

(IN)TANGIBLE HERITAGE(S)

A conference on design, culture and technology
- past, present and future

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(IN)TANGIBLE HERITAGE(S): Design,
culture and technology – past, present, and
future

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INTRODUCTION

(IN)TANGIBLE HERITAGE(S): Design, culture and technology – past, present, and future

The buildings, towns and cities we inhabit are physical entities created in the past, experienced in the present, and projected to inform the future. The same can be said of the artefacts we use daily: designed furniture in the home, the mobile devices in our hands, the vehicles we see on our streets. However, each of these places, buildings and products had, at their inception, social and cultural roles beyond their 'object' status. They continue to have them today. What we understand a designed object to be then, is a complex question of material and social import, and an intricate play of the tangible and intangible identities. Increasingly, it is also a question of hybrid experiences and overlaid histories. This conference addresses the range of issues connected to this scenario.

The complexity described above is even more pronounced in the case of digital artefacts and experiences such as computational design, VR simulations of ancient buildings, mobile apps, digital photography or virtual exhibitions. Intangible at the very moment of their inception, such designed artifacts not only blur the difference between the object and the experience, but, increasingly, the past and the present. Computer generated imagery creates 'life like' reconstructions of historic sites. Laser scanning gives archeologists glimpses of pasts erased long ago. Computational design gives designers instant recordings of their work in progress. Coupled with digital cataloguing, it gives us the instant asynchronous design archive.

Considered in this context it is not surprising that recently questions about the nature of heritage and design have opened up to redefinitions of the tangible and the intangible. In responding to this scenario the work of the authors collected in this publication present a diverse range of perspectives from various fields including art, architecture, design and cultural studies, to name but a few. They present reconsiderations of 'heritage' as both a tangible and an intangible concept and overlay our notions of the digital, on ideas of heritage and concepts of physicality and the present.

TABLE OF CONTENTS

Chapter 1

A FACSIMILE HERITAGE: PHOTOGRAMMETRY AND THE CRITICAL RECONSTRUCTION OF BERLIN 1
Iman Ansari

Chapter 2

DIGITAL ENVIRONMENTS: UNDERSTANDING BUILT HERITAGE IN THE POST-MATERIAL AGE 13
Ethan Kocot, Raymund Königk

Chapter 3

MISSING ARCHITECTURES IN CHINA THE EUROPEAN PALACES OF THE ETERNAL SPRINGTIME GARDEN 23
Fanwei Meng, María Jesús Mañez Pitarch, Joaquin Angel Martinez Moya

Chapter 4

REJUVENATING LINKS BETWEEN ESTATES AND THEIR HINTERLANDS: A RELATIONAL LANDSCAPE HERITAGE APPROACH 40
Alia Shahed, Bieke Cattoor

Chapter 5

PAVED AND REPAVED: CIRCULAR AND SOCIAL SUSTAINABLE MATERIALITY IN THE STREETS OF COPENHAGEN 53
Torben Dam, Jan Støvring, Anna Aslaug Lund

Chapter 6

HISTORICAL AND TRADITIONAL TRADE: A FUNDAMENTAL ELEMENT OF THE CULTURAL IDENTITY OF CITIES. A REPORT ON THE SURVEY ON FLORENTINE HISTORIC SHOPS. 62
Federico Cioli

Chapter 7

DEVELOPMENT OF THE METHODOLOGY AND INFRASTRUCTURE FOR DIGITAL 3D RECONSTRUCTION 72
Igor Piotr Bajena, Piotr Kuroczyński

Chapter 8

REALITY OF THE VIRTUAL: REPRESENTATIONS THROUGH ARCHITECTURE 84
Berrin Terim

Chapter 9

TRACING THE DISSEMINATION OF BUILDING PRESERVATION AS A SUSTAINABILITY STRATEGY 93
Fabian Kastner, Orkun Kasap, Aydin Faraji, Stéphane Magnenat, Silke Langenberg

Chapter 10

THE [IN] TANGIBLE NEO-ANDALUSIAN JESUIT HERITAGE. THE CASE OF ESTANCIA SAN IGNACIO DE CALAMUCHITA. 111
Gustavo-Adolfo Saborido-Forster, Eduardo Mosquera-Adell, Mercedes Ponce-Ortiz

Chapter 11

PATRIM, ABOUT A RESEARCH EXPERIENCE 124
Luisa Chimenz, M. Carola Morozzo Della Rocca, Chiara Olivastri, Giulia Zappia, M. Ivan Zignego

Chapter 12	
THE DIGITALIZATION OF THE CREATIVE MARKET	134
Dho Yee Chung	
Chapter 13	
SEE-THROUGH: BUILDING FACADES AS CONTESTED GROUND	142
Malini Srivastava, Nathan Anderson	
Chapter 14	
MEDIA REHABILITATION IN SACRED PLACES	155
Jorge Duarte De Sá	
Chapter 15	
EXPLORING THE USE OF GENERATIVE ADVERSARIAL NETWORKS WITHIN THE WORKING PROCESSES OF FINE ART PRINTMAKING: AN AUTOETHNOGRAPHIC, PRACTICE-BASED PERSPECTIVE	161
Amy Van Den Bergh, Natalie Fossey	
Chapter 16	
PSYCHOLOGISING THE METAVERSE, A PLACE FOR CULTURAL EXTENSION	175
Tatjana Crossley	
Chapter 17	
POLITICAL IDEOLOGY-BASED GOVERNMENT POLICIES TO PROMOTE CULTURAL HERITAGE SITES OF RELIGIOUS IMPORTANCE AND USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	185
Swati Jaywant Rao Bute	
Chapter 18	
CALLIMACHUS AND THE CORINTHIAN CAPITAL. ANIMATING FRANCESCO DI GIORGIO MARTINI'S INTERPRETATION OF VITRUVIUS 4. 1. 9-10.	197
Davide Benvenuti, Matteo Bigongiari, Stefano Bertocci, Andrea Nanetti	
Chapter 19	
A SHARED TERMINOLOGY FOR HYPOTHETICAL 3D DIGITAL RECONSTRUCTIONS IN THE FIELD OF CULTURAL HERITAGE	205
Irene Cazzaro	
Chapter 20	
BHERA: THE HISTORIC CITY OF CRAFTS	218
Nimrah Jahangir	
Chapter 21	
MORE THAN BRIC-A-BRAC: BUILDING BRICKS AND MATERIAL CULTURE IN THE HISTORY OF THE WORLD'S LARGEST BIOMEDICAL LIBRARY	229
Jeffrey S. Reznick	
Chapter 22	
ARCHITECTURAL DESIGN IN SOCIAL HOUSING: UNDERSTANDING, DECISION-MAKING AND PARAMETRIC MODELLING	242
Antenor Coelho	

Chapter 23	
3D DIGITAL MODELS USING PHOTOGRAMMETRY APPLIED TO WORKS OF ART.	250
Fernández Alconchel, María, Bienvenido Huertas, José David, Marín García, David, Moyano Campos, Juan José	
Chapter 24	
SAFEGUARDING INTANGIBLE CULTURAL HERITAGE (TWO CASE STUDIES OF LIVING HUMAN TREASURES IN IRAN)	261
Nahal Haghdoost, Jan Marontate	
Chapter 25	
VIRAL CULTURAL HERITAGE: A CASE STUDY APPLYING HYBRID DISCOURSE ANALYSIS	270
Pedro Andrade	
Chapter 26	
'SOUNDPATHS: HEPTONSTALL'; USING PLACED SOUND AND AUGMENTED REALITY TO ENGAGE AUDIENCES WITH THE HISTORY OF A PERFORMANCE LOCATION	281
Yoni Collier	
Chapter 27	
REDEFINED-COMS	290
Austin Houldsworth, Alexander Gillott, Rilwan Olasun	
Chapter 28	
HERITAGE PRESERVATION IN THE WAY OF RESILIENT MICRO-REGENERATION: FINDINGS ON PARTICIPATORY HISTORIC COMMUNITY PRESERVATION IN BEIJING, CHINA	300
Tongfei Jin	
Chapter 29	
THE LIVES OF SPACES: 166 CAROLINE STREET, BRIXTON, JOHANNESBURG	309
Sally Gaule	
Chapter 30	
DESIGNING THE DIGITAL CHARLES WILLSON PEALE MUSEUM OF NATURAL HISTORY AND ART, INDEPENDENCE HALL, PHILADELPHIA 1802-1827, A WORK IN PROGRESS	319
Glen Muschio, Dave Mauriello, Nick Moy, Tyrone Bullock	
Chapter 31	
LAB-OURING: HERITAGE AS LAB WORK	330
Neelakantan Keshavan	
Chapter 32	
DOMESTICATING HERITAGE – AN EXPANDED HISTORY OF THE 1956 GRANT HOUSE	337
Angus Grant	
Chapter 33	
PLANTATIONS IN SÃO TOMÉ AND PRÍNCIPE: SPATIAL LAYOUT AND INDUCED BEHAVIOURS	348
Sara Eloy, Rui Brito	

Chapter 34	
BRIDGES IN PUNE AND COLLECTIVE MEMORY	360
Pranali Musale	
Chapter 35	
SAFEGUARDING OF IRANIAN INTANGIBLE CULTURAL HERITAGE FROM IRANIAN PHOTOGRAPHERS' APERTURE	366
Ehsan Dorosti	
Chapter 36	
MONTAGE AND DIALECTICAL HISTORY: THE ACCESSION DAY TILTS, WHITEHALL AND EMBODIED PARTICIPATION	378
Constance Lau	
Chapter 37	
MATERIAL VERSUS IMMATERIAL DICHOTOMY: THE TERRITORIALIZATION OF INTANGIBLE HERITAGE AS URBAN ENTREPRENEURIALISM	386
Barbara Guazzelli	
Chapter 38	
BETWEEN PERMANENCE AND CHANGE THE LIVING-MUSEUM OF FÁBRICA DE CONSERVAS PINHAIS & Cia. Lda. FROM MATOSINHOS (PORTUGAL)	395
Francisco Costa	
Chapter 39	
TOWARDS A HOLISTIC DIGITAL RECORD SYSTEM OF A HERITAGE BUILDING IN JEDDAH HISTORICAL CITY, SAUDI ARABIA	405
Walaa Taha A Albouree, Stuart Walker, Paul Cureton	
Chapter 40	
RECONSTRUCTION OF ANCIENT SETTLEMENT OF AKROTIRI, THIRA IN 1613 BC IN THE CONTEXT OF AN INTEGRATED VIRTUAL REALITY SERIOUS GAME	418
Thomas Varelas, Alexandros Pentefountas, Dionysios Kehagias, Dimitrios Tzovaras	
Chapter 41	
THE ARCHAEOLOGICAL SIMULATION: BLENDING TIMES AND TIME TRAVEL THROUGH METAVERSE?	428
Pedro Da Silva	
Chapter 42	
ARCHIVAL CHALLENGES IN EMERGING FORMS OF DIGITAL ARCHITECTURAL CONTENT	437
Jason Shields	
Chapter 43	
DIGITAL PRACTICES FOR GENERATING INTERACTION: EXHIBITS AND MUSEUMS AS PHYGITAL ENVIRONMENTS.	449
Marco Borsotti	

Chapter 44	
LA PROMENADE ARCHITECTURALE: LE CORBUSIER, HADRIAN'S VILLA AND THE DIGITAL WORLD	456
Michael R. Ytterberg	
Chapter 45	
AN APP TO MAKE VISIBLE THE CINEMATOGRAPHIC ECOSYSTEM OF VALLADOLID, SPAIN.	473
Eusebio Alonso-García, Sara Pérez-Barreiro, Iván Rincón-Borrego	
Chapter 46	
SEARCH FOR ARCHE: STANISŁAW WYSPIAŃSKI IN THE DIGITAL ERA	482
Michał Strachowski	
Chapter 47	
A TEMPORAL PERSPECTIVE IN PÓVOA DE VARZIM: ENVIRONMENTAL CONDITIONS, LANDSCAPE AND HUMAN SPACE DEVELOPMENT	496
José Filipe Silva	
Chapter 48	
SYMBOL OF PESSIMISM OR A WISE PROPHET? A CONTEMPORARY READING OF VELHO DO RESTELO AS A KEY CHARACTER IN CAMÕES' EPIC NOVEL OS LUSÍADAS.	506
Aleksandra Kosztyła, Heitor Alvelos, Pedro Cardoso	
Chapter 49	
FROM ANCIENT TO META ARTEFACTS: EXPLORATIVE PARTICIPATORY MUSEUM EXPERIENCE.	519
Dragana Koceska, Bence Henz, Zuzana Kocurova, Pablo Villalba Galiano	
Chapter 50	
MATTER AND MEMORY OF THE GREAT NORTHERN	530
Beth Tauke, Gregory Delaney	
Chapter 51	
PUBLIC INTERIORITY: REVELATORY HISTORIES	544
Liz Teston	
Chapter 52	
TANGIBLE PHILOSOPHY WITH VIRTUAL REALITY FOR TOEGYE'S TEN DIAGRAMS ON SAGE LEARNING, <SUNGHAKSIPDO VR>	552
Hyun Jean Lee, Wonjean Lee, Jinhun Park	
Chapter 53	562
MAPPING HERITAGE(S) OF ÉVORA: HERITAGE URBANISM IN OBJECT AND EXPERIENCE	
Shajjad Hossain, Filipe Themudo Barata	

A FACSIMILE HERITAGE: PHOTOGRAMMETRY AND THE CRITICAL RECONSTRUCTION OF BERLIN

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INTRODUCTION

On a day in September of 1858, a young architect named Albrecht Meydenbauer was sent off to one of his first job assignments to survey the *Wetzlarer Dom*, a large thirteenth-century church in Wetzlar. As building surveyor working for Prussian government, Meydenbauer's new job entailed visiting various historical buildings, moving around and climbing the edifices to measure them, and then producing plan and elevation drawings of the buildings. That day at Wetzlar, while trying to measure the great *Wetzlarer Dom*, Meydenbauer nearly fell from one of the church towers. The traumatic experience made him question the safety and efficiency of the conventional surveying method, leading him to ponder the possibility of measuring buildings indirectly, without having to physically interact with the large structures. He wondered, can photography offer a better alternative?

PHOTOGRAMMETRY

The interest in architectural photography was rooted in an interest in preservation.¹ Within months from the introduction of daguerreotype photography, for instance, French politician Prosper Mérimée had revised the forthcoming inventory of the newly-established *Commission des monuments historiques* to include daguerreotypes, and in 1851, the Commission established the *Mission Héliographique*, a project that sent a selected group of French photographers on five separate missions to document the historical monuments in various parts of France.² In the following years, numerous self-commissioned projects and photographic associations formed across Europe.³ But this interest in photographic documentation as a method of historical preservation was gradually subsumed by the advent of tourism and travel photography. Travel photography, especially through the Grand Tour, not only influenced architectural photography, but also architectural education. At a time when a growing interest in historicism, the revival of classicism, and the question of "In What Style Shall We Build?" dominated the architectural discourse, traveling and collecting travel photographs became the basis of the architectural education in the various academies that sprawled across Europe.⁴ Architectural curricula, modeled after the Académie des Beaux Arts, largely relied on collection of images, and drawing, literally, from photographs of historical buildings.⁵

It was in this educational environment, in Berlin's *Königliche Bauakademie*, where Albrecht Meydenbauer was trained. And after his near fatal experience in Wetzlar, Meydenbauer focused on developing a method that would allow him to indirectly measure buildings from their photographic images, in turn facilitating the construction of orthographic drawings—a reversed translation of building back to drawing (Fig. 1). This process required an inverse method of perspective, a technique

known as *restitution*. Pioneered by the Swiss-French polymath Johann Heinrich Lambert, restitution process uses descriptive geometry to derive the metrical proportions of objects depicted in perspective.⁶ Meydenbauer was also aware of the limitations of existing photographic cameras in recording large architectural objects without distortion. He developed a special type of camera, by combining a typical photographic camera with a theodolite, which he named *phototheodolite*. Meanwhile, realizing the limitation of existing photographic cameras, Meydenbauer The camera was tripod-mounted device equipped with a wide-angle *Pantoskop* lens with 105° field of view and a 25 centimeters focal length. The leveling screws allowed the image plane to be kept in a vertical position and the coordinate system was imprinted onto the glass plates during exposure. Later generations of phototheodolite were made collapsable to facilitate transport, enlarged the glass plates from 30 x 30 to 40 x 40 centimeters, and were equipped with a lens that could be vertically shifted to better adjust them to the architectural objects.⁷ In 1867, Meydenbauer published a series of essays in the *Wochenblatt*, the weekly journal of the Society of Architects in Berlin, where he used the term *photogrammetrie* to describe his photographic measurement method.⁸

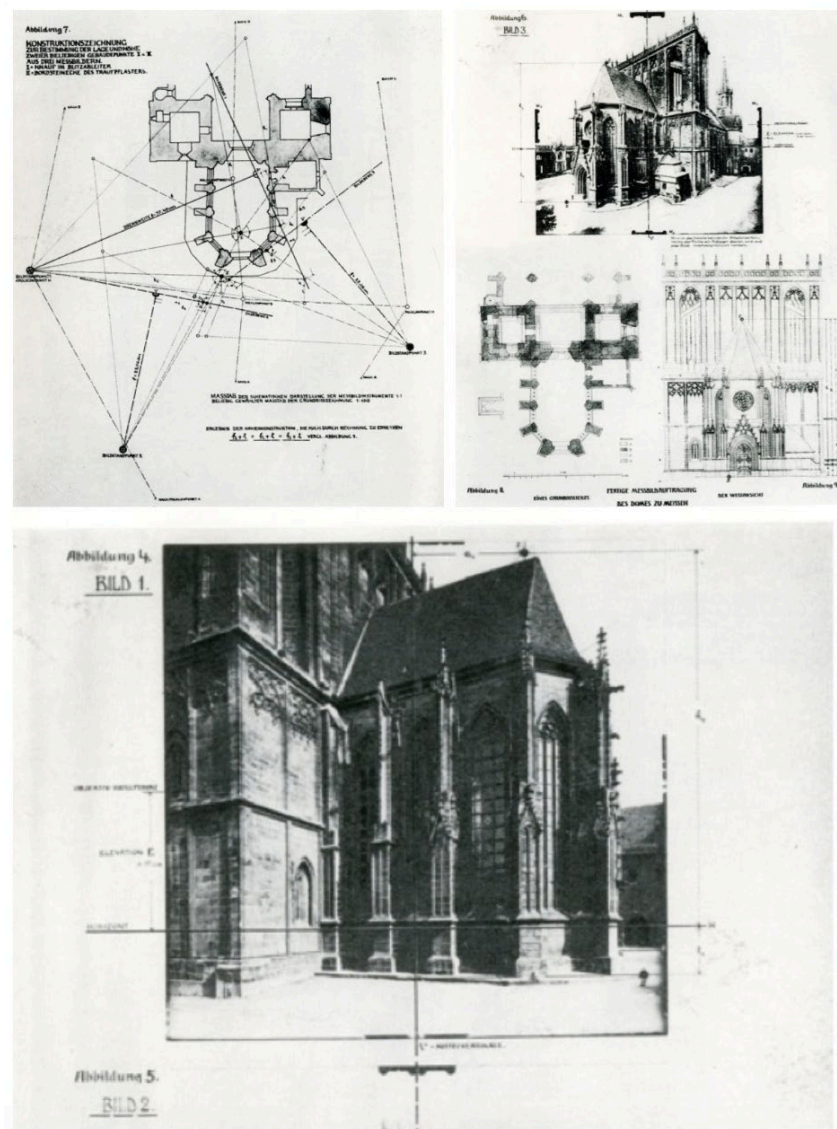


Figure 1. Albrecht Meydenbauer, *Handbuch der Meßbildkunst* (1912)

In the following years, Meydenbauer continued to work on his method and to promote it in lecture and published articles. In April of 1885 he was appointed by the Prussian Ministry of Culture as the Government and Building Councilor in Berlin, which enabled him to establish the *Königlich Preußische Meßbildanstalt*, the Royal Prussian Photogrammetric Institute. But beyond a mechanization of measurement, Meydenbauer saw his method also as an effective preservation strategy. Already in an 1860 memorandum to the Curator of Cultural Heritage, Meydenbauer had voiced his concerns over the dangers of conventional surveying methods, but had also pointed to the risks of fire, vandalism, or decay that threatens the buildings themselves. Taking the concept of his photographic measurement to a new level, he had proposed the establishment of a *Denkmälerarchiv*, a Cultural Heritage Archive that would collect photographic records of all historical buildings in Germany. Even after the establishment of the *Meßbildanstalt*, in an 1894 essay, he argues that unlike historical documents and objects that are well-preserved in museums and archives, the “built-heritage” remains vulnerable and exposed to natural erosion processes, which if not broken down by nature, is often rapidly deteriorated by negligence and traffic. He also estimated that all the important cultural monuments in Germany could be documented within twelve to fifteen years.⁹ A photographic surveying method originally conceived to protect human life against interactions with buildings, photogrammetry became a means to protect buildings against the individuals and the society that now threatened them.

This form of protection relied on photographs that carried all the necessary information for the reproduction of historical monuments. If Mérimée’s *Commission des monuments historiques*, or even its *Mission Héliographique*, in France saw photography as a passive documentation tool—a descriptive or mnemonic device to preserve a visual record of monuments in the archives and museums—Meydenbauer’s *Denkmälerarchiv* conceived photography as an active measuring instrument—a prescriptive apparatus that would record metric information about the buildings with such precision that would allow their reproduction. While he did not succeed in implementing a national cultural heritage archive, his institute continued to document historical buildings and stored the photogrammetric images in its own archive. The photographs were also offered in subscription sales to private investors, government agencies and universities.¹⁰ By the time Meydenbauer retired in 1909, *Meßbildanstalt* had collected approximately 11,000 photogrammetric images of nearly 1,200 monuments in Prussia alone, with an additional 1,600 images of 100 buildings across other German states, and about 800 images of monuments outside Germany—including in Lebanon, Greece, Turkey and Persia. Seen as a form of raw data that could later be decoded or translated if necessary, photogrammetric restitution was only carried out on a small number of the photographs, leaving most in their original format as 40 x 40 centimeters negative glass plates.

THE BAUAKADEMIE

From the time it was established in 1885, the *Meßbildanstalt* was housed in the *Bauakademie*, a building designed by Karl Friedrich Schinkel that originally housed the *Königliche Bauakademie* (the Royal Building Academy), an architecture school where Meydenbauer himself was a student thirty years earlier. Established in 1799 as the central school for Prussian architects and structural engineers, the *Bauakademie* marked the beginning of the regulated professional education for architects in Germany. The academy moved into its new building on April of 1836. Situated on the western side of the river Spree and across from Berlin’s City Palace, *Stadtschloss*, the *Bauakademie* had a nine-square grid plan and four nearly identical brick-cladded facades with terra cotta ornaments and reliefs. A radical departure from Schinkel’s earlier neoclassical or neogothic work—such as the *Konzerthaus Berlin* (1821), the *Altes Museum* (1830), or the neighboring *Friedrichswerdersche Kirche* (1831)—the *Bauakademie* signaled the emergence of a new “modern” style that was simple, efficient and straightforward, even if seemingly dull. The building was praised by critics who saw it as the emblem

of a new *tektonic* architecture: a synthesis between *Kunstform* and *Kernform*; between ornament and structure.¹¹

The fascination with Schinkel's new building was also shared by the artists in Berlin. The *Bauakademie* was depicted in numerous paintings of Berlin, from Eduard Gaertner's *Berlin Panorama* (1834)—painted from the roof of the *Friedrichswerdersche Kirche* when the *Bauakademie* was still under construction—his *Ansicht der Rückfront der Häuser an der Schloßfreiheit* (1855), and *Die Bauakademie* (1868), to Friedrich Wilhelm Klose's *Die Werderschen Mühlen in Berlin mit Bauakademie* (1836) and Carl Daniel Freydanck's *Die Königliche Bauschule in Berlin* (1838). And it seemed the *Bauakademie* had appeared just in time for the introduction of daguerreotype photography. In fact, when the first daguerreotypes arrived in Berlin in 1839, they went on display in *Gropius'sche Buch und Kunsthandlung*—one of the twelve retail stores on the ground floor of the *Bauakademie*.¹² Despite that, the *Bauakademie* remained absent in the early photographs of the city. Amateur photographers wandering the streets of Berlin were more interested in the neoclassical and baroque architecture they deemed worthy of preserving than what they viewed as the *häßliche rote kasten*, “the ugly red box.”¹³



Figure 2. The Bauakademie Photogrammetrie (1888)

The *Königliche Bauakademie* remained in the building until 1879 when it merged with the *Königliche Gewerbeakademie* (the Royal Trade Academy) to form the *Königlich Technische Hochschule zu Berlin*, the Royal Technical Academy of Berlin—now the *Technical University of Berlin*. In the followings years, the *Bauakademie* housed various facilities of the Friedrich Wilhelm University until 1885 when *Meßbildanstalt* moved into the building. Meydenbauer photographed the *Bauakademie* in 1888 with a total of eight photogrammetric images of its exterior but, similar to other monuments, none of the interior spaces were photographed (Fig. 2). *Meßbildanstalt* continued to operate in the building after Meydenbauer's retirement in 1909 under a new director Theodor von Lüpke. In 1921 when the institute was renamed as the *Staatliche Bildstelle Berlin* (the State Image Office Berlin). By then the institute collection had grown to over 20,000 photographs of more than 2,600 monuments.¹⁴ The *Staatliche Bildstelle* remained in the *Bauakademie* until 1933, when the *Nationalsozialistische Deutsche Arbeiterpartei*, the National Socialist German Workers' Party rose to power. The *Staatliche Bildstelle* was then moved to the upper floors of the *Alte Marstall*.

During the Second World War, Berlin was subject to 363 air raids that left much of historic center in near complete destruction. The bombings reduced the *Bauakademie* to a hollow shell (Fig. 3), and completely destroyed the *Alte Marstall* that housed photogrammetric archive. Divided in half and left in ruins, much of the *Berliner Innenstadt*, including the entire historical core, fell on under the Soviet occupation until 1949 when the Soviet Union turned control of East Germany to the newly formed government, the German Democratic Republic. The *Königliche Bauakademie* was reincarnated in 1951 as a leading academic institution. And while the *Bauakademie* building was partially restored but the work came to a halt in 1956 and was eventually terminated. In 1960, the implementation of the “Ideas Competition for the Socialist Remodeling of the Centre of the Capital of the GDR Berlin” excluded the *Bauakademie* in the urban redevelopment plans of the city. A year later, the *Bauakademie* was razed to make room for the construction of the new GDR Ministry for Foreign Affairs, a ten-story modernist building completed in 1967 that occupied the entire *Schinkelplatz*.



Figure 3. The *Bauakademie* (1961)

Across the *Bauakademie*, Berlin’s *Stadtschloss* followed a similar fate. Heavily damaged during the Battle of Berlin and viewed as a symbol of Prussian imperialism, the city’s 17th century royal palace *Stadtschloss* was dynamited by the GDR in 1950. The absent space of the *Schloss* was used as a parade ground and a parking lot for over two decades until 1973 when the new *Palast der Republik* emerged in the site. A modernist building with distinct bronze-mirrored glass facade, it was designed by Heinz Graffunder together with the *Bauakademie* institute of the GDR. The building was the seat of the *Volkskammer*, the East German Parliament, but also housed a variety of public programs, including: two large auditoria, art galleries, theatres, restaurants, a casino, a bowling alley, a rooftop skating rink, a private gym with spa, and indoor basketball court and a swimming pool, a medical station, a post office, a police station, hair salons, and even a discothèque. Inspired by the socialist Palaces of Culture and People’s Houses that saw cultural centers as symbols of new state power, the modern “People’s Palace” was seen as a substitute for Berlin’s antiquated royal palace.

CRITICAL RECONSTRUCTION

When the Iron Curtain came down in November of 1989 after nearly half a century, the two halves of Berlin could not be any more ideologically and architecturally different. The city adopted an urban development strategy called “critical reconstruction.” An architectural and urban theory originally developed by architect Josef Paul Kleihues for the *Internationale Bauausstellung Berlin*. IBA Berlin was an urban renewal project, lasting from 1979 to 1987, with the aim to house about 30,000 residents in selected areas in West Berlin. Kleihues, who was appointed as the director of the IBA, developed two distinct strategies for the project: *IBA Alt*, that explored methods of “sensitive urban renewal,” dealing with issues of preservation, restoration and rescue of existing housing, and *IBA Neu*, that functioned as an experimental laboratory for “Critical Reconstruction,” which considered new buildings but as means to restore Berlin’s original baroque plan.¹⁵ In 1990, when Hans Stimmann was appointed as the Senate Building Director in Berlin, leading the Department of Construction and later the Department of Urban Development, he adopted Critical Reconstruction as the basis for his *Planwerk Innenstadt*, an inner-city development plan for Berlin. The plan favored the demolition of Soviet era modern buildings in order to restore Berlin to its pre-war legacy.



Figure 4. The Bauakademie (2004)

In 1994, the newly formed *Förderverein Bauakademie* (Friends of the Bauakademie) proposed “true-to-original reconstruction of the historic façades” of the *Bauakademie* with a modern interior to be used as an international innovation, exhibition and event center. A year later, the GDR Foreign Ministry was demolished, laying the groundwork for the reconstruction of the *Bauakademie*. The Federal Republic of Germany officially joined the campaign with the establishment of the *International Association for the Promotion of the Bauakademie* in 2001 in an initiative by the German senate committee for Urban Development and Museums and the Trust for Prussian Cultural Heritage. That same year, the northeastern corner of the *Bauakademie* was reconstructed as a one-to-one scale mockup by the students and faculty of *Bildungsverein Bautechnik*, in part to raise funds for the reconstruction the entire building. Finally in 2004, in anticipation for the reconstruction of the building, a full-scale simulacrum of the *Bauakademie* was constructed in its place: vinyl panels with a colored drawing the original facades, held in place by scaffoldings that imitated the building’s original volume. A large printed billboard appeared on the each facade, displaying Mercedes Benz or Gucci advertisements (Fig. 4). And in the evenings, a white screen was rolled down from the front facade onto which foreign films with German subtitles were projected. Turned into an architectural Frankenstein, a collage image of its

original self, the *Bauakademie* exhibited its new politicized and commodified identity through an urban theatrics.

But what made the idea of reconstructing the *Bauakademie*—over a five decades after its destruction—even conceivable was the *Meßbildanstalt*'s eight photogrammetric images of the building's exterior taken in 1888. In April of 1945 when the *Alte Marstall* building was destroyed, the negative photogrammetric plates in the archive were seized by the Soviet troops and transported to Moscow. Most of the plates were returned to the GDR in 1958 and, a year later, were handed to the Institute of Art History of Humboldt University. In 1968, the collection was sent to the Institute for Monument Preservation's *Meßbildstelle*, the Measuring Image Center. After the reunification of Germany, the *Brandenburgische Landesamt für Denkmalpflege*, the Brandenburg State Office for Monument Preservation, was founded in 1991 to manage the approximately 100,000 images of the old *Meßbildanstalt* archive as well as the *Staatliche Bildstelle*, including about 19,200 glass plate negatives in a format of 40 x 40 centimeters.¹⁶ Among them, were the photogrammetric plates of the *Bauakademie*, but also those of the *Stadtschloss*.



Figure 5. The fabrication of the *Stadtschloss* ornaments (2004)

Following the reunification, and a similar turn of events, lobby groups prepared detailed plans for the demolition of *Palast der Republik* and the reconstruction of *Stadtschloss*.¹⁷ Seeing the reconstruction of the *Schloss* as a way to “restore the unity and integrity” of the historical center of Berlin, the German parliament voted in 2003 to demolish the *Palast der Republik* in order to make room for the partial reconstruction of *Stadtschloss*—the return of the Royal Palace at the expense of the People’s Palace. The demolition of the building began in 2006. A year later, the German parliament voted to rebuild the *Stadtschloss* with three sides being exact replicas of the original façades, but with the eastern façade and the interior being modern. The reconstruction of the *Stadtschloss* began in 2013 and was completed in 2020. The new building houses the *Humboldtforum*, a museum of non-European art, assumed to be “the German equivalent” of the British Museum.¹⁸ To resurrect the *Stadtschloss* in the true image of its

original self, *Meßbildanstalt*'s photogrammetric images of the palace were translated into three-dimensional digital models of the building's façade, stone and terra-cotta ornaments were then crafted using digital fabrication technology, and at the end, expert masons were called in from across Europe to chisel the robotically-fabricated ornaments as to give them the appearance of being hand-crafted (Fig. 5). Over a century after the establishment of the *Messbildanstalt*, the reconstruction of the *Stadtschloss* marks the final chapter of the *Meßbildanstalt* and brings Meydenbauer's photogrammetric project into a full circle.

CONCLUSION

Through this process, which began with the introduction of photography as a mode of scientific documentation, and sustained through an institutionalized archive built on photogrammetric images, transformed historical buildings and monuments into a visual database capable of producing a facsimile heritage that ultimately makes it difficult to differentiate the real and the representational. Coupled with a selective demolition of the remnants of its recent past, Berlin's Critical Reconstruction has signaled the emergence of a new phase of this process whereby architecture has become an essential ingredient in the makeover of the modern German state in the *image* of its antiquated imperial past.

NOTES

¹ For more on the relationship between architecture and photography see: Richard Pare, ed., *Photography and Architecture: 1839–1939* (Montréal: Canadian Center for Architecture, 1982); Cervin Robinson and Joel Hershman, *Architecture Transformed: A History of the Photography of Buildings from 1839 to the Present* (Cambridge MA and London: MIT Press, 1987); Eve Blau and Edward Kaufman, eds., *Architecture and its Image* (Cambridge, MA and London: MIT Press, 1989).

² *Commission des monuments historiques* was founded in 1837 as a part of the French Ministry of the Interior. The Commission, while initially relied on its own photographers, later began purchasing photographs from outside sources, and eventually terminated the Mission in 1880. For more on *Mission Héliographique* and photographic documentation of historical buildings in France see: Philippe Néagu, et al., *La Mission Héliographique, Photographies de 1851* (Paris: Inspection Générale des Musées Classés et Contrôlés, 1980); Joel Herschman and William W. Clark, *Un Voyage Héliographique À Faire: The Mission of 1851, The First Photographic Survey of Historical Monuments in France* (Flushing, NY: Godwin-Ternbach Museum at Queens College, 1981); Anne De Mondenard, “La Mission Héliographique: Mythe et Histoire,” *Études Photographiques* 2 (May 1997): 60–81; Anne De Mondenard, *La Mission Héliographique: Cinq Photographes Parcourent la France en 1851* (Paris: Monum, Éditions du Patrimoine, 2002).

³ The Architectural Photography Association in London was founded by William Henry Fox Talbot, David Octavius Hill, Robert Adamson, Benjamin Brecknell Turner, Thomas Keith, Thomas Sutton, and Roger Fenton. The Association held two exhibitions in London in 1858 and 1859. In Berlin, Hermann Wilhelm Vogel founded the *Photographischer Verein zu Berlin*, the Photographic Association of Berlin, in 1863 which offered photographers, studio operators and manufacturers opportunities to exchange ideas and experiences in various meetings, exhibitions and publications in the Association’s journal. During its first major exhibition, *Internationale photographische Ausstellung*, in May and June of 1865, Meydenbauer exhibited some of his work where he also met his future collaborator, and the Association’s future chairman, Franz Stolze. Rolf Sachsse, “Architecture,” in *Encyclopedia of Nineteenth-Century Photography*, vol. 1, ed. John Hannavy (New York, London: Routledge, 2008), 58–64.

⁴ The formulation of the concept of *beauty* and a renewed interest in Greek and Gothic architecture during this period had especially prompted German-speaking architects and theorists to debate the nature of style, and the concept of ornament as its culprit. Most notable texts during this period include: Immanuel Kant, *Critique of Judgement* (1790); Friedrich Schiller, *Letters on Aesthetic Education* (1795); Heinrich Hübsch, *In What Style Shall We Build?* (1828); Augustus Welby Northmore Pugin, “On the Wretched State of Architecture at the Present,” *Contrasts* (1836); Gottfried Semper, *The Four Elements of Architecture* (1851), and “Science, Industry, and Art” (1852).

⁵ On the history of architectural education and professionalization in the United States see: Burton J. Bledstein, *The Culture of Professionalism: The Middle Class and the Development of Higher Education in America* (New York: W. W. Norton and Company, Inc., 1976); Spiro Kostof, ed., *The Architect: Chapters in the History of the Profession* (New York: Oxford University Press, 1977); Sibel B. Dostoglu, “Towards Professional Legitimacy and Power: An Inquiry into the Struggle, Achievements and Dilemmas of the Architectural Profession through an Analysis of Chicago 1871–1909” (Philadelphia: University of Pennsylvania, 1982); Mary N. Wood, *From Craft to Profession: The Practice of Architecture in Nineteenth-Century America* (Berkeley: University of California Press, 1999); Ulrich Pfammatter, *The Making of the Modern Architect and Engineer: The Origins and Development of a Scientific and Industrially Oriented Occupation*, trans. M. Ferretti-Theilig (Basel: Birkhäuser Publishers for Architecture, 2000); Andrew Saint, *Architect and Engineer: A Study in Sibling Rivalry* (New Haven: Yale University Press, 2007); Elyse Gundersen McBride, “The Changing Role of the Architect in the United States Construction Industry, 1870–1913,” *Construction History* 28, no. 1 (2013), 121–140.

⁶ Johann Heinrich Lambert, *Die Freye Perspektive* (Zurich: Ben Heidegger und Compagnie, 1759). *Geometric restitution of perspective*, also known as the *inverse method of perspective*, is a technique used for reconstructing the basic elements of perspective, namely, the center of projection, the depth of sight, the horizon or the base line. For a general introduction of geometric restitution see: Joanna Barbara Rapp, “A Geometrical Analysis of Multiple Viewpoint Perspective in the Work of Giovanni Battista Piranesi: An Application of Geometric Restitution of Perspective,” *The Journal of Architecture* 13, no. 6 (2008): 701–736.

⁷ For more on the history of photogrammetry see: Carl Koppe, *Die Photogrammetrie oder Bildmesskunst* (Weimar: Verlag der Deutschen Photographen-Zeitung, 1889); Frederick J. Doyle, “The Historical Development of Analytical Photogrammetry,” *Photogrammetric Engineering* 30, no. 2 (1964), 259–265; Rudolph Meyer, *Albrecht Meydenbauer: Baukunst in Historischen Fotografien* (Leipzig: VEB Fotokinoverlag, 1985); Rudolph Meyer, “100 Years of Architectural Photogrammetry,” *Kompodium Photogrammetrie* 19 (1987): 183–200; Teodor J. Blachut

and Rudolf Burkhardt, *Historical Development of Photogrammetric Methods and Instruments* (Bethesda: American Society for Photogrammetry and Remote Sensing, 1989); Jörg Albertz, "Albrecht Meydenbauer: Pioneer of Photogrammetric Documentation of the Cultural Heritage" (paper presented at the 18th Symposium of the International Committee for Documentation of Cultural Heritage: Photogrammetry and Cartography, Potsdam, Germany, September 18 - 21, 2001); Chris J. McGlone, *Manual of Photogrammetry*, Fifth Edition (Bethesda: American Society for Photogrammetry and Remote Sensing, 2004).

⁸ Meydenbauer was aware of the work of Aimé Laussedat, French military engineer, who was experimenting with taking measurements from perspectival drawings that he had traced from camera lucida. Laussedat had called that method *métrophotographie*. In a two-partite essay published in the weekly journal of *Architekten-Verein zu Berlin*, the Society of Architects in Berlin, in April of 1867, Meydenbauer explained his ideas and initially used the term *photometrographie* to describe his photographic documentation method. In December of the same year, however, he published another article in the same journal, anonymously, where he used the term *photogrammetrie* instead. Commenting on the change of name from *photometrographie* to *photogrammetrie*, the journal editors' footnote explained: "The name photogrammetry is decidedly better chosen than photometrography, although not yet entirely characteristic and satisfactory." Since German geodesist Wilhelm Jordan had claimed to have introduced the term *photogrammetrie* in a surveying article he had published in the same year, there was an ongoing dispute over the name, and questions over who authored the anonymous December article. This was only resolved in June of 1892 when the editorial board of the *Deutsche Bauzeitung* (the old *Wochenblatt*) revealed that the anonymous author of the December 1867 article was in fact Albrecht Meydenbauer. See: Albrecht Meydenbauer, "Die Photometrographie," *Wochenblatt herausgegeben von Mitgliedern des Architekten-Vereins zu Berlin*, no. 14 (April 6, 1867); Albrecht Meydenbauer, "Die Photometrographie," *Wochenblatt herausgegeben von Mitgliedern des Architekten-Vereins zu Berlin*, no. 16 (April 20, 1867); "Die Photogrammetrie," *Wochenblatt herausgegeben von Mitgliedern des Architekten-Vereins zu Berlin*, no. 49 (December 6, 1867). For more on the work of Aimé Laussedat See: Stuart I. Granshaw, "Laussedat Bicentenary: Origins of Photogrammetry," *The Photogrammetric Record* 34, no. 166 (2019), 128–147; For more on the origins of the term photogrammetry see: Albrecht Grimm, "The Origin of the Term Photogrammetry," *Proceedings of 51st Photogrammetric Week* (Berlin, 2007), 53-60.

⁹ The first article published in 1894, titled "*Deutsches Denkmälerarchiv*" (A German Cultural Heritage Archive), and later revised and republished in 1896 as "*Denkmäler-Archiv und seine Herstellung durch das Messbild-Verfahren*" (The Cultural Heritage Archive and its Creation by Photogrammetry). Jörg Albertz, "Albrecht Meydenbauer: Pioneer of Photogrammetric Documentation of the Cultural Heritage" (paper presented at the 18th Symposium of the International Committee for Documentation of Cultural Heritage: Photogrammetry and Cartography, Potsdam, Germany, September 18 - 21, 2001).

¹⁰ The primary source material used in the European architectural academies and practices in the late nineteenth century consisted of Jean-Nicolas-Louis Durand's drawings along with the *Mission Héliographique* and *Meißbildanstalt's* photographs. Rolf Sachsse, "Architecture," in *Encyclopedia of Nineteenth-Century Photography*, vol. 1, ed. John Hannavy (New York, London: Routledge, 2008), 61.

¹¹ Although the writings of Alberti and other architectural theorist before would have differentiated the elements of architecture into structure and ornament, in Germany, the ornament (*Kunstform*) was understood as the expression of the internal structure (*Kernform*) on the exterior façade. See: Karl Botticher, *Die Tektonik der Hellenen* (1844); Kenneth Frampton, "Bötticher, Semper, and the Tectonic: Core Form and Art Form," *What is Architecture?*, ed. Andrew Ballantyne (New York: Routledge, 2002), 139-140.

¹² For more on the *Bauakademie* building see: Nany Wiegand-Hoffmann, ed., *Karl Friedrich Schinkel: Bauakademie* (Berlin: BWV Berliner Wissenschafts-Verlag, 2003).

¹³ Barry Bergdoll, "Reconstruction Doubts—The Paradox of Building in Schinkel's Name," *The Berlin Journal* 10 (Spring 2005), 48.

¹⁴ Rudolph Meyer, *Albrecht Meydenbauer: Baukunst in Historischen Fotografien* (Leipzig: VEB Fotokinoverlag, 1985), 19.

¹⁵ Kleihues invited an international group of renowned architects to participate in the project, which included: Gottfried Böhm, Mario Botta, Peter Eisenman, Vittorio Gregotti, John Hejduk, Herman Hertzberger, Hans Hollein, Arata Isozaki, Rem Koolhaas, Léon Krier, Rob Krier, Charles Moore, Aldo Rossi, Alvaro Siza. James Stirling and Oswald Mathias Ungers. See: Josef Paul Kleihues, Heinrich Klotz, *International Building Exhibition Berlin 1987* (Rizzoli, 1986); see also: Sebastian Schmaling, "Masked Nostalgia, Chic Regression: The "Critical" Reconstruction of Berlin," *Harvard Design Magazine*, no. 23 (Fall 2005/Winter 2006), 24-30.

¹⁶ Deutsches Dokumentationszentrum für Kunstgeschichte - Bildarchiv Foto Marburg. "Staatliche Bildstelle Berlin," accessed November 20, 2022, <https://www.uni-marburg.de/de/fotomarburg/bestaende/uebernahmen/staatliche-bildstelle-berlin>.

¹⁷ Following the reunification of Germany, lobby groups such as *Gesellschaft Berliner Schloss* (the Society for the Berliner Schloss) and *Förderverein Berliner Schloss* (the Promotional Association for the Berliner Schloss) were formed, which in 2001, came together to establish the *Stadtschloss Berlin Initiative*.

¹⁸ Neil MacGregor, "Britain forgets its past. Germany confronts it," *Guardian*, April 17, 2016, <https://www.theguardian.com/culture/2016/apr/17/neil-macgregor-britain-germany-humboldt-forum-berlin>

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DIGITAL ENVIRONMENTS: UNDERSTANDING BUILT HERITAGE IN THE POST-MATERIAL AGE

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INTRODUCTION

The contemporary prevalence of digital media and -culture can be seen to have significantly altered the ways in which we choose to access and interact with the lived world. The proliferation of digital platforms, interfaces, and algorithms has opened multiple alternate ways in which to think about the objects and environments around us. The mediums through which we choose to experience such culture present an unsettling paradox between the flat, texture-less surface of the screen and the entirely three-dimensional, tangible spaces which are represented. These offer simultaneous contradiction between the edited digital world and the intrusion of context, which erodes the once discernible distinction between the digital and physical realm. Unlike the lived world, the digital environment exists as a panoramic lens which distorts our perception of the 'real' to the extent whereby it is no longer temporally, situationally, or contextually bound. Further, digital media has dramatically altered the ways in which we locate, collect, and organise images: search engine optimisation and image-based algorithms influence our understanding of places in ways that can entirely dissociate them from their physical context. In the digital world, therefore, images exist in a perpetually liminal state, often devoid of any accompanying frame or text and delaminated from the context in which they were captured.

This paper aims to investigate the perceived interchangeability of environments with their images, how these representations alter our expectations of the lived world, and to what extent the future of the built environment will be influenced by attempts to capture the multiplicity, ideological diversity, and aesthetic pluralism of the digital age. The study will engage with examples, data collection through a rapid evidence assessment, and image boards, alongside the consideration of interiorist tools that re-structure and re-imagine the lived world through intervention within the state and context of existing images.

THE ISSUE OF THE IMAGE

The often complex and undoubtedly troubled relationship between architecture and the image can be traced as far as the early 19th Century and the rudiments of modern-day photography. Photography's formative technical capacity presented the newfound ability to capture and represent subject matter in unprecedented detail and accuracy, relieving a previous Western hesitancy to reproduce artefacts through visual mediums in favour of orality and memory¹. This early relationship between architecture and photography was symptomatic of an idealistic shared condition, emphasising faithful recreation and utilitarian objectivity. Such mutual inference initially reflected formative architectural adoptions of photography as a means of recording historical monuments under the guise of preservation. However,

with the advancement of printing techniques and the subsequent mass dissemination of images, the priority of photography soon shifted toward a cultural product for mass consumption.²



Figure 1. Frederick H Evans Photographic Plates of Lincoln Cathedral (see Fiedorek)

The complexities of the photograph stem from an innate physical connection to their subjects which creates a false sense of objectivity (they are two-dimensional artefacts representing three-dimensional places). Further, photographs are accepted as the standard for realistic visual representation with assumptions about universal understanding by providing evidence of spatial arrangement, the relative position of objects and materials, and the tangible aspects of places. Such depictions allow the user to (implicitly or explicitly) construct a narrative framework of space that fundamentally simplifies the complexities underpinning built heritage as tangible compressions of haptic perception, memory, identity, and experience.³

Whilst such imagery presents the opportunity to organise and focus the gaze of the reader toward the common, perceived, or authored narrative of a building's heritage, it is stated by John Berger that photographs can only perceivably constitute the half-language of reality.⁴ David Levi-Strauss expands on such statements suggesting that whilst [documentary] images eternalise narrative, they are destructive toward any form of subjectivity at the hand of the reader.⁵ Despite such ambiguity, Jesús Vassallo states that it is through the expected and consistent vernacular of documentary photography that we can typically track the evolution of a particular subject.⁶

Further, the fact that such mechanically reproduced images could only be circulated through limited, often regulated, sources allowed for the manipulation and distortion of such imagery to serve and disseminate the desires, aesthetics, and disciplinary knowledge upheld by the prominent institutions that produced them.⁷ They can be seen as sustaining the Authorised Heritage Discourse (AHD) of any given place, manipulating or purposefully omitting tangible and intangible attributes to relay pre-agreed narratives.⁸ This upholds the established, affected, and embedded assumptions of place. The circulation of such extant material raises issues of the relationship between the original, its documentation, the subsequent dissemination, and the potential dangers of sequestering the built environment through outdated heritage practices that conform to prevailing power structures. The change and renewal at the core of living expression could be supported as an alternative.

Such complexities of the relationship between the representation and the real are further magnified when considering that the built environment's lived, bodily experienced qualities can be seen to extend far beyond any visual appearance captured in an image.⁹ Place is not merely material but is also lived and experienced.¹⁰ Any visual depiction or image should connote a diverse range of meanings¹¹ dependent on conventions of use, transferring meaning between different semiotic modes: the real, the image, and verbal descriptions about either.¹²

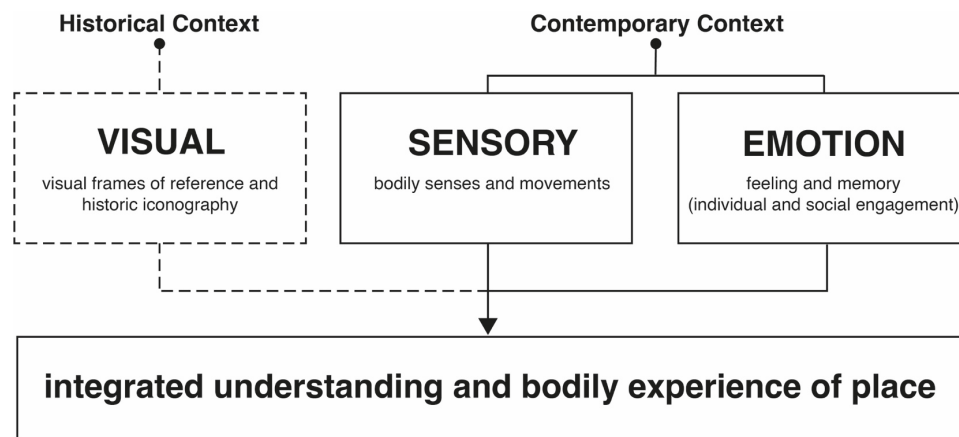


Figure 2. Phenomenological Understanding of Place (from Lee, 2022)

Whilst this paper does not seek to radically re-define the practice of documentary photography nor discredit it as a discrete practice through stringently aligning it with any architectural vernacular – it is worth stating that the two practices cannot be understood as entirely uncoupled. Rather, this concise examination aims to provide scepticism about how we have come to understand built heritage, the sources through which we choose to engage with it, and to consider the meaningful transformation which occurs during the representation of existing places.

THE MEDIATED IMAGE

Over the past century, architecture has sought to continuously reposition itself through progressively developing representational media. Today, our transition from the era of experience to the information age dictates that the discipline must now contend with the dissemination of images through digital platforms, ordered along entirely different terms than mechanical reproductions – that are scarcely controlled by a single institution¹³. It is with consideration for such divergence that the tendency to define preservation as a retrospective practice is considered sceptically. Conversely, it is stated by Rem Koolhaas that preservation is a hallmark of modernity, evolution, and progression¹⁴. Figure 3 outlines how certain landmark technological advancements often align with catalysts brought by heritage legislation. The fundamental question of modernisation, and the issue of what to keep, what to re-use and what to discard, is continuously re-framed through increasing technological development and the ability to re-capture and re-negotiate heritage artefacts.



Figure 3. Landmark Technological Advancements and Heritage Conservation Catalysts Timeline

Society at present is imbued with an abundance of imagery, unquestionably more so than at any other point in time.¹⁵ The mode through which we now consume such imagery, however, is fundamentally different. While the mechanical nature of analogue photography has allowed for its retention as an artefact, the technological revolution's inherent democratisation has determined a condition in which the omnipresence of digital imagery has diminished any singular associated value.¹⁶ Further, in direct contrast to the static objectivity of printed photographs, the digital imagery that frequents our screens appears momentarily and in a state of constant flux. The result is an increasingly generalised effect in

which individual images are seldom apprehended or dwelled upon, and the impact of their meaning is inherently restricted. It can be further argued that this passive consumption dictates a far less concentrated effect than the act of repeatedly viewing discrete analogue images.¹⁷

The 'photographic' image has undoubtedly become the primary mode of transmission of architecture in modern society, surpassing the previous dominance held by the drawing. However, unbound by context and detached from any physical environment, architectural imagery rejects location as a fundamental prerequisite for the making of architecture. Such imagery presents buildings as interchangeable objects not specific to any place.¹⁸ Similarly, in such contemporary digital ecosystems, images are delaminated from context and creator, allowing for the construction and communication of meaning through the aggregation of previously discrete images.¹⁹ Michael Meredith likens such a process to an act of curation: one that is based upon analogy and unification, collecting wholes, and celebrating their coexistence.²⁰ In such instances, and in direct contrast to collage, where the emphasis is placed upon the inconsistencies between pieces, images maintain their integrity within a collection, coalescing as a series of discrete yet simultaneous views of the world.²¹

It is through the digital act of selecting, sorting, and tagging such digital imagery that we could ultimately come to curate culture and personal identity in contemporary society.²² Guy Debord suggested that the modern condition of the world is not merely facilitated by a collection of images but rather by a social relation between people that is mediated and sustained by imagery.²³ Such relational dialogue, sustained by assemblages of images, presupposes a visual network in which images provide the context and background for other images. Rather than any certain fixity of meaning or overriding conformity to a singular worldview, our contemporary cultural landscape is sustained by a vast web of links, convergences, and reproductions.²⁴ First and foremost, this enables us to exist as individuals, assembling personal understandings of the world before projecting such experiences back into the cultural domain. Such omnipresence of mediated imagery, allowing its appropriation by anyone and everyone, would suggest that we are living in the hyper-referential age.²⁵

MODES OF REPRESENTATION

As the discipline of architecture developed, a divide in the classification of representational media appeared. It is suggested by Michael Young that "Images that abstract aspects from reality are given a place of privilege [and classified as the 'drawing'] while images that 'look like' reality are devalued [with the word 'image']".²⁶ Figure 4 contextualises such disparity through differentiating between modes of representation that 'abstract reality' and those that 'imitate reality'. To dissect the former, traditional, primarily abstract modes of architectural representation (i.e. sketches, plans, elevations, or axonometric drawings) are historically removed from the laity as a professional tool. The ability to produce and read them is underpinned by a desire for the delineation of disciplinary knowledge. The fact that few people possess the required knowledge to read them subjectively indicates its inherent exclusivity and subjectivity.²⁷

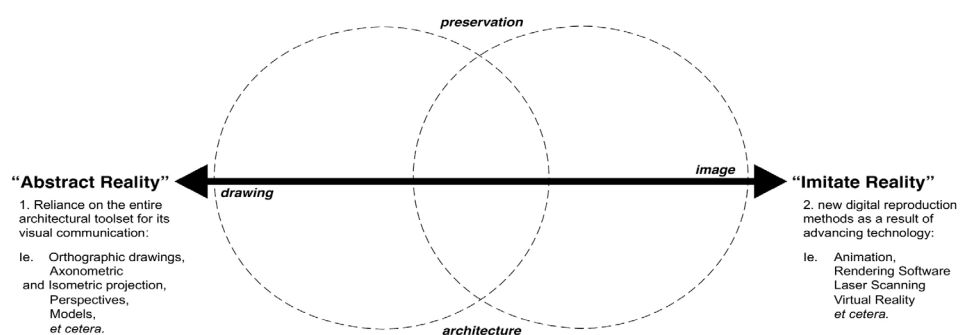


Figure 4. Formal Modes of Representation in Architecture and Preservation

Conversely, a new type of image is now being used: a digitally produced image that imitates reality. Such images, traditionally associated with the image of built architecture supplied through [documentary] photography, are now used to replicate the physicality of architecture yet to be realised.²⁸ Digital renderings now serve as a basis for architectural projects and have become the primary medium through which architects choose to engage with buildings. Imaging techniques are utilised from the outset to govern, alter, and enhance the project's pictorial qualities.²⁹ As a result, the making of buildings is reduced to a mimetic technique.

Similarly, the bodily perception of the existing building is under threat by recent advances in indirect technological surveying techniques (such as 3D laser scanning), which are gaining traction in both architecture and conservation.³⁰ Photogrammetry, the practice of recording and interpreting photographs in order to obtain information on a physical subject, begins to mediate between the static nature of the image and the perspective of bodily experience.³¹ As the process requires photography, the resultant digital model may become the end-product, archived as they are, exported as scaled orthophotos (see figure 5), or as a doctored mosaic composed of several scaled photographs stitched together.³² However, it's supposed objectivity and value as measured empirical evidence, belies its authorship.



Figure 5. Photogrammetric model of the Ringers Chapel in Lincoln Cathedral, generated in Autodesk Recap Photo from photographs taken for this purpose

As the technical capacity of photogrammetric software improves in parallel with the emergence of image-sharing platforms and the ability to seamlessly tag and sort through vast amounts of data, the plausibility of entirely digitally sourced photogrammetric recreations as a speculative tool, is considered. Figure 6, whilst by no means a technical object, speculatively documents and combines, changing light qualities, perspectives, focuses, the changing arrangement of furniture and the subjectivity of individual experience into a singular seamless image. Since place-making depends on inhabitation, which is dependent on a bodily presence, it is expected that documentation of extant buildings should involve bodily engagement with the building and bodily practices in its expression.

There is plausibility in stating that in a similar vein to architects engaging with prospective buildings through imitations – those dealing with the existing could too only engage with digital reproductions.



Figure 6. Photogrammetric model of the Chapter House at Lincoln Cathedral generated in PolyCam from photographs collected from social media.

THE IMAGE BOARD

Fred Scott states that upon a building's completion, one of three fates are inevitable in its lifetime: demolition, preservation; or the lesser versed alteration.³³ Alteration occupies difficult territory in that it is neither architecture, nor preservation but mediates between the characteristics of both. Concerned primarily with the investigation and adaptation of matter considered redundant or obsolete, designers undertaking any alteration must consider such expendability of the existing as a condition for mediation and the starting point for the enactment of research and creative processes.³⁴ Alteration, in its simplest form, suggests a selective and interpretive process, mediating between past and present and through which existing elements are borrowed or salvaged from their former environment and applied to new contexts. This generates an intergenerational dialogue which transmits cultural heritage from the past into the present and makes it available for the future.

More importantly, the reworking of the existing forces the designer into either “accepting or editing previous patterns of existence...which requires the ability [and toolset] to unpick, re-edit, and focus on new meanings for what is already there”.³⁵ As conventional modes of representation depict buildings as objects, they are biased towards the outside, a static understanding of place, and a certain fixity of meaning. However, if places were made for inhabitation, then they should not be deteriorated in conventional documentation. Interiorist representation can subvert this through representing buildings as sequences of spaces and thus be biased towards the experience of place. Depictions centred on the interior, such as the developed surface drawing (which indicates all the surfaces of a room like an unfolded box) and the collage (assemblages of found images), are disliked because they emphasise the surfaces and spaces at the expense of the building structure. Since experience is essential to the establishment of place, this should not be considered problematic.

The assembly of an image board is a form of inquiry involving the observation and documentation of images and what they may become when re-assembled. The board serves as a speculative interpretation of the subject matter and thus contains original meaning. In such an instance, the collected, re-framed and re-structured images presents a mediation between the subjective lived experience of place and objective technological observation of the material – offering the scope to re-frame such narrative dependent on user, purpose, and perspective (see figure 7). Further, the image board celebrates the often-diverse contexts in which images are sourced in the digital age. The facture of the image board, in its pasting together of various images, exploits this accumulative, generalising effect of depicting one subject with various partial depictions. The curation and editing involved in the composition of image boards counteracts the loss of meaning which results from the ubiquity of images and contributes to the making of meaning by the designer – this has analogy to the depictions of buildings in singular photographs.

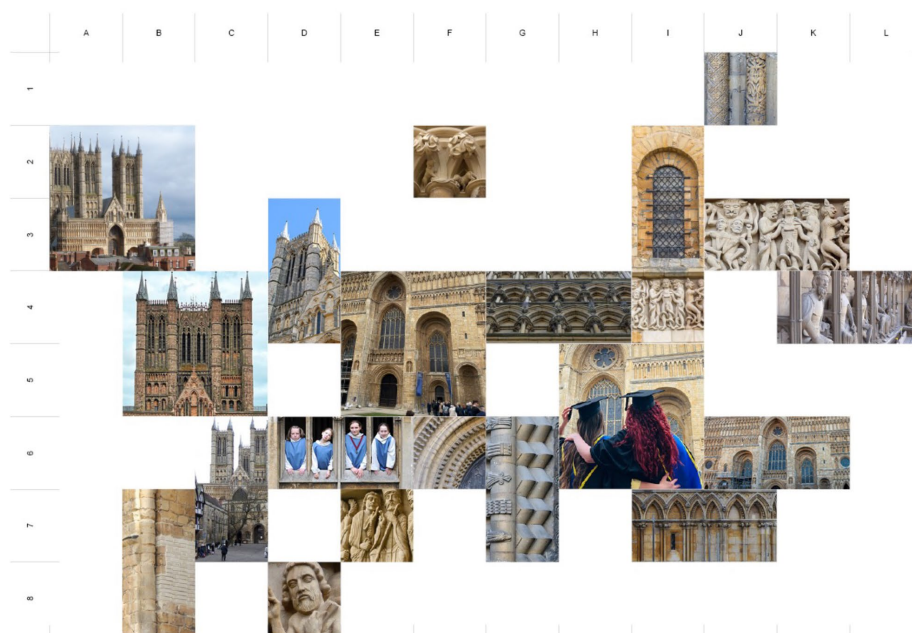


Figure 7. Image board of the west front of Lincoln Cathedral, curated from photographs collected on social media.

If the use of image boards is developed as a critical practice, it may emerge as a powerful visual research method in the documenting of place; accomplished through the recognition and integration of creative spontaneity and reflective practice with traditional modes of recording and analysis. The image board, as a methodically defined yet fundamentally interpretive practice, could function as a link between the subjective and interpretive nature of the design process and the technical and material certainty of the existing. Further, once notions of collection, curation, and compilation are understood as an extension of existing documentary practices, the potential of digital image-sharing platforms as formal modes of representation could be realised and incorporated as active practice in the documentation and understanding of place.

CONCLUSION

This study offers a re-imagining of how the apparatus of the internet can function as a speculative platform in the representation and redefinition of the existing built environment. Such an approach constitutes a move toward that of methodological connection, involving the ability to relate visual

information, rearrange it, and place it into new contexts. It is through reference to imaginative, speculative, and fundamentally creative techniques embedded in the vernacular of interiorist practice that we can articulate previously unattainable solutions accommodating continuous transformations and conflicting heritage narratives. Such approaches, driven by intuition and experience, are deemed paramount in an environment increasingly characterised by rationally operating algorithms and assumed objectivity – it is such non-rational approaches that will ultimately support the change, renewal, and reinstatement of the built environment as a reflection of intangible living expression.

ACKNOWLEDGEMENTS

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NOTES

- ¹ Mario Carpo. "How Do You Imitate a Building That You Have Never Seen? Printed Images, Ancient Models, and Handmade Drawings in Renaissance Architectural Theory." *Zeitschrift Für Kunstgeschichte* 64, no. 2 (2001): 223. doi.org/10.2307/3657211
- ² Jesús Vassallo. "Seamless: Digital Collage and Dirty Realism In Architecture." *Log*, no. 39 (2017): 45.
- ³ Iñaki Bergera and Jorge Otero-Pailos. "Editors' Introduction: Photography and Preservation." *Future Anterior: Journal of Historic Preservation, History, Theory, and Criticism* 11, no. 1 (2014): iii.
- ⁴ David Levi-Strauss. *Photography And Belief*. (New York: David Zwirner Books, 2020): 32.
- ⁵ Levi-Strauss: 33.
- ⁶ Jesús Vassallo. "Documentary Photography and Preservation, or The Problem of Truth and Beauty." *Future Anterior: Journal of Historic Preservation, History, Theory, and Criticism* 11, no. 1 (2014): 15.
- ⁷ Michael Young. "Fear Of The Mediated Image". *Cornell Journal Of Architecture*, no. 11 (2019): 156.
- ⁸ Graeme Brooker. *50 Words For Re:Use*. (London: CanalSide Press, 2021), 16.
- ⁹ Michael Young. "Fear Of The Mediated Image". *Cornell Journal Of Architecture*, no. 11 (2019): 148.
- ¹⁰ Keunhye, Lee. 2022. "The Interior Experience of Architecture: An Emotional Connection between Space and the Body" *Buildings* 12, no. 3: 326. doi.org/10.3390/buildings12030326
- ¹¹ Jacquelin Burgess. "The Production and Consumption of Environmental Meanings in the Mass Media: A Research Agenda for the 1990s." *Transactions of the Institute of British Geographers* 15, no. 2 (1990): 146. doi.org/10.2307/622861.
- ¹² Roland Barthes. *The Fashion System*, trans. Susan Sontag (New York: Penguin Random House, 1983): 6.
- ¹³ Michael Young. "Fear Of The Mediated Image". *Cornell Journal Of Architecture*, no. 11 (2019): 157.
- ¹⁴ Rem Koolhaas. *Preservation is Overtaking Us*. (2014)
- ¹⁵ Hito Steyerl. "Is the Internet Dead?" *e-flux Journal* 49. (2013)
- ¹⁶ David Levi-Strauss. *Photography And Belief*. (New York: David Zwirner Books, 2020): 63
- ¹⁷ Levi-Strauss: 64.
- ¹⁸ Philipp Schaerer, "Built Images: On the Visual Aestheticization of Today's Architecture", *ZARCH* 9 (2017): 50. ISSN: 2341-0531. doi.org/10.26754/ojs_zarch/zarch.201792267
- ¹⁹ During the Renaissance Architect Sebastiano Serlio would pre-empt such practice through an otherwise syntactic approach to architecture. Allowing new ideas to be expressed through pre-existing works and fragments severed from their original context, yet validated by prior use (see Carpo, 2022).
- ²⁰ Michael Meredith. "Collection" in *Under the Influence*, ed. Ana Miljacki. (Barcelona: Actar Publishing, 2020): 70.
- ²¹ Guy Debord. *Society of the Spectacle*, trans Ken Knabb. (London: Rebel Press, 2005): 7.
- ²² Michael Meredith. "Collection" in *Under the Influence*, ed. Ana Miljacki. (Barcelona: Actar Publishing, 2020): 70.
- ²³ Guy Debord. *Society of the Spectacle*, trans Ken Knabb. (London: Rebel Press, 2005): 7.
- ²⁴ Jack Murphy. "Hyper-Referential Architecture. The Ooz 4, no. 16 (2019).
- ²⁵ Such statement is a direct rebuttal of the line of argument in Valerio Olgiati and Markus Breitschmids publication entitled 'Non-Referential Architecture' (2018).
- ²⁶ Michael Young. "Fear Of The Mediated Image". *Cornell Journal Of Architecture*, no. 11 (2019): 148.
- ²⁷ According to Aureli the plan, as a mode of representation, becomes a 'concrete abstraction' as along with other forms of architectural notation, "the plan translates many determinations—money, measures, code, gender, class, rituals, beliefs, ideologies, environmental conditions, etc.—into a specific spatial layout" (see Aureli, 2017).
- ²⁸ Philipp Schaerer, "Built Images: On the Visual Aestheticization of Today's Architecture", *ZARCH* 9 (2017): 50. doi.org/10.26754/ojs_zarch/zarch.201792267
- ²⁹ Schaerer: 50.
- ³⁰ Historic England. *3D Laser Scanning for Heritage*. (2018). <https://historicengland.org.uk/images-books/publications/3d-laser-scanning-heritage/heag155-3d-laser-scanning/>
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MISSING ARCHITECTURES IN CHINA: THE EUROPEAN PALACES OF THE ETERNAL SPRINGTIME GARDEN

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INTRODUCTION

China is a large Asian country with a current population of 1.45 billion (2022).¹ Because of its large population and long cultural history, it has numerous customs, landscapes, and architecture. It has been ruled by several dynasties. Today, many relics are preserved and lots of studies help scholars to better understand Chinese civilisation.

There are many places and cities in China with a unique architecture that presently draw domestic and international visitors. These centuries-old buildings, with both Chinese and Western architectural elements, have many years of history and centuries of character, reflecting by the social, economic, cultural, and artistic forms of each period. Therefore, these monuments (i.e., palaces, temples, and other architectural works) need to be studied in-depth.

Landscaping and gardens in China are a manifestation of artistic thought. Emperors ordered to build these palaces and gardens for their own enjoyment and as a form of artistic expression.²

The remains of the Old Summer Palace,³ located 8 km northwest of Beijing's city walls, is a complex of palaces and gardens built in the 17th and early 19th centuries that still exist today. It covered approximately 2,100 hectares and its construction was initiated by Chinese Emperor Kang Xi (1662-1722) of the Qing dynasty. Initially, the palace was built for leisure and to get away from the summer heat. Surrounded by streams and lakes, the palace was always at a cooler temperature. Over time, the palace became a favourite regular residence of emperors.

These buildings represented a great fortress for emperor. Although it grew in size and complexity, its function was to provide a relaxing and elegant place for emperors. At that time, many painters recorded the scene in the Old Summer Palace. Thus, by way of example, in several paintings we can see Emperor Yong Zheng (1678-1735)⁴ depicted in his library reading a book.⁵

Basically, this palace was divided into three main areas: the Garden of the Elegant Spring,⁶ the Garden of Perfect Brilliance⁷ and the Garden of Eternal Spring,⁸ European Palaces were built north of the Garden of Eternal Spring,⁹ and included elements of Western architecture with a clear European tendency but, at the same time, with elements of Chinese influence by combining Chinese and Western styles. These buildings, in their age, were used by the emperor, so aesthetics and practicality were sought. In his time, the Calm Water Pavilion (Hai Yan Tang) was one of the most important buildings of European-style palaces.¹⁰

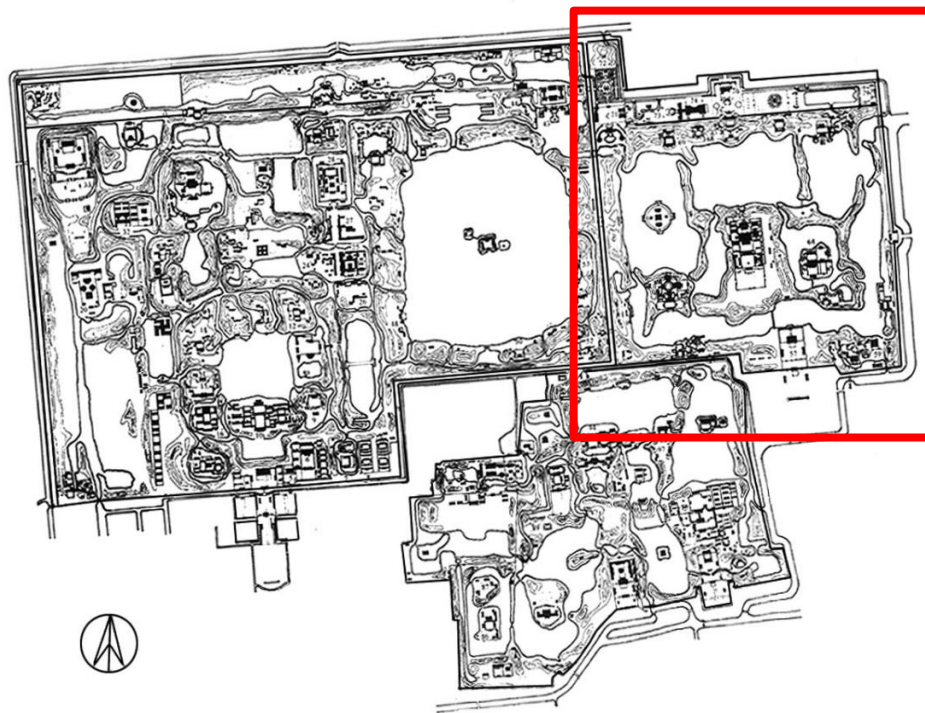


Figure 1. Plan for the Old Summer Palace. The area marked in red corresponds to the Garden of Eternal Spring and the European Palaces¹¹

It should be noted, however, that the Old Summer Palace is now in ruins and is nothing more than a wreck compared to what it was in the past. In fact, the Old Summer Palace, completed in 1764, was destroyed by British and French forces in 1860. This historic event, albeit forgotten by many people, lives in the history of China and is considered a symbol of catastrophe in the hands of Western powers,¹² The Garden of Eternal Spring was probably the grandest and most powerful building of the Old Summer Palace, but only its remains have been able to withstand the trials and tribulations of history.



Figure 2. Da Shui Fa¹³

In China, we find a lot of tangible heritage containing architecture, monuments and historic sites that have, over time, been neglected during the country's modernisation period. Chinese architecture is gradually fading away due to problems like those associated with modern development and a growing population. The Imperial Gardens for China are an emblem and should, in turn, be preserved because of their unique historic, cultural, and architectural characteristics.¹⁴

This research work aims to analyse the European Palaces of the Garden of Eternal Spring, their architectural characteristics, and their cultural influence, and to carry out a chronological study of them and their influence at the time. A virtual restitution of the main building, the Hall of National Peace¹⁵, will be carried out with the help of CAD and Sketchup tools and other software.

In order to understand the causes and influence of the Garden of Eternal Spring and European Palaces, we must firstly understand the history and the main reasons why they were built because, if we analyse these two issues separately, we obtain one-sided knowledge. The best approach is to combine these two concepts: their origins, building and their history, to form a new holistic vision that helps to contextualise the study of this landscape space over time.

The introduction of the Catholic Church and Western buildings at the end of the Ming Dynasty

For centuries, the Catholic Church, and with it, the construction of churches as temples for public religious worship, has been expanding worldwide. Its main expansion took place in Europe and the Americas, but it also succeeded in entering Asia. In the last years of the Ming dynasty (late 16th century), Jesuit missionaries came to various parts of China to introduce this religion.¹⁶

During that time and later, Jesuits were a major influence on cultural exchange because they introduced China to Christian forms from Europe, as well as architectural styles for building Christian temples.

Emperor Yong Li (1646-1662) changed his beliefs to Catholicism. The Cathedral of the Immaculate Conception (南堂, Nán Táng)¹⁷ is the oldest Catholic church in China and is located in Beijing. Although the original foundation of the cathedral was laid in 1605, the present building dates back to 1904. The first building was erected by Jesuit Matteo Ricci (1552-1610) and was a small Chinese-style chapel, the Xuanwumen Chapel, which only differed from other buildings by bearing a cross above the entrance. In 1650, German Jesuit Johann Adam Schall von Bell (1591-1666) built, in only 2 years, a new building next to it in the Baroque style, a style that was imported from ancient Europe. In 1690, Beijing received its first Catholic bishop, Franciscan Bernardino della Chiesa, and the church became a cathedral. The building was badly damaged by an earthquake in 1775, was rebuilt, but then badly damaged again in 1900 by the Boxer Rebellion¹⁸. The present structure was completed in 1904 in the baroque or neo-baroque style, and this was the fourth time it was erected on the same site.¹⁹

The European Palaces in the Garden of Eternal Spring, The Old Summer Palace, Haidian District, Beijing

The Old Summer Palace is a complex of palaces and gardens built between the 17th and early 19th centuries. This building enclosure was the main residence and working space for the emperors of the Qing dynasty. The Forbidden City was only used for a few weeks in winter and for formal ceremonies.²⁰

During the Qing dynasty (17th-20th centuries), the spread of Catholicism was not as extensive as at the end of the Ming dynasty (14th-17th centuries). Technically speaking however, the Qing court used some Western missionaries as officials. Around 1747, Emperor Qian Long (1711-1799) had a new garden built to the west of the Old Summer Palace, the so-called Garden of Eternal Spring.²¹

Thereafter, the emperor began to conceive a series of European-style buildings, constructed north of the Garden of Eternal Spring. These palaces were actually pavilions built of stone and marble, and elaborately decorated with sculptural carvings, reliefs, cornices, pilasters and winding staircases, with

blue roofs and exotic decorations.²² In accordance with the emperor's wishes, Chinese craftsmen, materials and craftsmanship were used to build them. In this way, European architectural styles gave form to these buildings by integrating them with characteristic details and craftsmanship of Chinese architecture.

Italian Jesuit Giuseppe Castiglione (郎世宁, 1688-1766) and French Jesuit Jean-Denis Attiret (王致诚, 1702-1768) were responsible for the design, construction and decoration of the new palaces. These European Palaces also contained intricate fountains, such as the Zodiac Fountain in front of the Hall of National Peace, with complicated water features, and was constructed by French Jesuit, Michel Benoist (蒋友仁, 1715-1774). When palaces have been built, the emperor ordered some engravings of the buildings, known as the 'Twenty Views of European Palaces'. Unfortunately, this complex was looted and burned during the Second Opium War in 1860.²³

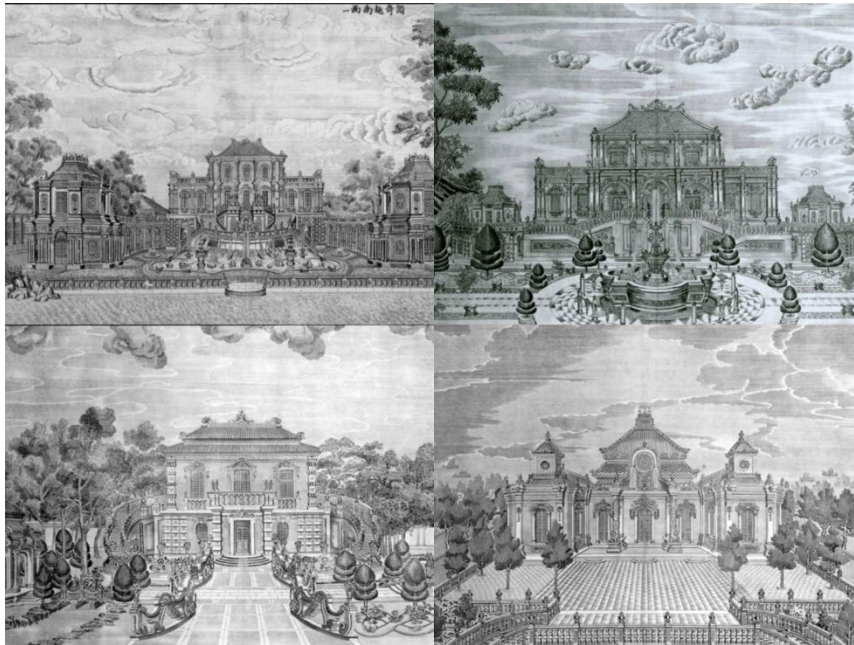


Figure 3. Engravings of European Palaces²⁴

These engravings are influenced by Western painting. The composition of this group of images is panoramic, the proportions of the landscape are rigorous and precise, and the engraving technique achieved in them is extremely precise and fine, and allows us to understand the architecture and art of European Palaces before they were burnt and destroyed by providing us with essential graphic documentation to help us to understand the architecture of these palaces.



Figure 4. Palaces of the Eternal Spring Garden²⁵

Western influence in China during the 19th and 20th centuries

The opening of commercial ports after the First Opium War of 1840 led to an influx of Western-style buildings in China. Building types were no longer limited to churches, but were extended to include consulates, foreign banks, ministries, clubs, shopping centres, hospitals and schools. These were called "Western-style" buildings. Some of these buildings were built in the neo-baroque style. At the same time, other European styles also simultaneously appeared in China, such as neoclassicism, eclecticism or Art Nouveau.

From the 20th century onwards, advanced European ideas were implemented in China: planning, architectural concepts, management models, production techniques and the drafting of a land distribution law. However, the emergence of European culture and architecture in China dates back hundreds of years, as discussed above.²⁶

OBJECTIVES

In order to conduct this research, the following objectives were set:

- Analyse the architectural characteristics of European palaces
- Relate the cultural influence of the period during which they were built
- Conduct an exhaustive study of the European and Chinese elements within the historic framework of gardens
- Explain the causes of the origin of this construction and its chronological order over time
- Carry out the virtual reconstruction of the main Hai Yan Tang building using software
- Know the motivations and duties of this work in the culture of their time.

By fulfilling the above objectives, we can move forward with the following hypothesis, which we will attempt to demonstrate while conducting this work:

The values provided by these palaces were relevant in artistic and landscape terms in their time and directly influenced European-style architecture in China.

METHODOLOGY

In order to conduct this research work, different activities were performed in the study of heritage and architectural surveys. These activities were based on an extensive historic and graphic knowledge search, and on social, cultural and artistic backgrounds.

First of all, archives, books, articles, websites, documents, old photos, engravings and plans were reviewed. As primary sources for our research, archives were searched on the official websites of the Chinese government, such as the "National Archives Administration of China", "Beijing Research, Institute of Science and Technology", "The Chinese Society of Ancient Ceramics", the "Chinese Academy of Social Sciences", among others.

At the same time, information was also sought in databases elsewhere in the world. Thus, old engravings of palaces were found in the British Museum and the Bibliothèque Nationale de France.

In this way, archaeological data and the research results of many experts and scholars were used. Subsequently, data were classified and categorised for further development and explanations in this work.

Secondly, a classification of the obtained digital information was made and digital models were generated using software, such as CAD and Sketchup, which objectively represent the building.

THE GARDEN OF ETERNAL SPRING (长春园 - Changchun Yuan)

The Garden of Eternal Spring was commissioned by Emperor Qian Long (1711-1799) between 1745 and 1751. It took about 6 years to complete this construction, and it has been repeatedly reproduced later and has served as a model for other gardens, with the perfect combination of Chinese and Western cultures. Compared to the main Old Summer Palace Garden, the Garden of Eternal Spring is a true water garden. The water area occupies two thirds of the total garden area. The water sheet width is between 100 m and 200 m, which is appropriate in view of the surrounding landscape. In overall design terms, the Changchun Yuan Garden is also more reasonable: the continents, bridges, islands and dykes used to divide the water surface are scattered and arranged with one another. The Garden of Eternal Spring had a separate entrance to the south, and a sumptuous palace surrounded by small islands and lakes was erected in the centre of it. The most famous buildings of the Imperial Gardens, known as European Palaces, were erected on a strip of land lying to the north of the garden.

European Palaces

European Palaces were actually a collection of pavilions built of stone and marble, carved by Chinese craftsmen and decorated in the Western style. The intended was to satisfy Emperor Qian Long's taste for exotic buildings and objects. The architectural form was in the late European Baroque style.

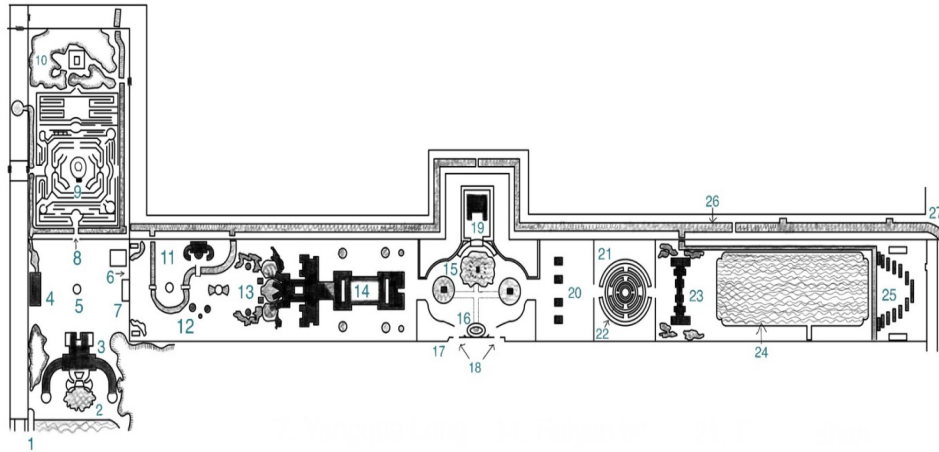


Figure 5. Floor plan of European Palaces (the author).

Number	Name in English	Name in Spanish	Name in Chinese	Name in Pinyin ²⁷
1	Bridge of Perspective	Puente de perspectiva	线法桥	Xian Fa Qiao
2	Water feature	Fuente de agua	水喷泉	Shui Pen Quan
3	Harmonious Wonder	Maravilla Armoniosa	遯奇趣	Xie Qi Qu
4	Water Tower	Torre de agua	蓄水楼	Xu Shui Lou
5	Fountain	Fuente	喷水池	Pen Shui Chi
6	Gateway	Puerta	出口	Chu Kou
7	The Aviary	El aviario	养雀笼	Yang Que Lou
8	Garden Gate of the Labyrinth	Puerta del jardín del laberinto.	黄花阵花园门	Huang Hua Zhen Hua Yuan Men
9	The Labyrinth	El laberinto	黄花阵花园	Huang Hua Zhen Hua Yuan
10	Pavillon	Pabellón	小亭子	Xiao Ting Zi
11	Belvedere	Mirador	方外观	Fang Wai Guan
12	Five Bamboo Pavilions	Cinco pabellones de bambú	五竹亭	Wu Zhu Ting
13	Water Feature	Fuente de agua	水喷泉	Shui Pen Quan
14	Hall of National Peace	El Pabellón de las Aguas Calmadas	海晏堂	Hai Yan Tang
15	Grand Waterwork	Gran trabajo de agua	大水法	Da Shui Fa
16	Throne for Viewing the Waterwork	Trono para ver el trabajo de agua	观水法	Guan Shui Fa
17	Zeeland Hall	Salón de Zelanda	泽兰堂	Ze Lan Tang
18	Two Portales	Las Puertas	通道门	Tong Dao Men
19	Immense Ocean Observatory	Observatorio Oceánico Inmenso	远瀛观	Yuan Ying Guan
20	Portal of the Hill of Perspectives	Portal de la Colina de las Perspectivas	线法山正门	Xian Fa Shan Zheng Men
21	Hill of Perspective	La Colina de las Perspectivas	线法山	Xian Fa Shan
22	Garden of the Hill of Perspectives	Parque del Cerro de las Perspectivas	线法山公园	Xian Fa Shan Gong Yuan
23	Eastern gate of the Hill of Perspectives	Puerta oriental del Cerro de las Perspectivas	线法山东门	Xian Fa Shan Dong Men
24	Square Lake	Lago cuadrado	方河	Fang He
25	Perspective Landscape	Paisaje en perspectiva	线法画	Xian Fa Hua
26	Channel	Canal	渠道	Qu Dao
27	Water Drain	Drenaje de agua	排水管	Pai Shui Guan

Table 1. Glossary of European Palaces.

The employed building materials were mainly white marble. The stone surface was meticulously carved and roofs were covered with glazed tiles. The main feature of European Palaces was an artificial fountain surrounded by large trees arranged in rows, and carefully trimmed hedges and geometric patterns composed of flowers. They were characterised by many spur fountains and peculiar

sculptures.²⁸ It consisted mainly of three groups of large-scale sources: Xie Qi Qu²⁹ (Nos. 2 and 3), Hai Yan Tang³⁰ (Nos. 13 and 14) and Da Shui Fa³¹ (No. 15).

The entire construction area was not very large, but it was a successful attempt to imitate a European-style garden in a single setting that occupied an important place in the history of the exchange of gardens between East and West, which has had strong repercussions in Europe.³²

The Da Shui Fa building was the most spectacular fountain of European Palaces. Its architectural form came in the style of a stone niche that resemble an entrance. A large lion's head sprayed water downwardly to form a seven-layered water curtain. There was a fountain in the shape of an oval chrysanthemum at the front and bottom, and a copper sika deer in the centre of the pool to spray water from eight spouts on its antlers.

It had 10 copper dogs in the two compartments, which expelled water from their mouths by shooting directly at the deer's body.³³

In front of the left and right sides of Da Shui Fa, a huge tower sprayed water. The tower was square and had 13 floors. Jets of water poured from the top. It had 88 copper pipes around the tower, all spraying water at the same time. On the opposite side of Da Shui Fa's fountain was Guan Shui Fa³⁴ (No. 15). It was the place where the emperor of the Qing dynasty observed the Da Shui Fa fountain. There was a throne on the stone platform in the middle of the Guan Shui Fa, surrounded by a large stone made of five juxtaposed stone sculptures. Their faces were engraved with sunset flags, armour, swords and firearms.³⁵ British envoy Macartney and Dutch envoy Victorious once admired the wonders of the fountain from this privileged position.³⁶

The Calm Water Pavilion building, Hai Yan Tang, was located in the western part of European Palaces, with a large fountain standing in front of the main building.

The main building Hai Yan Tang

The building Hall of National Peace, Hai Yan Tang, was the largest and most important building of the European palaces (see Figure 5). The main façade faced west and had a large fountain surrounded by a grand staircase (No. 13).³⁷

Building	Hall of National Peace
Name in Chinese	海晏堂, Hai Yan Tang
Architects	郎世宁 (Giuseppe Castiglione), 1688-1766, Italy ³⁸ 王致诚 (Jean-Denis Attiret), 1702–1768, France ³⁹ 蒋友仁 (Michel Benoist), 1715-1774, France ⁴⁰
Address	Street Hua Qing west 28, Haidian District, Beijing

Table 2. Hai Yan Tang building details.

This fountain was designed as a large water clock, commonly known as the "hydraulic clock"⁴¹. In the middle of the pool stood a large stone clam with two fish spraying water over it. On each side were six stone platforms with six bronze statues seated on top of them.⁴² The Qianlong Emperor wished to replace the fountain sprinklers, the usual Baroque-style nude female sculptures, with the 12 animals of the Chinese zodiac (see Figure 7).⁴³ Thus, fountain jets were a rat, an ox, a tiger, a rabbit, a dragon, a snake, a horse, a goat, a monkey, a rooster, a dog and a boar. The odd-numbered zodiac animals were placed on the right side of the fountain and the even-numbered ones on the left.⁴⁴

The body of the bronze statue of the Chinese zodiac is a stone sculpture wearing a robe, the head is realistic in style, the plaster body is meticulous, and the folds and hair of the animal's head are clear and

realistic. The material chosen to cast the animal's head was refined red copper, which was widely used by the Qing Court at the time. It was deep in colour on the outside with a fine finish on the inside⁴⁵. Every day and every night, water was sprinkled in turns every 2 hours and all the signs of the zodiac sprinkled water together at noon.

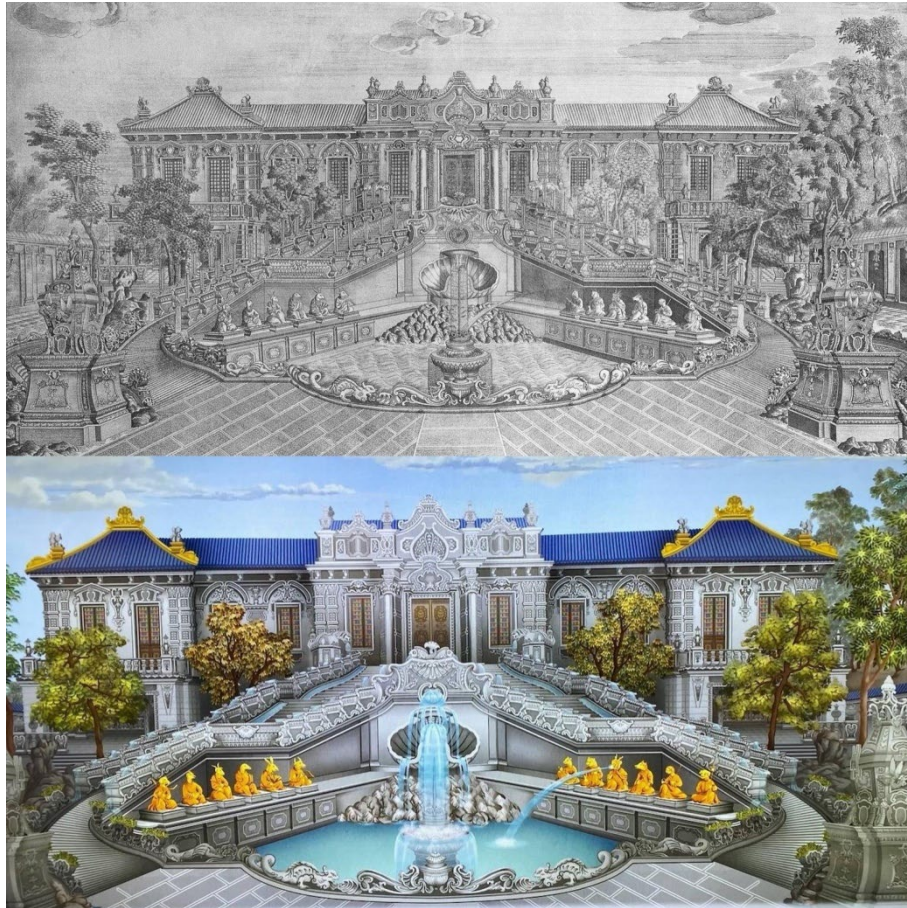


Figure 6. Antique coloured engraving of the main façade of Hai Yan Tang⁴⁶



Figure 7. Source of animals⁴⁷ and the ruins of Hai Yan Tang⁴⁸

A set of 20 copper engravings of these European buildings is said to be "the first attempt at copper engraving made in China under the eyes and by the order of the Emperor". The following description follows the Chinese numbering and naming of the engravings on the Hai Yan Tang building (see Figure 8).

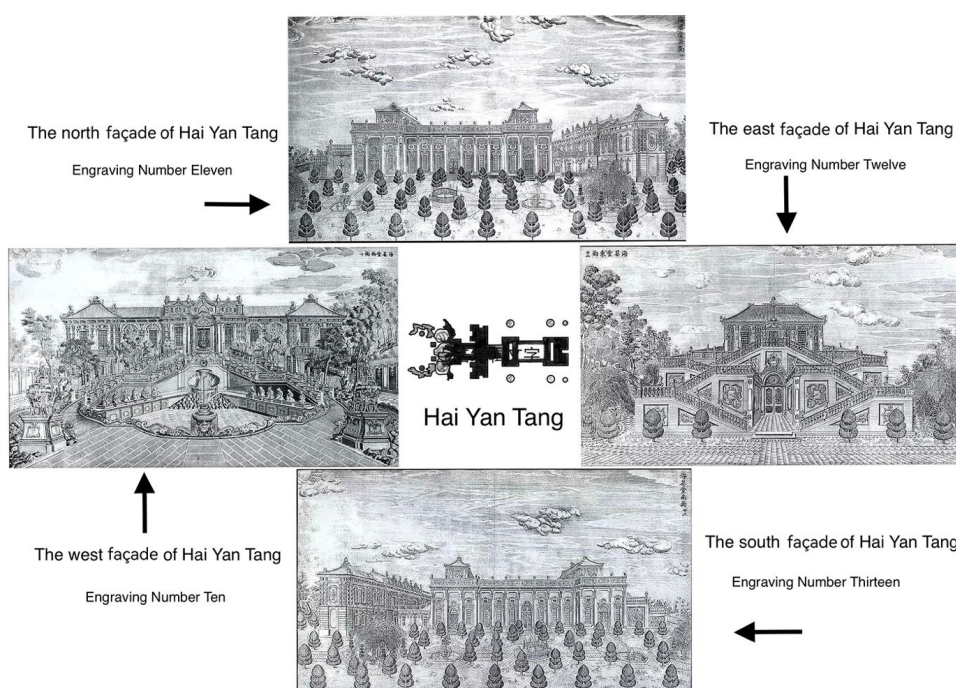
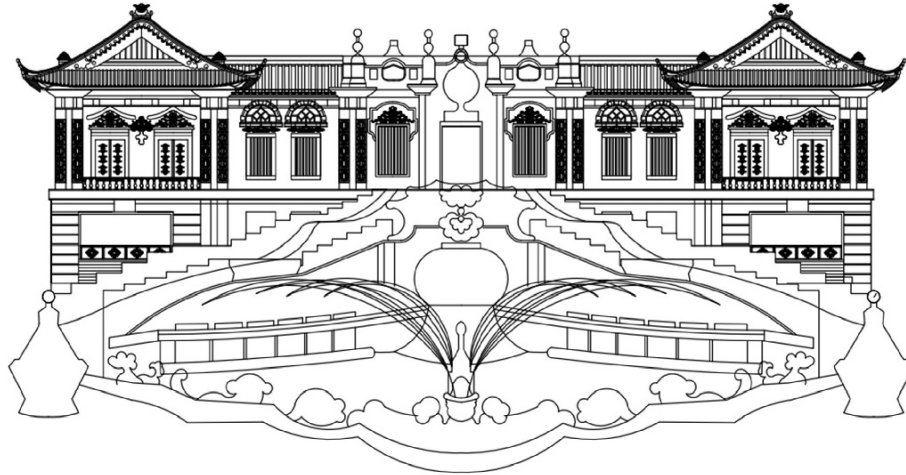


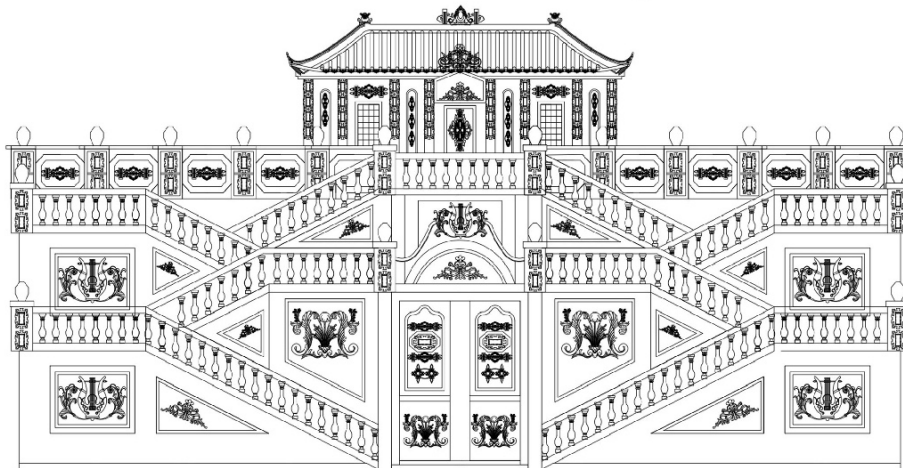
Figure 8. The ancient engravings of the Hai Yan Tang building⁴⁹

Graphic Documentation

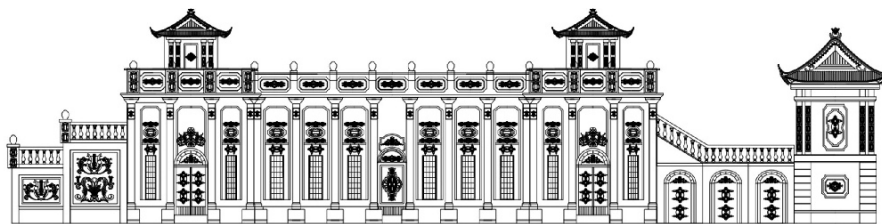
Based on the carried out graphic survey, the plans of the four building façades were drawn up using the AutoCad tool to obtain orthogonal views of them. These plans will allow the subsequent analysis of the building from the metric and geometric points of view (see Figure. 9).



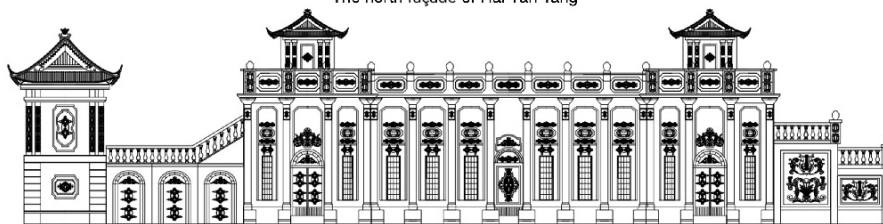
The west façade of Hai Yan Tang



The east façade of Hai Yan Tang



The north façade of Hai Yan Tang



The south façade of Hai Yan Tang

Figure 9. The blueprints of Hai Yan Tang (the author).

The Hai Yan Tang building had four façades. The west side was its main façade where the main gate stood. It was more monumental with "Hulu" decoration, which symbolises health. At the bottom stood a large pool with a fountain in the middle, and a great scallop sculpture and two fish sculptures.

The east side was its rear façade, with two rows of stairs. The south and north sides were similar with a main door and two secondary doors, respectively.

Starting from the floor plans and the elevations of the building, the building's 3D modelling was carried out using the Sketchup software. Different views of the building were obtained with Sketchup by incorporating textures of the materials making up the façade, as well as light effects, to allow views of the building that cannot be seen by the human eye, and to avoid trees or other street furniture elements to confer a better visualisation and interpretation of the building (see Figure 10).



Figure 10. 3D model of the Hai Yan Tang building in Sketchup (the author)

RESULTS AND CONCLUSION

To date, there have only a few research works published on this subject of study, which allowed this field to be studied in-depth. The evolution process of the Old Summer Palace and how the Baroque style arrived in China from Europe were explored.

European architecture in China should not be treated only as beautiful buildings for the Chinese people. People know very little about their origin and history because very little research on this aspect has been conducted. By publishing this article, promoting the spread of this knowledge and helping more people to understand the true background of these beautiful unique buildings are hoped. European architecture was very special and modern in its time in the Chinese cultural environment and, thus, strongly influenced the Chinese architectural style.

Emperor Qian Long's (1711-1799) aesthetic taste for the Baroque style helped bring this exotic landscape architecture to China. In overall style terms, European Palaces were undoubtedly an important European-style building. Unfortunately, today people can only know about this romantic emperor's taste for Western architecture through the fragmentary carvings and archaeological remains of the Old Summer Palace.

They bore very important characteristics of European and Western styles by presenting harmony between the two, and these buildings had very significant characteristics of European and Western styles by showing a perfect symbiosis between Western and Chinese cultures. These European Palaces had very spectacular engineering works for their time, such as the Da Shui Fa fountain, which then witnessed the success of Hai Yan Tang.

The deeper its historic and cultural heritage, the richer the relics of historic buildings, the stronger its landscape features, the richer its environmental image and the more prominent its urban personality. The protection and preservation of architectural heritage lead to the healthy and orderly development of cities and improve people's lives.

NOTES

¹ <https://www.worldometers.info/world-population/china-population/>

² Isabel Cervera. Paisajismo y jardín en China. *Ars Longa*, Vol. 9, No. 10, pp. 27-35. (2000). Autonomous University of Madrid. <https://www.uv.es/dep230/revista/PDF196.pdf>

³ The Old Summer Palace is the name by which the Garden of Perfect Brilliance (Chinese 圆明园; pinyin, Yuán Míng Yuán or Yuanmingyuan), originally called the Imperial Gardens (Chinese 御园; pinyin, Yù Yuán), is known in the West.

⁴ Lilian M Li. The garden of perfect brightness. Destruction, looting and memory (1860-present-day) on MIT's Visualizing Cultures, New York. (2012).

⁵ Norman Kutcher. Unspoken Collusions: The Empowerment of Yuanming Yuan Eunuchs in the Qianlong Period. *Harvard Journal of Asiatic Studies*, pp. 449-495. (2010).

⁶ The Garden of Elegant Spring in Chinese is 绮春园 - Qí Chūn Yuán.

⁷ The Garden of Perfect Brilliance in Chinese is 圆明园 - Yuán Míng Yuán.

⁸ The Garden of Eternal Spring in Chinese is 长春园 - Cháng Chūn Yuán.

⁹ European Palaces in Chinese is 西洋楼 - Xī Yáng Lou.

¹⁰ Yongxing Li. «Yuan Ming Yuan Park (Old Summer Palace) (2018). - eBeijing.gov.cn». www.ebeijing.gov.cn.

¹¹ CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=332462>

¹² Meredith, Ana. Beijing Summer Palace: the essential travel guide. Study Clic. <https://studycli.org/es/travel-china/summer-palace/>

¹³ Yang Liu, "Shadow of the Book of the Ancient Summer Palace"

¹⁴ Weiqi Chu. Rebuilding of the imperial gardens: an examination of feudalism production within the objectives of the Chinese modernization project. *Int. J. of Design & Nature and Ecodynamics*. Vol. 14, No. 3, pp. 217-228. DOI: 10.2495/DNE-V14-N3-217-228. (2019).

¹⁵ Hall of National Peace in Chinese is 海晏堂 - Hai Yan Tang.

¹⁶ Heinrich Wölfflin. Renaissance and Baroque. Ediciones Paidós Ibérica S.A. pp 102-113, ISSN: 84-7509-350-7. (1991).

¹⁷ The Cathedral of the Immaculate Conception: in Chinese it is 南堂 - Nán Táng

¹⁸ The Boxer Rebellion, also known as the Boxer Uprising, the Boxer Insurrection or the Yihetuan Movement, was an anticolonial and anti-Christian uprising in China between 1899 and 1901, towards the end of the Qing dynasty, by the Society of Righteous and Harmonious Fists (Yihéquán), known as the "Boxers" in English because many of its members had practised Chinese martial arts which, at the time, were referred to as "Chinese boxing".

¹⁹ Pedro Luengo. Arquitectura jesuita en Filipinas y China, La arquitectura jesuítica, Instituto Fernando El Católico, pp.523-540. (2012).

²⁰ Weiqi Chu. Rebuilding of the imperial gardens: an examination of feudalism production within the objectives of the Chinese modernization project. *Int. J. of Design & Nature and Ecodynamics*. Vol. 14, No. 3, pp. 217-228. DOI: 10.2495/DNE-V 14-N3-217-228. (2019).

²¹ Manuel V.Castilla. Giuseppe Castiglione (Lang Shining), precursor of the first pictorial-architectural globalisation. *Asian and African Studies* LI: 3, University of Seville. (2016).

²² Kleutghen Kristina. Imperial Illusions: Crossing Pictorial Boundaries in the Qing Palaces. Seattle: University of Washington Press. (2015).

²³ W. Dou "European influence on Yangzhou gardens in the early Qing dynasty", "The Architect", China Construction Industry Press, pp. 28. (1987)

²⁴ C. Alfonso García. Architecture and furnishings of 18th-century European palaces in Beijing. (2017)

²⁵ Author: Shen Yuan, Tangdai, Wang Youduan –

http://ocw.mit.edu/ans7870/21f/21f.027/garden_perfect_brightness/ymy1_essay03.html, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=25049555>

²⁶ Pedro Luengo. Jesuit architecture in the Philippines and China. *Proceedings of the International Symposium, Zaragoza*, ISBN 978-84-9911-158-2, págs. 523-540. (2012).

²⁷ Pinyin is a Chinese letter

²⁸ Manuel V. Castilla. "Views of a distant sea (Yuanying Guan): composition of modern architecture in the tropics", PhD thesis on architectural history and composition, University of Seville, Seville, 2013

²⁹ Xie Qi Qu in Chinese is 谐奇趣.

³⁰ Hai Yan Tang in Chinese is 海晏堂.

³¹ Da Shui Fa in Chinese is 大水法.

³² Wang Kai-xi, "Are the Western Buildings of Changchun Garden in Yuanmingyuan Park the Products of the Intercultural Communication Between China and the West in the Qing Dynasty?", *Journal of Xuzhou Institute of Technology (Social Science Edition)*, pp. 21-28, ISSN: 1674-3571, 2019-07.

³³ Manuel Castilla. Semiotic significance of the design of the Labyrinth Garden, paradigm of the Yuanming Yuan. *Asian and African Studies*, vol. 53, no. 2 (166), pp. 351-376. (2018).

³⁴ Guan Shui Fa in Chinese is 观水法

³⁵ Rucai Lu. The Summer Palace, Beijing's imperial garden. *China Today*. (2005).

³⁶ Manuel Castilla. Semiotic significance of the design of the Labyrinth Garden, paradigm of the Yuanming Yuan. *Asian and African Studies*, vol. 53, no. 2 (166), pp. 351-376. (2018).

³⁷ Rachel Miller. The European Palaces of the Qianlong Emperor, Beijing. *Khana Academy*. (2009)

³⁸ <http://art.people.com.cn/n/2015/1020/c399591-27720080.html>

³⁹ Universal dictionary of history and geography, Manuel Orozco & Berra, 1853:

<https://books.google.es/books?pg=PA351&dq=diccionario&id=fpdRAQAAMAAJ&hl=es#v=onepage&q=diccionario&f=false>

⁴⁰ Mark Elliott. *Emperor Qianlong: Son of Heaven, Man of the World*. New York: Pearson Longman. p. 131. (2009)

⁴¹ Pedro Luengo. *Yuánmíng Yuán in the 18th century: Art between diplomacy and philosophy; between Europe and Peking*. University of Seville (Spain). (2016)

⁴² <http://www.historychina.net/qsbk/xgyy/387112.shtml>

⁴³ Greg M. Yuanming Yuan/Versailles: Intercultural Interactions between Chinese and European Palace Cultures. *Art History* vol. 32, no. 1, pp. 115-143. (2009).

⁴⁴ Weiqi Chu. Rebuilding of the imperial gardens: an examination of feudalism production within the objectives of the chinese modernization project. *Int. J. of Design & Nature and Ecodynamics*. Vol. 14, No. 3, pp. 217-228. DOI: 10.2495/DNE-V14-N3-217-228. (2019).

⁴⁵ Pedro Luengo. *Yuánmíng Yuán in the 18th century: Art between diplomacy and philosophy; between Europe and Peking*. University of Seville (Spain). (2016).

⁴⁶ https://commons.wikimedia.org/wiki/File:Yuanmingyuan_haiyan.jpg

<https://static4.abc.es/media/MM/2020/12/23/palacio-pekino-chocho-kUKG--1600x900@abc.jpg>

⁴⁷ Details of the 12 bronze human figures with animal faces sprinkled with water.

<https://www.duitang.com/people/mblog/29307524/detail/?next=29307615>

⁴⁸ Beijing Tourism the Legend of the Ancient Summer Palace. (2016). <http://spanish.visitbeijing.com.cn/a1/a-XCCG5C082AC831361AADC6>

⁴⁹ Alfonso García, C. Architecture and furnishings of 18th-century European palaces in Beijing. (2017).

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REJUVENATING LINKS BETWEEN ESTATES AND THEIR HINTERLANDS: A RELATIONAL LANDSCAPE HERITAGE APPROACH

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INTRODUCTION

Like most European countries and many of their former colonies, the Netherlands holds a large collection of heritage estates comprising of castles, manors, or country houses, of which some date back to the medieval period¹ while others were constructed in the 19th C.² These Dutch heritage estates are predominantly situated in the provinces of Utrecht, South Holland, North Holland, and Gelderland, clustering in what we will call *estate landscapes*.

In this paper, we focus on the estate landscape situated in the Baakse Beek valley, part of the Achterhoek region, located in the Province of Gelderland (NL) (Figure 1). We will discuss current landscape-related challenges faced by these estates and how rejuvenating tangible/intangible heritage links to the broader context can strengthen future estate landscape resilience. In the process, we will suggest a relational landscape heritage approach facilitating these tangible/intangible heritage links on different scale levels.

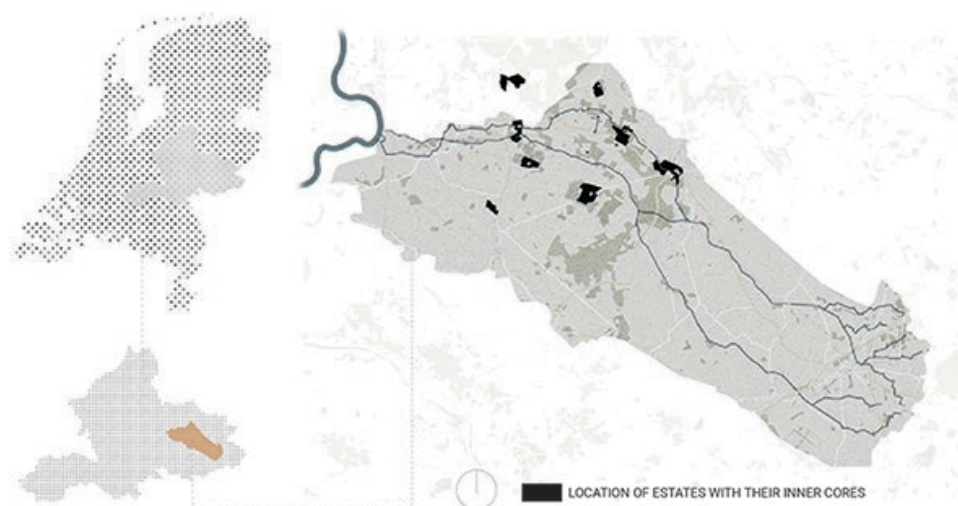


Figure 1. The area of Baakse Beek, Gelderland, Netherlands

Estates and hinterland: a historical interdependency and territorial impact

Writing about the estates in the Achterhoek region, Cruyningen³ defines a historic estate as a spatial and economic unit and centrally managed organization of various ground-based functions. He refers to agriculture and forestry as economic lifelines of an estate supporting the recreational and residential functions. Thereby he implies that in a historic estate, there is an inherent balance between production (negotium) and leisure (otium), between ecology, economy, and social functionality.

In this paper, we use the word ‘hinterland’ to refer to the accumulation of agricultural lands and forests that were owned and managed by an estate for a certain period, and which provided economic support to manage the estate. In the Achterhoek region, although situated beyond the primary boundary of the main house and garden, the hinterland was not a territory of secondary importance to an estate. The house, garden, and hinterland, together, formed an estate’s functional entity. The hinterland harboured recreational functions as well. Wild grounds and later planted forest areas were the perfect stage for hunting and outside parties.⁴ Also, the layout of the ornamental inner gardens portrayed a conscious awareness about the position, views, and spatial experience of the hinterland (farmlands, meadows, and forests).⁵ Therefore, it can be said that the productive functions and experiential qualities of the hinterland made it an inextricable part of the historical estate and its spatial composition.

In the Achterhoek region, the heritage estates are clustered together as adjacent establishments. Consequently, they have always had a broader impact over each other as well as the entire region in numerous ways. The estate owners were economically, socially, and politically powerful and influential. Some of them were great visionaries and had innovative ideas about land reclamation, new transportation, land and water management systems, agriculture, and forestry. Initially they experimented with implementing these on their own lands and later would influence the larger farmer community to follow their trends.⁶ Therefore, it is appropriate to consider them together as large-scale spatial constellations rather than isolated entities dispersed in a landscape.

The existing gap in preservation policy and current challenges

In the Netherlands during the beginning of 20th century, the notion of preservation was focused on individual elements of the heritage estates such as trees, house, or any singular built object. This was followed by focus on the ensemble of house and garden as we see today in the Province of Gelderland. Recently this idea has been further expanded to include the immediate hinterland or larger surroundings which today is being implemented in provincial policies like estate biotopes in Utrecht and South Holland.⁷ Therefore, today, the conservation or attenuation of future resilience of a certain heritage place or landscape transcends both, an individual focus point and a singular scale.

A major drawback in the current conservation policy in Gelderland is the focus on the inner core of an estate namely the main building and the garden excluding the historical tangible/intangible links with the immediate hinterland or the broader landscape (Figure 2). The former preservation approach to some extent, hinders the understanding of the heritage estate because the hinterland is an integral part of the estate’s experiential qualities and until recently, there existed a strong productive, functional, and experiential link between the two.

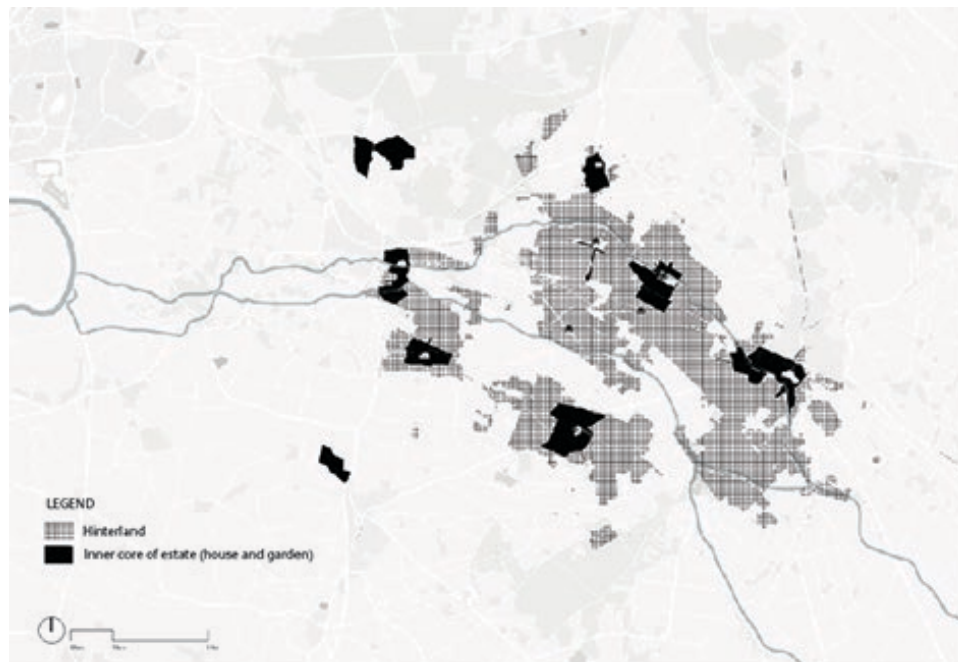


Figure 2. Map drawn from base image⁸ showing the preservation focus on the inner core of the estates excluding the hinterland

To acquire a deeper and holistic understanding of the estates as cultural heritage landscape components and to make them resilient for the future, they cannot be treated as dispersed points in space. For harnessing the territorial influence of these heritage constellations there is a need to reconcile the lost tangible/intangible links between the estates and the immediate surrounding hinterlands, between the adjacent estate groups as well as between the estate groups and the greater region/territory.

Among various spatial and landscape-related challenges, the present climate-change-induced water scarcity is most acute in the estate grounds of Achterhoek region in the province of Gelderland. This crisis has repercussions in micro, meso and macro scales. In the scale of an individual estate in the Achterhoek region, water scarcity is affecting the experience of the heritage gardens and associated farmlands are subject to drought. At the scale of estate groups, in the situation of Gelderland, the estate authorities are dealing with similar problems separately. Thus, the main crisis is pertaining while the estates try to take partial reactive measures. The crisis also exists in the scale of the region. The water scarcity is affecting numerous intensive agricultural farms in the East of Achterhoek.

Under these circumstances, addressing the heritage constellations as integrally linked to the region's landscape and seeking sustainable ways to overcome the regional water crisis may bring resilience for all.

Research question

This research explores whether and how restoring the tangible/intangible heritage links between the estates and their hinterlands can create new possibilities regarding heritage preservation and future landscape resilience?

Here, the idea of hinterland encompasses the immediate surrounding hinterland, the combined hinterlands of adjacent estates and the regional hinterland that builds up the context of these estate constellations.

METHODOLOGY

We adopted a research by design methodology, focusing on the estate landscape within our case study area which is the water management area of Baakse Beek located in the province of Gelderland in a region called Achterhoek (Figure 1).

Since the medieval period, Gelderland has been an auspicious location for military castles and estates. The site of our research is the water management area of Baakse Beek which is located within Gelderland in a region called Achterhoek. Here, several medieval estates are situated along Baakse Beek. Surviving and functioning since the 12th century, the estates have proven to be resilient to the test of time. But today, with the imminent threat of climate change, water scarcity, loss of native ecology and inadequate revenues from the productive hinterland, it is becoming harder to ensure that this heritage landscape remains resilient to future challenges as well.⁹

Micro, meso and macro scale case study.

Our micro scale case study estate is the Estate De Wiersse located between the small towns of Ruurlo and Vorden, amid the heritage estate constellations of Baakse Beek water management area. A 13th century manor later turned into an estate, De Wiersse owns approximately 300 ha land of which 16 ha is dedicated for garden, 32 ha for landscape park and the rest are forests, farmlands, and pastures.¹⁰



Figure 3. Estate De Wiersse, its hinterland boundary and eutrophication problem at the inner moat of Estate De Wiersse

At present, the conservation focus is on the estate building, garden, and landscape park. The garden of De Wiersse is a well-known tourist destination open for visitors during spring and summer. Currently, the estate is suffering from severe water scarcity and eutrophication especially during prolonged dry summer periods (Figure 3). This compromises agricultural production processes and affects local ecology and biodiversity. Additionally, De Wiersse's moats are either out of water or the shallow water is covered with thick layer of duckweed, which hampers the full heritage experience of the estate and gardens as national monuments.

Apart from the water crisis, there is also a missing awareness about the strong historical link (both functional and experiential) between the inner estate and outer hinterland (Figure 3). The richly protected zone only covers the inner core ignoring the experiential qualities and heritage value of the surrounding landscape. Also, the income from hinterland is not enough for the maintenance of the estate at present. Consequently, there exists a need to revalue the hinterland as an essential heritage component and address its missing tangible and intangible links to the heritage estate.

In the meso scale of estate landscape, if we zoom in to the smaller group of adjacent estates such as the Wildenborch, t Medler and De Wiersse, we can see that historically, each of the estates were directly or indirectly related to the Baakse Beek stream system. But, with intensive drainage systems implemented, the connections were gradually lost (Figure 4). All the three estates now function as

individual points in the larger landscape although if we consider their hinterlands, it would be one unified landscape.

Looking from the macro scale, a timeline (Figure 5) depicts the gradual loss of sponge function in the Baakse Beek area, especially the eastern part of Achterhoek from 1100 up to now. Before agriculture started in this area, it was a wetland with peat and marsh forest at places and this wet landscape, along with the exfiltration from the terrace edge

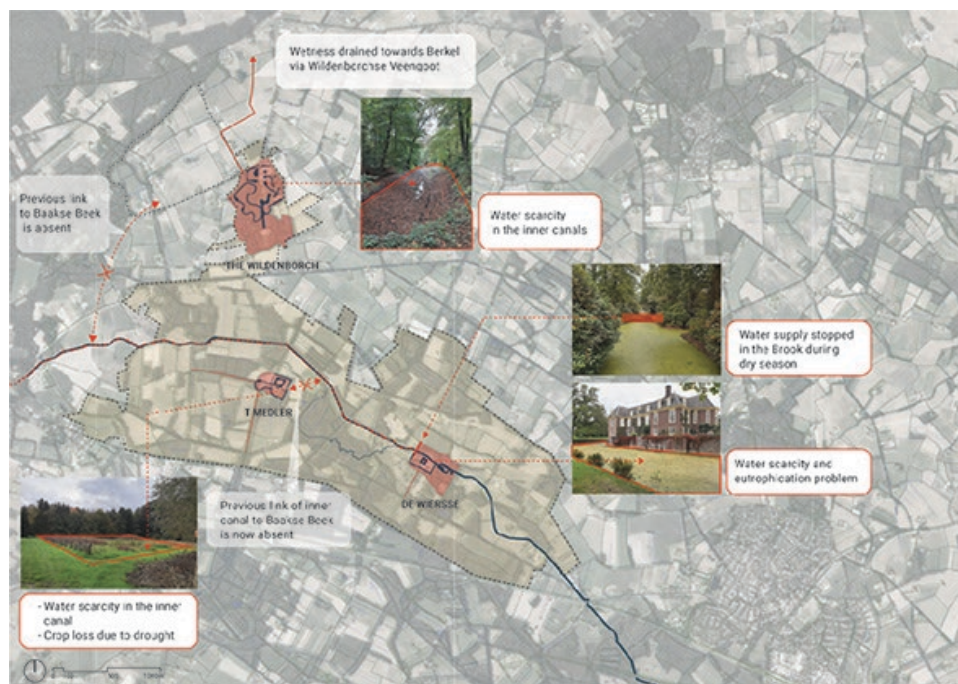


Figure 4. Existing problems in the meso scale

plateau, initiated brook-like water flows towards the river IJssel. But through time, the constant dewatering processes of the productive landscape replaced the wetland with an intensive network of ditches. Consequently, the area became an efficient ground to drain as much water as possible and in turn, lost the capacity to hold wetness within itself for drier periods. Thus, the estates located downstream are currently suffering from water scarcity during summer.

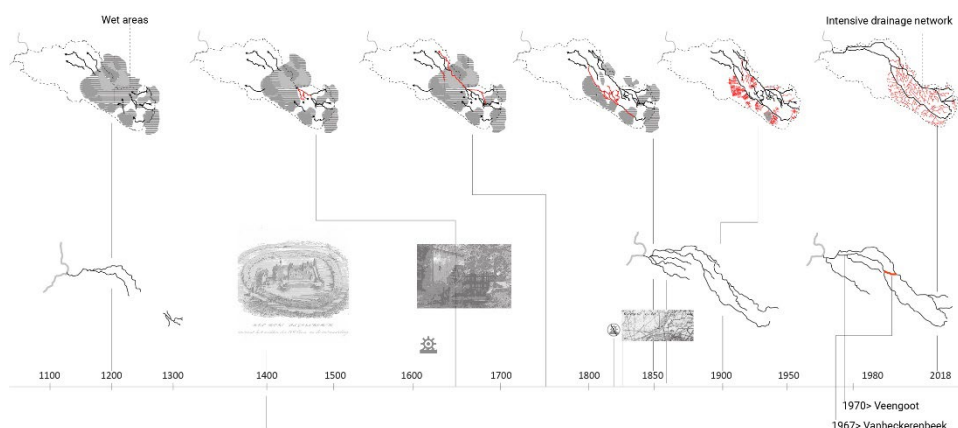


Figure 5. Gradual loss of sponge function in the Baakse Beek area

Therefore, we conclude that De Wiersse lies within a group of heritage constellations that suffer water scarcity due to a faulty regional water management that is further deteriorated by climate change. Hence,

the landscape and water management of the entire region has deep impact on the future resilience of the estate landscape and vice-versa.

RESULTS

A relational landscape approach

The main objective of the research by design was to explore how tangible/intangible heritage links can be rejuvenated at different scales by means of a landscape heritage design approach (Figure 6). On the macro scale (regional scope), the research by design established a landscape framework comprising of numerous strategies in the micro and meso scales that has the capacity to restore old links and create new links between the Achterhoek estate landscape and the Baakse Beek valley as a landscape infrastructure. On the meso scale of estate ensembles, we focus on designing a landscape system using the acquired strategies to restore links between individual heritage estates so that they can benefit from each other's presence rather than dispersed points. On the micro scale, we investigated how a landscape architectural intervention on the grounds of Estate De Wierrse that is embedded within the macro scale landscape framework and that adopts to the meso scale strategies, can alleviate problems like water scarcity and initiate or restore visual-spatial heritage experiences, local ecology, and biodiversity.

From the analysis of the water crisis across different scales, it is apparent that numerous water drainage manipulations took place in the productive landscape of Achterhoek over the years that has aided the severe seasonal water scarcity and pollution. Therefore, if appropriate measures are taken in the productive landscape, the water scarcity could be alleviated for both the larger region as well as for the estate constellations. This in turn generates opportunities to rejuvenate the link between estates and their hinterlands across different scales.

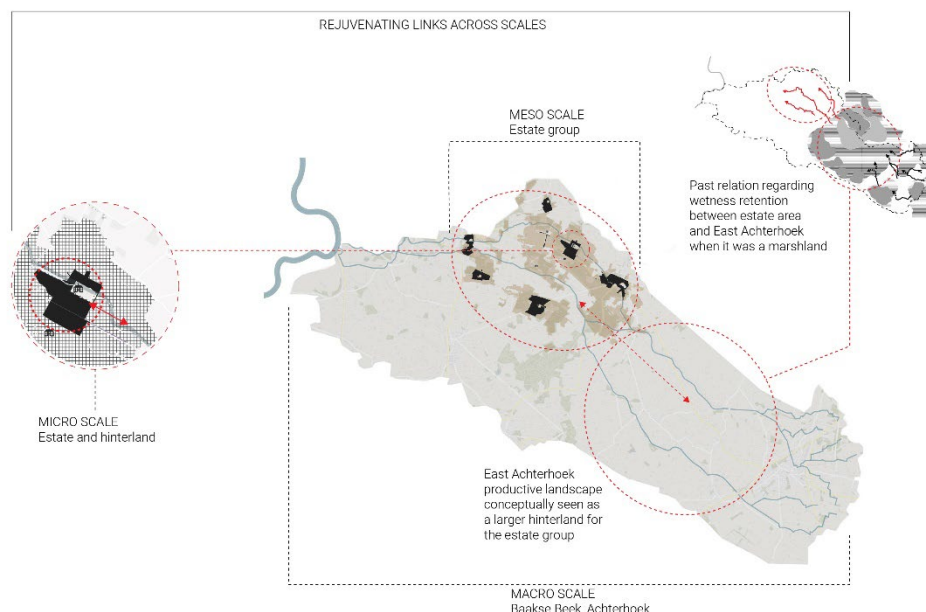


Figure 6. A relational landscape approach

Macro scale design intervention

In the macro scale of Baakse Beek area, the design research reframes the landscape as a wetness container. The series of three images (Figure 7) depict the idea that the larger agricultural landscape or the greater hinterland can be prepared to conserve wetness during wet season and provide necessary water to the estate ground and the greater region in the dry season. The idea of retaining wetness in the productive hinterlands leads to a vision of a “wetness matrix” for Baakse Beek area in macro scale.

Based on the four criteria of wetness retention, economy, ecology and experiential qualities, the wetness retention strategies (Figure 7) were selected from case studies, historical study and relevant toolboxes and the analysis on the various landscape types in the Baakse Beek area. Then we assigned groups of appropriate wetness retention principles to each landscape type to make the initial compilation of wetness strategies that we named ‘wetness matrix’ (Figure 7).

This matrix is meant to convey a collection of appropriate landscape strategies for retaining wetness in the productive landscape of Baakse Beek area. Some of these strategies can be applied in macro or meso scales as a part of a robust area plan and some can be applied individually for micro scale wetness retention. They have the possibility to provide an array of options for local stakeholders where they can decide themselves which measure is most appropriate for them at a certain time in a certain context.

For the estate landscape, these strategies can create new possibilities for the productive hinterland to become an active support for the estates regarding functionality, leisure and enhanced nature values in micro and meso scales and thus rejuvenating tangible and intangible links. Similarly, in macro scale, the strategies help to bring back the lost link between the estate area and greater productive landscape of East Achterhoek where wetness is retained in the landscape for the combined benefit of all.

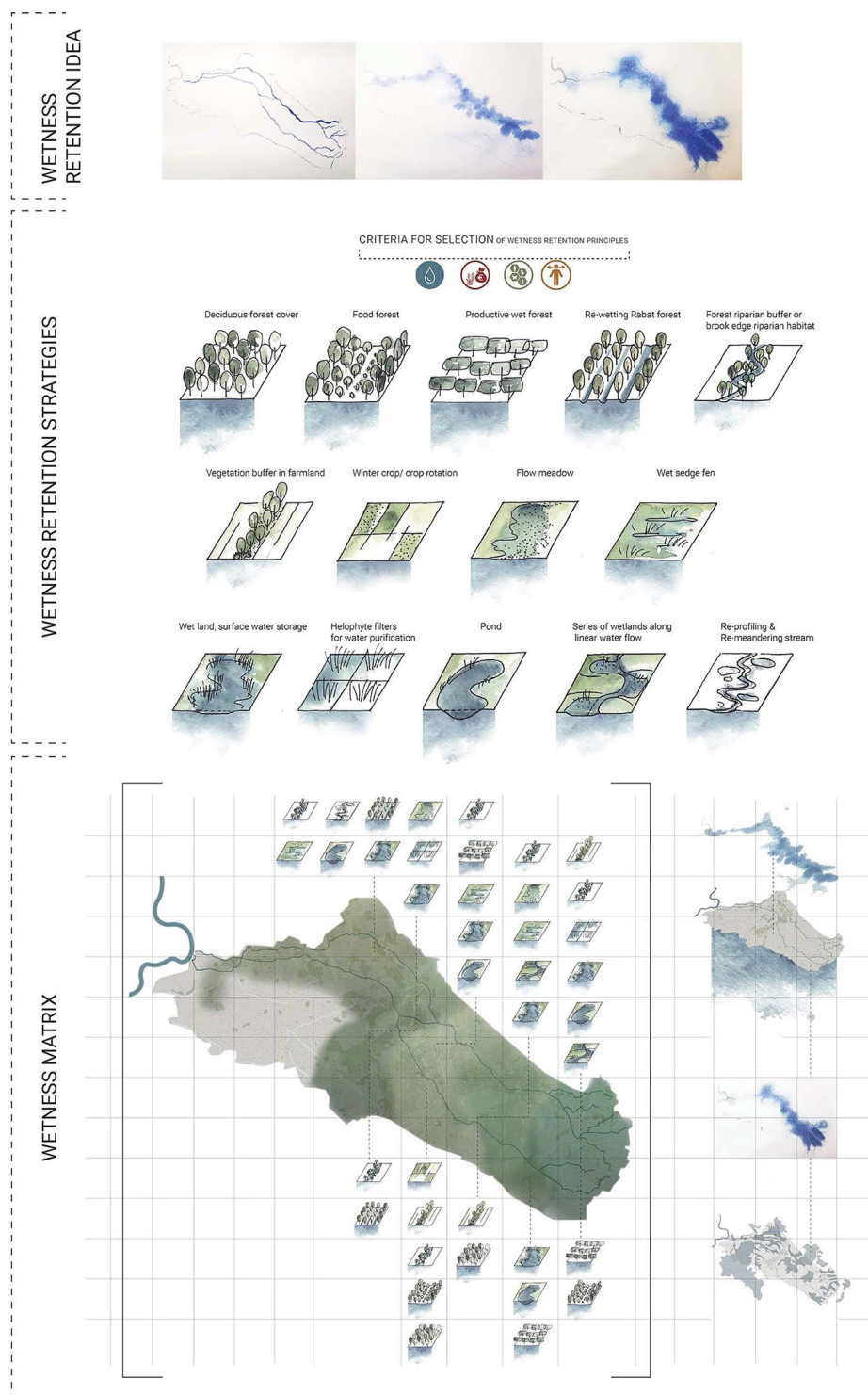


Figure 7. The wetness matrix; a macro scale wetness framework

Micro scale design intervention

In the micro scale, we explored how a landscape architectural intervention by applying different wetness retention strategies from the wetness matrix in the hinterland can introduce new value for the hinterland while restoring its lost tangible/intangible links with the inner core of the estate. As shown here in the plan, different degrees of wetness have been placed all around the inner core of the estate in its hinterland, occupying the lower meadow spaces, croplands, and some Rabat forest areas (Figure 8). Here, a routing is designed from the estate towards the wetness retention spaces along with some rest and

recreational spaces in the hinterland so that this retained wetness along with the existing cultural and historical landscape qualities can be experienced by visitors of this heritage place. Thus, the experiential link is also rejuvenated creating new meanings and values for this heritage landscape (Figure 8).

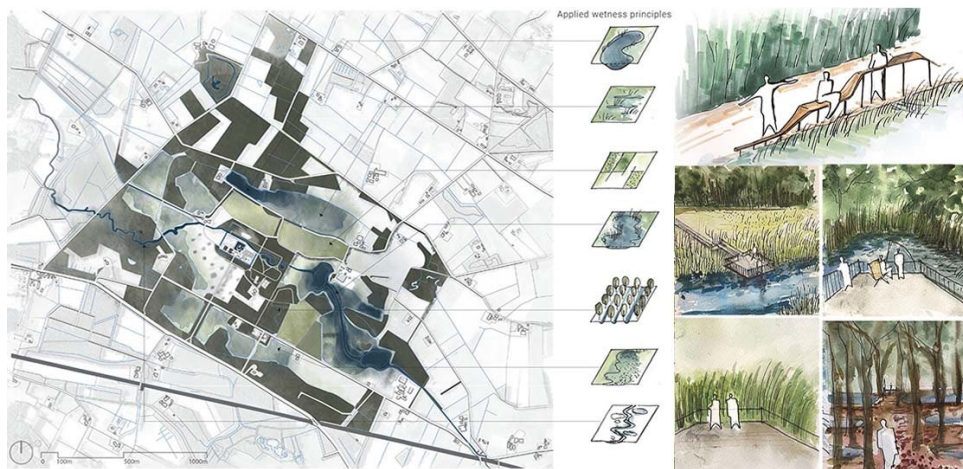


Figure 8. Landscape architectural intervention at Estate De Wiersse

Meso scale design intervention

The wetness principles from the matrix are also applied in the meso scale of the three estates De Wiersse, T Medler and the Wildenborch (Figure 9). Through these measures, the estates can revive their lost link with their own hinterlands as well as the Baakse Beek water system. The meso scale projections help us to comprehend that the wetness interventions for individual estates are not isolated measures and together, they should function as a landscape system for becoming resilient to climate change related challenges.

Working across the scales

The learnings from all the different scales are then reflected in further development of the wetness matrix and interpretation of future phases of wetness retention in the area. The tentative wetness reclamation phases (Figure 9) shown here, provide a basic understanding of what is expected in future, and a vision, towards which the entire region should work for. In the macro scale, applying large scale wetness strategies from the matrix, the lost wetness connection between the eastern part of Achterhoek and the estate landscape on the west side can be re-established ensuring water supply to the estate grounds all through the year (Figure 10). Along with the estates, the wetness conservation also benefits the agriculture, ecology, experiential qualities, and economy of the whole region. These wetness reclamation measures can be implemented by related authorities like the province and water board in consultation with stakeholders.

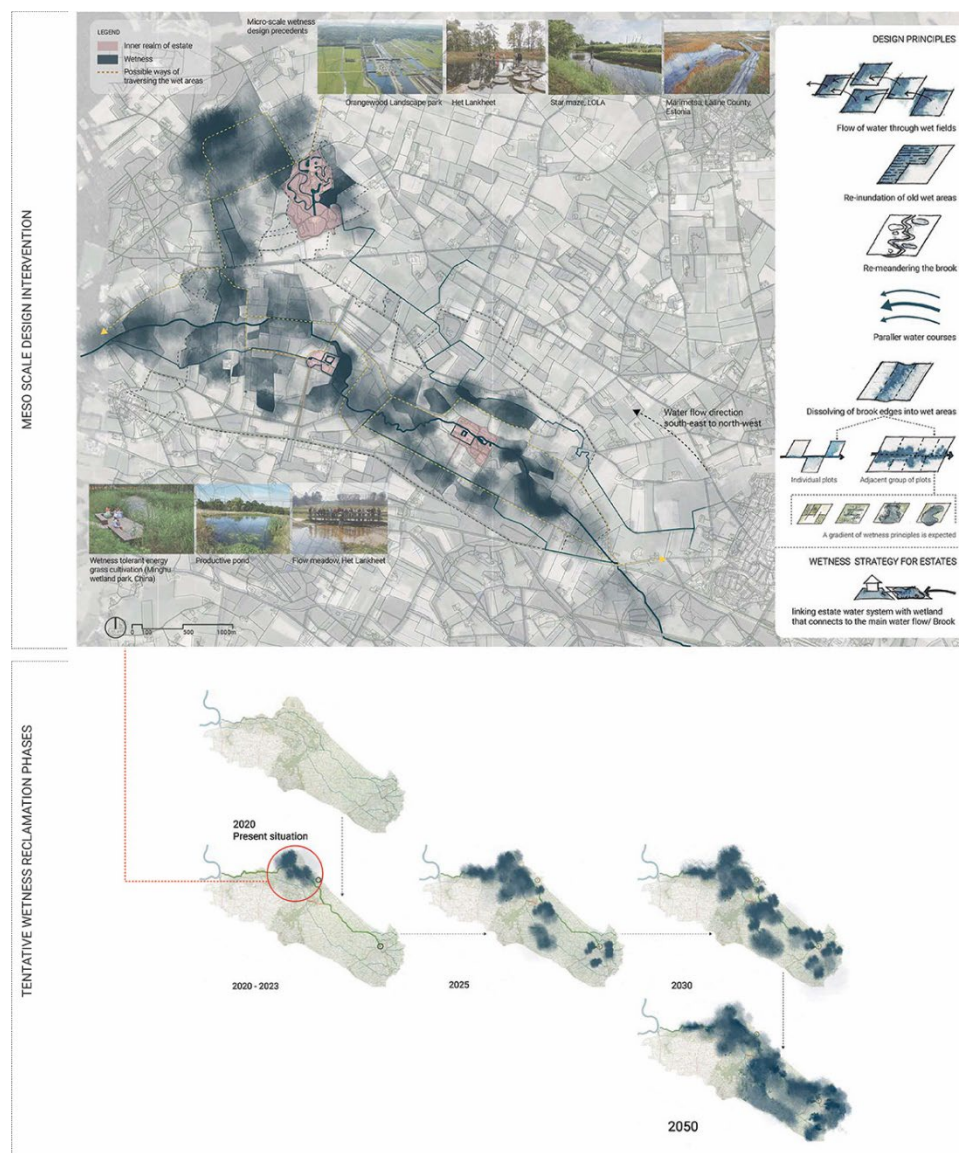


Figure 9. Meso scale design intervention and macro scale projection of wetness reclamation over time

CONCLUSION

In a research by design on rejuvenating lost tangible/intangible links between the estates and their hinterlands addressing an existing and imminent water crisis in the Baakse Beek area, we experimented with developing a multi scalar relational landscape design approach, that ensures future resilience of the heritage estates as well as the larger region.

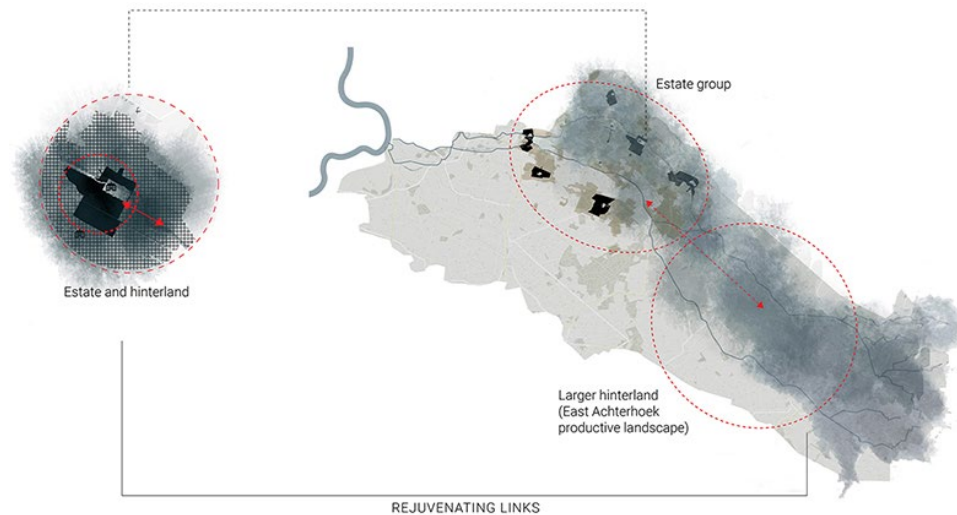


Figure 10. Rejuvenating tangible and intangible links at multiple scale levels through the relational landscape approach

A major issue that has been addressed here, is the fact that heritage sites are not dispersed points in space. The revival of their link to the broader context, from micro to macro scales, can ensure resilience towards threats like climate change, global warming, water scarcity, economical changes, ecological degradation etc. This is not only true for the heritage estates of Baakse Beek but similar heritage places all over the world.

In this research, we have experienced that the restoration of these links is not a hierarchical process but goes back and forth to create a web of interdependencies. This web of linkages is one of the key elements of ensuring resilience for the heritage constellations and the entire region against the present and future landscape challenges.

The research and design furthermore emphasize the experiential qualities and heritage values of cultural landscapes and the role of landscape architecture in making these values explicit. This can be relevant for landscape architectural interventions in other locations with characteristic cultural landscapes.

NOTES

- ¹Vista Landscape and Urban Design and Bureau Lantschap, Baakse Beek ontwerpstudie waterbeheer cultuurhistorie als inspiratiebron voor ruimtelijke (2006), https://www.wrij.nl/publish/pages/3108/027bb_landgoederenzone_baakse_beek_ontwerpstudie_waterbeheer_cultuurhistorische_als_inspiratiebron_v.pdf
- ² Elyze Agnes Charles Smeets, "Landscape and society in Twente & Utrecht: A geography of Dutch country estates, circa 1800-1950" (PhD diss., The University of Leeds, 2005), 1-2
- ³ Piet van Cruiningen, *Landgoederen en Landschap in de Graafschap* (Utrecht: Historische Publicaties Gelderland dl. 5, 2005)
- ⁴ Piet van Cruiningen, *Landgoederen en Landschap in de Graafschap* (Utrecht: Historische Publicaties Gelderland dl. 5, 2005)
- ⁵ Elise Holtman, "contours around cultural history; an investigation into the instrument of the country estate biotope in relation to the estates and country estates in the county" (Master's thesis, Vrije Universiteit Amsterdam, 2014), 33-39
- ⁶ Piet van Cruiningen, *Landgoederen en Landschap in de Graafschap* (Utrecht: Historische Publicaties Gelderland dl. 5, 2005)
- ⁷ Gerdy Verschuure-Stuip, "de buitenplaatsbiotoop of landgoedbiotoop", Vitruvius nummer 33 (2015): 19
- ⁸land-id. "Richly protected country estates". In land-id., *Ontwikkelvisie landgoederenzone baakse beek bronckhorst*, 28. 2019
- ⁹land-id., *Ontwikkelvisie landgoederenzone baakse beek bronckhorst* (2019), <https://www.wrij.nl/publish/pages/6032/ontwikkelvisie.pdf>
- ¹⁰ De Wiersse, *De Wiersse landgoedvisie 2014* (De Wiersse, 2014)

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PAVED AND REPAVED: CIRCULAR AND SOCIAL SUSTAINABLE MATERIALITY IN THE STREETS OF COPENHAGEN

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INTRODUCTION

Every street has, at its inception, social and cultural roles beyond its ‘object’ status.¹ The materiality is therefore a complex question of material and social import, and an intricate play between the street’s tangible and intangible identities. Circular and social sustainable materiality raise questions about heritage, technology, culture, and design when transformation changes paved urban streets into a repaved new edition. Many actors – planners, politicians, citizens, investors, special interest organizations – are involved, often with conflicting ideas and development objectives;² a complex set-up. Our contribution focuses on four cases³ in Copenhagen, recent research on circular economy in Denmark,⁴ and on social sustainable materiality.⁵

Internationally, urban streets are increasingly regarded as valuable social public spaces. Healthy Streets in London restore confidence in the city and seek to rebuild the city’s economy and society. In London, challenges include resisting a rising proportion of private vehicles and tackling London’s deep physical and mental health inequalities, addressing isolation, inaccessibility, and inequality. Further, the aim is to mitigate climate change and revitalize London’s economy.⁶ Paris’ plan for halving street parking similarly regards the streets as valuable social public spaces in combination with overarching subjects, e.g., climate adaptation.⁷ Scandinavian cities transform traffic-oriented streets into pedestrianized zones, referring to a historic heritage context, while contemporary climate adaptation and sustainability agendas also reign.⁸ Whilst transformation proceeds and the urban ground is a subtle and abstract medium for the horizontal elements and programs that compose a city, circular and social sustainable materiality may benefit from a more comprehensive attitude to the ground. Technology, culture and design, as included in the conference title, represent a comprehensive attitude in the interpretation of specific cases in Copenhagen.

Technologically, recent writing on landscape materials foregrounds their functional and technological nature where the adaptive reuse of existing materials, design for disassembly to minimize waste, etc. are encouraged. However, global generalized guidelines reduce and limit local material culture.⁹ The Danish Association of Landscape Architects have made circular economy operational, dividing one circle into four: The Inner Circle; Long Term Circulation; Cascaded Use; and Pure Circles.¹⁰ Sustainability involves environmental, social, and economic factors, but most construction evaluation systems focus primarily, if not entirely, on the environmental factor.¹¹ Circular and social materiality goes beyond a specific material, it expresses properties and also idiosyncrasies. Culturally, discussions

are usually synonymous with spatial and aesthetic concerns, therefore, Danish landscape architect and assistant professor Anna Aslaug Lund adds cultural and social aspects to the generally technological approaches to storm water management, when a study of streets uncovered three spatial dimensions: a) Ground, b) Orientation, c) Domain. The spatial dimensions promote social activities.¹² In her book *Reciprocal Landscapes*, Jane Hutton also exposes this combined and deep cultural and social relation of materials, when production, construction and transportation is related to social relations in New York and the reciprocal landscape where the materials were quarried. The complexity of circular and social sustainability meets in design. Within heritage is a similar complex situation, and American heritage scholars John Tunbridge and Gregory Ashworth define “new heritage” as a concern of managing change in the whole built environment and using heritage for the purposes of local development. They suggest dividing the complex situation into two main activities, “heritage selection” and “heritage targeting.”¹³ To come up with potential physical and aesthetic solutions, the designer simply needs to select among the many possible resources and target a prioritized assembly of the resources in the design proposal. Danish landscape architects Association’s four subcategories and three spatial dimensions from above similarly select and target circular and social sustainable materiality in the design process, which offers an opportunity to analyse and interpret cases.

On this background, the aim of this paper is to investigate the contemporary transformation of urban streets by studying recently transformed streets in Copenhagen. The objective is to discover and expose the tangible and intangible aspects of circular and social materiality, and to discuss the challenges involved in the high ambitions within this field of sustainability.

This paper introduces some of the present international technological, cultural, and design theory behind circular and social sustainable aspects to provide a scale and importance of street transformation, and to uncover some shortcomings in the actual transformation. In order to discover and expose new tangible and intangible aspects of circular and social materiality, this paper presents four case-studies in Copenhagen. The four case studies identify material variation defined by the materials available in Copenhagen’s centre for recycling.¹⁴ Two recent Danish publications serve as models for analysis and interpretation of circular and social sustainable materiality in the streets of Copenhagen. Four Danish categories of circular development and analyse and interpret the circular materiality in the cases, and the spatial dimensions of a) Ground, b) Orientation, and c) Domain provide an analytical framework for the social sustainable materiality. A discussion confronts and evaluates the specific regional cases with the international situation, in general, and the two Danish models, in particular. The paper concludes on lessons learned in the cases, and suggestions for future improvements of circular development, social sustainability, and design with materiality in the transformation of urban spaces.



Figure 1. Conceptual approach

TECHNOLOGY AND CULTURE IN COPENHAGEN'S SURFACE DESIGN

Natural stone setts are the result of a long tradition of providing transportation over land, especially when the concentration of people in urban areas became dense. Setts reduce dust and mud that occur when the road is paved with gravel or composed of existing soil. Granite stone setts reflect the resources most available in the region of Copenhagen.¹⁵ While material and temporal differences occur in paving, blended granite stone setts from the whole region proved to be the customary material in Copenhagen, together with a special half-metre square concrete slab. Granite stone setts came in three quality standards,¹⁶ they were sorted by size and physical properties and used in the streets ensuring accessible critical pathways, directing storm water, and providing conditions for outdoor workspaces, storage, and pedestrian circulation. Regulations on street paving were introduced in 1793, and in 1888 the municipality recorded and expressed Copenhagen's present situation at a Nordic exhibition in Copenhagen.¹⁷

Denmark's temperate mild summers and moderate cold winters with many freeze-thaw cycles have both technological and cultural impacts. Rain, sun, frost, and thaw influence natural stone setts, joints, and pavement subgrade technologically, and the microclimatic aspect of sun, clouds, humidity, and wind culturally influence the social outdoor urban life.¹⁸

Copenhagen city's recycling centre

Since 2011, the City of Copenhagen has had a recycling centre dedicated to giving used pavement materials, public benches, signage, playground equipment and the like a possible second life. Until 2011, on-site materials were reused, if possible, within the boundary of the site itself, e.g., when a delapidated public street or plaza needed renewal. After 2011, the recycling centre has enabled the exchange of materials across sites and time scales, since the centre has storage capacity. At present, the stock at the recycling centre includes 144 tonnes of natural stone in different formats and usages as valuable leftovers from various projects in the city over the last ten years. On a daily basis, ten to fifteen tonnes of stone enter the centre, and a little less leaves.¹⁹

A visit in June 2022 to the recycling centre revealed that the stored paving materials could be divided into four categories of circular development based on their past, present, and future history: Waiting to come back, Waiting for a second life, Waiting for a life, Waiting for? These four categories are used as an analytical framework in the case studies below.



Figure 2. Granite setts waiting to come back to Ny Carlsberg Vej.

Waiting to come back

Ny Carlsberg Vej is a street situated in the former industrial grounds of Carlsberg Brewery with a layout perpendicular to the hilly Valby Bakke. The street design from 1882 reshaped an existing road to serve as a new entrance.²⁰ Since 2007, a housing development scheme has changed the industrial area into a construction site, and in 2015 the street was repaved to ease the installation of new utility lines and access for construction trucks.

In 2015, trees were cut down and the street was repaved with asphalt. Before, the street had a wide profile paved with granite setts and additional pedestrian pavements at both sides composed of the materials and layout normally used in Copenhagen. Horse chestnut (*Aesculus hippocastanum*) in strips of gravel flanked Ny Carlsberg Vej. Granite setts, with joint lines perpendicular to the direction of traffic, accommodated the heavy loads of goods going in and out of the brewery by horse-drawn carriage. The street has a strong longitudinal orientation. The ground had separate domains of horse/motorized transportation on the street lanes and wide space for walking. While the street and many buildings in the new district are designated as worthy of preservation and changes need approval from the authorities, the granite setts were transported to Copenhagen's recycling centre for temporary storage. The plan is to return them in 2024, and they can be classified under Long Term Circulation. These particular granite setts have a reddish colour and uniform shape, different from other stones at the recycling centre, and remind us that the Carlsberg brewing family were willing to spend money in order to fulfil their interests in art and architecture.²¹

Local citizens, the developers, and others in 2015 and later discussed different views on heritage in the Carlsberg district and the street design for Ny Carlsberg Vej, balancing between the history and contemporary car – and bicycle – traffic. Alternatives swayed between complete reconstruction, new joint patterns to reduce noise from motorized traffic, post-processing parts of stones to make the surface more even and pleasant for cycling, or simply keeping asphalt and using the stones in another place at the site.²²



Figure 3. Granite setts waiting in their second life on Linnégade.

Waiting for second life

Linnésgade and Rømersgade are two parallel streets located in the city centre of Copenhagen connecting the Botanical Garden, the food market Torvehallerne, and the public park Ørstedsparken.²³ The project was designed by Gottlieb Paludan Architects and implemented in 2021.

In order to slow down traffic, as well as to underline the historical character of the district, it was decided to pave the road with natural stone setts. The street had originally been paved with granite stones, but these had been covered with asphalt in the twentieth century. The ambition was to reuse as much of the existing paving as possible. Accordingly, the granite stones were uncovered, cleaned, and reused as paving for the new design. Thus, the project in Linnésgade and Rømersgade draws on three out of four circular categories: Long Term Circulation, Cascaded Use, and Pure Circles, but none of the existing asphalt paving or subgrades were reused, and a new curb-line resulted in a complete change of the site. The new design of the streets has altered the spatial dimensions. In essence, the project transformed the ground of the street (street profile and paving). The combination of wider pavements and the use of natural stone setts on the road has slowed down car traffic and thereby created a pedestrian-oriented street. The pedestrian domains were augmented by granite sett paving beside the pavement between pockets of parking spaces, trees, and pedestrian crossing zones. The perception of the orientation and domains strengthen Linnésgade and Rømersgade with a recreational connection.

Linnésgade and Rømersgade are an example of the use of natural stone setts that is founded on considerations of materiality and that clearly provides a new spatial quality to the street design.

Waiting for a life

In Østerbro, Tåsinge Plads, a triangular new urban space appeared in 2015 in a city district from the 1900s. Transformation and upgrading of stormwater management in two local streets, reducing traffic and parking, led to the design of the plaza.²⁴

Small habitats replaced one thousand square metres of impervious street paving. Six hundred square metres of granite setts waiting for their next life were used. While the overall paving scheme reflects Copenhagen's traditional rectangular concrete flags and granite setts, six hundred and twenty-five square metres in the centre of the square were paved with granite slabs from Copenhagen's recycling centre. The granite slabs were originally used in the Ørestad district, and some still remain in storage waiting for a new life.

Stormwater management – by its construction character – disrupts the street topography and subgrade construction, and surface paving materials must be removed, stored, and replaced or substituted; this means that concerns included in the Inner Circle and Long Term Circulation are challenged. Copenhagen's concrete flags and granite setts can be reassembled. The re-used granite slabs in the centre of Tåsinge Plads are an example of Cascaded Use. All the paving materials can be disassembled and represent a Pure Circle.

The ground along the perimeter of Tåsinge Plads and along the street Tåsingegade was paved with the Copenhagen style pavement, with the orientation and the ground indicating a path connecting the urban structures. The pavement also cuts through the green area, creating different green domains called “dry mound” and “moist depression.” Six hundred square metres of ground with granite setts in the shadow of two perimeter-blocks have created a new domain and frame the central six hundred and twenty-five square metre domain of the square with granite slabs.

Even though the pavements and granite setts are familiar to Copenhagen, small aesthetic details express an effort to create something special and invite people to stay a while. By introducing additional re-used granite from the Copenhagen recycling centre, the centre of Tåsinge Plads signals circular development and creates a meeting point.

Waiting for?

Gernersgade is situated in the historic centre of Copenhagen in a residential area of houses that are predominantly 2½-3 storey listed “building association houses” from the second half of the nineteenth century. In neighbouring streets, houses dating back to the fifteenth and sixteenth century make the whole district a true historic place and a tourist attraction.²⁵ Gernersgade has little to no traffic because the centre point of the street is blocked to cars, allowing only bikes to pass through. The City of Copenhagen started renovating the degraded asphalt surface in 2021 as part of an overall renovation scheme for replacement with new state-of-the-art asphalt. However, as asphalt was removed the original granite setts were exposed, starting a fight about the future design of the city between city officials, politicians, and local residents.

The orientation of Gernersgade is mainly influenced by the traditional street profile with six-metre-wide granite setts, additional curbstones, and a pavement on each side of the street. Orientation across the street occurs in some places where Copenhagen’s traditional concrete slabs lie perpendicular to the facades, and many front door staircases point in the same direction. A shared domain for pedestrians and cyclists exists because of minimal car traffic and parked cars.

The forgotten and hidden granite setts were removed from Gernersgade and later crushed into smaller aggregates as there were remnants of asphalt on them. The crushing of natural stones together with other degraded concrete building elements is reuse, however not within the principles or circular economy. Crushing the granite setts from Gernersgade was based on the assumption that setts with asphalt remnants have no aesthetic value and cleaning them is too costly.²⁶ The residents in Gernersgade blocked the street to prevent construction workers from removing the granite setts. However, the City of Copenhagen removed the stones, stating that it was too costly to repair the street by re-use of the setts. The street’s residents argued that removing the setts would be destroying the soul and history of the district.

DISCUSSION AND CONCLUSION

Natural stone materials and setts are generally considered to have circular materiality. The cases of Linnégade, Rømersgade, and Tåsinge Plads reflect this, while Gernersgade and Ny Carlsberg Vej in different ways deny the circular materiality and instead consider prioritizing project economy and comfort for cars and bicycles. The four categories of circular development offer a vocabulary in this discussion, and one case includes natural stones which can easily be defined under three of the categories; however, none of the cases depict the Inner Circle. Every case has excavated and changed everything in the street, and that is also what goes on internationally – circular sustainable materiality is included in the line-up of policies, for example in London and Paris. “Doing less”, which is the essence of the Inner Circle, would in fact maintain sustainable circular materiality better. The specific case of Long Term Circulation and Cascaded Use doesn’t help the designer to opt for a specific material. The visit to Copenhagen’s recycling centre emphasized how circular sustainable materiality on a larger urban scale depends on which materials are waiting, and available. The capacity to store materials will also affect circular materiality. You can’t simply decide to adopt a circular approach, and then expect to find materials as you would in the market for new materials. Focus on the Inner Circle challenge local citizens’s expectations for new and fresh design, and a changed understanding of newer historic urban layers also include new aesthetics. Further, doing less, affects, e.g., stormwater management, climate adaptation and other sustainable issues, because of alterations underground.

Linnégade and Rømersgade and Tåsinge Plads reduced parking capacity, similar to London and Paris, and assumed sustainable social materiality would arise, yet the cases mainly prepare of the ground that indirectly invites social activities. Orientation in all four cases was mainly focused on pedestrian circulation using the traditional Copenhagen pavement to indicate the flow. Domains in the four cases

mainly arise from areas between parking, trees, and pedestrian crossings determined by old and new forms traffic arrangements. It seems like the materiality of natural stone setts by default is expected to mean social activity. Gernersgade and Ny Carlsberg Vej have an ambiguous attitude to natural stone setts, because the setts are meant for car traffic, functional interest competes with historic concerns, and social qualities are less apparent in the spatial dimensions. The spatial models function well in the interpretation of the cases, however none of the four cases support social materiality by novel interventions or by combining many spatial dimensions from facades, topography, elements, and paving in one domain.

Our study of the circular use of natural stone setts in Copenhagen concludes a key role of aesthetics as both catalyst and obstacle for valuing and preserving circuits of materials. “Doing less” requires new conceptions of aesthetics and a more open mind to how and where social activities should take place. Apparently, policy programmes, designers, and citizens are hooked by the same underlying narrative of natural stone, a semiology which the four circular categories question, however it is only when specific cases set their priorities that we realize that the underlying narrative is challenged and pacified by other concerns in the final design. Narratives of natural stone in general, and natural stone setts in particular, should clarify whether an “inner circle” or long term circulation and cascaded use addresses tangible and intangible sides. Sustainable circular and social materiality can only compete with economic issues, climate adaptation, and the like, if the purpose and objectives are articulated comprehensively. Spatial qualities and attributes of coherent surfaces of natural stone deserve attention beyond being historical and offering available ground between trees, parking spaces, and pedestrian crossing peninsulas.

A vocabulary about aesthetics, materiality, and spatial qualities constitute essential drivers for the implementation of the circular use of natural stone setts. However, the role of the categories for supporting the transition towards circular thinking in the material practice has not yet been fully explored in professional design practice. Future research can resolve specific cases determined to circular economy and elaborate on intangible aspects of aesthetics, semiology, and spatial quality. Sustainable circular and social materiality request another mindset to become a game-changer.

NOTES

¹ Landscape architect and professor Lawrence Halprin highlights how the type of flooring used in the city can guide the activities and movements of pedestrians through the affordances of its materiality.

² Svava Tietjen and Anne Riesto, *Planning with Heritage*: cites John E. Tunbridge and Gregory J. Ashworth, for “New Heritage”, “Heritage is no longer exclusively defined and managed by heritage experts. Rather, it is made in inclusive, collaborative processes involving many actors”.

³ The streets: Gernersgade; Linnégade, Rømersgade, and Vendersgade; Tåsinge Plads; Ny Carlsberg Vej in Copenhagen, can be located on digital maps

⁴ See publication: Circular Economy in Landscape Architecture (2022), available at <https://www.landskabsarkitekter.dk/wp-content/uploads/2022/03/Circular-economy-in-landscape-architecture.pdf> - accessed June 7, 2022.

⁵ The research in social sustainable materiality was part of Anna Aslaug Lunds phd-thesis, where she brings an analytical and design-oriented perspective on street design with a focus on perceived sensuous and social qualities and to support natural ecologies in the city.

⁶ “Streetspace Funding and Guidance,” Transport For London, accessed June 2, 2022. <https://tfl.gov.uk/info-for/boroughs-and-communities/streetspace-funding>

⁷ “Paris halves street parking and asks residents what they want to do with the space,” World Economic Forum, accessed June 2, 2022. <https://www.weforum.org/agenda/2020/12/paris-parking-spaces-greenery-cities/>

⁸ Scandinavian cities transforming traffic-oriented streets into pedestrianized zones is well-documented in the records of the municipality of Copenhagen, see <https://www.kk.dk/dagsordener-og-referater/Teknik-%20og-%20Miljøudvalget/møde-28102019/referat/punkt-6>

⁹ American landscape architect and assistant professor Jane Hutton sees LCA and building rating systems as the global industry’s mechanism to account for the environmental impacts of construction.

¹⁰ In 2020, The Danish Association of Landscape Architects (DL) issued a guideline to approaching circular economies. The structure was adapted from the Ellen MacArthur Foundation, to offer specific design projects an indication of the many potential approaches to circular economy. The key to *the Inner Circle* is retaining existing project parts. *Long Term Circulation* is any effort intending to prolong the lifetime of structures, and/or to minimise the resources needed for maintenance. *Cascaded Use* keeps the materials in circulation, even in reshaped or refurbished forms. *Pure Materials* often have a higher resale value, even often increasing in value over time.

¹¹ Jane Hutton, “While the sustainable building literature generally agrees that the pursuit of ‘sustainability’ must involve environmental, social, and economic factors, most construction evaluation systems focus primarily, if not entirely, on the environmental. *Reciprocal Landscapes – Stories of Material Movements* (Routledge, 2020), 4.

¹² Anna Aslaug Lund, *Room for Rain - The City as a Garden and the Future Streets*, PhD thesis, (Gottlieb Paludan Architects, Rambøll, Department of Geosciences and Natural Resource Management, University of Copenhagen), 162-164. Ground, orientation, and domain provide the street with three spatial dimensions, which promote social activities, such as the edge zone; informal seating; uneven paving (zone for staying); corners; coherent surface and involvement.

¹³ Heritage selection starts from a “quarry” of possible heritage resources such as “past events, personalities, folk memories, mythologies, literary associations, and surviving physical relics.” Heritage targeting assembles these resources and interprets and packs the selected heritage with other relevant resources into a tailored “heritage product.”

¹⁴ The case-study research is a information oriented selection of maximum variation cases according to Bent Flyvbjerg, “Five Misunderstandings about Case-Study Research,” *Qualitative Inquiry* 12(2) (2006): 230.

¹⁵ The region includes the Danish island of Bornholm and Swedish coastlines in the Baltic Sea and in Kattegat and Skagerak. The region also includes Polish and Norwegian coastal quarries. The granite setts in Copenhagen are based on ballast from ships returning to or passing by Copenhagen, where the city bought stone for a fixed annual price. *Københavns Brolægnings - og Vejvæsen* (1888). In Denmark the surface ground consists of fertile unmetamorphosed sediments brought with ice from areas in the present Norway and Sweden. Stones were often used as they were found in the landscape, small and rounded, however bigger stones were split for transport, with the split sides used for doorsteps and paving. Bornholm founded quarries in the late eighteenth century and natural stone setts were exported to Copenhagen.

¹⁶ Old Danish Standard (1935) DS136 is published in Holgersen, Søren and Dam, Torben Befæstelser <in Danish> DS 136 specifies quality A joints max 1 cm, quality B joints max 1,5 cm quality C joints max 2,0 cm

¹⁷ Two documents in Danish reveal the conditions street lay-out and width of sidewalks and driving lanes. It also detail material shape and properties, see Forordningen om Vei-væsenet i Danmark af 13. december 1793 og Københavns Brolægnings- og Vejvæsen, 1888.

¹⁸ The prevailing weather phenomena and the average temperature during winter is 1-2 °C and 17-18 °C in summer. All in all, natural stone setts, ready at hand and with weather conditions in mind, are considered a first choice for pavements in the city.

¹⁹ 51% of the surface in Copenhagen is paved, 47.1 km² in total. A square metre of granite stone setts is approximately 0.5 tonne. The storage of 144 tonnes equals approximately 300 m² and the actual amount of granite setts in Copenhagen is far bigger

²⁰ In fact, the street name relates to a bitter strife between father and son over the beer's fermentation process, eventually leading to a split between the two and the foundation of the competing brewery Ny Carlsberg <ny is new in English>

²¹ Leading Danish architects over a period of one hundred years are responsible for building and rebuilding the brewery site. Today the industrial grounds are one of twenty-five national cultural monuments.

²² See the website of nearby neighbourhood, Humleby (<https://humleby.dk/2015/07/2027/>), local newspaper Ugeavisen (<https://ugeavisen.dk/kbhliv/artikel/kampen-for-kvarterets-sten>), among others

²³ The district was historically – until the late nineteenth century – formed by the green fortification belt of the city. For decades, until 2021, Linnésgade and Rømersgade were car-oriented streets with relatively narrow pavements, predominantly asphalted roads, and a high number of parking spaces. With reference to the history of the site, in 2017 it was decided by the municipality to retrofit the streets and plant trees in order to accentuate the historical green connection. In addition, the aim was to create more space for pedestrians by reducing space for parking, widening the pavements and modifying the paving.

²⁴ As an example, see “Nyboder,” Visit Copenhagen, accessed July, 29 2022.

<https://www.visitcopenhagen.dk/koebenhavn/planlaeg-din-tur/nyboder-gdk410757>

²⁵ Inspector at Peterspladsen (City of Copenhagen's recycling centre) makes it clear during our visit on June 14, 2022 that no stones with asphalt are allowed at the recycling center as they are not seen as a resource in future projects. Instead, trucks are directed to the treatment centre next door where granite setts are crushed with other types of construction and demolition waste.

²⁶ Head of City Maintenance (Byvedligehold og Tilsyn), Jane Snog estimated that keeping the granite setts would increase overall construction costs to almost twice the cost of using asphalt (“Beboere i oprør: Kommune fjerner gamle brosten og erstatter dem med asfalt,” TV2/Lorry, accessed July 29, 2022

<https://www.tv2lorry.dk/koebenhavn/beboere-i-oproer-kommunen-fjerner-gamle-brosten-og-erstatter-dem-med-asfalt>).

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HISTORICAL AND TRADITIONAL TRADE: A FUNDAMENTAL ELEMENT OF THE CULTURAL IDENTITY OF CITIES. A REPORT ON THE SURVEY ON FLORENTINE HISTORIC SHOPS

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INTRODUCTION

The paper investigates the relationship between the city and historical and traditional trade, which testifies to the cultural evolution of cities while portraying behaviours and social habits reflected in the urban facades and the streets. Historical centres are particularly subject to a loss of identity, which follows the decline of artisanship and tradition, and jeopardises the integrity and authenticity of the entire site.

Historic and traditional shops have a fundamental role in preserving the urban heritage. In particular, the main commercial streets are necessary for social sustainability and cultural exchange.

Shops are the central place of human relations, representing an essential testament to their demo-ethno-anthropological heritage. The crucial role of the commercial landscape highlighted the need to record the intangible value in the urban documentation and survey campaign. These aspects represent the fragile part of cities' heritage that should be safeguarded to preserve the site's "authenticity".¹

In fact, «Retail history is a rich, cross-disciplinary field that demonstrates the centrality of retailing to many aspects of human experience, from the provisioning of everyday good to the shaping of urban environments; from earning a living to the construction of identity».²

The research aims at defining more homogeneous criteria and operational protocol for the documentation of historic shops, along with considering the material aspects of the architectural structure, the furniture, the shop windows, and their relations with the urban environment, history, social life, and economic and artistic culture.

The historical Centre of Florence is the case study for this in-depth analysis. A collaboration between the University of Florence and the Municipality of the city was set up in 2017, with the aim to define a new strategy for safeguarding and enhancing the cultural heritage of historic shops.³ Furthermore, the research investigates the relationship between historical and traditional shops and the city, underlining the mutual influence between the tangible elements of architecture and urbanism and the intangible heritage of tradition.



Figure 1. From left: Berlin's historic KaDeWe shopping centre during the Christmas season. Detail in decorated ceramic of a commercial front in Oporto. Leadenhall Market internal gallery in London (credit: Simone Bettoli)

CITY AND COMMERCIAL HERITAGE

Since ancient times, commercial architecture has been based on the principles of perception, with decorative devices being used to attract customers' attention.

Over time, the relationship between shops and public spaces has evolved, creating complex systems that increasingly transcended the physical reality of the streets, entering the “hyperuranic” world of telecommunications. The contemporary city has a double spatiality: the physical sphere of everyday life and social relations in the streets and squares; and the super-local, a virtual spatiality made of flows and networks.⁴

The fast evolution of commerce and trends constantly modified cities, weakening their historical identity over time.⁵ The architecture of urban spaces is dynamic: streets, squares and buildings are the constants that define a city's structure, while shops are inevitably subject to changes, which will also influence the social life.

The management of a city's commercial landscape involves many actors; First and foremost, the owners' interests must be balanced with those of the sellers, as well as the tastes of an increasingly globalised clientele. It must also consider the local community, who together with the shopkeepers constitute the social value of the city.⁶

All these aspects have a significant impact on the community: «When local shops change from one type to another, long-time residents and users experience a wrenching sense of loss. They have lost their “moral ownership” of the street, a sense of belonging that goes beyond legal property rights and is based on a deep identification with the culture of the space».⁷

In this context, the role that local shops play in structuring the identity of a neighbourhood or urban district is fundamental.⁸ These activities are often family-run and define the commercial character of a street, becoming reference points for the local community.⁹

The shops are not only the backdrop for shopping, but have substantial importance for social sustainability and cultural exchange within cities: local stores help build community, maintain a human scale, and contribute to local economic growth.



Figure 2. From left: Entrance to the historic Viena café in Barcelona. Detail of the historic Ginjinha Rubi restaurant in Lisbon (credits: Roberta Ferretti). Commercial front of the Tullio Bosio pharmacy in Turin (credits: Gian Marco Tramontano)

Historic and traditional shops

In the Seventies and Eighties, many European historical centres underwent a radical change with the development of suburbs, the diffusion of supermarkets and the increased use of private transportation. The widespread use of low-cost airlines and the development of mass tourism impacted the way we experience cities. Historical centres attract investments from large international companies eager to open luxury hotels and chain stores. This situation has a significant impact on the local economy: it contributes to increasing the real estate values and it encourages the exodus of residents to the suburbs. The departure of part of the residents and the closure of local shops lead to a loss of identity, impacting the remaining community that makes the city alive and functional.

In European cities such as Florence and Lisbon, these changes are mainly due to tourism (*touristification*), which continues to attract foreign companies that invest in the area without providing local economic improvements.

Today's commercial architecture is strictly influenced by e-commerce and modern technologies such as Augmented, Virtual and Mixed Reality, and it is evolving continuously, influenced by trends. In this context, the historic shop represents the permanence of the past in the present, handing down part of the history of cities and territories. Year after year, these substantial changes become less noticeable as they are part of everyday life. To protect the commercial and social heritage of the city, some local administrations have developed tools to identify and inventory those shops that in some way help to pass on local historical and cultural identity.

Generally, a “historic and traditional shop” is a commercial activity that has been operating in a static space for at least 50 years, that has maintained its original function and link with tradition over time, passing down the knowledge and practices through the generations. Several European cities have promoted documentation and safeguarding projects, such as *Lojas com Historia* of the Municipality of Lisbon and *Ruta dels Emblemàtics* of the Municipality of Barcelona.

In this problematic context, encountered throughout Europe and aggravated by the 2008 crisis and the COVID-19 pandemic, historic shops are surviving according to three main approaches.¹⁰ resistance (remaining authentic, hoping for an economic and political change); resilience (adapting to the new times through the proposal of more marketable products); modernisation (through a significant transformation of the image, product, and customers).



Figure 3. Artisans in Florence. From left: Work tools from the Nardi Orafi laboratory. Decoration of a Madonna on wood, Dipinti Bianchi company. Work tools of the Balsimelli Bookbinding

HISTORIC SHOPS AS WITNESSES OF INTANGIBLE CULTURAL HERITAGE

To understand the research's goal, it is essential to consider the value that historic shops assume as demo-ethno-anthropological heritage and which can be the tools to analyse both their architectural and urban and socio-cultural value. Cultural heritage is not only made up of physical elements such as buildings and monuments but also of traditions that have been passed on through the generations. These traditions and their constant renewal are the engines that keep the cultural process of a city and a territory alive over time and constitute the critical element of irreproducibility. In fact, once the intangible heritage has disappeared, it cannot be recreated.

Artisans and their traditional manufacturing processes are an irreplaceable resource, which help preserving the know-how that was an integral part of the city, and continues to keep the image of the city intact. The profound interdependence between intangible and tangible cultural heritage has long been ignored, sometimes leading to the survival of architecture despite its social value. Some historical elements, such as signs and furnishings, remain silent witnesses of a commercial and productive past as a mere element of street furniture. By adopting the *Convention for the Safeguarding of the Intangible Cultural Heritage*¹¹ in 2003, UNESCO took an essential step towards recognising this cultural heritage, considered fundamental to maintain cultural diversity and promote of intercultural dialogue.

With the introduction of the term “Intangible Cultural Heritage” (ICH), UNESCO not only wants to shift from the material to the immaterial dimension, but it also recognises cultural expressions as cultural processes in their entirety and complexity, to be considered dynamic over time.¹² An important innovation introduced by the 2003 Convention was to replace the term “conservation” with that of “safeguard”, recognising the intangible heritage as a living object. That means that cultural heritage must be considered free to evolve, overcoming the static criterion of preservation.

The 2003 Convention raises the question of what we want and must consider heritage to preserve those local cultural aspects to be handed down to future generations. However, the intangible heritage is more fragile than the material one, as it is closely linked to the people who make it exist. This entails the need to develop protection strategies that consider various aspects. As already mentioned, the difficulty of safeguarding intangible heritage is connected to habits and traditions that have been handed down spontaneously over time, and any forcing can compromise their authenticity. The UNESCO label and its strong attractiveness influences the tourism industry, which often intervenes negatively in the genuineness and survival of cultural events.¹³ In this context, the recognition of ICH remains a significant step forward in a historical period in which globalisation tends to level out and erase less intense cultural expressions and which are impossible to recover once they have disappeared.

In particular, the close correlation between tangible and intangible heritage, place, tradition, and culture is highlighted, as the one depends on the other in terms of maintaining the concept of “authenticity”.

Documentation and safeguarding strategies

To define a system of safeguarding and protecting commercial activities, it is necessary to consider their historical evolution over time, highlighting the dynamic nature of commercial architecture, excluding static documentation systems and conservative safeguard systems.

One of the things that mainly emerged from the history of contemporary commercial architecture is the dynamism of the forms, which must attract and be constantly innovative, modifying the “image” of cities at pace with the evolution of commerce. The 2003 Convention recognises “inventory” as the essential measure for the protection of ICH,¹⁴ and it identifies the three phases of the inventory methodology:

- a) Research and data collection in the field;
- b) Identification and multimedia documentation (paper, audio or visual);
- c) Interpretation of the acquired data.¹⁵

The act of documenting records an exact moment of the phenomenon under investigation and can slow down or even stop the possible development.¹⁶ The 2003 Convention highlights the dynamic nature of culture, recognising its evolution and the need for its vitality. The Convention insists on the essential social function of heritage and the importance of the participation of communities in all stages of the process of safeguarding the Intangible Cultural Heritage,¹⁷ preferring a bottom-up system, i.e., mainly promoted by the interested parties, over top-down, i.e., mostly based on administrative protection strategies.

These assumptions are an essential reference in research projects concerning historical and traditional shops, especially in those contexts where craftsmanship is an integral part of urban culture. The need to develop an intervention strategy to document, understand, manage, and promote the intangible elements of the commercial architectural heritage is an increasingly debated issue on the international scene, as it will help preserving the historical commercial identity of cities.

HISTORIC SHOPS IN THE UNESCO CITY CENTRE OF FLORENCE

Historical centres are suffering for the loss of “authenticity”, catalysing mass tourism and becoming fertile ground for investments by multinationals and large international brands aimed at exploiting the “shop window” factor of the city. The research aims to focus on the issues and develop a method of interpreting the phenomenon of historical and traditional shops through the case study of Historical Centre of Florence. In Florence, the constant loss of local and historic shops prompted the municipal administration to develop an intervention plan in 2018, which led to the draft and approval of the *Regulations for the protection and enhancement of historical and traditional Florentine economic activities*. The value of “authenticity” of the historic centre of Florence, included in the UNESCO World Heritage List in 1982, is strongly linked to the uniqueness of Florentine craftsmanship and traditional shops, which guarantees the continuity of an exceptional practice connected to the “image” of the city. Amongst the criteria for inclusion in the list, the importance of historic shops is highlighted, which testify to the past and constitute a factor of continuity with the present.

The development of an investigative methodology to document historic and traditional Florentine shops requires understanding the role played by commercial activities towards the city and the historic centre, highlighting their relationships and deep interdependence. The investigation into the historical evolution of the shops does not only mean studying the history of the city and the development of its political and economic aspects, but it is also useful to highlight and analyse the social relationships and the role that craftsmanship and tradition play in the cultural and urban image of the city. The recent

improvement in digital survey technologies and Digital Humanities have resulted in increased opportunities in heritage documentation, facilitating a rapid updating of data and the development of increasingly intuitive and immediate user systems. These tools consent to a multilayer methodology that connects and integrates the aspects of the qualitative and quantitative survey with those of the architectural study.



Figure 4. The census was carried out within the municipal perimeter. The image shows the four pages of the data-sheet census form, the GIS with the location of the historic shops in the UNESCO centre of Florence and some characteristic historic shop windows

The digital survey campaigns

The starting point for this research lies in structuring the data-sheet census system that allows the rapid updating of data and the timely extrapolation of helpful information at various scales of intervention. Laser-scanner and photogrammetric *Structure from Motion* (SfM) digital surveys supported the census to document the shops as a physical element in constant evolution. The project database is therefore composed of a constantly updated side connected to a GIS (*Geographic Information System*) and a static one that documents some shop's crystallized images through drawings. The census form is divided into four main sections:

- (A) General classification data;
- (B) Description of the architectural structure;
- (C) Description of the history and products;
- (D) Relationship with the urban context.

The census involved over 400 commercial activities within the municipal area. The survey investigated links, history, product characteristics and processing techniques through interviews with shopkeepers, creating an archive rich in multimedia material: photographs, videos, and stories. These data have contributed substantially to understanding the fundamental problems of preserving this heritage. The digital survey activities considered three scales of intervention: the small shop, the monumental complex, and the commercial street.¹⁸ The case studies, chosen for their environmental and architectural value, were involved in digital laser-scanner and photogrammetric SfM surveys to represent the interiors and the relationship with the urban front.

The survey campaigns were carried out using a Faro Focus M70 and a Z+F 5016 laser-scanners, equipped with integrated cameras that acquire highly descriptive 3D data, supplemented by well-balanced high-resolution images in colour representation.



Figure 5. 3D point cloud models at the three scales of analysis: the small shop, the monumental complex, and the commercial street

The data acquisition involved planning many stations to obtain a complete 3D point cloud model, some of which overlapped at different heights, to avoid the formation shadow cones on the surfaces. Once registered, the point cloud required a post-production and data cleaning process to remove improperly generated parts due to the shiny, reflective, translucent, and transparent surfaces. The SfM photogrammetric survey concerned the external facade of the buildings, focused on shop windows and signs. The architectural drawing was performed at a detailed scale of 1:20, in addition to drawings on a scale of 1:10, 1:5, 1:2 and 1:1. Plants and sections represent the historical furnishing systems and decorative elements, drawn based on sketches and measurements taken by the direct survey. The digital survey campaign applied to the case study of the historic shops of the centre of Florence served to return the graphic drawings representing plans, elevations, and sections, helpful in setting up an abacus of the characterizing elements, to deepen further the historical activities in different cities of Italy and Europe, and to relate mutual influences and their evolution throughout history.



Figure 6. Images from within the 3D point cloud models. Top left: Molteni Pharmacy; top right: the Bizzarri shop. Bottom left: the Baccani Frames and Prints shop; bottom right: the Officina Profumo Farmaceutica of Santa Maria Novella

CONCLUSION

Coordinating the various parts of the documentation and information collected during the survey phases is essential to offer a reliable overall picture, which also considers the heritage's intangible aspects. The historic shops' value as a demo-ethno-anthropological testimony constitutes an asset that cannot be

separated from the city in a rational planning framework consistent with the identity of the place. The analysis aimed to develop a reference model for research, documentation, management, and protection of historic shops – applicable nationally and on the European and international scene – to define broader and more complete economic and cultural dynamics that bind historical commerce and cities.

The research highlights an essential issue for safeguarding historic shops: the dynamism of trade undermines a static protection system that would risk making the spontaneous aspects of culture, architecture, and the city disappear. However, it emerges that some fixed and essential points relating to conserving the historic image of shops can be identified under the principles of the UNESCO Convention on ICH.¹⁹

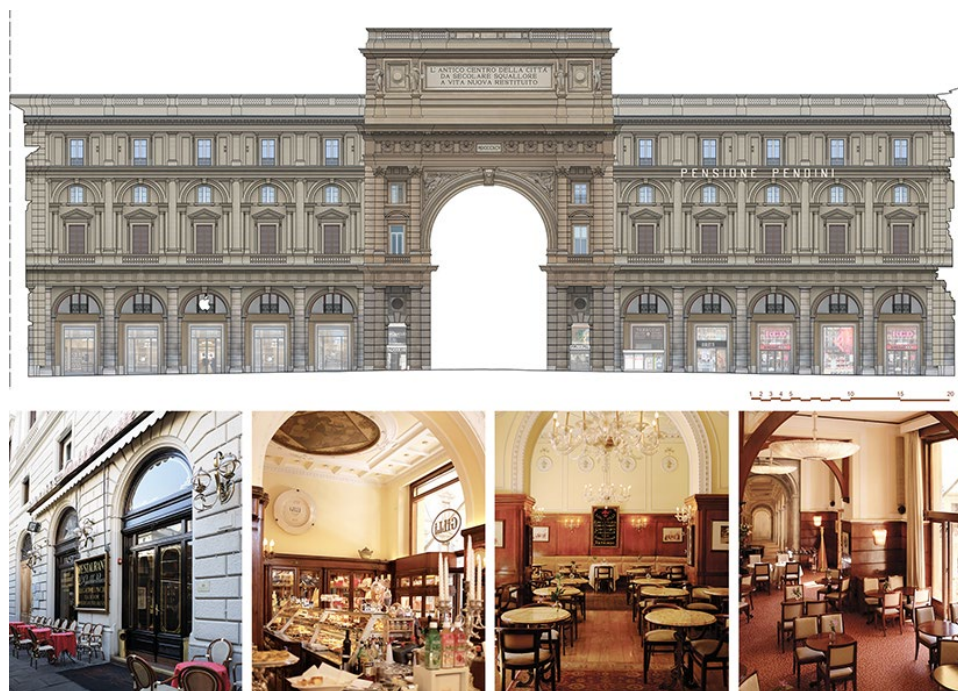


Figure 7. East architectural elevation of Piazza della Repubblica for the study of the relationship between historic cafes and urban space (credits: Chiara Fogato)

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NOTES

¹ The term “authenticity” was discussed at the Nara Conference on Authenticity in 1994. In particular, the conference highlighted that the concept has a different meaning between East and West and should not be related to cultural heritage. Despite this, some declarations on historical centres, such as that of the historic centre of Florence, claim that their authenticity must be preserved, handing down traditions and cultural values.

² Howard Vicki and Jon Stobart, *The Routledge Companion to the History of Retailing* (London and New York: Routledge, 2019), 2.

³ Stefano Bertocci and Federico Cioli, “The documentation of the historical commercial activities in Florence city centre”, in *Drawing as (in)tangible*, ed. Rossella Salerno (Roma: Gangemi Editore, 2018), 941–948.

⁴ Eleonora Fiorani, *I panorami del contemporaneo* (Milano: Lupetti, 2005), 11.

⁵ Vanni Codeluppi and Mauro Ferraresi, *La moda e la città* (Roma: Carocci, 2007), 13.

⁶ Philip Kasinitz et al. “Local shops, Global Streets”, in *Global cities, local streets. Everyday diversity from New York to Shanghai*, ed. Sharon Zukin et al. (New York: Routledge, 2015), 195.

⁷ Sharon Zukin et al. “Spaces of Everyday Diversity. The Patchwork Ecosystem of Local Shopping Streets”, in *Global cities, local streets. Everyday diversity from New York to Shanghai*, ed. Sharon Zukin et al. (New York: Routledge, 2015), 24.

⁸ A local shop is a commercial activity not linked to major international brands, which operates mainly within a neighbourhood context, providing the inhabitants with specific services (e.g., hairdressers, florists, shoemakers, etc.), residence services and goods necessities (e.g., food, newspapers, butchers, etc.).

⁹ Jane Jacobs, *Vita e morte delle grandi città. Saggio sulle metropoli americane* (Torino: Einaudi, 2009).

¹⁰ Pedro Chamusca et al., “O comércio como património: o projeto “Lojas com História”” (paper presented at the XI Congresso da Geografia Portuguesa, Porto, Portugal, November 9–11, 2017).

¹¹ Federico Cioli, “The intangible cultural heritage: a dialogue between East and West”, *Firenze Architettura, Quaderni* (2020): 126–133.

¹² Chiara Bortolotto, “Introduzione”, in *Il patrimonio immateriale secondo l’UNESCO. Analisi e prospettive*, ed. Chiara Bortolotto (Roma: Istituto Poligrafico e Zecca dello Stato, 2008), 19.

¹³ Marco D’Eramo, “Unescocide”, *New Left Review*, 88 (2014): 47–53.

¹⁴ Luciana Mariotti, “Prospettive italiane della Convenzione per la salvaguardia del patrimonio culturale immateriale. Ipotesi di analisi tra antropologia e norme giuridiche”, in *Il patrimonio immateriale secondo l’UNESCO. Analisi e prospettive*, ed. Chiara Bortolotto (Roma: Istituto Poligrafico e Zecca dello Stato, 2008), 79.

¹⁵ These phases were identified during the Inventorying Intangible Cultural Heritage meeting, Paris, 2005.

¹⁶ Lorenzo Brutti, “Documentare l’intangibile: dai progetti di banche dati audiovisive ai sistemi di informazioni” in *Il patrimonio immateriale secondo l’UNESCO. Analisi e prospettive*, ed. Chiara Bortolotto (Roma: Istituto Poligrafico e Zecca dello Stato, 2008), 115.

¹⁷ Chiara Bortolotto and Marta Severo, “Inventari del patrimonio immateriale: top-down o bottom-up?”, *Antropologia museale*, anno 10, numero 28/29 (2011): 24–33.

¹⁸ These experiences were conducted within a thematic seminar entitled *The Historical Shops of Florence: integrated survey workshop of architecture* of the Laboratory of Survey of Prof. Bertocci for the Bachelor’s and Master’s degree in Architecture of the University of Florence. The selected commercial activities are the Molteni Pharmacy in via Calzaiuoli, the Anzuini and Massi Butcher in via dei Neri, the Baccani Frames and Prints shop in Borgo Ognissanti, the Bizzarri shop in via della Condotta and the Officina Profumo Farmaceutica di Santa Maria Novella. The commercial street taken into consideration is instead the one that from Cathedral square reaches Ponte Vecchio.

¹⁹ The Culture of the Vienna Coffee Shop (Wiener Kaffeehauskultur) - a classic example of a style and way of living in the city that spreads throughout Europe - was included in the list of Intangible Cultural Heritage by UNESCO in 2011, representing a prime example of recognition of this category in the UNESCO lists.

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DEVELOPMENT OF THE METHODOLOGY AND INFRASTRUCTURE FOR DIGITAL 3D RECONSTRUCTION

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INTRODUCTION

The discussion about the digital source-based 3D reconstruction in recent years concerns scientific validation of the 3D models in the terms of scientific documentation and publication of the digital research data. Currently, published guidelines and principles cover only general approaches and do not reveal the answer to questions about how to give scientific meaning to the digital reconstruction of destroyed or never realized build cultural heritage.¹ Requirements for fulfilling those guidelines remain unsolved for several reasons. Firstly, the different goals and resources (time and money) have huge impact on the final output of the reconstruction projects and level of their development. Secondly, different kind of skills (students, professionals, etc.) and participants backgrounds (archaeologist, architects, art historians, etc.) make it difficult to clearly answer these issues. In result, heterogenous 3D data format created with use of various modelling techniques and programs are produced. It leads to ephemeral, not sustainable, not interoperable and not accessible digital research data.² On the other hand, practical answers to the issues raised in the above-mentioned guidelines and recommendations were most often created for individual research projects with a high financial resources, long time frames and team of qualified specialists.

In order to respond to the above challenges, attempts were made to define available methods and tools characterized by a low threshold of requirements, ease of use and simplicity of application in the field of digital reconstruction based on sources. The ongoing project of “DFG 3D-Viewer”³ deserves a mention here, which aims to develop an infrastructure for sharing and documenting the 3D models in web-based repositories. This infrastructure includes several components. The first one is a 3D viewer as a tool that allows easy exploration of the 3D models in three-dimensional space with use of the web browser without the necessity of installing any additional software. The second component is web-based (online) repository, which main function is storing the uploaded 3D data and metadata. The last element is the definition of the core documentation scheme for the e-documentation of 3D models and its implementation as the user friendly and low-threshold service.

METHODOLOGY DEVELOPMENT

Against this background, the scientific low threshold and effortless methodology for digital reconstruction was proposed. The first version was originally a handout created as a part of the development “DFG 3D-Viewer” to establish a common ground for testing 3D viewer functionalities faced with 3D models created with different techniques and software and exported in a variety formats.

The methodology is based on the experience gained in accomplished reconstruction projects at the AI MAINZ – Institute of Architecture at the Hochschule Mainz.⁴ It helps to define how to structure and capture the process with special emphasis on scientific aspects like semantic division of the architecture, used historical sources or documentation templates, use of linked data technology (Getty Art and Architecture Thesaurus,⁵ ORCID,⁶ GeoNames,⁷ etc.) and open science (Wikipedia⁸ or Wikidata⁹). The development process was accompanied by two on-going dissertations at the University of Bologna in cooperation with Hochschule Mainz about digital 3D reconstructions as a research environment in the history of Art and Architecture. The first one is the research of Igor Bajena (author of this paper) on documentation and publication and the second conducted by Irene Cazarro on terminology, methodology and visualization. Their work is supported by researchers from the University of Bologna, who are concerned with the issue of uncertainty and how to implement the degree of hypothesis to the 3D visualization. The conclusions from the shared experiences were collected in the form of a handout describing the entire process in an accessible and easy to understand way.

In proposed methodology seven steps were distinguished, which helps to organize the work and prepare basic documentation with emphasis on the low threshold requirements (Fig. 1). Following those steps helps to acquire "Scientific Reference Model" (SRM). SRM is a concept of 3D model accessible on the web, which shows the characteristics of scientific work and enabling further work on it by third parties. First three steps of the methodology concern the work, which should be done before begin of the modelling – object identification, sources collection and work structure. Those steps help to prepare materials for further work and to structure them in a way that allows easy and quick use of the collected resources. Steps four, five and six refer to the active reconstruction process (source-based modelling) and could be done in parallel. The semantic division of the object into smaller parts by creating object hierarchy with simultaneous 3D modelling and complementing the scientific documentation enables the most effective work. The last step concerns publication possibilities which can enable the scientific estimation of the value of reconstitution. This goal was achieved by introducing components developed reconstruction in the “3D DFG-Viewer” project.

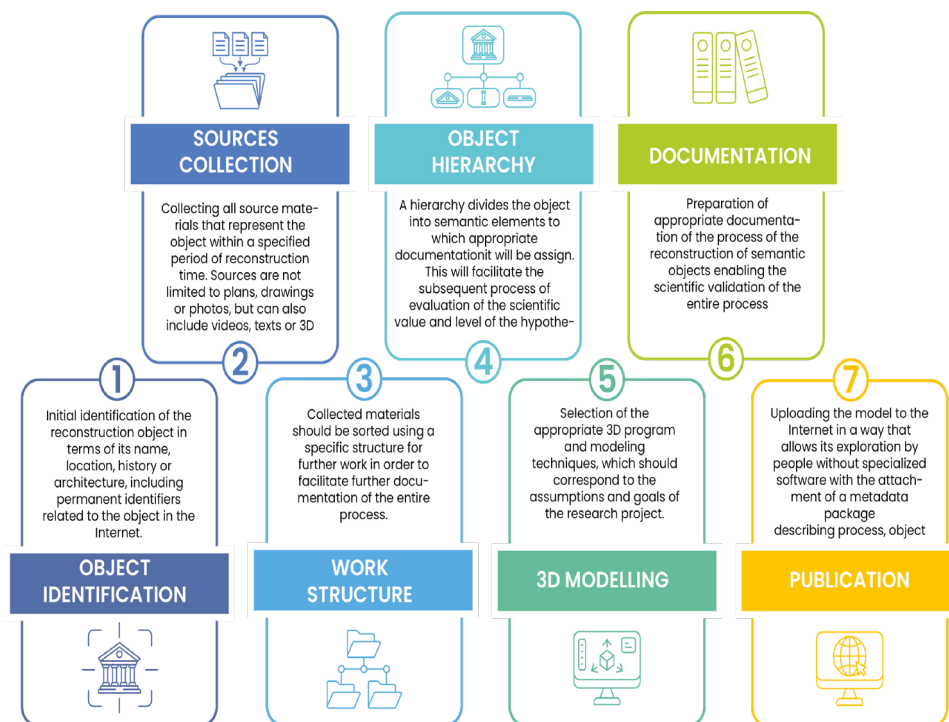


Figure 1. Visual representation of the methodology for digital 3D reconstruction (© AI MAINZ/Igor Bajena, 2022)

However, the proposed approach does not cover all aspects related to digital reconstructions of destroyed and never built architecture. A complementary approach is the “Critical Digital Model” (CDM) concept as described by Fabrizio Apollonio, Federico Fallavollita and Riccardo Foschi.¹⁰ The proposed concept is focused in particular on the definition of the model qualities (constructive aspects, traceability, accessibility, interoperability and visualization) and presenting various ways of 3D model visualization along with the consequences they bring. Comparing these two methods and concepts of working with digital models, we can see the emphasis focused more on theoretical aspects in CDM (issues related to the perception of various visualization methods, application of colour schemes regarding the uncertainty level, categorization of sources and techniques used in terms of their influence on scientific value of the model) and practical aspects in CRM (presentation of applicable steps for documentation and publication of research results, use of controlled vocabularies, presentation of the necessity of a sematic division of an object as a foundation for further work in a scientific context, searching for a documentation method with a low threshold of difficulty, or issues related to the web-publication of the model). The above-mentioned approaches are promising for further work on the development of a common ground in this field, which is currently undertaken in the on-going EU-project “Computer-based Visualization of Architectural Cultural Heritage” (CoVHer),¹¹ where authors of the above-mentioned concepts are participating. One of the project goals is to obtain applicable methodology, documentation and publication of the source-based 3D reconstructions of historical architecture. The results has to be tested and embedded in European higher education courses for architects, art historians and archaeologists.

AN INFRASTRUCTURE FOR WEB PUBLICATION

An important element of the entire process is to provide infrastructure and appropriate tools to meet the assumptions of the proposed methodology, in particular the publication of the 3D model. The main problem at present remains the possibility of web-publication the 3D reconstruction model. There are several aspects of this process, which should be taken into account:

- How to describe digital 3D reconstruction models? (data provenance, copyright issues, model specification, classification, sources, etc.)
- In which form should we publish our 3D models?
- How to ensure the appropriate quality of published data in accordance with the principles for scientific data management? (FAIR principles¹²)

There are currently several projects which are trying to answer this question and provide the appropriate infrastructure: “Kompakkt - Semantic annotation for 3D cultural artefacts”,¹³ “IDOVIR - Infrastructure for the documentation of virtual reconstructions”,¹⁴ already mentioned “DFG 3D-Viewer – Infrastructure for digital 3D reconstructions”. The last one has released a prototype alpha version repository of 3D models for public use, in which exemplary solutions answering the above question have been implemented.¹⁵ A web-based 3D viewer cannot be used without implementation in an online repository, which is responsible for storing the uploaded 3D data, which 3D viewer can display. In terms of the documentation of the digital 3D models, the most popular data repositories from the commercial and institutional offer were analyzed to check what kind of metadata are currently most often captured (Fig.2). On the experience gained in the reconstruction projects at the AI MAINZ and the survey of the 3D repositories, a metadata documentation scheme was developed, taking into account core documentation, i.e. the fields necessary to provide basic information enabling the identification of the object and resolving legal issues. The created scheme was compared with the proposal prepared by the team of the “IDOVIR” project. During a joint discussion, the used vocabulary, the meanings of individual fields in both proposals and the mandatory fields included in the core documentation were discussed. The results of this discussion were passed on to representatives of another research projects

in the field of digital heritage documentation (“baureka online”¹⁶, “NFDI4Culture”¹⁷, “Europeana”¹⁸ or “FID BAUDigital”¹⁹) to continue further joint discussions and provoke the development of a common documentation standard.

3D REPOSITORIES								
INSTITUTIONAL				COMERCIAL				
								
Smithsonian	KOMPAKT	Europeana	OpenHeritage ^{3D}	Sketchfab	3D Warehouse	TURBOSQUID	BLEND SWAP	
METADATA TYPE	METADATA CONCERNING 3D MODEL							
DESCRIPTIVE								
Title		•	•	•	•	•	•	•
Description				•	•	•	•	•
Category/Type	•	•	•					
Creator				•	•			•
Date of creation				•				
Identifier	•	•		•				
ADMINISTRATIVE								
Publisher					•	•	•	•
Publications date			•	•	•	•	•	•
Updates date	•		•		•			
Project			•	•				
License	•		•	•	•		•	•
Holder	•	•	•	•	•	•	•	•
STRUCTURAL								
Related models	•		•		•	•	•	
External relations	•		•	•				
TECHNICAL								
File size				•	•	•		
Origin format			•		•		•	
Software/Device				•			•	•
Polygons/vertices					•	•	•	
Textures presence					•	•	•	
Layers presence						•		
Models unit					•			
METADATA CONCERNING REAL OBJECT								
DESCRIPTIVE								
Name	•			•				
Description	•	•	•	•				
Category/Type	•		•		•	•	•	•
Location	•		•	•				
Creator								
Date of creation			•					
Identifier	•		•			•		
Materials	•		•					
Dimensions	•		•					

Figure 2. The comparison of metadata sets in chosen institutional and commercial web-based 3D repositories (© AI MAINZ/Igor Bajena 2021)

A similar discussion arose regarding the web-based visualization of the 3D models. This technology is more and more popular and it becomes the target of joint research projects that are looking for new, unique solutions along with accompanying new functionalities, aimed at meeting the needs of communities around digital heritage field. Against this background the “DFG 3D-Viewer” was initially intended to use the existing open source solutions for the presentation of models, with adequate market experience and an established position. An analysis of the main requirements of the project was prepared, compared with potential candidates offered by non-commercial and institutional developers like “Smithsonian”,²⁰ “Kompakkt”, “3D Hop”²¹ etc. (Fig. 3). However, it turned out that there is currently no such type of solution on the market that would be able to handle hand-made models, point clouds and complex architecture models all at once. Therefore, it was finally decided to create own solution based on the three.js library, which has a multimodal architecture and provides the ability to embed web-based 3D viewer on external websites.

In the 3D repository proposed for the “DFG 3D-Viewer” in the first phase of the project, attempts were also made to create a data model describing the proposed documentation scheme. For this purpose, the application ontology called OntSciDoc3D²² was used, prepared to describe hypothetical digital 3D reconstructions and based on the CIDOC Conceptual Reference Model (CIDOC CRM)²³ ontology. In result, the readability of the stored metadata was ensured not only by humans, but also by machines.

	3DHOP	Smithsonian	Kompakkt	Sketchfab	Inception	Media Wiki	DFG-3D-Viewer
Support of 2D & 3D objects	o	+	+	o	o	o	+
Variety of formats	-	o	+	+	-	-	+
Complex objects	o	+	o	o	+	N/A	+
Modern technology based	-	+	+	+	+	N/A	+
Hand-modelled objects	-	-	+	+	-	+	+
Laser-scanned objects	+	+	o	-	+	N/A	+
3D world operations	+	+	+	+	-	-	+
LoD (models representations)	+	-	-	o	-	-	o
Compression of 3D objects	+	-	-	-	-	-	+
3D metadata	+	+	+	+	-	-	+
Utilities, tools	+	+	-	+	-	-	+
Documentation	+	+	-	+	-	-	o

+ property is supported; - property is not supported; o property is partly supported; N/A information not available

*Figure 3. Comparison of functionalities of the most competitive 3D viewers on the market
(© AI MAINZ/Daniel Dworak, 2022)*

PROOF OF CONCEPT – COURSES IN HIGHER EDUCATION

The proposed methodology and the infrastructure of the “DFG 3D-Viewer” under development was introduced and evaluated in the course at the Faculty of Architecture, Warsaw University of Technology (WUT). The course was dedicated to the source-based hypothetical 3D reconstruction of lost architectural heritage. The students has to study the wooden synagogues, an original architecture of the former Polish east territories. The synagogues were documented in the survey of WUT academic staff and students in the booth decades before the Second War, where all of the synagogues were destroyed.²⁴ For this purpose, students were given a handout describing the 7-step reconstruction methodology to follow.²⁵ Among the entry materials, students also received resources in the form of the scientific book studies on synagogues in in the Territories of the Former Polish-Lithuanian Commonwealth.²⁶ Students could also enrich their sources materials by their own research. For educational purposes, students were instructed to search for additional historical and architectural information in popular, open and thriving scientific online repositories developed by Wikimedia Foundation, like Wikipedia, Wikidata and Wikimedia. In the case of absence of entries about object of the research, students had to create their own entries and a Wikipedia article with object description based on other sources. This task was to show students how the open access scientific repository works and introduce them to the scientific wiki editors community (Open Science / Citizens Science). All of the collected materials and information were analyzed in order to the preparation of the presentation about the object of interest (Fig.4). This presentation summarized the first three steps of the methodology and allowed to start the study on the building itself.

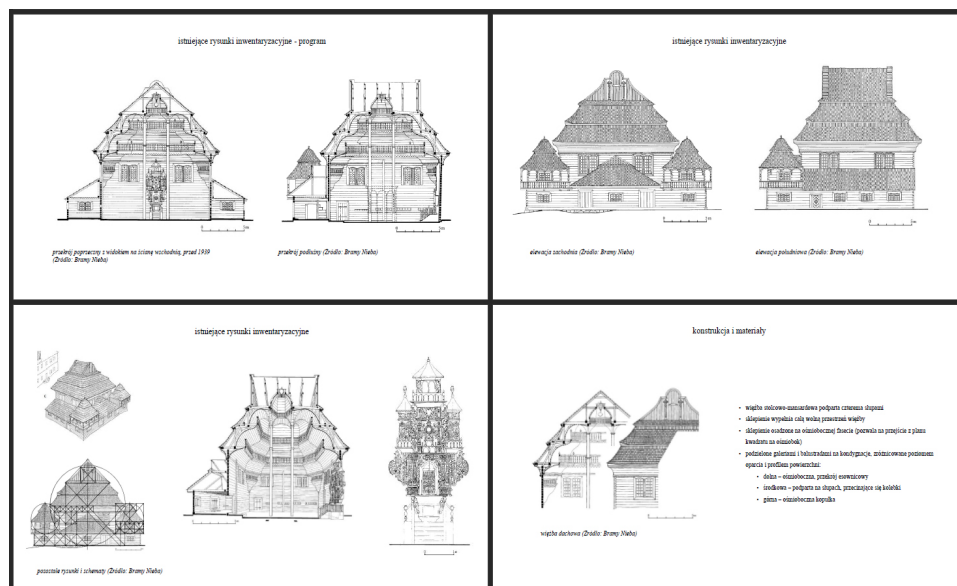


Figure 4. Student work: Fragments of a presentation showing selected drawings of the synagogue in Volpa based on the book "Heaven's Gates. Wooden Synagogues in the Territories of the Former Polish-Lithuanian Commonwealth" by Maria and Kazimierz Piechotka (© WUT/Katarzyna Prokopiuk, 2022)

The study of the building begins with a semantic division of the building and the establishment of an appropriate hierarchy regarding the structure proposed by controlled vocabularies. This is to isolate a clear structure that will allow for assigning documentation of the reconstruction process and assessment of the hypothesis level directly to individual elements. Depending on the goals of the project and the complexity of the object, this division may be very complex or be limited to only one level of the hierarchy.

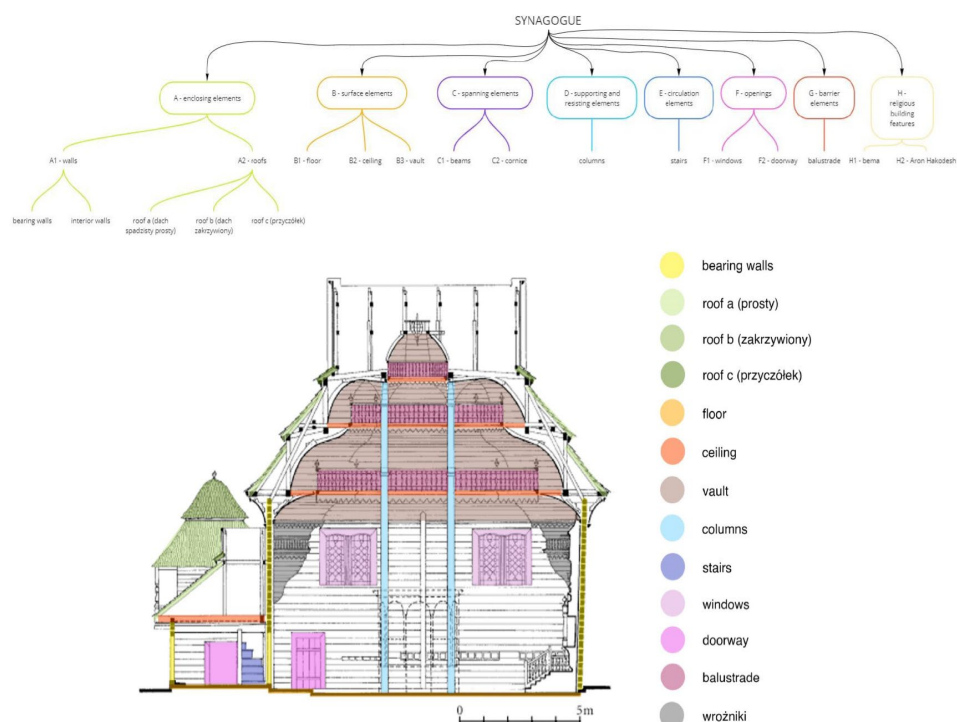


Figure 5. Student work: Semantic division and building hierarchy scheme of the synagogue in Volpa according to the Getty AAT controlled vocabulary (© WUT/Katarzyna Prokopiuk, 2022)

It is also possible to adopt various categories of division, e.g. in terms of the number of storeys, orientation in relation to the sides of the world, or architectural elements. The most important, however, is the use of controlled vocabulary for naming of the distinguished elements. Students were introduced with an example of controlled vocabulary offered by Getty AAT. On its basis, they semantically divided the synagogues and identified the architectural elements on the available source drawings in order to develop a hierarchy of division of the building (Fig. 5).

Students had to document their work during the modelling process. For this purpose, they received a layout in tabular format, where they should present the (re-)constructed object extracted in their sematic division, list the sources used and finally define the level of the model hypothesis, called the “uncertainty level” (Fig. 6). This layout has been prepared with a view to simplifying the documentation process while maintaining the possibility of scientific validation of reconstitution. However, in the case of buildings where a large number of semantic objects were distinguished, filling the form turned out to be a challenge.

Column		
Reconstruct ed object		
Used sources	Wolpa_Piechotkowie.zdj.2.jpg	
Argumentati on and evaluation of the uncertainty	the picture represents the synagogue in the times of its existence	03- inferences or sources directly related to the object

Window type 1		
Reconstruct ed object		
Used sources	Wolpa_ZAP.zdj.2.jpg	
Argumentati on and evaluation of the uncertainty	the shape and pattern of the window can be seen in the picture representing the synagogue in the times of its existence; the reconstruction of the polichromy is a hypothesis, but it is nearly identical as the window frame in the picture	03- inferences or sources directly related to the object

Figure 6. Student work: Fragment of documentation of the synagogue in Wolpa with use of the developed template (© WUT/Katarzyna Prokopiuk, 2022)

Determining the level of scientific accuracy of a 3D reconstruction model can be considered at multiple levels and with a variety of scales and application strategies.²⁷

The proposal presented by Irene Cazzaro is based on a simplified, 5-point scale (Fig. 7). The author describes it as follows:

”Uncertainty visualization also depends on the level of development of the model: in the case of the Speyer synagogue, a level of uncertainty should be assigned to each element proposed in the segmentation of the model. As far as the perimeter wall is concerned, it is proposed to divide the still existing part from the digitally reconstructed one: the former is based on observation and survey, the latter on deduction (we don’t have it, but we assume that it is similar to the still existing part). Therefore, a simpler 4-level scale is proposed:

- 4- blue stands for the still existing parts;

- 3- green for the elements reconstructed by deduction, because they should be similar to the existing ones;
 - 2- yellow for the elements reconstructed by analogy starting from other structures of the same historical period;
 - 1- red for the elements reconstructed by hypothesis, because there are no available sources for that.
- If necessary, the 0- black level should indicate the elements that are not taken into consideration for the uncertainty estimation. This could be the case of the 25x25 m fragment of land where the synagogue is situated. Both a colour and a sequential number are associated to each uncertainty level: the colour should be implemented in the visualisation of the model, the number in the attributes of each element.”

UNCERTAINTY DEGREE

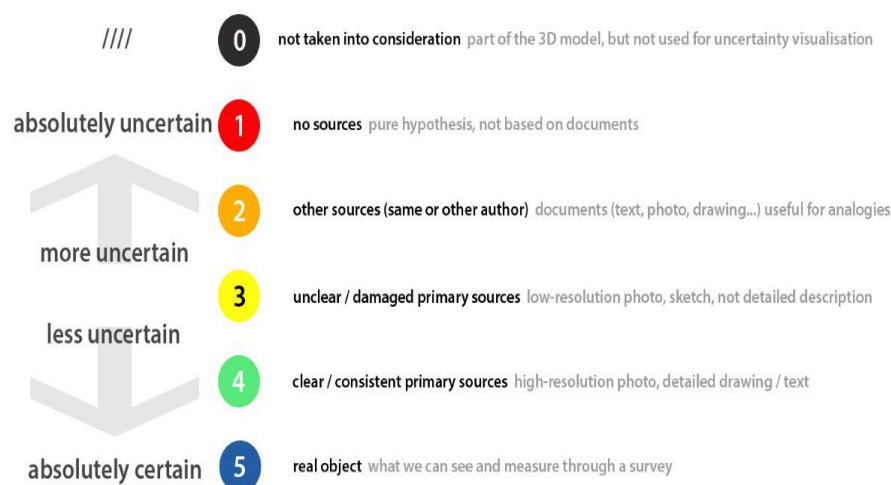


Figure7. General uncertainty scale according to the physical or mental operations on the sources used to digital 3D reconstruction (©UNIBO/Irene Cazzaro, 2022)

In the course the choice of 3D software and techniques was free. The students chose the following programs for individual work: Sketchup, Rhino, Archicad, 3DS Max and Blender, thus ensuring the study of the proposed methods in various 3D modelling environments. The programs selected by the students also belong to the group of the most popular software for manual 3D modelling according to the research conducted by the author.²⁸

The final task of the students' work was the publication of the results on the web (Fig. 8). For this purpose, a test repository of 3D models was used, prepared in the on-going “DFG 3D-Viewer” project, where solutions for a “Scientific (3D) Reference Model” viewer and core metadata documentation were implemented. The students were the first group confronted with the use of the newly designed infrastructure for the publication and documentation of 3D models, and their input made it possible to identify major problems in both the methodology as well as the operation of the repository and the 3D viewer.

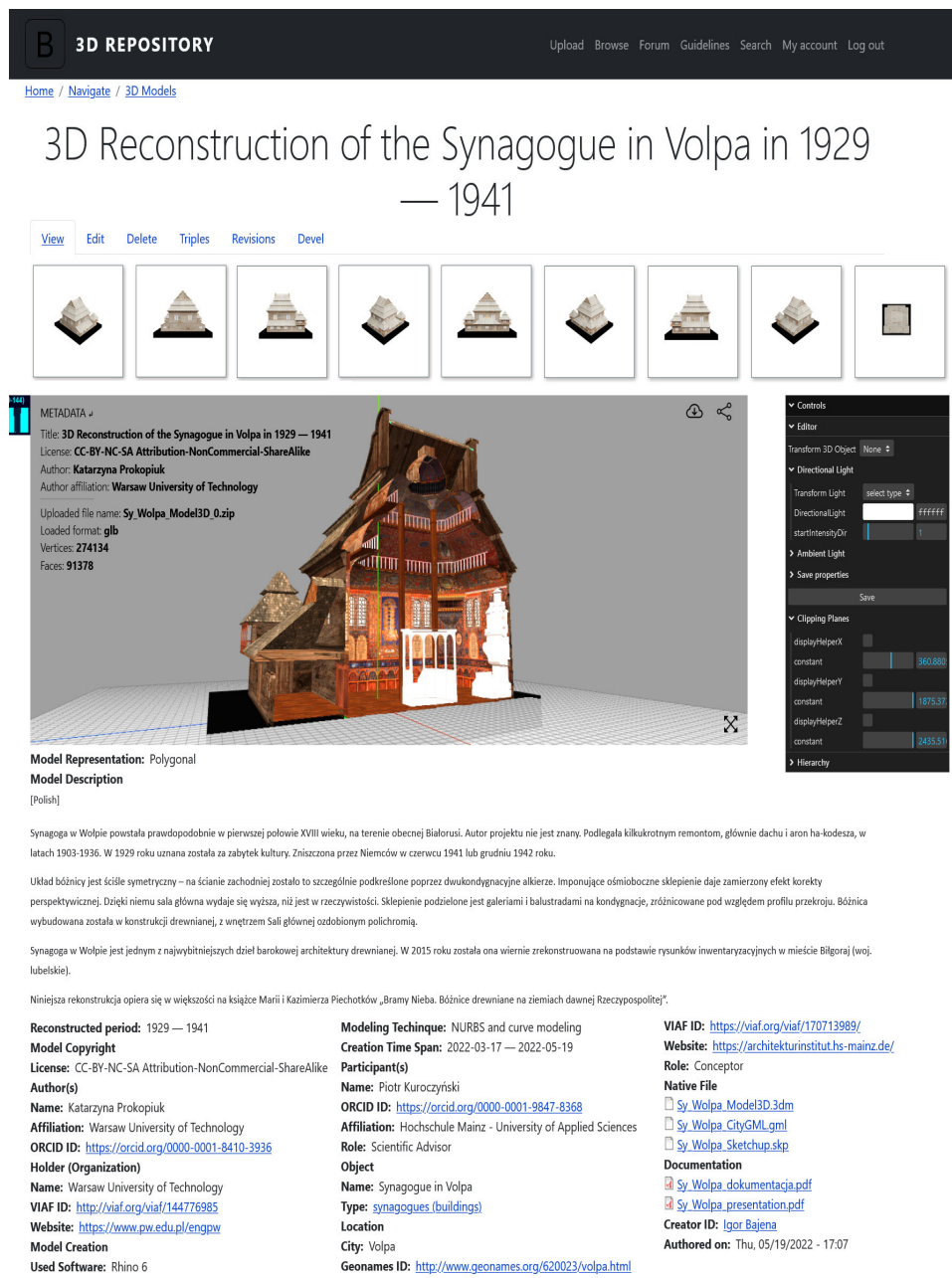


Figure 8. Publication of the Synagogue in Volga in the 3D repository developed in the “DFG 3D-Viewer” project (© AI MAINZ, 2022)

CONCLUSION

The course with students was concluded with a questionnaire checking how the students assessed the difficulty of each stage, the clarity of the instructions and how much time they had to spend on completing the tasks. These aspects are extremely important for the further development of the proposed methodology and infrastructure, which aims at a low threshold of difficulty to use and a transparent and clear interface. In most cases, students needed more than an hour of time for each step (sematic division of the object, filling in the documentation form, publishing in an online repository). Only in the case of filling in the form, the metadata of the responses differed greatly, with the shortest time being less than 10 minutes and the longest being more than 30 minutes. As for the clarity of the instructions, the vast majority opted for a clear description of the tasks. In terms of difficulties, filling in the documentation

form and creating a sematic division turned out to be the easiest in the students' opinion, while the online completion of the form in the repository and the correct preparation and upload of the 3D file caused many problems. Interestingly, nobody managed to prepare and upload the model the first time in a way that would enable its correct display in the 3Dviewer (Fig. 9).

How many attempts did it take to get your file to display correctly with the creation of automatic renders?

5 odpowiedzi

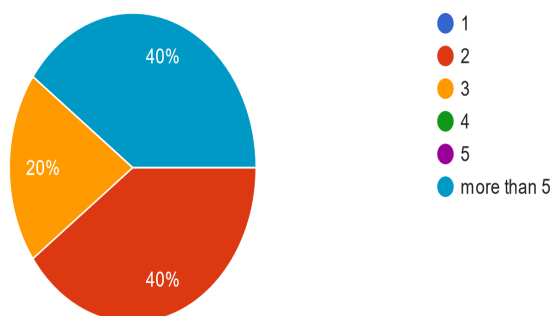


Figure 9. Student survey: Number of necessary attempts of 3D model upload for a proper visualization in the 3D viewer (© AI MAINZ/Igor Bajena, 2022)

The conducted research leads to the conclusion that, first of all, clear instructions should be prepared regarding the preparation of the model for leakage in the 3Dviewer, taking into account the various workflows in 3D software. The metadata filling form should also be streamlined for faster and easier filling. After reviewing the documentation forms uploaded by students, the problem of the imprecise nature of the sources emerged - using the adopted nomenclature without knowing the key they used makes it impossible to read the source materials.

Regarding the general methodology and infrastructure for digital reconstitution, it is a good sign to start a multi-faceted discussion between different groups of specialists related to this field. Starting smaller and larger projects dealing with methodology and their application in various cases (scientific projects, educational tools at universities, hobby activities) may result in the development of recommendations for individual methods and tools in the near future depending on the user's needs and approval of documentation standards, which are still missing in this field. A definition of a common ground work, introduced here in the concept of Scientific Reference Model (SRM), in combination with the DFG 3D-Viewer infrastructure under development ensure the findability, accessibility, interoperability and re-usage (FAIR-principles) of the research data represented by the 3D models and the metadata.

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NOTES

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¹⁹ “FID BAUdigital – The Platform for Science”, Technische Informationsbibliothek (TIB), last accessed 28 July 2022, <https://www.fid-bau.de/en/home/>.

²⁰ “3D Digitization - Smithsonian Institution”, Smithsonian Institution Digitization Program Office, last accessed 30 July 2022, <https://3d.si.edu/>.

²¹ “3DHOP - 3D Heritage Online Presenter”, Visual Computing Lab of CNR-ISTI, last accessed 30 July 2022, <https://3dhop.net/>.

²² “OntSciDoc3D”, Hochschule Mainz – University of Applied Sciences, last accessed 30 July 2022, <https://www.ontscidoc3d.hs-mainz.de/ontology/>.

²³ “CIDOC CRM”, CIDOC Documentation Standards Working Group (DSWG), last accessed 30 July 2022, <https://www.cidoc-crm.org/>.

²⁴ The drawings of the synagogues were prepared as part of the student practices organized by Polish Architecture Department of the Warsaw University of Technology. Every group of students needed to prepare whole documentation of the building including plans, sections and elevation. Drawings are stored in the archive of Polish Architecture Department in Warsaw.

²⁵ Handout was prepared by two PhD students of the University of Bologna, Irene Cazzaro and Igor Bajena under the supervision of prof. Piotr Kuroczyński. The study involved describing each step of the methodology on an example of the reconstruction of the Synagogue in Speyer (Germany) in 1250 AD.

²⁶ Maria Piechotka and Kazimierz Piechotka. *Heaven's Gates: Masonry Synagogues in the Territories of the Former Polish-Lithuanian Commonwealth*. (Warsaw: Polish Institute of World Art Studies, 2017). & Maria Piechotka and

Kazimierz Piechotka. *Heaven's Gates: Wooden Synagogues in the Territories of the Former Polish-Lithuanian Commonwealth*. (Warsaw: Wydawnictwo Krupski i S-ka, 2004).

²⁷Fabrizio I. Apollonio, 'Classification Schemes for Visualization of Uncertainty in Digital Hypothetical Reconstruction.' In *3D Research Challenges in Cultural Heritage II*, edited by Sander Münster, Mieke Pfarr-Harfst, Piotr Kuroczyński, and Marinos Ioannides, 10025:173–97. Cham: Springer International Publishing (2016): 185–191. doi: 10.1007/978-3-319-47647-6_8.

²⁸ To define most popular 3D modeling programs for hand modeling author analyzed reports made in this topic form several resources: "Sketchfab Cultural Heritage User Survey 2019 Results", "3D content in Europeana task force" and "3D Digitization in Cultural Heritage Institutions Guidebook" by Emma Cieslik and conducted the survey during 14th Working Meeting of Community of the Arbeitsgruppe Digitale 3D-Rekonstruktion (AGDR) in March 2022. The study revealed 9 the most popular 3D software in the digital reconstruction field: Blender, Cienma4D, 3DS Max, Rhino, Maya, Sketchup, ArchiCAD, Revit and Lightway3D (Last 3 as represents of BIM programs, which aspire to gain more popularity in the coming years).

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REALITY OF THE VIRTUAL: REPRESENTATIONS THROUGH ARCHITECTURE

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INTRODUCTION

The title of this paper is borrowed from Slavoj Žižek. In his 2003 lecture on film, Žižek simply reverses the over-exhausted phenomena “virtual reality,” in order to elaborate on his take on subjectivity. He starts his talk, saying: “[Virtual Reality] simply means let us reproduce in an artificial digital medium our experience of reality. I think that a much more interesting notion crucial to understand what goes on today is the opposite: not virtual reality but the reality of the virtual. That is to say: reality, by this I mean, efficacy / effectiveness, real effects, produced / generated by something which does not yet fully exist, which is not yet fully actual.”¹

Žižek doesn’t dwell on architecture as his subject matter in this talk. However, the key-words he stresses here are directly related to architectural jargon, both traditional and contemporary. Although quite a majority of architects and especially potential clients are fascinated with the offerings of digital tools, and most particularly Virtual Reality, one should be reminded that “virtual” has never been a new phenomenon for architecture.² Architecture as a profession consists of providing design services, which always had to take place in some form of virtuality. This has traditionally been provided through study and presentation of various physical artefacts (drawings/models) produced in small scale(s). Between the actual building and the physical model or drawing of a building, scale would constitute that virtual dimension, and the architects would operate through this distance.³ The remote essence of the practice -distance between representation (design) and the physical building- however, is often described as an issue.⁴ Digital tools which have been utilized for architectural practice target directly at reducing this distance, and are celebrated for providing the experience of the actual building within its virtual stage (design phase). Such digital artefacts then blur the difference between object and experience.

While the advancement of technology in this field is fascinating, its application for architectural creativity and critical thinking, unfortunately remain dull. VR tools perfectly simulate the most complex, intriguing, exciting spatial formations, and can allow one to experience such spaces even in the most mundane physical setting. Fully disconnected from any physical reference of the built environment, these isolated experiences are not yet utilized to explore architecture’s ability to frame the contextual realm. How virtuality can be more critically incorporated into built environment still remains a valid question.

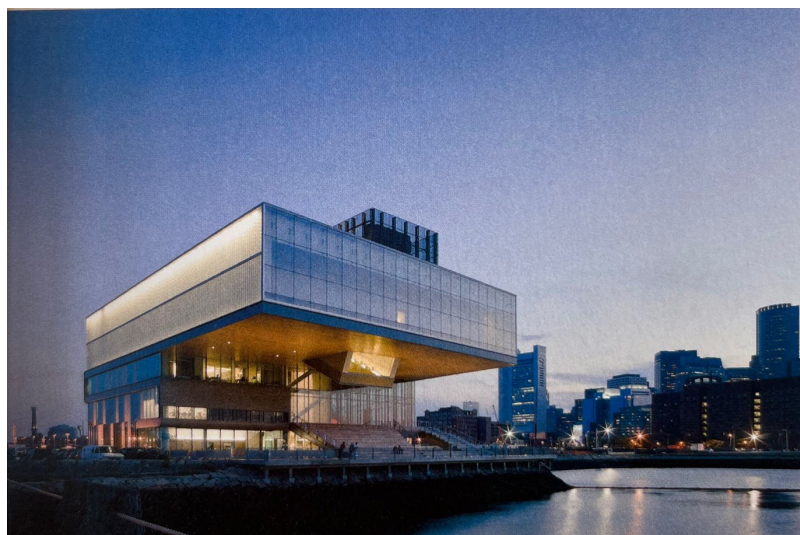
Following Žižek’s pun in twisting the term, this paper [also] leaves the question of virtual reality applications in architecture aside, and seeks to speculate on the reality of the virtual that architecture can provide. This, I will demonstrate through an in-depth analysis of one museum building, whose

architects, I believe, diligently tackled the issue of the virtual and the actual – the object and its representation in a rather provocative way.

The museum building is the Institute of Contemporary Arts (ICA) in Boston, designed by the architectural firm Diller Scofidio + Renfro. This project was the first museum building the architects designed in the US, and during this project Charles Renfro was added as a third named partner. The earlier practice of Diller Scofidio consisted of exhibition works, installations and other forms of constructions that always involved various experimentations with different forms of media (video, surveillance, simulations, etc.). Through the interaction of such media with space, they often interrogated the normative practices of our everyday inhabitations, and the power dynamics inherent within that. With the ICA building, I argue that they were able to use the museum building itself, as a medium to interrogate the actual object and its virtual display, which poses further questions on the notion of intangible heritages.

Institute of Contemporary Arts (ICA) in Boston

The museum building is located on the Harbour Walk of Boston, which is one of the major investment districts of the city, connecting waterfront neighbourhoods to Boston Harbour and to each other via a near 46-mile path. The building is commissioned in 2002 and completed in 2006. At the time of the completion, the rest of the master-plan was not fully realized. Now the near proximities of the museum building are filled with commercial and residential structures. The project site is right in front of the water and the location makes the project very significant. This major investment is really about re-appropriating water as a civic public amenity, rather than a mere natural resource. In that regard, the water is gaining a new value here. Taking advantage of this asset, the architects Diller Scofidio + Renfro explain their design as an extension of this Harbour walk. The location, therefore, is the inevitable reality of the project, and the architects not only acknowledge but truly capitalize on that. In interviews they stress the importance of the location by saying: “[w]hat we intended to do is to take advantage of the fact that the water is out there. Unique location. This was made as a piece of propaganda to get everybody interested in the phenomenon of using the site but abstracting it away.”⁵



*Figure 1. Northeast view of the Institute of Contemporary Arts (ICA), Boston – Photo: Iwan Baan
Image taken from Diller Scofidio + Renfro: Institute of Contemporary Arts (ICA) Boston: Museum
Building Series, 2011, p.9*

According to Oxford English Dictionary, propaganda means the systematic dissemination of information, especially in a biased or misleading way, in order to promote a political cause or point of

view.⁶ When Elizabeth Diller says: “this was made as a piece of propaganda,” the information that the building would disseminate in a biased or misleading way was going to be about the water. What are the ways to see and make sense of the context we are in – or to make non-sense of it?

Museum: DS+R’s critique and creative approach

Such attitude the architects had, that architecture itself can be a medium that interrogates its very context was something inherent at the core of their early practice. The New York based firm was established in 1979, and has been known for their provocative work in the form of installations, videos, performances and conceptual art. Within such various media and experimentation, if the architects were asked to define a common thread across their work, they would articulate it as their desire to “interfere with spatial conventions of the everyday, whose familiarity inoculates us from developing new cultural understandings.”⁷

How they demonstrate this idea for museum spaces were especially intriguing. Their 1989 exhibit in MoMA, named *Para-site*, questioned the museum building as a biological host and their installation as the opportunist feeding off it, since the installation was unapologetically using the structural and electrical resources of the building, without giving anything back in return. Following Michel Serres’ three definitions of the biological, social and technological parasite,⁸ they interrupted the flow of the museum space, by introducing the architectural elements of the building itself in mediated fragmented forms into their installation (Figure 2). The work extends beyond the given gallery space, into three remote circulation locations, keeping them under surveillance and projecting them on the screens. What you see is the simultaneity of the actual inhabitation of a threshold condition and its projection in a space where conventionally that threshold cannot take place. Hence the project targets the museum building which is supposed to be the “neutral”⁹ space for displaying art, as the protagonist of their installation, the object of display.

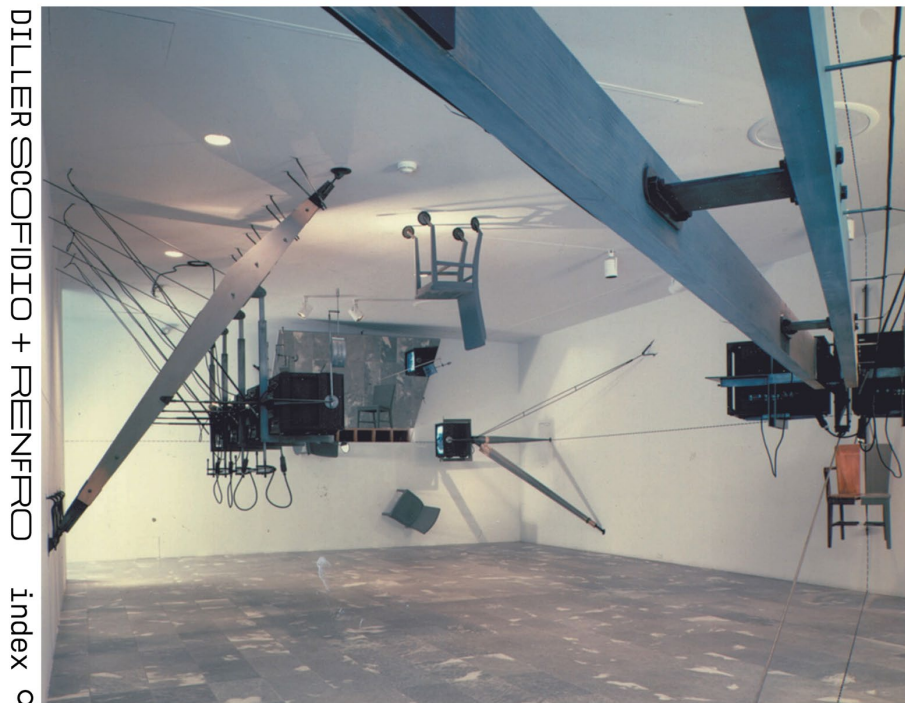


Figure 2. *Para-Site*, MoMA, New York, 1989.

Image taken from <https://dsrny.com/project/para-site>, 06.13.2022

In 2003, Whitney Museum of American Art hosted a retrospective exhibition of the architects' work titled *Scanning: The aberrant architectures of Diller + Scofidio*. In the gallery space, the architects proposed another installation that shifted the perspective of the spectator from their exhibited work to the actual walls of the museum, which are in the service of housing, organizing, and partitioning the exhibition. In this installation, a robotic drill guided by an "intelligent navigator" randomly moves on a track mounted to the gallery walls and pierces ½ inch holes through the wall. As the exhibition continues, the walls become increasingly perforated, eliminating (eventually) the visual barrier while also disturbing the acoustic isolation of the galleries.¹⁰ Naming the art-work *Mural*, the architects position the walls in a competition for attention, rather than serving as a neutral backdrop for their exhibition (Figure 3). Through constant visual and aural disturbance, *Mural* actively resists submission to the mediating authority of the museum.



Figure 3. *Mural*, Whitney Museum of American Art, New York, NY, 2003
Image taken from <https://dsrny.com/project/mural?index=false>, 06.13.2022

As author Sarah Amelar writes in *Architectural Record*: "While Diller and Scofidio were complicit with the museum in producing a grand show of their work, their staged (institutionally sanctioned) 'disobedience' seemed to insist: But you see, we're still provocative outsiders--we're not really part of The Establishment."¹¹ Long-time rebels of the museum, when the architects were approached to actually design an institutional museum building, the challenge was inevitable. The quote I just gave from Sarah Amelar, was from her 2007 article, which was literally titled: "After punching holes in the fundamental concept of Museums, Diller Scofidio + Renfro actually creates one."¹² Often being on the other side of the museum institution, Diller Scofidio + Renfro acknowledges: "having played the role of the artists, curators, exhibition designers, and now the role of the architect at the ICA, having to speak in the voice of the institution... We believe that much like the museum, architecture has a responsibility to raise the consciousness of the public."¹³ The voice of the institution is important to stress here, because no voice is actually free of ideological implications. The architects first acknowledge that the institution they will be designing has a voice, and as providing architectural design services for this museum, they also participate in that voice. Museums, as civic entities and cultural institutions, play a crucial role in shaping society, which can be traced in the definition of museum provided by The International Council of Museums: "A museum is a non-profit, permanent institution in the *service of society and its development*, open to public, which *acquires, conserves, researches, communicates* and exhibits tangible and intangible heritage of humanity and its environment *for the purposes of education*,

study and enjoyment".¹⁴ The italics are my emphasis of the key expressions that highlight the intentions behind museum organizations. Either the museum building can be impartial to this agenda, or can be designed as a response / critique to this agenda, which I argue is the case with the ICA. The way the architects take advantage of the waterfront site and create a certain dialogue between the building and its context parallel the intentions the museum institutions pursue in lieu of educating the public. No matter how neutral the museum space intends to be, the curation of the view of the public is always in act, which can be true for architecture as well.

Apparatus

Speaking of the challenges of this project, the architects point out that the waterfront site is actually a distraction from the inwardly focused program of the museum, but, in this case, it is also a great asset. In their words, they "designed the ICA as an *apparatus* [my emphasis] for producing and reproducing ways of mediating its surrounding waterfront site. The building essentially analyses the view and regulates the experience of the harbour over time, distributing it in a controlled manner."¹⁵

Represented through a section drawing, there is a choreography in hiding and revealing the waterfront view throughout the experience of the ICA (Figure 4). As the architects poetically narrate: Upon entry, the view is compressed under the belly of the theatre, then scanned by the glass elevator [b], used as a variable backdrop in the theatre [c], denied entirely in the galleries [d], and revealed as a panorama at the crossover gallery [e]. At the glass wall of the digital media gallery suspended beneath the cantilever [e], the harbour context is highly edited to frame only the mesmerizing texture of water. A tranquil natural / electronic atmosphere highlights every nuance of weather change and shift of light as the day progresses.¹⁶

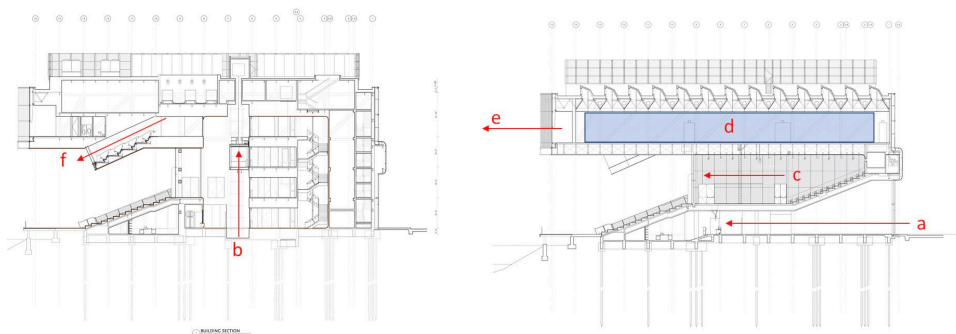


Figure 4. Section Drawings. Image taken from Diller Scofidio + Renfro: *Institute of Contemporary Arts (ICA) Boston: Museum Building Series*, 2011, p.26

In its simplest sense, the word *apparatus* means, appliance, device, gear, machine, mechanism. Accordingly, the various spatial conditions of ICA can be interpreted as a mechanism that produces and re-produces the various views of the water. As avid readers of the writings of Michel Foucault,¹⁷ I suspect that the architects were probably hinting at his loaded definition of this word in his texts, notably *Archaeology of Knowledge* and *Discipline and Punish*, when describing their building as an *apparatus*, in French *dispositif*. In an attempt to further explain Foucault's employment of the term, Giorgio Agamben, in his essay "What is an *Apparatus*," argues that: "The term 'apparatus' designates that in which, and through which, one realizes a pure activity of governance devoid of any foundation in being. This is the reason why apparatuses must always imply a process of subjectification, that is to say, they must produce their subject."¹⁸ In various means of controlling the view of the water via the building, the architects continuously remind the audience of the ideological power the civic institution has by

simply serving as the guardian of cultural heritage, both tangible and intangible, hence raising the consciousness of the public by governing their experience of the site.

The most interesting moment of this apparatus takes place in the Mediatheque, cantilevered from the cantilever, the room inhabits the underbelly of the suspended roof over the public extension of the harbour walk (Figure 5). Although the space can be accessed from the 4th floor, the Mediatheque cannot be fully revealed in a drawing of the floor plan due to the slope of its ceiling parallel to its levels stepping down toward the water. The entrance and the view are articulated along this slanted line. At the threshold of the room, the view is delayed, not visible until you are fully inside the space, which is forcing you to look down in the direction of the water. What you are seeing is an edited view of the water, cropped from its context, devoid of any horizon. Following Agamben's notes on the apparatus, the space pushes the limits literally to "capture, orient, determine, intercept, model, control, or secure the gestures, behaviours, opinions, or discourses of living beings."¹⁹



Figure 5. Mediatheque of ICA – Photo: Iwan Baan

Image taken from https://www.archdaily.com/897150/institute-of-contemporary-art-diller-scofidio-plus-renfro/5b32bb47f197cc88af0007be-institute-of-contemporary-art-diller-scofidio-plus-renfro-photo?next_project=no, 06.13.2022

This particular room has been conceived as a special experience since the beginning. Among very many study models created to explore the building design, all of them in some way incorporate a moment that responds to the water in this particular way, revealing itself as a deformation in the building design. During the design phase, this experience is articulated through another apparatus, in the sense of a viewing device that is made out of cardboard. Looking through it you see the cropped images of sky and water, literally cropped and pasted at the end of the binocular like device to suggest the "actual" experience as virtual as it can feel (Figure 6).²⁰

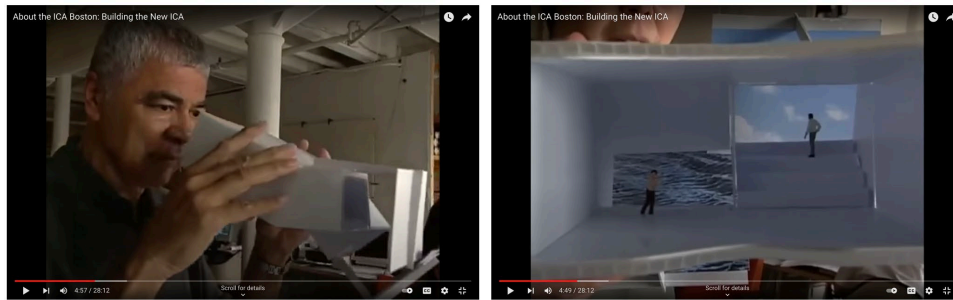


Figure 6. Ricardo Scofidio looking through the study model. Excerpt from “About the ICA Boston: Building the New ICA” - <https://www.youtube.com/watch?v=XLitLiWPtDE>

The Mediatheque room divides the experience of its actual location from the experience it offers, and its whole purpose can be defined as to offer just this experience. It is not a gallery space for the tangible objects, it doesn't have any claim to be neutral to accommodate any art work. The room as well as its experience is pretty fixed, while the rest of the building can adapt to various other conditions. In that sense, it is a space alienated from the rest of the museum function. This alienation is further amplified by introducing the “communication” mission of the museum in a witty manner into this space. The room is named Mediatheque, a digital media gallery, that is filled with computers that allow for access to look at the museum catalogue among many other (intangible) things. Computers in this room, when they are on but not actively used, simply run the screen-saver, which is the view of the water, moving in the same direction, displaying the same texture as can be seen from the framed view. The tension between tangible and intangible – the actual object under display in the museum and its virtual image on the screen is to be re-questioned, when the actual view of the ocean is under the same framed display as the image of it on the computer screen. Rather than being immediately subjected to the virtual reality the computer provides, with the Mediatheque design, DS+R raises bigger questions on subjectivity, by deliberately incorporating virtuality into their architecture.

CONCLUSION

In their earlier work incorporating video / projection / computer-controlled drill mechanism, Diller Scofidio was never hesitant to use technology. Not only using technology in a mischievous way to suggest a provocative angle but also for its direct purposes when necessary. But they have always been keen on the governing aspect of technology as well as the governing aspect of architecture. In further exploiting that relation, the architects suggest a fixed function for this room which is the virtual search of the museum catalogue. Accessed through the computer screen, this mediated image is going to be an edited version of the tangible object. But even the moment the object gets inside the museum space and put under display, it is already edited, like to ocean view you're exposed to in this process.²¹

ACKNOWLEDGEMENTS

This paper has been produced based on a 2017 trip to the ICA and evidence found throughout architects' oeuvre that state their intention with the design. I want to thank Dr. Paul Emmons for providing me updated images on the recent changes in the context, which are certainly critical but beyond the scope of this paper.

NOTES

- ¹ Lecture filmed in London in 2003 by Ben Wright for LUX: "Slavoj Žižek -The Reality of the Virtual (2004)," LUX, accessed, May 15, 2022, <https://www.youtube.com/watch?v=gBRTxGyKZo&t=1339s>.
- ² Donald Kunze, "Architecture as Reading; Virtuality, Secrecy, Monstrosity," JAE 41 no.4 (1988): 28-37.
- ³ Paul Emmons, "Size Matters: Virtual Scale and Bodily Imagination in Architectural Drawings," ARQ 9 no.3-4 (2005): 227-235.
- ⁴ Robin Evans, "Translations from Drawing to Building," AA Files 12 (1986): 5.
- ⁵ "About the ICA Boston: Building the New ICA," ICA Boston, accessed June 10, 2022, <https://www.youtube.com/watch?v=XLitLiWptDE&t=479s>.
- ⁶ "propaganda," OED, accessed June 10, 2022, <https://www-oed-com.libproxy.clemson.edu/view/Entry/152605?rskey=da3C0u&result=1#eid>
- ⁷ DS +R and Iwan Baan, *Diller Scofidio + Renfro: Institute of Contemporary Arts (ICA) Boston* (Barcelona: Ediciones Polígrafa, 2011), 18.
- ⁸ Diller + Scofidio, *Flesh* (New York: Princeton Architectural Press, 1994), 164.
- ⁹ Michaela Giebelhausen, "Museum Architecture: A Brief History," in *A Companion to Museum Studies*, ed. Sharon Macdonald (West Sussex: Wiley & Blackwell, 2011), 233.
- ¹⁰ Aaron Betsky, K. Michael Hays, Laurie Anderson, Jordan Crandall, Edward Dimendberg, RoseLee Goldberg and Ashley Schafer, *Scanning: The Aberrant Architecture of Diller + Scofidio* (New York: Whitney Museum of American Art, 2003), 4.
- ¹¹ Sarah Amelar, "After Punching Holes in the Fundamental Concept of Museums, Diller Scofidio + Renfro Actually Creates One: a New Building for Boston's Institute of Contemporary Art," *Architectural Record* 195 no.3 (2007): 108.
- ¹² Amelar, 108.
- ¹³ DS +R & Baan, *(ICA) Boston*, 17.
- ¹⁴ "Museum Definition," International Council of Museums, accessed May 28, 2022, <https://icom.museum/en/resources/standards-guidelines/museum-definition/>
- ¹⁵ DS +R & Baan, *(ICA) Boston*, 18.
- ¹⁶ DS +R & Baan, *(ICA) Boston*, 29.
- ¹⁷ DS +R & Baan, *(ICA) Boston*, 18, and Jo Steffens, *Unpacking My Library: Architects and Their Books* (New Haven, CT: Yale University Press, 2009).
- ¹⁸ Giorgio Agamben, *"What is an Apparatus?" And the Other Essays*, trans. David Kishik and Stefan Pedatella (Stanford, CA: Stanford University Press, 2009), 11.
- ¹⁹ Agamben, *Apparatus*, 12.
- ²⁰ "About the ICA Boston: Building the New ICA," ICA Boston, accessed June 10, 2022, <https://www.youtube.com/watch?v=XLitLiWptDE&t=479s>.
- ²¹ Peter Van Mensch, "Methodological Museology; or, towards a theory of museum practice," in *Objects of Knowledge*, ed. Susan Pearce (London: The Athlone Press, 1990), 145.

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TRACING THE DISSEMINATION OF BUILDING PRESERVATION AS A SUSTAINABILITY STRATEGY

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INTRODUCTION

“Built heritage comprises immovable objects which bear witness to the past. They can testify to manifold human activity, historic events and evolutions, artistic creations, social institutions and technical achievements.”¹ The objects do not have to be “great works of art”, also “modest works of the past” could be protected as monuments, if they “have acquired cultural significance with the passing of time”.² To be listed and preserved, the value and significance of the object has to be proved “through human perception and interpretation.”³ Since the outstanding value or special significance of an object is not always visible on first sight, communication of building qualities is essential, especially to younger generations (Burra Charter).⁴ The Faro Convention⁵ emphasizes the appreciative relationship of society to heritage objects instead of static historic or aesthetic values of the object itself. This dynamic approach towards heritage recognizes the fact that the needs and values of a society evolve over time and generations. In parallel, the Faro convention highlights sustainable building management, the definition of its principles and their promotion while encouraging maintenance (Article 9) and promoting cultural heritage protection as a central factor in the mutually supporting objectives of sustainable development, cultural diversity, and contemporary creativity (Article 5). Thereby, the convention builds a bridge between the concerns of the younger generation – often characterized as a digital-native “generation Z”⁶ – and the communication directed at them. Regarding “energy-efficiency first” paradigms promoted in regulations⁷ and initiatives⁸, frameworks used in regulations and campaigns for heritage preservation could offer an interesting holistic approach to assess building transformations by connecting building characteristics with principles such as “regular care” or long-term intergenerational considerations.⁹ While historic or artistic characteristics are somehow easily recognized, other intangible or embedded qualities may often remain hidden in the mass of buildings. Further exploration of the interplay of different qualities of buildings in the context of appropriate approaches to sustainable transformation of the built environment warrants critical attention in terms of environmental impact. This points to a recent connection between heritage preservation and the wider discussion on environmental sustainability.

The difficulty of communicating sustainability is illustrated by the necessary paradigm shift in research considering inter- and transdisciplinary approaches while requiring broad public support for the implementation of sustainability measures.¹⁰ Regarding transfers to younger generations (13-25 years)¹¹, the recent global movement “Fridays for Future” launched in 2018 show that expanding decision-making spaces on complex topics such as sustainable building transformations may be more

important than raising environmental awareness on the path towards net-zero emissions. In this context, so far, little attention has been paid to younger generations as politically active citizens¹² and future protagonists rather than mere consumers. Although, the goals of education for sustainable development (ESD) clearly aim at helping to create an environment for self-determined and autonomous actions instead of enforcing behavioural changes.¹³

Considerable efforts in reducing GHG (greenhouse gas emissions) from building operation have been made in research and practice. However, current regulations and initiatives lead to an increase of embodied GHG for new construction, resulting from the production and disposal of building materials to compensate for improved operational energy efficiency. The magnitude of the shift for highly energy efficient buildings with a share of up-to 90% of embodied GHG emissions over the entire life cycle is striking.¹⁴ In Switzerland, studies on material flows forecast that materials typically used for refurbishments will become the dominant source of embodied GHG from buildings by 2050. This demonstrates the importance of focusing on the reduction of embodied GHG beyond operational energy efficiency to support the sustainable transformation of the built environment.

In this respect, heritage scholars contributed with early publications.¹⁵ However, a recent review from Germany on the state of the art in disseminating aspects on heritage objects and preservation shows that there is a need to further investigate this intersection from the perspective of preservation. So far, transfer efforts mainly targeted adults by thematically focusing on the use of heritage objects and on their historic relevance.¹⁶ However, the problems with effective dissemination of such approaches remain manifold due to the complexity of buildings and environmental assessment, and actors with diverging interests. Therefore, this paper aims to investigate approaches towards dissemination on the intersection of sustainability and preservation in two relevant media formats – games and exhibitions – by understanding them as demonstrators and observing them within a larger process of diffusion.

DISSEMINATION OF CONTENT USING DEMONSTRATORS

This paper investigates the dissemination of concepts on sustainability and buildings to younger generations, with an emphasis on the built environment and preservation. It does not provide a complete review but focuses on selected case studies including content which has been adapted for broad communication such as exhibitions and games. A selection of past paradigmatic dissemination activities, that informed conceptions of sustainability in architecture with potentially wide-ranging outreach, form the entry-point of this work. The further investigation focuses on the connection between academic research output, demonstrators, and the associated approaches. The integration of scientific output in concepts of dissemination to a broader audience is emphasized. Exhibitions and games as case studies are examined as demonstrators that aim at showcasing an innovative concept according to Roger's theory of diffusion¹⁷ by trying to understand their approaches, underlying concepts, and context.

Research Questions

In what ways are concepts and data on sustainability and buildings disseminated to a young audience?

Question 1: Which forms of communication exist and evolved over time?

Question 2: How and by whom are concepts adapted through different forms of communication?

A BRIEF OVERVIEW OF EMERGING SUSTAINABILITY ACTS IN POLITICS, SOCIETY, AND SCIENCE

In the Western world, especially from the 1960s onwards, an “explosive increase”¹⁸ in available information from various fields and related topics on environmental problems and later sustainability was observed. An expansion of research and development accompanied this process, leading to an increased environmental awareness beyond academia.¹⁹ In this context, various perspectives on sustainability in architecture emerged since more than 50 years.²⁰ However, scholars assess the degree of knowledge on sustainability, which the general public possesses, as to be still not very profound.²¹ The 1972 United Nations Conference on the Environment in Stockholm was the first global gathering to make the environment and the limits to resources a global issue.²² Although sustainable development is frequently criticized to be ambiguous and contradictory, an integral guideline of policies as well as research agendas today is the global conception of “sustainable development” set by the Brundtland commission in the 1987 report *Our Common Future*, highlighting its ethical foundation: the new paradigm of economic growth was introduced as a “[...] development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”²³

After the influential publication of the book *Silent Spring* from Rachel Carlson in 1962, the counterculture project *Drop City Commune* in Colorado (US), inhabited from 1965 to 1973, was at the forefront of the ecological movement at that time, inspired by the dome architecture from Buckminster Fuller.²⁴ The movement transformed the industrialized “high-tech architecture” from Fuller hands-on to vernacular architecture by reusing waste materials such as glass panels from cars.²⁵ Earlier, preservationists in the US successfully shaped a dichotomy between nature and civilization to protect pure wilderness, which was less suitable regarding complex environmental politics in the mid 1960s.²⁶ The *Whole Earth Catalog* published by Stewart Brand in 1968 applied a different, uncommon strategy by using one of the first colour images of the earth as the cover image of the first publication. The publication was conceptualized as a product catalogue with the slogan “access to tools” which at first emphasized handcraft, escapism, low-tech, and self-sufficiency, and later shifted to emerging energy technologies such as solar and geothermal systems, towards an environmental movement of “soft tech”.²⁷

Simultaneously, initiatives from a broad society led to the foundation of NGOs. After a first “earth day” for environmental education was held in 1970 in the US after an extensive oil spill in Santa Barbara, California²⁸, Greenpeace, initially founded as a small-scale environmental protest group with campaigns against nuclear weapons testing and whaling (Figure 1), is now the world’s largest environmental NGO²⁹. Due to petroleum shortages and associated price increases, the 1970s can be characterized by the first and second energy crisis in 1973 and 1979. Mass media campaigns communicated the implications of the crisis to a broad US audience by emphasizing energy conservation measures.³⁰ In parallel, in 1972, *Limits to growth* published for the Club of Rome gained global attention by discussing the finite nature of non-renewable material resources such as copper, aluminium, and iron based on simulations presented by Jay Forrester, former professor for system dynamics at Massachusetts Institute of Technology (MIT), which were discussed at conferences in Bern (Switzerland) and Cambridge (Massachusetts).³¹



Figure 1. Greenpeace anti-whaling campaign in North Pacific in the 1970s.³²

In architecture, the research in academia, development, and commercialization of innovative solutions on emerging environmental problems were entangled. Many distinctive “eco-design” paradigms for new construction emerged in the given context of the 1960s and 1970s such as vernacular, bio-climatic, tropical, technocentric, countercultural, and solar architecture.³³ Only later, a shift from new construction to existing buildings can be marked in the 1990s.³⁴ Arguments on environmental problems related to new construction, extensive material resource use, and building demolition can be found in scientific publications³⁵ and beyond (see Figure 2). However – in comparison with the increased attention and research output³⁶ on reuse and circularity as a sustainability strategy and despite its overlaps to preservation – preservation was for sure less prominently considered within the broader field of sustainability and building research.³⁷ One actor that needs to be considered with respect to the development of higher education curricula is “the professional association”. These organizations, such as ASCA (Association of Collegiate Schools of Architecture) or AIA (American Institute of Architects) in the US, had an impact on the conception of preservation education in the 1960s³⁸ as well as on the integration of sustainability in the 1990s³⁹.



Figure 2. Visualization from the book “Bauen als Umweltzerstörung” (1973) on the exponential increase of new construction referring to the publication Limits to Growth.⁴⁰

In research, early quantitative studies on material flows of existing building stocks and related material resources were conducted in the 1970s.⁴¹ However, research and institutions only accelerated from the 1990s onwards.⁴² While early methodical developments on material flow analysis (MFA) in the 1960s focused on existing buildings and stocks, many research efforts and associated developments on the topic of life cycle assessment (LCA) (academic journals, international standards like the ISO 14040, and databases like the ETH spin-off *ecoinvent*)⁴³ focused on new construction. A remarkable shift in research from new construction towards existing buildings and its embodied environmental impacts can be marked from 2006 to 2013.⁴⁴ In parallel, efforts on currently widely used approaches such as digital assessment tools⁴⁵ and certification systems⁴⁶ on transformations of existing buildings for building professionals accelerated.⁴⁷

Two major figures in architecture show paradigmatically how concepts on sustainability diffused early-on through various actors and formats to a broader audience. Besides well-known books, lectures, and exhibitions, Buckminster Fuller developed another format that included the concept of finite resources in 1960: the *World Game*. It was designed to work as a data platform accessible for a broad audience, spread across countries and associations, and was played in schools and universities in North America.⁴⁸ Another early example of an architect whose concepts on sustainability spread through games is Paolo Soleri, a former employee of Frank Lloyd Wright.⁴⁹ He developed concept of “arcology,” a neologism from the words *architecture* and *ecology*, which later circulated through games as well as exhibitions.⁵⁰

EXHIBITIONS AS MULTIPLIERS

Exhibitions can play a significant role in communicating sustainability in architecture, as Fuller’s dome project for the 1967 World Expo in Montreal has proven.⁵¹ They can address critical topics through narratives, communicating hidden and intangible aspects using representation and visual abstraction. However, surveys show that their audience may not be representative of the general public. Younger generations are overrepresented in visual art exhibitions, who, although mainly well-educated, visit primarily because of intellectual stimulation, inspiration, and learning.⁵²

Three major exhibitions at the Architecture Biennale in Venice connected aspects of building preservation to sustainability while communicating to a broad audience in architecture and beyond. The 2012 German pavilion *Reduce, Reuse, Recycle*⁵³ used large-scale format pictures of buildings which were transformed through subtle but material efficient renovation strategies. The accompanying catalogue included case studies on building transformations. The exhibition *Elements of Architecture* at the Venice Architecture Biennale 2014 curated by Rem Koolhaas, professor at Harvard University Graduate School of Design since 1995⁵⁴, set out to demonstrate the impact of technology in architecture based on the outcome of architectural design studio work by students at Harvard university. It revealed the complex technical mass inside contemporary buildings which are normally hidden from sight and what lies underneath the building skin while exploring the history of the building elements and how they evolve over time.⁵⁵ The Japanese Pavilion curated by Kozo Kadowaki, associate professor at Meiji University (Japan)⁵⁶, featured the exhibition *Co-ownership of Action: Trajectories of Elements* in 2021. An entire post-war Japanese wooden house built in 1954 with elements that underwent several changes until the 1980s was transported to Venice.⁵⁷ At the exhibition, all building elements of the house were arranged in a way to show the articulated architectural history and the sheer number and complexity of elements as well as different layers from decades of renovation activity alongside historical photographs.

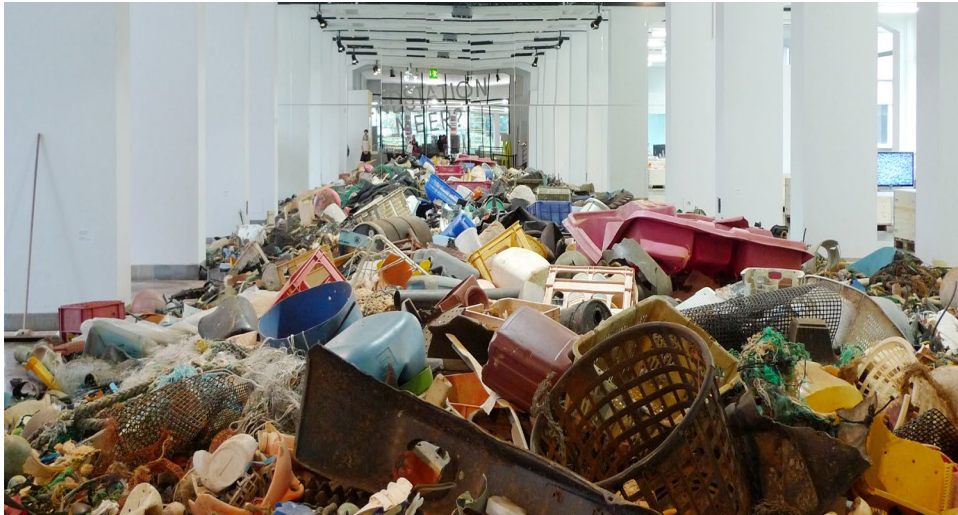


Figure 3. Visualization of mass of waste going to the ocean every day in exhibition space.⁵⁸

The travelling exhibition *Endstation Meer. Das Plastikmüll-Projekt* (2012) related to waste in the oceans shows paradigmatically how quantitative environmental aspects can be communicated beyond the physical exhibition space (Figure 3). The edition in Zurich's Museum für Gestaltung, affiliated with the Zurich university of the arts (ZHdK), actively confronted visitors with the immense amount of plastic garbage which ends up in the sea by placing a large amount of original plastic flotsam in the exhibition space.⁵⁹ A contrasting approach towards visualising quantitative embodied aspects of processes and related objects is shown by Studio Drift. In *Materialism* (on-going, Figure 4), Studio Drift explores the relationship between manmade objects and the materials by breaking down objects into volumetric blocks with respect to different raw materials.⁶⁰ The exhibition travelled to several locations in Europe until 2015 and was accompanied by educational activities to further enhance its impact.⁶¹



Figure 4. Exhibitions: Visualization of the quantity and type of materials inside a Volkswagen Beetle.⁶²

Within the realm of building demolition, the project and exhibition *Die Schweiz: Ein Abriss* curated by the Swiss Architecture Museum (SAM) Basel in cooperation with various initiatives, organisations, as well as the Chair of Construction Heritage and Preservation (ETH Zurich)⁶³ visually demonstrated the intensity of demolition activity, associated construction waste, and loss of architectural diversity by

showing an exhibition which integrated a digital atlas on demolition sites in Switzerland⁶⁴. The above-mentioned exhibitions paradigmatically showcase the variety of approaches to dissemination on the intersection of preservation and sustainability while demonstrating the importance of scholars as actors in the communication process.

(EDUCATIONAL) GAMES TO REACH THE NEXT GENERATION

Research projects⁶⁵ and discussion on the national political level⁶⁶ currently reflect an increased interest in games⁶⁷ as cultural products in Switzerland. Interestingly, well-received digital simulation games dealing with the built environment such as *SimCity* (1993) by Will Wright and later *Minecraft* (2011) by Markus Persson use abstract block visuals aiming at almost the opposite of triple-A games which focus on virtual realities.⁶⁸ So far, various connections between games and spaces were researched in architecture.⁶⁹ Thereby, educational games on sustainability in architecture form a recent focus in research⁷⁰ aiming at targeting not only younger generations but a broad audience through all generations interested in computer games.⁷¹



Figure 5. Screenshots of arcologies featured in *SimCity 2000* (1993).⁷²

SimCity 2000 (1993) popularized Paulo Soleri's concept of "arcologies" by featuring four different arcologies (Figure 5) in their gameplay. According to the *SimCity 2000* user manual "Arcologies are huge, tall, dense, cities-in-a-building"⁷³ which is a partial adaption of the initial concept of a circular urban metabolism which critically addresses consumerism by questions of minimizing energy, material, and land usage, as well as preserving natural landscape and solar architecture design.⁷⁴

Similarities to the arcologies in *SimCity* can be found in many games. The simulation game *Block'hood* (Figure 6) by architect and professor⁷⁵ Jose Sanchez and its underlying ecological model shows similarities to the conception of a self-sufficient city community. Further, the block visuals are strongly reminiscent of early simulation games such as *SimCity*. In the game, data processes are established with a tile-based map representing units (blocks) with inputs and outputs and adjacency features which connect tiles nearby to each other.⁷⁶ The data input is generated by a global pool of resources. If the input is too small, the blocks decay. However, the "data of each block is currently a placeholder [...]" and the research aim is that blocks "contain real world data" that "represent real world conditions".⁷⁷

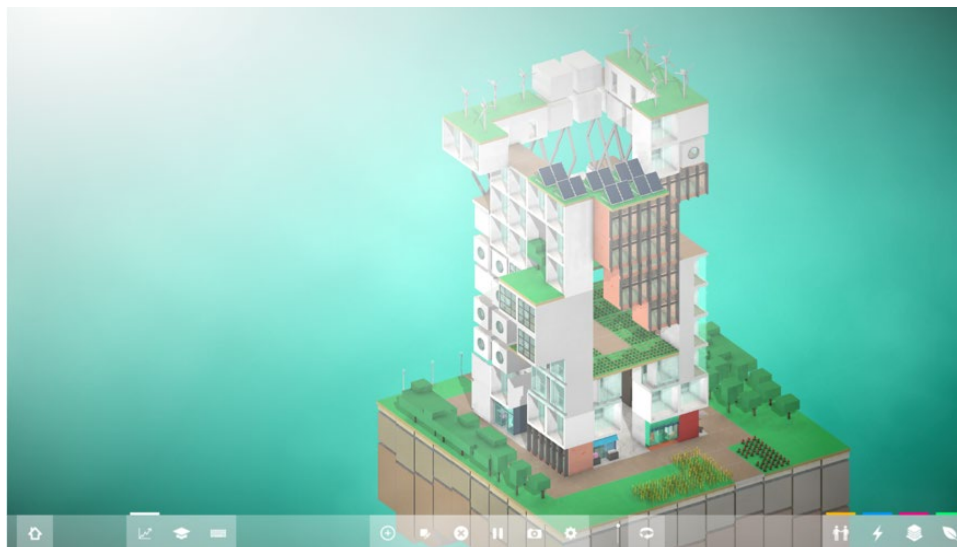


Figure 6. Screenshot of Block'hood's interface.⁷⁸

Specific references to reality – which may also be turned up-side down during gameplay – can be seen as a characterizing feature of educational games.⁷⁹ Multiple educational games developed in academia focus on aspects of operational building energy, without establishing a connection to embodied aspects and thus do not consider a holistic framework needed for the problem.⁸⁰ In heritage studies, educational games were specifically developed with the intention to communicate embodied aspects.⁸¹ Nonetheless, the context of sustainability is oftentimes not explicitly established and therefore difficult to be grasped by the player without prior knowledge.

The board game *In the Loop* developed in the field of industrial ecology and materials science intends to "increase the players' recognition of the benefits of circular economy [...]".⁸² Each player takes on the role of a CEO from a manufacturing company. Within their game concept, players can test different strategies towards circular economy of different products such as photovoltaic cells. Data from research is directly transferred to the game world by using simplified real-world causes (e.g., environmental concerns and resource availability), effects (e.g., price volatility), and potential circular economy approaches such as maintenance, repair, and refurbishing.⁸³ The presented selection of games indicates the implications of using them for educational purposes and showcases educational games as a growing field of research with the potential to operate directly on the gap between academia and a general public.

OUTLOOK: BUILDING PRESERVATION AS A SUSTAINABILITY STRATEGY IN GAMES

Since 2021, the authors of this paper (all ETH Zurich) have been developing a prototype educational simulation game⁸⁴, where real-world models and data were included within the case study of the historic Hotel Schatzalp in Davos, Switzerland, and its uninterrupted history of physical transformations. The aim of the prototype is to facilitate long-term considerations on existing buildings beyond energy efficiency. Therefore, the building simulation conceptually connects embodied and operational impacts of buildings by including lifetime models of building components, heating energy consumption, as well as life cycle impact data for repairs, replacements, and renovation activities.⁸⁵ The data is presented to the player through the interface's menu bars (Figure 7). In this way, the player can compare the decisions of repairing or renovating from different perspectives, as well as to assess the impacts of material selection for replacement and renovation work. By taking the role of the director of Hotel Schatzalp, the challenge is to sustainability transform the building while actively and iteratively reflecting on the decisions and strategies towards the building on the long-term.

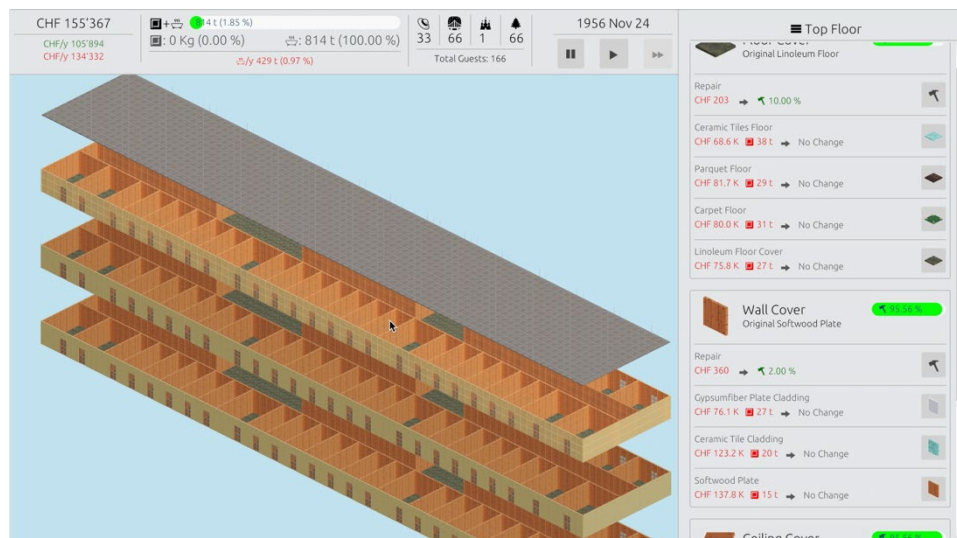


Figure 7. Screenshot of the prototype educational game interface on building preservation.

DISCUSSION

One way of bridging the gap between theory and practice towards sustainable transformations of the built environment could be through effective approaches in dissemination. Several actors and associated structures play a role in this process. This paper presented selected efforts which show paradigmatically how to reach out to a younger generation as future protagonists from the perspective of preservation by emphasizing the context of sustainability, actors, and conceptions transferred to exhibitions and games. The methods of communicating data and concepts through text, pictures, games, exhibitions, and other tools not only have advanced, but also became more diverse and intersecting over time, for instance with exhibitions using digital tools and interfaces. Specifically, games and exhibitions demonstrate adapted, abstracted, and condensed content elements with specific narratives, intended to increase awareness, visibility, and recognition of specific aspects of sustainability. Comparing different approaches to dissemination, an important distinction needs to be made in terms of the underlying concepts, including content on principles, awareness, or methods, according to Roger's theory of diffusion. As some of the presented efforts with broad outreach show, including content on principles and methodology – which can be at least equally important as content targeting awareness to increase diffusion⁸⁶ – may still result in pertinent demonstrators although its preparation may require extensive material and time.

Conceptions, framings, and scopes vary greatly in the investigated media formats. These variations can be reflected on considering a diffusion process including research, development, dissemination, and associated demonstrators, as well as relevant actors. Unsurprisingly, digital tools play a major role in recent communication efforts. A central feature of the discussed exhibitions is understanding how quantitative aspects as a central approach to environmental sustainability can be made tangible using qualitative aspects, for instance the mass and visualization of different materials.⁸⁷ If used mindfully⁸⁸, games offer a clear advantage in transferring concepts, which may not be restricted to educational games: they allow the player to test out novel approaches and perspectives iteratively and become accustomed to them. This can make an important difference within transfer processes as most individuals do not adapt new approaches without first determining their usefulness.⁸⁹

CONCLUSION

This paper demonstrates the complex and interdisciplinary character of transfer processes in architecture and sustainability, spanning from approaches in research, development, dissemination through various formats, and accompanied reception within society and its political contexts. The selection of media formats and case studies are explicitly limited to exhibitions and educational games. Nevertheless, the presented discussion on demonstrators within the intersection of architecture, sustainability, and dissemination to a younger audience used deconstruction, abstraction, comparisons, and interactions to communicate the intangible aspects of the built environment showcasing a wide variety of approaches and characteristics. The analysis showed that the underlying concepts and intentions can vary greatly, moving in a field between raising awareness and communicating principles as well as methods. In many cases, actors from academia play vital roles in the diffusion process. Therefore, it is important to observe the connection between academic research and efforts in dissemination to a broader audience. Younger generations can be seen as active citizens and future protagonists. Therefore, demonstrators which provide them with innovative and iterative learning experiences offer the potential of extending their decision-making capabilities by showcasing a different perspective to sustainable transformations of the built environment. Regarding the current efforts on this topic, there can still be seen a great potential to develop approaches on the intersection of preservation and sustainability.

NOTES

- ¹ Swiss Federal Commission for Monument Preservation, *Guidelines for the Preservation of Built Heritage in Switzerland*, 2007, 85.
- ² ICOMOS, "The Venice Charter: International Charter for the Conservation and Restoration of Monuments and Sites," *ICOMOS - Hefte Des Deutschen Nationalkomitees*, vol. X, 1964.
- ³ Federal Commission for Monument Preservation, *Guidelines for the Preservation of Built Heritage in Switzerland*, 2007, 85.
- ⁴ The first article of the Burra Charter (1999) states that the heritage value can be aesthetic, historical, scientific, or societal and is directed at past, present or future generations. See Australia ICOMOS, "The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance," *International Council on Monuments and Sites*, 1999, 23.
- ⁵ Council of Europe, "Faro Convention. Council of Europe Framework Convention on the Value of Cultural Heritage for Society" (Faro, 2005).
- ⁶ Generation Z can be defined as the follow-up group of "millennials", born between 1996 and 2012, who are now between the ages of 10 and 25. See: Kim Parker and Ruth Igielnik, "On the Cusp of Adulthood and Facing an Uncertain Future: What We Know About Gen Z So Far," *Pew Research Center*, 2020.
- ⁷ See: H. Birgisdottir et al., "IEA EBC Annex 57 'Evaluation of Embodied Energy and CO₂e_q for Building Construction,'" *Energy and Buildings* 154 (2017): 72–80.
- ⁸ E.g.: "Renovation wave" by the European Commission, accessed December 14, 2022, https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en.
- ⁹ See: Swiss Federal Commission for Monument Preservation, *Guidelines for the Preservation of Built Heritage in Switzerland*, 89.
- ¹⁰ Jasmin Godemann and Gerd Michelsen, *Sustainability Communication: Interdisciplinary Perspectives and Theoretical Foundations* (Dordrecht: Springer, 2011), 5.
- ¹¹ The UN conference on Environment and Development in Rio de Janeiro (1992) connected sustainability to education and emphasized the importance of addressing school-age to adult education as crucial to improve "[...] the capacity of people to address environmental and development issues." See: Paula Jones, David Selby, and Stephen Sterling, eds., *Sustainability Education: Perspectives and Practice across Higher Education* (New York: Earthscan, 2010).
- ¹² Hannah Wallis and Laura S. Loy, "What Drives Pro-Environmental Activism of Young People? A Survey Study on the Fridays For Future Movement," *Journal of Environmental Psychology* 74 (2021): 101581.
- ¹³ See: Godemann and Michelsen, *Sustainability Communication: Interdisciplinary Perspectives and Theoretical Foundations*, 10.
- ¹⁴ Martin Röck et al., "Embodied GHG Emissions of Buildings – The Hidden Challenge for Effective Climate Change Mitigation," *Applied Energy* 258 (2020): 114107.
- ¹⁵ Uta Hassler, Niklaus Kohler, and Wilfried Wang, *Umbau: Über Die Zukunft Des Baubestandes* (Tübingen: Ernst Wasmuth, 1999).
- ¹⁶ Deutsches Nationalkomitee für Denkmalschutz (DNK), "Analyse Zum Stand Der Vermittlungsangebote Im Denkmalschutz Und in Der Denkmalpflege in Deutschland. Statusbericht Zur Denkmalvermittlung 2022 Im Auftrag Des Deutschen Nationalkomitees Für Denkmalschutz" (Berlin, 2022).
- ¹⁷ According to Everett M. Rogers, *Diffusion of Innovations*, Fifth Edit (New York: Free Press, 2003), 170. demonstrators can be conceptually embedded in the diffusion process including the recognition of a problem (1), research (2), development (3), commercialization (4), and diffusion & adaption (5). Important characteristics of this process include the distinction between awareness-knowledge, how-to-knowledge, and principles-knowledge as well as emotions, opportunities for actors, compatibility, and complexity.
- ¹⁸ Godemann and Michelsen, *Sustainability Communication: Interdisciplinary Perspectives and Theoretical Foundations*, 4.
- ¹⁹ Important intellectual starting points of western ecological awareness in the US are demonstrated by Erik W. Johnson and Pierce Greenberg, "The US Environmental Movement of the 1960s and 1970s," in *Routledge Handbook of the History of Sustainability*, ed. Jeremy L. Caradonna (New York: Routledge, 2018), 137–50. Further, wilderness conservation and preservation efforts, led by John Muir and the Sierra Club, are presented as influential actors of the progressive era (1880-1920).
- ²⁰ Baweja, "Sustainable Architecture. A Short History," in *Routledge Handbook of the History of Sustainability*, 273–95. However, in architecture, strategies which aimed at making the most of the available resources, such as repurposing building parts as "Spolia" existed long before industrialization started as shown by Hans-Rudolf Meier, *Spolien: Phänomene Der Wiederverwendung in Der Architektur* (Jovis, 2021).

²¹ Godemann and Michelsen, *Sustainability Communication: Interdisciplinary Perspectives and Theoretical Foundations*, v.

²² See: <https://www.un.org/en/conferences/environment/stockholm197>, accessed August 11, 2022. In addition to measures concerning environmental assessment and management, the accompanying action plan as part of the conference report already highlighted education, training, and public information as key for the younger generation, as well as adults to act responsibly towards improving the environment. Today, a clear objective of the UN's sustainable development goals is "to ensure that all learners acquire the knowledge and skills needed to promote sustainable development (...)" (Goal Nr. 4). See: <https://sdgs.un.org/goals>, accessed August 11, 2022.

²³ World Commission on Environment and Development, *Report of the World Commission on Environment and Development. Our Common Future*. (United Nations, 1987). See section "From One Earth to One World", article 27.

²⁴ Simon Sadler, "Drop City Revisited," *Journal of Architectural Education* 59, no. 3 (2006): 5–14.

²⁵ Baweja, "Sustainable Architecture. A Short History.", 281.

²⁶ Andrew Kirk, "Appropriating Technology: The Whole Earth Catalog and Counterculture Environmental Politics," *Environmental History* 6, no. 3 (2001): 374–94.

²⁷ Kirk, 386.

²⁸ See: <https://www.earthday.org/history/>, accessed August 11, 2022.

²⁹ Frank Zelko, "Scaling Greenpeace: From Local Activism to Global Governance," *Historical Social Research* 42, no. 2 (2017): 318–42.

³⁰ Toby Bolsen, "The Construction of News: Energy Crises, Advocacy Messages, and Frames toward Conservation," *International Journal of Press/Politics* 16, no. 2 (2011): 143–62.

³¹ They presented graphs were developed based on systems dynamics simulation models by Jay Wright Forester. With the developed simulations including different variables such as population, food production, industrialization, pollution, and consumption of non-renewable natural resources over time it was illustrated that finite resources are not compatible to an economic system designed to grow infinitely. The report was heavily criticized for forecasting a civilizational collapse by the year 2050 due to demographic and economic trends. See: Dennis L Meadows and Donella H Meadows, *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*, Potomac Associates Books (New York: Universe books, 1972). Interestingly, a connection between the field of systems dynamics and Buckminster Fuller's *World Game* is established by Timothy Stott, *Buckminster Fuller's World Game and Its Legacy* (New York: Routledge Focus, 2022), 44.

³² Photo credits: Rex Weyler and Greenpeace.

See: <https://www.rexweyler.ca/greenpeace/barkr27tla3ec48t23xxbw8k3mrry>, accessed December 14, 2022.

³³ Baweja, "Sustainable Architecture. A Short History.", 275–277. The dissemination of the technocentric approach was marked by the buildings from architect Frei Otto in Europe, as well as by Buckminster Fuller in the US.

³⁴ Sebastian Moffatt and Niklaus Kohler, "Conceptualizing the Built Environment as a Social–Ecological System," *Building Research & Information* 36, no. 3 (2008): 248–68.

³⁵ See for example a visualization of the quantity of materials inside the German building stock per capita in Volkswagen Golf in Uta Hassler, *Umbau, Sterblichkeit Und Langfristige Dynamik*, ed. Uta Hassler, Niklaus Kohler, and Wilfried Wang (Berlin: Ernst Wasmuth Verlag, 1999), 54.

³⁶ Julian Kirchherr, Denise Reike, and Marko Hekkert, "Conceptualizing the Circular Economy: An Analysis of 114 Definitions," *Resources, Conservation and Recycling* 127, no. April (2017): 221–32.

³⁷ However, today, monument preservation is currently taking up the topic again, as shown, for example, by the AKTLD ("Arbeitskreis Theorie und Lehre der Denkmalpflege e.V.") 2021 conference in Zurich entitled *Avantgarde oder uncool?*. See up-coming publication: Stefanie Herold, Silke Langenberg, and Daniela Spiegel, "Avantgarde oder Uncool? Denkmalpflege in der Transformationsgesellschaft" (Holzminden, 2023).

³⁸ Michael Tomlan, "Historic Preservation Education: Alongside Architecture in Academia," *Journal of Architectural Education* 47, no. 4 (1994): 187–96. discusses the effects of professional organizations on university curricula in the US.

³⁹ James Wright, "Introducing Sustainability into the Architecture Curriculum in the United States," *International Journal of Sustainability in Higher Education* 4, no. 2 (2003): 100–105.

⁴⁰ Rolf Keller, *Bauen Als Umweltzerstörung: Alarmbilder Einer UN-Architektur Der Gegenwart* (Zürich: Verlag für Architektur Artemis, 1973). Shortly after, the exhibition «Umdenken Umschwenken» at ETH Zurich in 1975 – which afterwards was exhibited in 25 different venues in Switzerland, Germany, and Austria – shows another interesting example in aiming to reach out to a broad audience on the topic of environment and architecture. The exhibition is discussed in-depth in: Kim Förster, "Umdenken Umschwenken. Environmental Engagement and Swiss Architecture," in *The Routledge Companion to Architecture and Social Engagement*, ed. Karim Farhan (New York: Routledge, 2018), 271–88.

⁴¹ In the US early material flow studies were already done in the 1970s with Newcombe's investigation of the metabolism of Hong Kong after the methodological foundations were established by Leontief in the 1930s according to Paul H. Brunner and Helmut Rechberger, *Handbook of Material Flow Analysis: For Environmental, Resource, and Waste Engineers*, Second Edi (CRC Press, 2016). The study Hong Kong proved to be a viable research subject mainly because the countries boundaries coincided with the city's boundaries and thus data was available for an entire city. In Europe, Duvigneaud and Denayer-De Smet conducted an early study in 1975 and established an energy balance of goods such as construction materials going in and out of the city of Brussels. They concluded that Brussels imported all its energy from outside the city boundaries and coined the term "Hinterland".

⁴² In German speaking countries, Niklaus Kohler and Uta Hassler published articles in the 1990s on the German building stock and its environmental implications. E.g.: Niklaus Kohler, Uta Hassler, and Herbert Paschen, eds., *Stoffströme Und Kosten in Den Bereichen Bauen Und Wohnen* (Heidelberg: Springer Berlin, 1999). The emergence of university chairs for sustainability in architecture and civil engineering and their research foci in Europe is the subject of further investigation. The Technical University of Denmark (DTU) offered a course on LCA for engineers since 1997 according to Nuno Cosme et al., "Learning-by-Doing: Experience from 20 Years of Teaching LCA to Future Engineers," *International Journal of Life Cycle Assessment* 24, no. 3 (2019): 553–65. As further examples, the civil engineering department of the Swiss Federal Institute of Technology (ETH Zurich) established a chair for Sustainable Construction in 2006. See: <https://sc.ibi.ethz.ch/en/about-us/history.html>, accessed August 11, 2022. In the UK, the Oxford Brookes University founded an institute for Sustainable Development in 2004. See: <https://www.brookes.ac.uk/research/units/tde/institutes/oxford-institute-for-sustainable-development-oid/>, accessed August 11, 2022.

⁴³ The first academic journal fully dedicated to LCA was established in 1996. International standards on LCA followed shortly afterwards with the publication of the ISO 14040 in 1997. An important step towards comparable data usage was marked with the dissemination of life cycle inventory (LCI) databases such as the ETH spin-off *ecoinvent*, released in 2003. The LCI database *ecoinvent* started as a project in the 1990s and now includes more than 18'000 datasets for different sectors such as the construction industry. See: Anders Bjørn et al., "LCA History," in *Life Cycle Assessment: Theory and Practice*, ed. Michael Z Hauschild, Ralph K Rosenbaum, and Stig Irving Olsen (Cham: Springer International Publishing, 2018), 17–30., 19. and <https://ecoinvent.org/the-ecoinvent-association/history/>, accessed August 11, 2022.

⁴⁴ Birgisdottir et al., "IEA EBC Annex 57 'Evaluation of Embodied Energy and CO_{2eq} for Building Construction.'" Earlier, first LCA studies emerged in the 1960s, although the term LCA only became established in the 1990s. In the US and Northern Europe first packaging studies were conducted in collaboration between academia and industry focusing on energy for example from Coca Cola in 1969. As well as one of the first public LCA studies in 1974 on different beverage container alternatives. See Bjørn et al., "LCA History.", 19.

⁴⁵ Exemplary tools intended to support sustainable renovation planning are discussed in the following publications: IPB ed., "Feindiagnose Im Hochbau" (Bern, 1993)., Erik Brandt and K.B. Wittchen, "EPIQR - A New Surveying Tool for Maintenance and Refurbishment," *Durability of Building Materials and Componentes* 3 (1999): 1576–84., Dominique Caccavelli and Heinrich Gugerli, "TOBUS - A European Diagnosis and Decision-Making Tool for Office Building Upgrading," *Energy and Buildings* 34, no. 2 (2002): 113–19. Today, at least 39 LCA software tools exist for professionals, experts, and decision-makers, which include a broad range of data visualization approaches, reviewed by Alexander Hollberg et al., "Review of Visualising LCA Results in the Design Process of Buildings," *Building and Environment* 190 (2021).

⁴⁶ The US Green Building Council (USGBC) was established in 1992 with its LEED label launched in 1998 (see <https://www.usgbc.org/sites/default/files/2021-04/Foundations-of%20LEED-022520.pdf>, accessed August 10, 2022). In the UK, the Building Research Establishment (BRE) Organization was already founded in the 1910s. However, the BREEAM label was launched later in 2006 (see <https://bregroup.com/about-us/our-history/>, accessed August 10, 2022). In Switzerland, the concept of *Minergie* was developed in 1994 before the Minergie association was founded in 1998, while (see <https://www.minergie.ch/de/verein/geschichte/>, accessed August 10, 2022). Germany's DGNB ("Deutsche Gesellschaft für Nachhaltiges Bauen") which is responsible for the DGNB label was launched in 2007 (see <https://www.dgnb.de/en/council/index.php>, accessed August 2022).

⁴⁷ The described approaches were mainly based on quantitative environmental assessment, intended to transfer best-practice approaches from research to experts in the construction and real estate industry.

⁴⁸ The aim of the *World Game* was nothing less than to show players how resources can be redistributed on a global scale. See Stott, *Buckminster Fuller's World Game and Its Legacy*.

⁴⁹ Soleri's conceptions of biophilic buildings and cities were intended to reconnect humans with nature. See: Ruth A. Rae, "Arcology, Arcosanti and the Green Urbanism Vision," *Open House International* 41, no. 4 (2016): 56–62. His works were later also exhibited in a retrospective in the SMoCA museum in Scottsdale in 2017. See: <https://smoca.org/exhibition/repositioning-paolo-soleri-the-city-is-nature/>, accessed August 11, 2022.

⁵⁰ See: Mustafa Doğan, “Ecological Ideals, Sustainable Tourism and the Heritage Concept of an Eco-Village: The Case of Arcosanti, USA,” *Journal of Heritage Tourism* 14, no. 4 (2019): 371–81. Soleri manifested his concept in the “Arcosanti project” in Arizona in 1970, an experimental town which is still a frequently visited heritage site today. The town is promoted as ecological settlement and was recently exhibited in the US. Soleri and his works were initially heavily criticized by Paul Goldberger in *The New York Times* for being authoritarian and pseudo-scientific by promoting his utopian visions with the help of arbitrary numbers.

See <https://www.nytimes.com/1989/10/01/arts/architecture-view-a-cross-between-buckminster-fuller-and-buck-rogers.html>, accessed August 11, 2022. Later, he was criticized in *The Guardian* due to allegations of sexual abuse. See: <https://www.theguardian.com/artanddesign/2020/feb/29/paolo-soleri-architect-abuser-arcosanti-utopian-city-steve-rose>, accessed August 11, 2022.

⁵¹ Among other themes, the focus of the US Pavilion at the World Exhibition on entertainment instead of education is briefly discussed in an article from *The New York Times* from 1967. The article closes with a statement from the commissioner general of the US Pavilion: “We didn’t want to burden people down with a lot of heavy exhibits. This should be fun.”, See: <https://timesmachine.nytimes.com/timesmachine/1967/04/24/issue.html>, accessed August 12, 2022.

⁵² See report by the audience agency: <https://www.theaudienceagency.org/resources/audience-report-audiences-for-visual-arts>, accessed August 11, 2022.

⁵³ Muck Petzet and Florian Heilmeyer, *Reduce Reuse Recycle – Ressource Architektur*, ed. Muck Petzet and Florian Heilmeyer (Ostfildern, Berlin: Hatje Cantz, 2012).

⁵⁴ CV retrieved from: <https://www.gsd.harvard.edu/person/remment-koolhaas/>, accessed December 19, 2022.

⁵⁵ Anna Winston (Dezeen), “‘Scary’ Venice Architecture Biennale show has ‘nothing to do with design’ says Koolhaas,”

See: <https://www.dezeen.com/2014/06/05/rem-koolhaas-venice-architecture-biennale-2014/>, accessed August 11, 2022.

⁵⁶ CV retrieved from: <https://gyoseki1.mind.meiji.ac.jp/mjuhp/KgApp?resId=S001364&Language=2>, accessed December 19, 2022.

⁵⁷ Rima Sabina Aouf (Dezeen), “Japan creates exhibition from dismantled old house at Venice Architecture Biennale,” See: <https://www.dezeen.com/2021/06/02/japan-pavilion-old-house-venice-architecture-biennale/>, accessed August 11, 2022.

⁵⁸ Photo credits: Zürcher Hochschule der Künste (ZHdK), Museum für Gestaltung Zürich, CH.

⁵⁹ Initiated by the Zurich University of the Arts and Zurich Design Museum, the material at the core of the exhibition was collected during beach clean-ups at different locations in the world. It placed what for many Europeans is an abstract phenomenon directly at their feet. See: <https://www.emuseum.ch/exhibitions/1671>, accessed August 11, 2022.

⁶⁰ See: <https://studiodrift.com/work/materialism/>, accessed August 11, 2022.

⁶¹ The exhibition is currently available via website. See <https://www.plasticgarbageproject.org/>, accessed August 11, 2022.

⁶² Photo credits: Studio Drift. See: <https://studiodrift.com/work/materialism/>, accessed August 11, 2022.

⁶³ The exhibition started in September 2022. See: <https://www.sam-basel.org/de/ausstellungen/die-schweiz-ein-abriss>, accessed August 11, 2022.

⁶⁴ The instances of the demolition activity, which are spatially dispersed and as such less present in the everyday life, were displayed together which in turn elevated the relevance and urgency of the topic. See: <https://www.abriss-atlas.ch>, accessed August 11, 2022.

⁶⁵ Sarah Zurmühle et al., “Developing a Configuration System for a Simulation Game in the Domain of Urban CO2 Emissions Reduction,” in *Advances and New Trends in Environmental Informatics. Digital Twins for Sustainability*, ed. Andreas Kamilaris et al. (Springer Nature Switzerland, 2021), 165–79.

⁶⁶ Schweizer Bundesrat, “Games. Ein Aufstrebender Bereich Des Kulturschaffens” (Bern, 2018).

⁶⁷ Games and play beyond leisurely entertainment can be characterized on one axis of “open, free, and exploratory play” and “formalized, rule-based, goal-oriented” games and on another axis of liminal and liminoid. See: Steffen P. Walz and Sebastian Deterding, “An Introduction to the Gameful World,” in *The Gameful World: Approaches, Issues, Applications*, ed. Steffen P. Walz and Sebastian Deterding (Cambridge, Massachusetts: MIT Press, 2015), 11. Another approach towards understanding games is through defining characteristics such as goals, rules, feedback systems and voluntary participation. See: Jane McGonigal, *Reality Is Broken: Why Games Make Us Better and How They Can Change the World* (London: Vintage, 2012), 12.

⁶⁸ Sven Pfeiffer, “Virtual & Augmented Reality,” in *Atlas of Digital Architecture : Terminology, Concepts, Methods, Tools, Examples, Phenomena*, ed. Ludger Hovestadt, Urs Hirschberg, and Oliver Fritz (Basel: Birkhäuser, 2020), 470.

- ⁶⁹ See for instance: Matthias Noell, "Des Architekten Liebstes Spiel: Baukunst Aus Dem Baukasten," in *Spiele / Games (Figurationen : Gender, Literatur, Kultur; 5,1)*, ed. Caroline Torra-Mattenkott (Köln, 2004), Andri Gerber and Ulrich Götz, eds., *Architectonics of Game Spaces. The Spatial Logic of the Virtual and Its Meaning for the Real*. (Bielefeld: Transcript, 2019), Steffen P. Walz, "Towards a Ludic Architecture. The Space of Play and Games" (ETH Zurich, 2010).
- ⁷⁰ See: Marta Brković Dodig and Linda N. Groat, *The Routledge Companion to Games in Architecture and Urban Planning : Tools for Design, Teaching, and Research* (New York, NY: Routledge, 2020).
- ⁷¹ See: https://www.game.de/wp-content/uploads/2021/08/game_Jahresreport-der-deutschen-Games-Branche-2021_DE.pdf, accessed August 11, 2022.
- ⁷² See: <https://simcity.fandom.com/wiki/Arcology>, accessed August 11, 2022.
- ⁷³ See: <https://classicreload.com/sites/default/files/sim-city-2000-manual.pdf>, accessed August 11, 2022.
- ⁷⁴ The architectural design includes for instance apses that allow for solar capture in winter and shading in the summer. See: Rae, "Arcology, Arcosanti and the Green Urbanism Vision.," 57.
- ⁷⁵ Sanchez was an assistant professor at University of Southern California's School of Architecture since 2013, after becoming associate professor in 2020 at University of Michigan's Taubman College. CV retrieved from: <https://taubmancollege.umich.edu/sites/default/files/pdfs/faculty/Sanchez%2021CV.pdf>, December 19, 2022.
- ⁷⁶ Jose Sanchez, "Developing an Architectural Simulation Video Game.," *Real Time - Proceedings of the 33rd ECAAD Conference 1* (2015): 89–97.
- ⁷⁷ Sanchez, 95.
- ⁷⁸ Sanchez, 90.
- ⁷⁹ References to reality in educational games can for instance be thematic or logical-mathematical. See: Dominik Petko, "Unterrichten Mit Computerspielen : Didaktische Potenziale Und Ansätze Für Den Gezielten Einsatz in Schule Und Ausbildung.," *Medienpädagogik*, 2008.
- ⁸⁰ See up-coming publication: Fabian Kastner et al., "Towards Long-Term Perspectives on Existing Buildings: Developing a Game-Based Approach Using Hotel Schatzalp as a Case Study," in *AMPS Proceeding Series 28. A Focus on Pedagogy: Teaching, Learning, and Research in the Modern Academy*, ed. Z. Adil (Virtual, 2023).
- ⁸¹ Examples of games from heritage studies are presented in Eray Şahbaz and Aysun Özköse, "Experiencing Historical Buildings through Digital Computer Games," *International Journal of Architectural Computing* 16, no. 1 (2018): 22–33. and N K Hoang Giang, P Ferschin, and M Di Angelo, "Medieval Craftsmen at Castle Waldenfels Historical Construction Work as Serious Game," in *2015 Digital Heritage*, vol. 2, 2015, 243–50.
- ⁸² The game is discussed in Katherine A. Whalen et al., "All They Do Is Win': Lessons Learned from Use of a Serious Game for Circular Economy Education," *Resources, Conservation and Recycling* 135, no. June 2017 (2018): 335–45.
- ⁸³ An assessment of students' reflections on circular economy demonstrated that the game allowed students in reflecting on material criticality by finding new perspectives and strategies. See: Whalen et al., 342–343.
- ⁸⁴ The simulation is written in the Rust programming language (See <https://www.rust-lang.org>, accessed August 10, 2022), using the Bevy game engine (See <https://bevyengine.org>, accessed August 10, 2022), and the egui framework (See <https://github.com/emilk/egui>, accessed August 10, 2022).
- ⁸⁵ The database for the prototype game consists of multiple sources presented in an up-coming publication: Kastner et al., "Towards Long-Term Perspectives on Existing Buildings: Developing a Game-Based Approach Using Hotel Schatzalp as a Case Study."
- ⁸⁶ Rogers, *Diffusion of Innovations*, 171. Regarding the discussed exhibitions, interestingly, besides the exhibited objects, accompanying analogue (catalogue) and digital (platforms and interfaces) materials assume the role for long-term outreach beyond the exhibition space, and for the further communication of concepts and data.
- ⁸⁷ Quantitative reasoning through data visualization can be summarized by the question of "Compared to what?" (e.g., the mountain of rubbish that is related to the dimensions of an exhibition space). This corresponds to an important characteristic of data visualization: setting a single data point into context to demonstrate magnitudes, changes, and variations. See: Edward R Tufte, *The Visual Display of Quantitative Information* (Cheshire: Graphics Press, 2001).
- ⁸⁸ See: Myth Number 3 in Erin M. McTigue and Per Henning Uppstad, "Getting Serious About Serious Games: Best Practices for Computer Games in Reading Classrooms," *Reading Teacher* 72, no. 4 (2019): 453–61., 456.
- ⁸⁹ Rogers, *Diffusion of Innovations*, 174.

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THE [IN] TANGIBLE NEO-ANDALUSIAN JESUIT HERITAGE. THE CASE OF ESTANCIA SAN IGNACIO DE CALAMUCHITA.

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INTRODUCTION

Treatment of derelict pieces of heritage is a social quandary and appreciation for them comes in the late 20th century. Córdoba de la Nueva Andalucía [central Argentina today] is a World Heritage environment, as the Jesuit Block and six establishments conformed a unique social experiment still relevant to society.¹ Jesuit estancias are tangible monuments, incorporating intangible components. San Ignacio de Calamuchita – henceforth San Ignacio - the largest and most productive estate with key activities, was an expression of the former, but after two centuries of instability, buildings were looted, and it lost some 80% of the fabric to become an intangible asset.

Local communities and non-government organizations sought it to be listed and the provincial government included it within its heritage catalog.²

Jesuit estancias are part of our on-going research. We study Spanish haciendas considering estancias in Nueva Andalucía [Córdoba, Argentina] from an Andalusian viewpoint, as origin setting and reference. In Our Lady of Alta Gracia we focused on the construction aspects of Spanish haciendas, common heritage assets in contemporary countries.³ Additional research that unraveled singular intercontinental relations and potential leads for future studies was published as part of Master studies at the University of Seville in architecture and heritage.⁴

Spanish Jesuit haciendas,⁵ or estancias,⁶ are singular heritage assets developed as polyhedral undertakings between the 16th and 18th centuries, until the Jesuit estrangement. Polyfunctional “social experiments” with no match, neither at their own time, nor in subsequent epochs, that remain unparalleled to date.

No longer functioning as per their foundation mission, these estancias have standing values and influence on society, transpiring the Jesuit way of doing things.⁷

Although not the exclusive component, outstanding monumental architecture was the visible feature of these settlements; even at the sad level of ruins, as it happens with our object of study.

The social experiment appears to have carried out within its inception the seed for its own doom and demise. San Ignacio is an example of degraded architecture with overlooked potential, that portrays evangelization as a development engine.

The main compound is now a group of ruins, as regrettable result of socio-cultural and political disruption and lack of strategic vision - a common theme when power struggles cancelled sustainability across intercontinental Spanish regions. It is, however, an example of production and industrial models talking to us after 250 years, as underlying paradigm of joint Church and Crown endeavours.

In addition to the main religious activity, as Benso and Segnorile indicate, diverse production and trade were important aspects of Jesuit economy.⁸



Figure 1. From left to right: Churches of the Jesuit Block [Córdoba city]; Ea. Sta. Catalina; Ea. Our Lady of Alta Gracia; and San Ignacio's ruins ca 1962. Córdoba, Arg. Own work, and courtesy of Page C. A. and Schávelzon D.

OBJECTIVES AND METHODOLOGY

The research aims to investigate mechanisms for potential re-enactment of this valuable heritage. An asset that has been neglected but is very much in the social memory. We seek positive action to try and raise the settlement to a tangible condition.

From a scientific approach, we seek to confirm the settlement qualities, in many ways beyond the mere monumental material remains, towards a more ample vision involving, among others, territorial aspects, articulation structures, and economic components.

By graphically digitising it, we explore mechanisms for recovery, conservation, management, and re-activation, expounding heritage values and re-integrating peripheral components despite present [in] tangible conditions.

Contrary to some of its sibling estancias, this 1725 establishment has not only been neglected in the material arena, but it seems to have also been deleted from the official memory and records. Unlike with other Jesuit establishments, San Ignacio presents significant difficulties at the time of tracing back its last 350 years of existence to reconstruct its past. Sometimes it seems that the investigation could end up navigating in virtual reality – perhaps one of the potential inevitable outcomes.

We approached the research, therefore, from the architectural and general historiographic viewpoints, using photographic records with various graphic documents.

We work from up-to-date planimetry and 3D graphics [HBIM] to understand components and relationships, for historic matching and cross referencing historic details. Given the estate considerable historic extension and functions, territorial reviews using GIS, and intangible background studies are also incorporated. The relationship with an articulation skeleton, such as the Royal Road to Alto Perú, is brought into the equation due to its influence in the development of the asset. The lack of accurate data for this estancia poses an interesting challenge. Its archaeological condition, not fully approached as such, is a limitation as well.

A study of relevant milestones and context, with comparative research for typological analogies or discrepancies, is incorporated

SOCIETAS JESU AND ITS SETTLEMENTS

The singular settlements in the newly discovered world at the end of the 15th century were developed as part of the Society of Jesus endeavours in the following century.

One of the outcomes of the Council of Trent in the mid-16th century was the establishment of the Jesuit order. Canonically founded in 1540, it was the expression of the Council teachings, and the specific vocation of Saints such as Ignatius of Loyola and Francis Xavier, both Spaniards.

Il Gesù Church in Rome – coincidentally called Chiesa del Santissimo Nome di Gesù all'Argentina – by architects Giacomino da Vignola and Giacomo della Porta, became a key element and a model for future developments. Model as a general guideline, but not a rigid architectural typology to follow irrespective of circumstances and brief specifics.

The conceptual approach of the baroque era and style, its rationale and its purpose were spread around and applied; even to the most remote corners of the world. But late renaissance, carried through in Il Gesù, also influenced early Jesuit architecture. Neoandalusian buildings show this footprint, and although San Ignacio de Calamuchita would not have been an architectural masterpiece, it would have acquired a baroque spirit through Giovanni Andrea Bianchi's input - a Jesuit master architect from Spanish European background himself, among reputed European colleagues of his time.⁹

Jesuit Andalusian works commence in 1553 and in 1579 the order establishes its Professed House in Seville, the link city for the Americas. Numerous colleges and production complexes were built or purchased and expanded. Among them many haciendas that were to financially support the Jesuit charter. Mostly in southern Castille, but also interwoven with the Americas.

The first Jesuits landed in the Indies – Brazil – in 1549. As of 1573 and due to geopolitical and evangelization objectives, the Society of Jesus establishes the mother house in the centre of Nueva Andalucía – in the city of Córdoba, where in 1599 the Jesuit block is set up. Several estancias (also called haciendas or ranches) develop around very rapidly. Among them Caroya, Jesús María and outposts such as Candonga.¹⁰



Figure 2. Jesuit Professed house in Seville [left] and access portal at San Ignacio de Torquemada, to the outskirts of Seville and belonging to the Jesuit Province of Chile [right]. Own work

RESEARCH FRAMEWORK

Background and context.

Jesuit operations and architecture were part of the geopolitical concept of Phillip II, owner of the world at the time, a vast conglomerate of peoples and nations that by then included Portuguese territories. Whereas the Spanish Monarchy encompassed all continents, Europe and América naturally stood out. Under agreement with the Crown, the Society of Jesus would work in the Spanish territory in support of conquest advances.¹¹ Its mission was to reaffirm Trent's Magisterium, especially with indigenous

peoples, the new Christians, to educate middle and high social classes according to regional needs. Certain European protocols were not necessarily the same ones in America or in Asia.

To achieve their goals, the Jesuit fathers developed an economical model for growth and self-sustainment, especially in view of dynamic circumstances in unknown environments. They nurtured able American regions replicating European conditions, ensuring that fertility and productive conditions were improved.

Our research framework, being essentially in architectural heritage, involves various anthropic aspects ranging from the historical geopolitical, to the territorial, economic and legal. And we consider that the overall all-encompassing concept, the main Jesuit scheme feature can be summarized as “sustainability”.

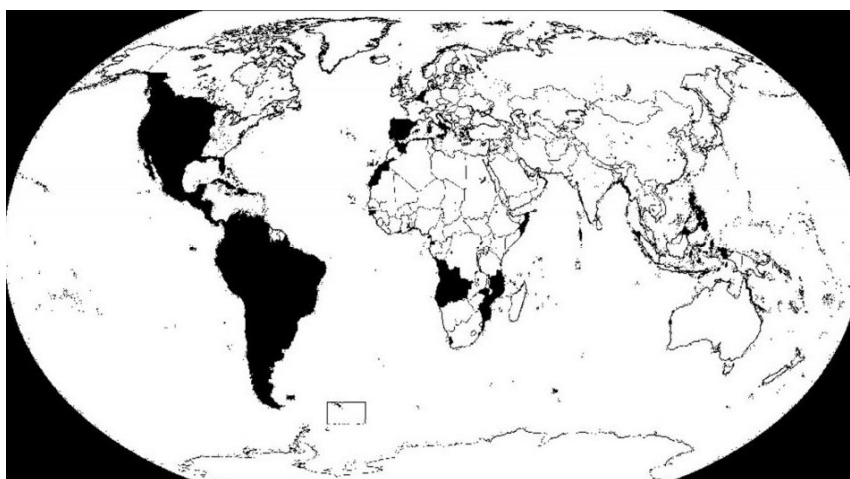


Figure 3. Phillip II dominions: Castille, the Yndies and Portugal; framework for Jesuit development in the mid-16th century. Own work

Ambit.

The object of study was, and still is, located in the [today's] Province of Córdoba, Argentina, the central region of South America, and originally Nueva Andalucía.¹² The Jesuit province of Paracuariae, with headquarters in the city of Córdoba [Argentina] and including thirty Guaraní reductions in the Guayrá region, was within this division.

Seven multipurpose settlements were established along the Royal Road: the Jesuit Block and six estancias, being San Ignacio the southernmost one, number 6 in Figure 4.

They reached different stages of development, as the floor plans indicate, also showing the magnitude of the exercise and the buildings. These are, however, but a small part of the territorial extent that Jesuit estancias had.

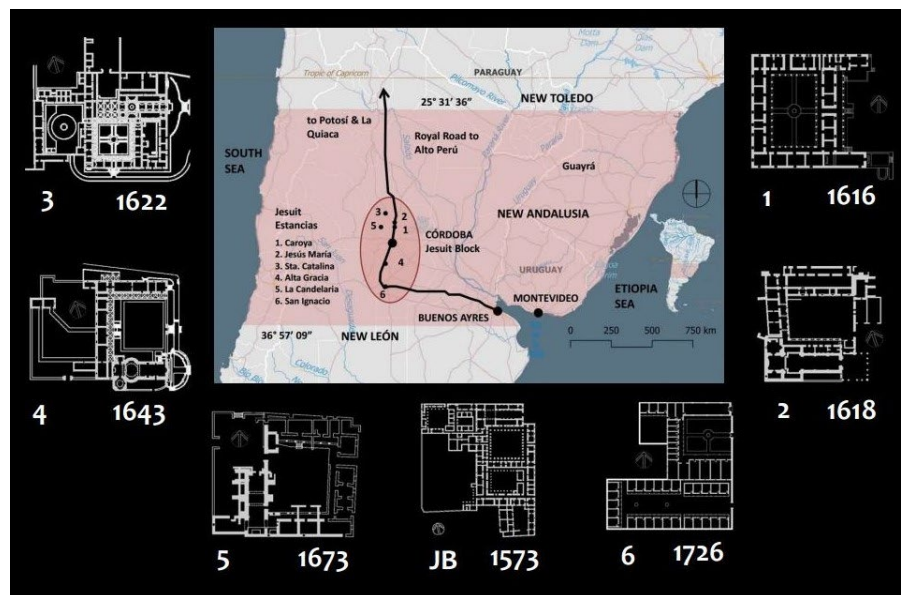


Figure 4. GIS mapping of New Andalusia and Jesuit Estancias in the Royal Road. Central region of South America. Own work

SAN IGNACIO DE LOS EJERCICIOS DE CALAMUCHITA

Territory

Heritage paradigms were re-focused towards the end of the 20th century and previous monumental architectural slant was expanded incorporating new elements, such as immaterial heritage, documentation, movable assets, works of art, cultural landscapes, and territorial components.

As in the other estancias, the territory is a key context element in San Ignacio. The small remnant we see today verifies this assertion as it shows how the estancia was decomposed through the years.¹³

The overall territory where neoandulsian estancias were established comprised some one million hectares.¹⁴

Settled in 1726 it expanded by way of Royal grants, purchases, and donations until reaching the remarkable area of 123 square leagues or 332,000 plus hectares¹⁵!! Figure 5.

The area was well served by generous natural hydric systems draining towards the eastern plains from the diving range, and a significant artificial reservoir of 5,426 ha now adjoins the main complex of San Ignacio – the Third River Reservoir.

San Ignacio was situated at 110 km south of the Jesuit Block in Cordoba city, and 80 km south of its sister estancia of Alta Gracia. As it happened with Santa Catalina up north, it had 20 outposts to allow an efficient and agile management; and some became towns that nowadays still stand. Cordoba's mountains were part of its natural landscape, with Cerro Champaquí¹⁶ being the uppermost northwest corner. This cultural landscape is of outstanding quality and a valuable heritage asset.

Not surprisingly, San Ignacio was the estancia with the largest cattle breeding and export capabilities.¹⁷



Figure 5. GIS analysis of San Ignacio's territory and its environs Own work

Main compound

Now barely there, San Ignacio's main compound is what most people keep in their memories. It was destined to Spiritual Ignatian Retreats for the order but did not reach full development because of the short time available since its foundation until it was abandoned by the order.

Griselda Benso and Analía Signorile *La estancia jesuítica de San Ignacio de Calamuchita* (2004) with Carlos A. Page and Daniel Schávelzon *Francesc Fábregas i Pujadas* (2012) provide details regarding the buildings.

It responded to the typical Jesuit layout around patios, a scheme inherited through the centuries from Rome, medieval Islam in Spain, and subsequent Castilian developments. Figure 6.

The residence had 12 rooms with a gallery around the main patio in an L-shaped configuration. With the 20 m long by 5 m wide church, it formed a U-shaped construction, and the front wall with an access gate fully enclosed the patio. From past artist impressions, although not accurate enough, and considering Bianchi's background, it could be assumed that the church façade had the typical austere baroque footprint, with its three bells at the curved crowning. Figure 8.

A 55 m long "rancheria" - a 27 hovels compound - completed the set up to the southern side, and an 11.7 m x 11.7 m square rear patio with services and workshops, as those of other establishments, was behind the residence.

Daniel Schávelzon and Carlos A. Page *La formación de una ruina histórica* (2011) give an account of the final act of destruction.¹⁸

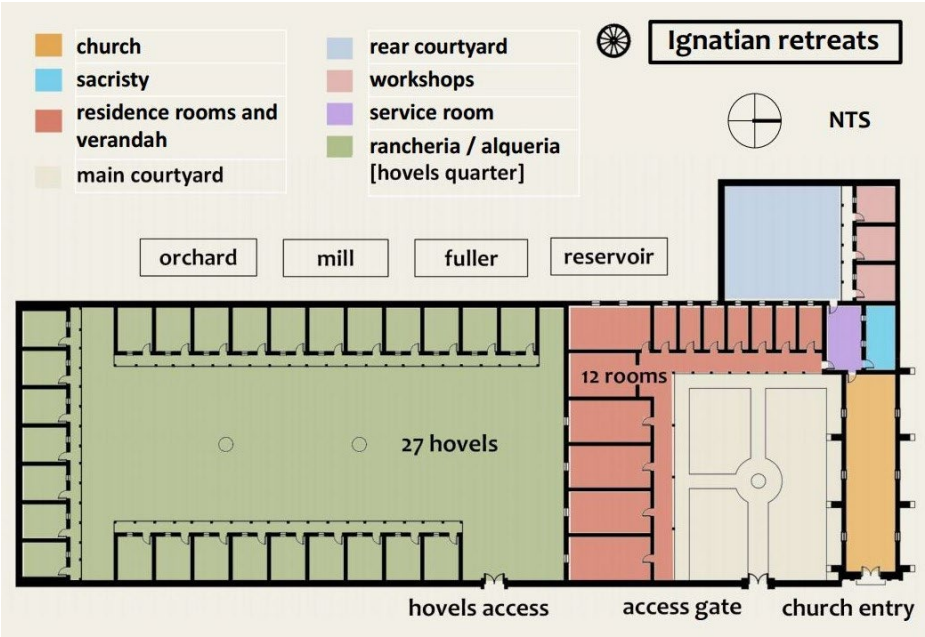


Figure 6. San Ignacio's main compound. Own work

Sustainability. An essential Jesuit [in] tangible heritage pattern.

The Jesuit scheme required material sustainment. Sometimes intentionally, sometimes by circumstantial needs, the order's agenda always involved sustainable processes that anticipated current thoughts by 400 years!! All establishments were managed under this premise.

From its foundation, the order developed a refined economic and financial structure that allowed it to pursue its mission. In every continent, the Society of Jesus undertook to setup production establishments in different fields according to the needs or capabilities of the region and its society; all constituting the most profitable production line for the specific location. Six estancias and thirty reductions in the Guayrá region were the example acknowledged today.¹⁹

San Ignacio's production and profit were destined to support spiritual retreats and associated needs. Several facilities made it self-sufficient, a status most desirable today. Table 1.

SUSTAINABILITY AT SAN IGNACIO			
	SYSTEM	ITEM/S	LOCATION
1	Hydraulic	Aqueducts [main still in place]	Main at 9 km north of main compound.
2		Irrigation ditches	Several locations.
3	Production, maintenance	Mill, metal workshops, fuller.	Rear of main compound.
4	Cattle breeding	Cattle pens	
5	Farming	Grain store	
6	Self-sustainment	Orchard	Rear of main compound.

Table 1. San Ignacio and sustainability. Own work; based on Benso and Signorile La estancia jesuítica

CHRONOLOGY OF AN [IN] TANGIBLE ASSET

Post estrangement actions after 1767 had negative impacts. A singular Jesuit asset suddenly ceased operating and became part of civil stocks belonging to the Crown. Whilst private ownership helped to maintain it within certain limits, San Ignacio was no longer a link in a potent chain of spiritual

endeavours. Initially managed by the “Junta de Temporalidades”²⁰ it turned into a private for-profit enterprise. Rebellions of the 19th century added confusion and a situation of neglect escalated. The resulting ex-novo social fabric, with its heritage, remained disorientated for at least 80 years, with partial dislocation still identifiable today. Legal frameworks were altered towards the last third of the century, and Spanish heritage was disregarded. Other steps towards total degradation followed and San Ignacio became «intangible». A lack of regulated frameworks did not help to protect it and works in other estates took precedence, relegating it into oblivion.²¹ Table 2.

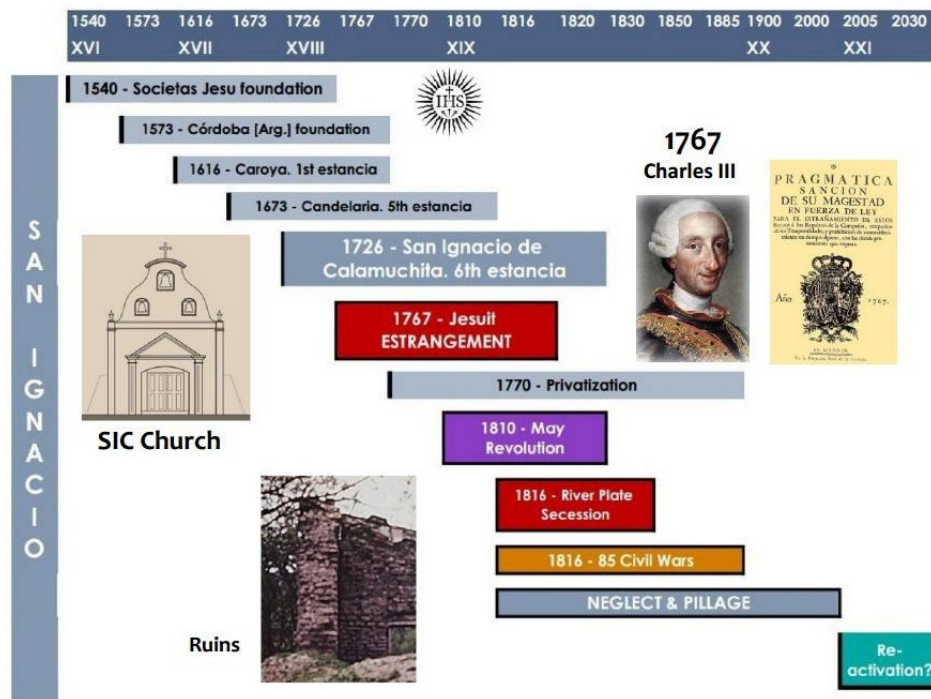


Table 2. San Ignacio: chronology of an [in] tangible asset. Own work

RESULTS

San Ignacio de Calamuchita was the last establishment in the region operating only during forty years until the estrangement. It became nonetheless the largest of the Jesuit estates, developing a multi-faceted sustainable Jesuit neo-andalusian undertaking, with a considerable production.

Given the limitations of the available data, many elements in our work need to be further investigated and verified. Although substantial progress has been made, several planimetric question marks keep on arising leading towards further working hypothesis. Archaeologists were involved, but the political will do not appear to support academic and community efforts.

Scientific research to date and the use of digital technology, permitted to explore the estate more in detail. In the main compound, now in ruins with less than 25% of its fabric being recognizable, it has been possible to confirm most part of the configuration. The development pattern, layout and facilities, followed that of the majority of Jesuit assets, and it has been possible to mostly re-construct the floor plan from historiographic data - Figures 6, 7.

San Ignacio had a specific mission in the Jesuit context: spiritual exercises. Available historiographic descriptions,²² partly corresponding with inaccurate artist impressions, depict an austere architecture. The lack of time in its development supports this assumption. This led to a relegation of monumental architecture, characteristic of its sibling estancias. San Ignacio was on the fringe of the Jesuit region. The additional vigilance tower of the 19th century²³ evidence that San Ignacio was close to the border

with indigenous tribes. Spiritual endeavours with production, therefore, did not ask for exuberant baroque architecture. Giovanni Andrea Bianchi's involvement, however, indicates that an unpretentious but elegant baroque façade, following Candelaria's, would have been applied to the simple 20 m long x 5 m wide nave.²⁴ Figure 7.

The late foundation affected both quality and reputation, furthering mismanagement, and pillage. Territorial assets, however, remained constant, with heritage value.



*Figure 7. 3D HBIM study model of San Ignacio's Church at LOK100 +. Own work.
Data procured from various historiographic sources and artist impressions of possible architecture*

CONCLUSION

The 1767 estrangement was a mortal blow to Jesuit works in the Spanish Monarchy. With rich and productive schemes Neo-Andalusian estates became a sought-after bounty. Republican rebellions in the 19th century added confusion to the matter. For 80 years society was in limbo and so was heritage. Legal frameworks were altered, with Spanish heritage partly discarded as undesirable. There was limited heritage conscience and soon valuable pieces were lost.

San Ignacio's fall run parallel to socio-political degrade of a boiling society; a verifiable phenomenon in most territories of the Spanish Monarchy.

Material understanding of tangible heritage is a natural human approach, prone to apprehend what senses permit. However, speculative intellectual exercises are required to bring intangible heritage into human minds. Intangible assets could then be relegated.

Contemporary digital and visual minds, however, can work through this process. Adequately combined frameworks, including technology and new uses, can re-position the asset back into the tangible world. Up-to-date tools – GIS, HBIM, etc. – can restructure intangible spaces and immaterial heritage, facilitating their understanding. Sotiris Logothetis et al explain how "... BIM technology contributes to the creation of a digital representation having all physical and functional building characteristics in five dimensions (5D)".²⁵ Territorial planning, interpretation settings, information tools and legal protection would help with shortfalls in the study asset, as shown hereinbefore.

With scientific approaches the estate could be brought back to social consideration. Partly by reconstructing reality of looted areas, by preserving structures [viz. the aqueduct] by establishing management protocols with living GIS and HBIM processes. From the archaeological viewpoint the “Virtual Showcase” that Florian Ledermann and Dieter Schmalstieg propose²⁶ would be an interesting alternative for San Ignacio, favouring its re-integration.

The research progressed to more accurate outcomes for the asset, being planimetry and HBIM work valuable tools - Figures 7, 8. As various details are contradictory or not clear, further investigation is necessary. Reconstruction of San Ignacio’s heritage – even at graphic and virtual levels – should be an on-going puzzle project. Joint architectural and archaeological research, supported by authorities, non-profit organizations and community groups should continue on from the research, as Ratcliffe and Murphy suggest, “fostering awareness through scenario learning” .²⁷ Territorial and sustainability aspects should be explored further.

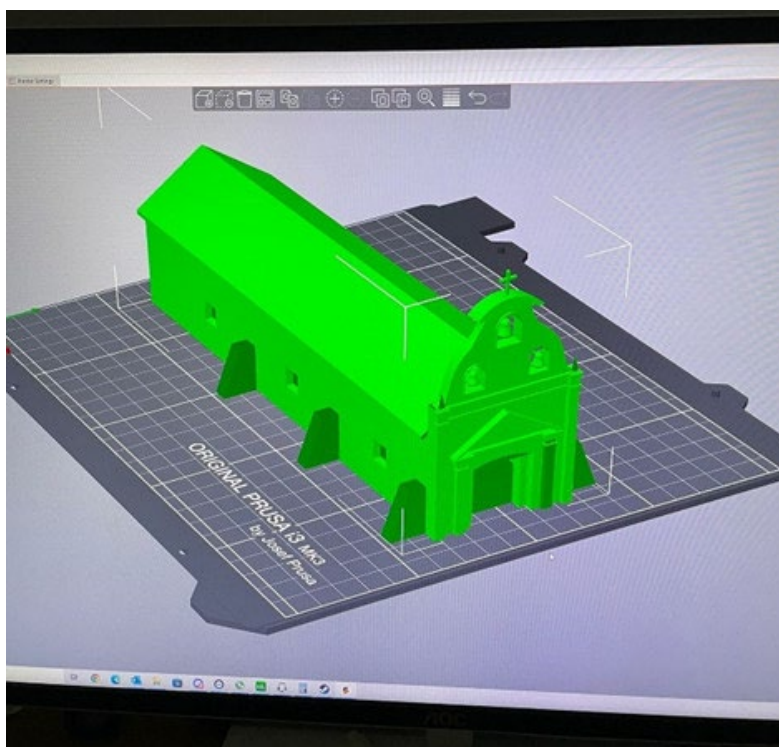


Figure 8. 3D study printing of San Ignacio’s Church from HBIM modelling. Own work

NOTES

¹ *Jesuit Block and Estancias of Córdoba* (UNESCO 2000) accessed November 15, 2021.

<https://whc.unesco.org/en/list/995/> "The Jesuit Block in Córdoba, heart of the former Jesuit Province of Paraguay, contains the core buildings of the Jesuit system: the university, the church and residence of the Society of Jesus, and the college. Along with the five estancias, or farming estates, they contain religious and secular buildings, which illustrate the unique religious, social, and economic experiment carried out in the world for a period of over 150 years in the 17th and 18th centuries."

² The national authorities, however, have some sort of umbrella overseeing control for most heritage in the country, thus generating a complex jurisdiction framework.

³ Gustavo-Adolfo Saborido-Forster, "La construcción del patrimonio compartido en el Camino de las Estancias Jesuíticas y el conjunto de Alta Gracia" (paper presented and minuted at the XI Congreso Nacional de Historia de la Construcción, Soria, Spain, October 9-12, 2019).

⁴ Gustavo-Adolfo Saborido-Forster, *Haciendas Jesuíticas Españolas. El caso de Santa Catalina en el Camino Real al Alto Perú*. (Mosquera Adell E., Ponce Ortiz de Insagurbe M. M. tutors). Máster in Architecture and Heritage Final Assignment (University of Seville 2019). <https://idus.us.es/handle/11441/100721>

⁵ "the term "hacienda" is first used in the 17th century assimilating the terminology used in America in respect of large productive Indian lands. Until then peninsular properties were considered as «olive inheritance» [English translation from the original Spanish] Saborido-Forster, 73.

⁶ Saborido-Forster, 100. "Estancia" is a term equivalent to hacienda. It was already used by King Charles III and applied to the large production lands in Córdoba [today Argentina]. "Ranch" is also used in some regions.

⁷ We refer to the Jesuit "modus noster", a set of development and artistic parameters, but not as a concise rigid and pre-established protocol to adhere to when confronted with issues to resolve. Although unwritten, these parameters allowed the order to adequately respond to challenging circumstances with unity of purpose, flexibility, and diversity of outcomes.

⁸ Griselda. M. Benso and Analía. M. Signorile *La estancia jesuítica de San Ignacio de Calamuchita. Única estancia cordobesa no recuperada. Córdoba [Argentina]*. (Córdoba: Ediciones del Boulevard, 2004), 46.

⁹ Gustavo-Adolfo Saborido-Forster et al "Dos arquitectos jesuitas para dos Andalucías: Pedro Sánchez S.J. y Giovanni Andrea Bianchi S.J." (presented at the II Congreso Internacional Nodos del Conocimiento. Universidad, innovación e investigación, rescate humano y transferencia de conocimientos: retos para la universidad en el horizonte 2030, Sevilla, Zaragoza y Ciudad de México, November 25 and 26, 2021).

¹⁰ Santa Gertrudis, commonly known as Candonga was a wintering outpost for mule cattle in transit of estancia Santa Catalina. Located South Southwest of the main compound, it was one of the several outposts that the estancia had.

¹¹ The new conquest was no longer with weapons but following the peninsular pattern by word and education; thus sustaining territorial expansion and consolidation in regions where Crown officials settled.

¹² Nueva Andalucía was one of the six administrative South American divisions that Charles I gave to the "Adelantados" by Royal Decree in 1534. It was located in between Nueva Toledo and Nueva León [today Patagonia]. It encompassed the territory between parallels 25° 31' 36" and 35° 57' 09", spanning almost 1,000 km from north to south in the centre of the land mass. It included parts of Argentina, Brazil, Chile, and Paraguay, and Uruguay. It was a bi-oceanic area of more than 2.5 million km² [about 70% of Western Europe] very similar in geographic conditions to Andalucía in the Southern part of Castille [Spain] and closely connected with this European region and Seville.

¹³ The main efforts in San Ignacio de Calamuchita appear to have been mostly directed towards monumental aspects, thus perhaps narrowing the field of action, limiting its recovery potential, and maybe conditioning the authorities' consideration and work.

¹⁴ More than twice the area of Cairngorms National Park in Scotland which has 452,800 ha or 4,528 km². Also covered in Saborido-Forster, 100. Most of San Ignacio's was productive land, and if inscribed within a polygonal rectangle, the north south dimension would have been 125 km, approximately the London Southampton distance. In the east west direction, the distance was about 92 km, roughly from London to Oxford.

¹⁵ The Lake District National Park in England extends for 236,200 ha, approximately 100,000 ha less.

¹⁶ With a height of 2,770 m above sea level, this mount is the highest peak in the province, and considered the second of the "Seven Natural Wonders of Córdoba" [Argentina].

¹⁷ Whilst Nicholas Cushner S.J. *Jesuit ranches and the agrarian development of colonial Argentina, 1650-1767* (State University of New York Press, Albany, U.S.A. 1983) 49-84 reviews in detail production activities of the estancias, there seems to be limited in-depth material regarding San Ignacio. Saborido-Forster (2019): 104,

however, based on Benso and Signorile (2004) data, indicates that San Ignacio, with 33% of the cattle production and more than 40,000 cattle heads, was the largest of them all.

¹⁸ Private owners bulldozed the remaining structures towards the end of the 1980's because of religious reasons and overall neglect. There are now only ruins left, with some components buried. The visualization is a challenging but rewarding project we aim to gradually work on.

¹⁹ *Jesuit Block and Estancias of Córdoba* (UNESCO 2000) recognized the set of estancias as an outstanding and never matched social experiment. They provided economical support to different components of Córdoba's scheme, but some surplus was also used to help the Guayrá's reductions when necessary. Alta Gracia provided the means for the High College of the order. As it happened in Seville, Santa Catalina supported the Novitiate – hence its name – a pattern also followed in Tepotzotlán of Nueva España, today México.

²⁰ Temporal Assets Management and Liquidation Committee - appointed by the Crown. Various committees were set up right across the world and unfortunately they were prone to abuse and corruption. Several cases of mismanagement and illegal appropriation of Jesuit assets or cattle took place, representing the beginning of pillage and degradation.

²¹ Over time San Ignacio divorced from its sister estancias, and the process came to a critical point by the year 2000, when UNESCO, in listing the set of estancias, left it out due to insufficient substantial remains – around 20%.

²² Carlos A. Page and Daniel Schávelzon *Francesc Fábregas i Pujadas* (2012) and Griselda. M. Benso and Analía. M. Signorile *La estancia jesuítica de San Ignacio* (2004).

²³ The tower was built in the western wing of the main patio and now no longer exists. Its addition leads to believe that the Jesuit fathers and the Spanish authorities would have had a reasonably pacific relationship with the surrounding tribes, but it was no longer so under subsequent Republican administrations.

²⁴ Page and Schávelzon (2012). There are two artist impressions showing the estancia, that appear to contradict each other in a number of aspects. In his graphic reconstruction, Francesc Fábregas i Pujadas shows elements of Jesús María, another estancia, that would not correspond with San Ignacio's architecture. The reconstruction of the church façade has assumptions based on Bianchi's style, also used at the Córdoba City's cathedral, and partly to Candelaria's church façade. Further research would surely cast more light into the architectural features of the main compound.

²⁵ Sotiris Logothetis et al. "Building information modelling for cultural heritage: a review." ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume II-5/W3 (2015) doi:10.5194/isprsannals-II-5-W3-177-2015. BIM for heritage is now called HBIM.

²⁶ Florian Ledermann and Dieter Schmalstieg. "Presenting an archaeological site in the virtual showcase." (paper presented at the VAST: 4th International Symposium on Virtual Reality, Archaeology and Intelligent Cultural Heritage, 1-8. Brighton, United Kingdom 2003) doi:10.2312/VAST/VAST03/123-130.

²⁷ Ratcliffe J. and Murphy M. *The architectural heritage industry: fostering awareness through scenario learning*. Future Academy Reports, Dublin Institute of Technology (2000).

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PATRIM, ABOUT A RESEARCH EXPERIENCE

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INTRODUCTION¹

The paper presents a research and design experience – yet completed for what concerns the research activities - funded by Regione Liguria and developed since the beginning of the year 2021.² Two have been the requests and the research undertakings for which the Department Architecture and Design of the University of Genoa was called for: one - which will not be described and commented on in this essay - was to get a ‘governance model’, as it could be roughly named, operating through a “designerly” vision for the *Parco Naturale Regionale delle Alpi Liguri* whilst the other - object of this paper – was getting a complete and detailed proposal for physical landmarks, to be considered as the park “gates” or park entrances, for highlighting the access to the park from seven little different municipalities, on which territory the natural park insists.

It could be said that the request for conceiving and then realizing these material and tangible elements of intangible narratives has been - as for the ‘client’ – unquestionably open, indeed, as we did not have particular restraints nor binds, except for some limitations about the available budget. But, from the very beginning of the process of designing these landmarks, among us discussing how to handle the posed issue, we focused on two claims, in our perception both pivotal to be fulfilled: on one hand, our design should relate itself to the freshly new graphic signage structure and to the already existing graphics for the park as well as the informative panels (all of them already funded and mostly installed); on the other, we clearly had the perception that these landmarks would be if compared to the ‘average’ signages and informative panels, something else.

Our ‘doors’ should be easily recognizable in their appearance and meaning; should insert themselves properly in the environment; should – of course – communicate that the municipality belongs to the park territory even if the village itself is not residing ‘exactly within’ the park ambit; in addition, last but not least, our accesses should be ‘felt’ and remembered. Not an easy issue if looked at from this side of it.

Thus, we commenced operating through a conceptual structure, having in mind the focus of communicating, creating belonging and wish for reminiscing, and that all of this would come along and abide by the already existing visual artefacts, but somehow aiming to encompass a more “designerly” vision for our gates.

In Munari’s concept for the *sculture da viaggio*³ «if there would be [in a hotel room] an object, light and not bulky, to bring along with oneself, which had a purely aesthetic function, it could act as a link with our modern cultural aesthetic world». ⁴ Like Munari’s idea - even if much more prominent in terms of dimensions and much more ‘shared’ because of being public - our design expectation has always

been to offer a place where to focus on, without answering - that much – about the meaning and creating an aesthetic moment, a connection with a cultural moment instead.

THE PROJECT

One: a weird literature review

The research moment - literally intended – has been conceived not only as the usual journey through literature, but evidently, it was needed, the examination of examples that could be either an inspiration, roughly said, or a lesson learnt: what has worked in similar task's request and why? Where do the signages and the landmarks have been placed, in respect of what they wanted to highlight? How have they conveyed their messages?

Searching for an answer to all, and many more, questions what has in particular been considered as an exemplary case study was the new design of the doors for the *Parco del Delta del Po*, by Inandoutarchitettura (an Italian design firm, based in Ferrara), issued in 2018, awarded with the first prize within a design contest⁵ in 2019 and currently in action to be built⁶. Besides this, most of the park entrances have been considered – even if not finding them wholly appropriate for the request we have been called for – like the entrances of *Parco Nazionale del Gran Paradiso*, - *del Gran Sasso*, - *della Sila*. Somehow, we found interesting, as a good reference too, the south entrance of the *Riserva Naturale di Crava Morozzo*, but considered basically it was working that well – as being shaped in a very traditional door form – because of being placed in a flat territory.

Thus, made clear, as always, in the Design discipline, that we did not want to engross too much from the example we would examine, rather we could say we were searching for references: a kind of mighty weird physical literature of the existing – or shortly upcoming - park entrances, even considered that we already were aware that the program under which the research and its outcome were funded was evidently interesting other similar cases, either in terms of theoretical projects, either in terms of finalized ones to which our doors/gates could be compared and related.

We proceeded considering very far and distant examples - and well-known ones too – so far not only examining park entrances or visitors' centres but also city landmarks and landscape designs: in fact, as Gui Bonsiepe says in his essay about design research, «If it is true that designers can no longer design the way they did one or two generations ago, then it must also be acknowledged that researchers can no longer do research as they did one or two generation ago – i.e. orienting themselves primarily or exclusively by text».⁷

So, we 'travelled' from *Reddacliff Place Wayfinding* (Brisbane, Australia), to *Les Berges de Seine* (Paris, France), from *Fundy National Park* outdoor interpretive media (New Brunswick, Canada), to *Maen Llia* interpretation signage (Brecon Beacon, Great Britain), till the entrances to great American National Parks like Yellowstone. In all of these we found something that arouse a scholarly debate between us, getting some of the intangible values we wanted to express in a material form in our design; in fact, as stated by Donner et al. when commenting on territorial and local branding, "mere" details can be considered as valuable resources « [...] based on specific cultural and/or qualitative differentiation and exploiting unique territorial assets, as landscapes, local products, or people's traditions and know-how. Consequently, the brand identities are strongly rooted in the territories and their values, highlighting geographic origins and characteristics»⁸. Within the same work, part of the *Schwarzwald* system, in particular the "Echt Schwarzwald" is examined, which stimulated intensely our interest because of being like 'our' park diffused or better to say not gathered.

From the farthest to the nearest, for the biggest to the tiniest examples, rather than looking only for an aesthetical stimulus, the idea has always been understanding the methods generating the models, what these final simple landmarks were narrating and if – in the end - they were succeeding in their attempt.

Two: the reasons and the whys

Commonly design discipline is wrongly intended because what seems to be the threshold and the key point is the final outcome: the object, the artefact. We need, instead, to consider for this task - as well as for many others in the contemporary design discipline - all the processes and the natural possible changes, as even observed by Stefano Caprioli and Pietro Corraini.⁹ We have always been aware in all the research and design moments that the users, were the final point to be reached.

In this term, we had to care about two extremely different targets, and both would influence and determine the success or the failure of our research activity and effort. On one side we had the stakeholders, and together with them the mayors and the inhabitants of the villages, proud like only Ligurian people can be and harsh somehow. On the other - as for the specific task we were called for but, perhaps, even more for our inner desire - we had in mind travellers and visitors, equally in this case profoundly different one from the other: from the most active one, as a trekker of the *Alta Via dei Monti Liguri*¹⁰ to the visitor reaching the settlements by car only, maybe for a short time, interested in nature but somehow wishing to experience it from afar. It might seem weird, but we could observe all these different nuances within our team, so it was pretty easy to depict the scenario.

As expressed by Deyan Sudjic: «We need to move beyond designing for the way things are now and begin to design for how things could be, imaging alternative possibilities and different ways of being and giving tangible form to new values and priorities. In the field of design, users and consumers are usually characterized in narrow and stereotypical ways, resulting in a world of manufactured objects that reflect an impoverished view of what it means to be human. This project set out to develop a design approach that would lead to products that embodied an understanding of the consumer user as a complex existential being».¹¹

Thus, from the very early moments, we looked for identifying possible non-misleading, shared 'signs', presences of intangibles heritage and material culture, that could be read by visitors and felt as genuine by local inhabitants, among the seven villages. We contemplated food, craftsmanship, traditions, local lore. But, in the search for cultural common grounds, in the need to recognize - and then enhance - determined codification of visual recurring motifs, conveying either a sense of community and belonging for the residents together with a witness of the local traditions for visitors and travellers, we found the answer – literally - under our eyes. The park itself! Its unique non-gathered constitution - residing within the territory of the seven settlements of Cosio di Arroscia, Mendatica, Montegrosso Pian Latte, Pigna, Rezzo, Rocchetta Nervina, Triora, but not starting 'exactly' adjacent to the centre of the inhabited area; its distinctive articulation on three valleys – *Valle Arroscia*, *Valle Argentina* and *Val Nervia* – and the *Alta Via* connecting all the system. We decided then all these would be the elements encompassed in our design for the park 'doors' – now more properly thought of as landmarks. Through a material and visual codification, seven different landmarks will be narrating from a selected and specific viewpoint the belonging and the connections (ideal and territorial). Moreover, it is to acknowledge that 'working' with valleys has always been a practice among the Italian mountains, i.e. the Alps in the Trentino-Alto Adige region or in Valle d'Aosta, but operating with three valleys is kind of a new! A system, hence: three valleys, seven boroughs, one *Alta Via*. Now we lacked only of understanding where to place our concepts, for making them fit the environment and operating their aim.

Three: Where do (we) belong to?

Where to place our signages and landmarks has been probably the most challenging issue and thus even the one, we cared about with special sensitivity. According to our design – which is pictured in the following pages – we already left aside the distinct narrative about tangible heritage and material culture that the park management was correctly suggesting, sensing that this information about local lore,

natural and historical facts and presences were somehow better to be depicted within the illustrative panels.

Therefore, as previously described, instead of exploring for a differentiating value, we looked for a unifying one and – hence the territory, wildly appearing in its very particular constitution along with this particularity of the boroughs/municipalities being “part of” the park without “residing inside” the park itself was a stimulus instead of a constraint. But we were asked to design the door gates: how to determine the issue? Curiously, about non-coordinated image, Corraini and Caprioli say: «Delegating, sampling, misleading: by consciously acting on these elements, one places oneself between order and chaos. The freedom or rigidity of the instructions provided, the degree of subjectivity or automation chosen [...] can lead to formal results more or less similar to each other and more or less close to the expectations of the designer».¹²

Even if the park does not start exactly within the inhabited centres, nevertheless it ‘belongs’ to them, so we found it would not be misleading or unprincipled getting some freedom whilst positioning our ‘gates’. The boroughs declare themselves “as” belonging to the park and that is the enhancement, the enrichment we were looking for.

In the research work of Emilia Janeczko, Rafał Wojtan, Natalia Korcz, and Małgorzata Woźnicka we found a strong reference about the resonance of enhancing the outdoor experience through an appropriate visual and material communication, similarly to how it has been expanded and scholarly applied in museums and enclosed spaces like visitor’s centres. In particular, they express a key point when saying: «Graphic techniques make it possible to give a visual image to interpretative content in order to better illustrate the information».¹³

Again, Donner et al. clarify that «place branding is not considered in a narrow sense as merely the promotion or the marketing of a place, but [...] as the construction of territorial ideas, signs and practices and devising new ways for a local society to identify itself. This includes the valorisation of unique qualities of rural regions which can be tangible (natural, agro-climatic or cultural, patrimonial resources), intangible (skills, knowhow, traditional recipes, lifestyle) or temporal (historical, e.g. family tradition linked to generations) ».¹⁴

Every municipality thus could have its own landmark, to be associated with the already existing informative panels: several arrow-shaped signage, with the indication of natural and anthropic threshold would be hosted on a platform, depicting three green valleys connected/crossed by the red *Alta Via dei Monti Liguri*. As for its constitution, evidently, these landmarks need a view, but this somehow is not determinant. Somehow, once appreciated the first, the reasons, the inner and manifest significance of the project - even without a bond connection with the park sole or with the pointed view - works because being comparable to the others, as part of a system. As expressed by Davis when saying «Interpretive signs have been shown to be important tools in increasing visitor knowledge at natural areas»¹⁵ this was the aim we were aspiring to: not to mislead, therefore, but to create belonging, shaping value and territorial significance. “Something” to remember, for everyone.

CONCLUSION

In our research, overlooking a physical artefact to narrate and enrich a territory, roughly said we really experienced what Papanek says about the design process: «In actual practice, the design process can never follow a path quite as linear and sequential as is suggested».¹⁶ Due to the pandemic that intervened whilst the research was already assigned, but that made impossible our original scheme and method, and also due to a series of apparently unlucky circumstances we were forced to reschedule the design process in the order it is narrated within this paper. Because of forcibly being unable to visit the territory -which providentially we already knew because of having developed other researches in the same neighbourhood - exploring the ‘exact’ area of gates has been impossible for months as well as having

the chance to evaluate and verify our first attempts as research outcomes. After all, this unexpected pathway did not leave us discontent, indeed.

If Homer's grave can be indicated, on the Ios island, only by five simple thin steles, covered by inscriptions in five languages,¹⁷ thus our search for simplicity and effectiveness, bond and belonging, aesthetic value and freedom for a personal narrative is much more than understandable.

Through the discourses and the scholarly experience, the research team learnt that a landmark is not only made by its design – whenever proper and fascinating it could be – and, instead, that it lasts in people's minds only if felt, heartfelt. But, as said, this was almost already known since the early beginning. In our work, therefore, we sought the reasons that should allow each person, visitor or inhabitant, to build a personal relation with the 'object', whilst adherent to the original aim, meaning and narrative.

When looking back, after the intangible values of the *Parco Regionale delle Alpi Liguri* and its specific consistency, not thought of as a sum of its elements but as an entire whole, we observed at a certain point of the process we were already where we aimed to be. Through our project, inhabitants can look for their 'own' signage when being in another village for shopping or for visiting friend, and eventually visitors and travellers might have the feeling that all the valleys and the park is under their eyes. But more than everything else, the younger generation can develop attraction and affection to these territories through these landmarks, telling them that everything belongs to a very special area, with three valleys, seven settlements (easily overlooking each other but harder to be reached physically) and one ancient way, the *Alta Via dei Monti Liguri*. All of these elements embodied in a single 'object'!

Maybe we could point our interest on other territorial particularities and amenities, we could tell other stories and tales, but we decided the park and its very particular configuration, with these municipalities overlooking each other, always together but never connected, was the point and it was enough. «Cultural identity – John Heskett says - is not fixed, like a fly in amber, but is constantly evolving and mutating, and design is a primary element in stimulating the awareness of possibilities».¹⁸ accordingly, we tried our best to create a new value through tangible (and remarkable, we hope) 'objects' for the narrative of a very intangible heritage.

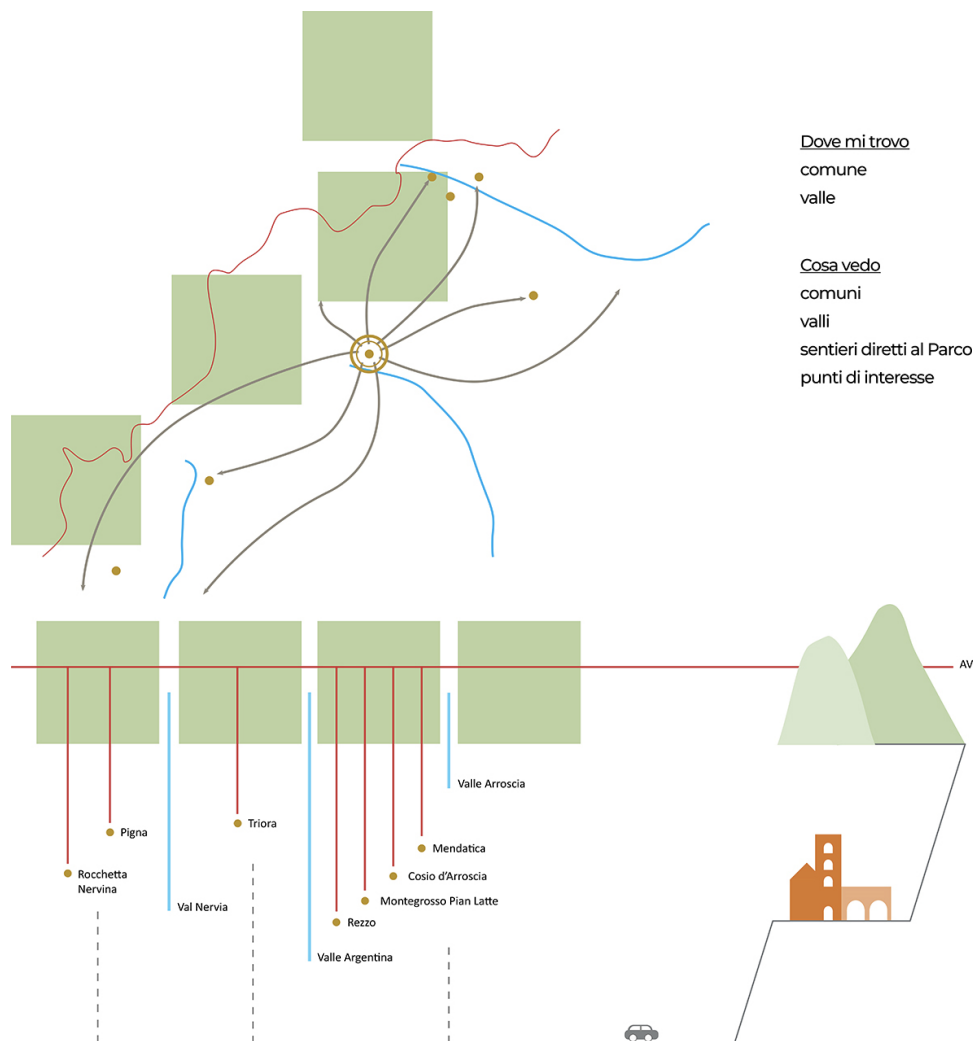


Figure 1-2. Scheme/abstraction for the concept



Figure 3. The panorama from one of the three valleys and the sight concept



Figure 4-5. Installation's drawing (sides and top view) and render imagined on site



Figure 6. Technical drawing of the installation, featured with material and constructions details, applied on the single element

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NOTES

¹ All the research activities have been carried on by the whole team, here mentioned as authors; within the current paper - even if the whole experience has been reported - the "Introduction" has to be considered by M. Carola Morozzo della Rocca whilst the "Conclusion" has to be considered by M. Ivan Zignego; about "The Project" section/paragraph "One: a weird literature review" has to be attributed to Luisa Chimenz, section/paragraph "Two: the reasons and the whys" has to be attributed to Giulia Zappia and paragraph "Three: Where do (we) belong to" has to be attributed to Chiara Olivastrì.

² In particular, the team's research task was assigned by Regione Liguria, which joined the (PITER) ALPIMED in early 2018 and has thus started adopting all the necessary acts to finalize the project ALPIMED PATRIM in late 2018.

³ Literally translated as "journey sculptures"; Bruno Munari comments on and illustrates this project, which was truly realized in weathering steel and exhibited on the *Lungomare Caracciolo* in Naples. The ones presented for the hotel room, instead, should be contained pleated in an envelope, and opened once in the room «to maintain the bond with oneself cultural world». See Bruno Munari, *codice ovvio*, ed. Paolo Fossati (Torino: Giulio Einaudi, 2008), 68-72.

⁴ Munari, 69.

⁵ The architectural contest was very close to the design we were asked for, unless for a profoundly different budget available and some constraints we did not have, like using wood for the landmarks. See "Progetto Realizzazione delle Porte del Delta - Land Mark", Parco Delta del Po Emilia-Romagna, accessed June 30, 2022. <http://www.parcodeltapo.it/it/pagina.php?id=57>

⁶ For further reference to the case study and the project please see. "Le Porte del Parco del Delta del Po", Inandoutarchitettura, accessed June 30, 2022. <https://www.inoutarchitettura.com/it/le-porte-del-parco/>

⁷ See Gui Bonsiepe, "The Uneasy Relationship between Design and Design Research", in *Design Research Now. Essays and Selected Projects*, ed. Ralf Michel (Basel: Birkhäuser, 2007) 37.

⁸ See Mechthild Donner et al., "Place branding, embeddedness and endogenous rural development: Four European cases." *Place branding and public diplomacy* 13.4 (2017): 284. <https://doi.org/10.1057/s41254-016-0049-z>.

⁹ See Stefano Caprioli and Pietro Corraini, *Manuale di immagine non coordinate*, (Mantova: Corraini, 2005) 28-29.

¹⁰ The *Alta Via dei Monti Liguri* (AV, literally "High Route of the Ligurian Mountains") is a long-distance waymarked hiking trail in Liguria. The *Alta Via* ways are common through the Alps and the Italian mountains, i.e., the many ones present in the Dolomites; these hiking trails in some way originate and relate to the preservation and hiking activities of CAI, *Club Alpino Italiano* ("Italian Alp Club"). The Ligurian one connects the Ligurian Alp and the L. Apennines, almost running through the whole region, from west to east.

¹¹ See Deyan Sudjic, *B is for Bauhaus. An A-Z of the Modern World* (London: Penguin Books, 2014) 135.

¹² Freely translated from Caprioli and Corraini, *Manuale di immagine non coordinate*, 60.

¹³ Emilia Janeczko, Rafał Wojtan, Natalia Korcz, and Małgorzata Woźnicka, "Interpretative Signs as a Tool Supporting Informal Environmental Education on the Example of Warsaw's Urban Forests", *Forests* 12, no. 8: 1091 (2021): 2, <https://doi.org/10.3390/f12081091>.

¹⁴ Donner, "Place branding", 274.

¹⁵ Shawn K. Davis and Jessica L. Thompson, "Investigating the impact of interpretive signs at neighborhood natural areas.", *Journal of Interpretation Research* 16, no. 2 (November 2011): 56.

<https://doi.org/10.1177/109258721101600205>

¹⁶ Victor Papanek. *Design for the Real World: Human Ecology and Social Change* (London: Thames & Hudson, 2011), 312.

¹⁷ See Christoph Ransmayr, *Atlante di un uomo irrequieto*, trans. Claudio Groff. (Milan: Giangiacomo Feltrinelli, 2022), 80-1.

¹⁸ John Heskett, *Design. A Very Short Introduction*, (Oxford: Oxford University Press, 2002), 90.

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THE DIGITALIZATION OF THE CREATIVE MARKET

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INTRODUCTION

This article draws on research that explores the digitalization of the creative market as prompted by the advent of digital matching firms, which is often referred to as the platform economy among other labels.¹ While the platforms offer a wide range of labor, from low-skill microtasks to complex, knowledge-based challenges that require creative problem-solving skills,² they operate on an unprecedented business structure that provides an unconventional way of connecting workers and jobs. This article focuses on the crowdsourcing platforms that mediate creative work in conjunction with algorithm-based outsourcing systems. Digital platforms for creative workers such as Fiverr and Upwork facilitate virtual labor exchange in worldwide markets, giving rise to an unforeseen ecosystem in the creative market.

In addition to their global expansion, multisided digital frameworks provoke alternative work organizations and impact the economy's structure at large. Considering that the technological revolution has constantly reshaped the nature of design practices, today's design industry has much to consider regarding the crowdsourcing platforms-based creative market. It requires all-encompassing changes in the operation of design practice and autonomy in creative work, and—most importantly—the well-being of designers. Thus, this article illustrates the challenges in design practice by analyzing the greater systemization of the digital creative market to provide a holistic ground for how we deploy new technologies for the sustainable growth of the ever-changing design industry.

In the midst of the critical reorganization of work, it is timely to ask what the benefits and disruptions are and raise questions about the choices we can make for a better working environment. As firms adopt a new business model and the market expands rapidly, the platform economy has the potential to provide a number of benefits. The new techno-ecosystem can liberate and empower workers with flexibility and lower prices for consumers, among many other virtues. Moreover, the COVID-19 pandemic has accelerated the growing demand for flexibility in employment, resulting in the blooming of the platform economy. According to a report from Staffing Industry Analysts, in 2020, talent platforms had an annual basis growth of 25% in gross service volume. Fiverr has risen 178% over the past two years and its fourth quarter in 2021 alone increased in revenue by 43% to \$79.8 million.

Despite the undeniable benefits that crowdsourcing platforms have brought to consumers and market growth, a number of studies have revealed critical views of precarious employment,³ regulatory challenges,⁴ global division of labor,⁵ devaluation of work and qualifications,⁶ and exploitation of creative labor.⁷ The platform economy may make labor markets more efficient and inclusive, but its systematic structure impacts the nature of the labor process and the related forms of control and surveillance and drives a new mode of appropriation. In the absence of careful consideration of worker

rights and protection, the working system of the platforms has grown out of capitalism. Unprofessional service and low-quality design provided on the platforms may create an incorrect notion of graphic design practice and undervalue the industry at large. In addition, it raises the question of work ethic. Crowdsourcing platforms are iconic places that reveal the contradictory role of designers. They involve designers in developing their own system architecture, including strategic and UX design, yet their systems victimize other designers who use the platforms. Analysis of the systematic problems of the platforms can be a mechanism to search for ways to advance the digital working environment of graphic design.

To articulate the challenges led by the technological revolution that fundamentally transformed the system of performance and management in the design industry, this article builds on the notion of the Fourth Industrial Revolution (4IR), a term coined by Klaus Schwab.

“The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.”

The platform economy has emerged in the manifestation of characteristics of 4IR⁸ in that it connects users in the physical world via digital platforms. The platforms no longer require designated workplaces nor involve the same working arrangements. While many designers have endeavored to transform their practice in response to the expansion of the design discipline to digital products and services, many of the design industry standards are still rooted in the past technological and economic conditions. As the rapid shift in conventional employment takes place, the current online creative market is relying on new communication and management technologies that easily neglect the ethos and knowledge of numerous designers for well-thought-out design.

	Symbols	Things	Action	Thought
Symbols	Graphic Design			
Things		Industrial Design		
Action			Interaction Design	
Thought				Environmental Design

Figure 1. Buchanan, *Four Orders of Design*, 2001.

This danger, in turn, urges designers to consider how to navigate in an unforeseen world. Schwab described the era of 4IR as "Engineers, designers, and architects are combining computational design, additive manufacturing, materials engineering, and synthetic biology to pioneer a symbiosis between microorganisms, our bodies, the products we consume, and even the buildings we inhabit." It advocates for designers to take a holistic stance on a systematic level. More recently, Ferrari explored the correlation between cybernetics⁹ and four order of design¹⁰ and the notion of 4IR. He claimed that design in the operating system of 4IR is less concerned with simply giving visual solutions but seeks to

understand "complex system and environment,"¹¹ which aligns with the fourth order of design. Grounded in this context, I intend to highlight the need to implement this extended domain of design to create an advanced system for its own workplace and infrastructure of digital platforms.

The analysis of the article is divided into three complementary perspectives on the infrastructure of the digital creative industry: the working, economic, and reputation systems. First, it begins by examining working systems that paralyze the creative design development process. Next, it looks at how the platforms deploy economic systems in which designers are simultaneously complicit in their own exploitation and sacrifice their autonomy over the design process. Finally, these perspectives, in turn, point to reputation systems that limit a designer's capability. Understanding the current position in multifaceted perspectives is the first step to creating a fair digital working environment.

THE WORKING SYSTEMS AND DESIGN PROCESS

While the low barrier to entry enables anyone to join the crowdsourcing platforms easily, it doesn't provide trustworthy credential backgrounds for users. The identity system that allows users to easily fabricate their identity or qualifications doesn't provide a proper setting for the design development process. User registration can be accomplished by providing contact information and does not necessarily require any identity verification. Users can participate in various activities and communicate with pseudonyms, which gives them ample opportunities to discriminate without restraint. It restricts users to "the possibility of being easily terminated via a simple deactivation or exclusion from a platform or app."¹²

In addition, designers are required to take simple tests to verify their skills. They may take multiple-choice tests for Adobe Photoshop and Illustrator, the scores of which will likely have the most impactful results on seller profiles. The tests assess basic knowledge of the design programs and focus on technical skills rather than creativity and knowledge of design. These arbitrary tests undermine other qualities of design to mere technical skills and demotivate professional designers who invest years of tuition and time in their learning. Simultaneously, the unreliable information doesn't allow for the fostering of trust between clients and designers, which is essential in the design development process. The platforms provide a simple introductory profile page assigned to individual design workers to showcase their exemplary work without background credentials. Similarly, designers aren't offered a system to learn about the clients for whom they work. It is highly contradictory in the sense that an original design can only be achieved through a creative process that accumulates shared understanding and exchanges knowledge and interest between designers and clients.

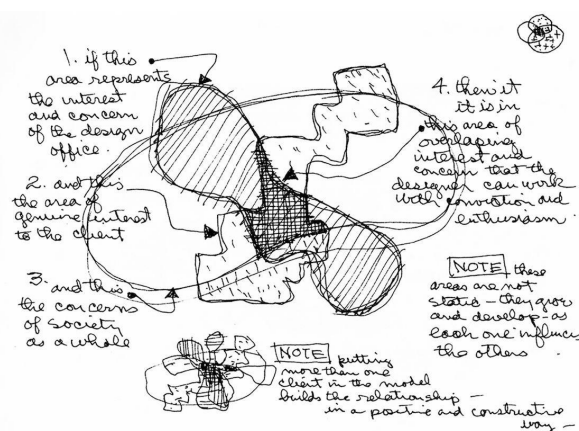


Figure 2. Eames, Design Process Diagram, 1967.

The design process in practice has evolved throughout history through the efforts of numerous designers who dedicated their time, knowledge, and passion for design. From early modern design to participatory

design, they share a core vision: Design is a collaborative effort among diverse stakeholders. In 1969 Charles Eames was invited to participate in the exhibition *What is design?* (Qu'est ce que le design?) at the Musée des Arts Décoratifs in Paris. In answering the 26 questions on the topic of design, he created his famous diagram defining the design process. The diagram comprises three overlapping areas: (1) interest and concern of the design office; (2) interest of the client; (3) concerns of society as a whole. The center of the diagram where the areas overlap indicates shared interest and concern that the designer can work with emotion and enthusiasm. Furthermore, he created a more complex version of the diagram to include other possible stakeholders who can be a part of the model to "build a relationship in a positive and constructive way." Successful design cannot simply be carried out by designers; it requires the reciprocal relationship between designers and clients.

Over the past decades, the field of design has witnessed significant growth in an analytic and creative process, often referred to as Design Thinking. The origin of Design Thinking can be traced back to the 1950s when Professor John E. Arnold introduced a series of innovative engineering design courses at Stanford University.¹³ The idea of Human-Centered Design intersects various disciplines, including engineering, psychology, and design philosophy. The phases of Design Thinking entail a structural yet cognitive process that includes early research and exploration in a highly opportunistic manner and an iteration process and user test in support of high-quality outcomes. In contrast, the platforms mutilate the essential steps of design development in an effort to reduce production costs. The generalized market values quantity and speed over quality and originality. It restricts designers to a condition where they can't adhere to legitimate design phases. Instead, they are forced to participate in their own exploitation to survive in the platform economy. They cut their rates while giving up their creativity and professionalism in the design process. Its cheap pricing model devalues knowledge and performance that may have taken years of effort for designers to achieve.

THE ECONOMIC SYSTEMS AND DESIGN LABOR

One characteristic of the platform economy is the business architecture that controls the market values among different groups of users under the logic of capitalism. The platforms have accelerated the growth of the cheap labor market with an operating system that connects designers and clients worldwide. While the platform economy attempts to provide equal opportunities and bring diversity to the market, it creates extreme competition and devalues creative labor for designers based in the US and UK, where the platforms' primary buyer market is located. For logo design services on Fiverr.com, a large number of designers are located in countries with poor economies. As of July 2022, Pakistan had the highest number of service providers (74,207), followed by the United Kingdom (39,546), Sri Lanka (9,329), the United States (9,022), and Indonesia (8,877). It indicates that designers in the US and the UK have to compete with designers in countries with different monetary values and average wages. Yet, they cannot complain as there are on-demand pools of labor that will replace them with lower costs.

In turn, the competitive market requires designers to optimize their creative process and follow the standardized system to meet a fast turnaround time at a low cost. The platforms accompany the cycle of "digital Taylorism"¹⁴ in the order of commodification that is collecting data, codifying processes, standardizing the system, and finally controlling users. Huws called it "Capitalism's trick,"¹⁵ which incentivizes ongoing development by reinvesting the profit into systemization. In this endless effort to stimulate consumption, design gears capitalism by serving as a vehicle to give an actual form to its products and services. From a historical standpoint, the development of graphic design, capitalism, and attendant technology is intrinsically interwoven such that they cannot be separated. It is an inevitable consequence that the commodification process of capitalism is embedded in the platforms.

These accounts point to a generalized market tendency on which their business architecture relies. In commercial relationships, their patternized design labor is a systematic solution to reduce production costs and sabotage competitors from the on-ground design market. As Srnicek noted, “The outcome of these competitive actions was eventually expressed in the medium-term tendencies of capitalism: prices tangentially declined to the level of costs, profits across different industries tended to become equal, and relentless growth imposed itself as the ultimate logic of capitalism.”¹⁶ Drawing a contradictory picture from the ethos and value of design, the platforms adopt a generalized market that regularizes service cost and design quality. The platforms take various strategies to meet their strong imperative to control designers' creativity and autonomy.

A symptom of the generalized market can be found in logo design services. Taking into consideration that designers in the industry put great effort and time into creating a brand identity, it leads to the question of how designers can possibly make a logo in such a short period of time with a reward as low as \$5. The International Council of Design answers this question in its article, "It Might Look Like a Logo, But It Isn't Design." 'Logos' sold on crowdsourcing platforms are an arbitrary combination of clip art and fonts produced by untrained practitioners masquerading as professional designers. It is an unavoidable consequence of digital sweatshops where practitioners copy stock logos to save time. Their product pretends to be a design, but they are mere shells in the absence of values and principles. Instead of finding original solutions, the platforms suggest generalized styles of logos such as minimalist, mascot, hand-drawn, etc.

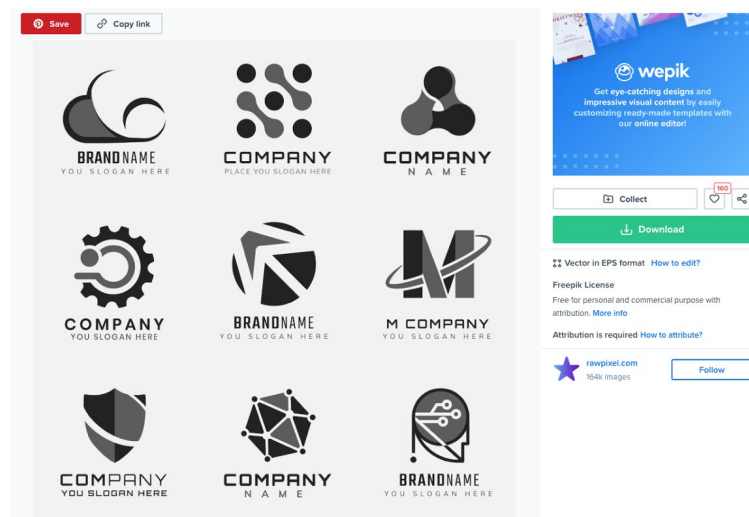


Figure 3. Techno-Futuristic Style Logo Set on Freepik.com

As the International Council of Design warns, the practitioners are not experts with an adequate understanding of plagiarism or ownership of design property. Similarly, clients pay for logos—potentially with a trademark infringement—at their own risk. From a structural point of view, the logic of capitalism imposes a market system to demand, but sacrifices quality standards and user safety. On these unprotected market platforms, all the users are potential victims of the system, whether they are designers or clients.

THE REPUTATION SYSTEMS AND DESIGN EVALUATION

The last stage of Design Thinking is a design review, which is often considered as important as the phase of creation. The design review allows designers to evaluate their outputs using specific criteria and to have an iterative process for sustainable long-term growth. The design review should be an unbiased appraisal of the design process, the achievement of a target value, and the prospective

feasibility. Also, it requires a reliable source of data for accurate measurement and responses from not only a stakeholder but also a creator.

However, the design evaluation in the platform economy relies on reputation systems, which are programs or algorithms that allow clients to rate designers they hired. The reputation systems often become a tool to punish designers who couldn't satisfy their clients, regardless of whether that punishment is fair. The client reviews and ratings significantly influence algorithms of search patterns and, eventually, a designer's business. In addition, Fiverr provides an award known as Fiverr Rising Talent Badge. According to its website, this badge will be granted to sellers who provide the best possible service in a professional manner. The sellers with this badge will get exposure to the market, leading them to more work and profits. In a way, reputation systems are the primary factors to promote at work. However, reputation systems center on clients, not designers who are being put under pressure to respond to their clients' demands.

Reputation systems are widely used in e-commerce websites such as Amazon and eBay as reviews are believed to share honest feedback with the sellers. However, the same five-star rating systems for products are not competent methodology to evaluate design services. Reputation systems add "pervasive surveillance" to the market as they work as alternative forms of control.¹⁷ The system of controls from a number of different directions endangers the authorship of a designer. It is against a designer's capability as a performer, entrepreneur, and change maker.

CONCLUSION

The platform economy is related to the paradigm of working arrangement and digital development in the 4IR. As technology has tremendously changed the working environment and the design practice, the design industry is urged to seek alternative systematic solutions accordingly. A growing number of scholars in graphic design have suggested that expanding the designer's role may save their clients from a capitalistic economy. For example, the designers can help orient their clients to a more philanthropic approach. However, it is most critical to first protect the designers themselves. A successful design is simply not possible without considering the designer's welfare and need for a proper working environment. Designers need to observe and advance their own workplace and working conditions. Furthermore, capitalism is continuing to soar, and its growth seems inevitable despite its connection to exploitation. It is time to perceive current issues as a path to identify opportunities for sustainable growth and co-existence rather than relying on utopian dreaming about the digital future.

NOTES

- ¹ Rudy Telles, "Digital Matching Firms: A New Definition in the "Sharing Economy" Space," *ESA Issue Brief #01-16* (2016): 2-4.
- ² Wilma B. Liebman, "Debating the Gig Economy, Crowdwork and New Forms of Work", *Soziales Recht* 7, No. 6 (2017): 221.
- ³ Juliet Webster, "Microworkers of the Gig Economy," *New Labor Forum* 25, No. 3 (2016): 56-64.
- ⁴ Alex de Ruyter et al. "Gig Work And The Fourth Industrial Revolution: Conceptual And Regulatory Challenges," *Journal of International Affairs* 72, no. 1 (2018): 37–50.
- ⁵ Ursula Huws, "Defragmenting: Towards a Critical Understanding of the New Global Division of Labour," *Work Organisation, Labour & Globalisation* 1, no. 2 (2007): 1–4.
- ⁶ Thomas Höhne and Martina Sproll, "Devaluation of cultural capital on online platforms and the changing shape of the social space," *Work Organisation, Labour & Globalisation* 14, no. 1 (2020): 32-46.
- ⁷ Ursula Huws, "The Spark in the Engine: Creative Workers in a Global Economy," *Work Organisation, Labour & Globalisation* 1, no. 1 (2007): 1-12.
- ⁸ Alex de Ruyter et al. "Gig Work And The Fourth Industrial Revolution: Conceptual And Regulatory Challenges," *Journal of International Affairs* 72, no. 1 (2018): 37–50. In particular, "Into these futuristic discussions, gig work has emerged as an issue that manifests many of the features of 4IR: platform-based; driven by mobile and digital technology; containing conditions of easy entry for providers and workers; and from daily observation, appearing to be extensive in urban environments as large numbers of delivery agents pedal and ride across cities delivering their cargoes of pre-prepared food. Gig work is a suitable starting point to examine the "new" economy in action and to consider its growth, operations, and consequences."
- ⁹ Hugh Dubberly and Paul Pangaro, "Cybernetics and Design: Conversations for Action," *Cybernetics and Human Knowing*, 22, (2015): 73–82.
- ¹⁰ Richard Buchanan, "Design Research and the New Learning," *Design Issues* 17, No. 4 (2001): 3-23.
- ¹¹ Klaus Schwab, "The Fourth Industrial Revolution: What it Means, How to Respond," *Foreign Affairs*, December 12, 2015.
- ¹² Valerio De Stefano, "The rise of the "just-in-time workforce": on-demand work, crowdwork and labour protection in the "gig-economy"," *Comparative Labor Law and Policy Journal* 37 (2015): 461-471.
- ¹³ John E. Arnold, *Creative Engineering Promoting Innovation by Thinking Differently* (2017)
- ¹⁴ Wilma B. Liebman, "Debating the Gig Economy, Crowdwork and New Forms of Work," *Journal Title* 7, No. 6 (2017): 221-238.
- ¹⁵ Ursula Huws, *Labor in the Global Digital Economy* (NYU Press, 2014), 101–125.
- ¹⁶ Nick Srnicek. *Platform Capitalism*. (Wiley, 2017), 43-44.
- ¹⁷ Nick Srnicek. *Platform Capitalism*. (Wiley, 2017), 27-47.

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SEE-THROUGH: BUILDING FACADES AS CONTESTED GROUND

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INTRODUCTION

This work intersects contradictory forces, as it seeks to transform the *building facade* from a mechanism of concealment to one of unmasking, transparency and change. Building facades have often been used as sites for acts of protest. However, in this research we problematize facades as contested ground where communities act,¹ making them the subject and simultaneously the site of protest in the fight against climate change. Buildings consume immense amounts of energy in order to mechanically create environments meeting narrow definitions of comfort. Any discontinuities or inefficiencies in exterior skin assemblies make them act like sieves that waste energy. This wasted energy contributes to carbon emissions and thus, climate change. Yet, this waste through the exterior building skin is invisible to the human eye. Our goal is to make the culpability of existing inefficient buildings and built environments and the energy they waste, prominently visible *in situ* at full scale. The force of *pervasive gaming* is leveraged to provide agency to the community to vote for buildings suspected of energy waste, thermographic documentation and analysis is conducted to examine the energy waste and pursue dialogue with building authorities (owners, managers, occupants), and finally in a public media projective event, the collected thermography is mapped on the building itself. The thermographic projections reveal the otherwise hidden aspects of energy waste thus positioning the building facades as contested ground between the private (ownership) and the public (climate change and global warming) and further positioning the facades as sites for action and change. In this article, we propose a categorization of projective protests on building facades, we contextualize our work within this categorization and, finally, we describe our experimentations with the documentation, thermography and projection of thermograms at the University of Minnesota campus.

Contested Ground

Contested ground, a term most commonly associated with territorial or urban scale boundary disputes,² recognizes that boundaries don't belong to one or the other domains they separate. Away from the boundary and on either side of the boundary, the status quo is preserved. However, when the boundary is occupied or transgressed, the status quo of ownership and territoriality is challenged and activism and deliberate aggression emerges. Our work seeks to position the building facade as a *contested surface*, transforming it from being only the domain of owners, managers and occupants of buildings into a surface that public can challenge, make it a site of activism to cause dialogue and mitigation of climate change impacts.

THE CONTEXT OF PROTEST

There is a long history of building surfaces being used as sites for protest, artistic expression or commerce, with various media and forms including carvings, paint, text, signs and symbols and other forms of expression. Although these expressions are not new, the advent of electricity allowed media to be incorporated into facades in unimagined ways.³ In this work we specifically focus on light⁴ as a medium of projections on building facades and specifically, urban projection mapping⁵ as a method of creating social commentary⁶ and as a form of activism such as those practiced by the Illuminator Group.⁷ It is important that we differentiate the concepts of contested surfaces from media architecture or media facades. While contested surfaces and media architecture use light and urban projection mapping as a medium, and may have visual similarities, the crucial difference is that media architecture incorporates media intentionally for commercial, political, social and/or aesthetic purposes in the design process, and forms the domain of those who have legal authority on the surface. Whereas in contested surfaces, the facade projection is intended as a critical spatial practice,⁸ typically authored by besieged community groups,⁹ tactical urbanists,¹⁰ advocates and activists.

The projective events which position surfaces in contestation may happen with or without the sanction,¹¹ cooperation and permission of authorities, giving prominent voice to issues of concern to the creators of the contested surface who may belong to or give voice to besieged or mobilized communities.¹² We use these term besieged community to signify a group that identify together due to common concerns but may or may not share locality (geographic location, or other identity attributes such as race, ethnicity, income etc.). The mobilized community signifies those that act due to the common concerns.¹³ Thus the conception of a contested boundary is a deliberate assertion that the surface does not belong to one or the other domains (those with authority of ownership and those without) that it separates, but is a liminal thresholds of perception and action, where transgressions can foreground activism through an act of protest and deliberate and visible aggression. In this, we further Doris Sung's functional positioning of the urban facade as "not just a pretty face," where facades have split personalities and the outside surface belongs to the city and inside to the building.¹⁴

In the realm of contested surfaces, building facades may be selected for and utilized in distinct ways. Sometimes, projections occur on surfaces that are selected for visibility and potential for exposure, or for functional reasons (e. g., invitation or convenience of projection). We call these *acontextual projections*. Examples include Jenny Holzer's projections which are US government documents projected on the Kunsthau Bregenz in Austria (Figure 1). At other times, projections occur on surfaces that carry specific context or highly-charged meaning. We call these *contextual projections*: an example is Robin Bell's projections on the Trump Hotel (Figure 2).¹⁵ A third possibility is for projections to interact topologically with specific surfaces (perhaps but not necessarily alongside with contextual significance). We call these projections homeomorphic. An examples of homeomorphic projections is UrbanScreen's video projections work, 555Kubik, at Hamburger Kunsthalle (Figure 3).¹⁶ Another example of homeomorphic projections which includes close attention to the facades' topology and deliberate concurrence, and draws specific meaning from the charged context is Shimon Attie's series of projections in Berlin (Figure 4).¹⁷



Figure 1. Acontextual Projections: Jenny Holzer's projection of US Government documents on Kunsthhaus Bregenz. June 12, 2004, Projection: FX Productions; Charles Passarelli, Photo: Attilio Maranzano. Accessed in June 2022 from the artist's website, <https://projects.jennyholzer.com/projections/bregenz-2004/gallery#0>



Figure 2. Contextual Projections: Robin Bell's projections on the Trump Hotel that spanned a four-year period. Accessed in June 2022 from the artist's website, <http://bellvisuals.com/Trump-is-a-Pig>

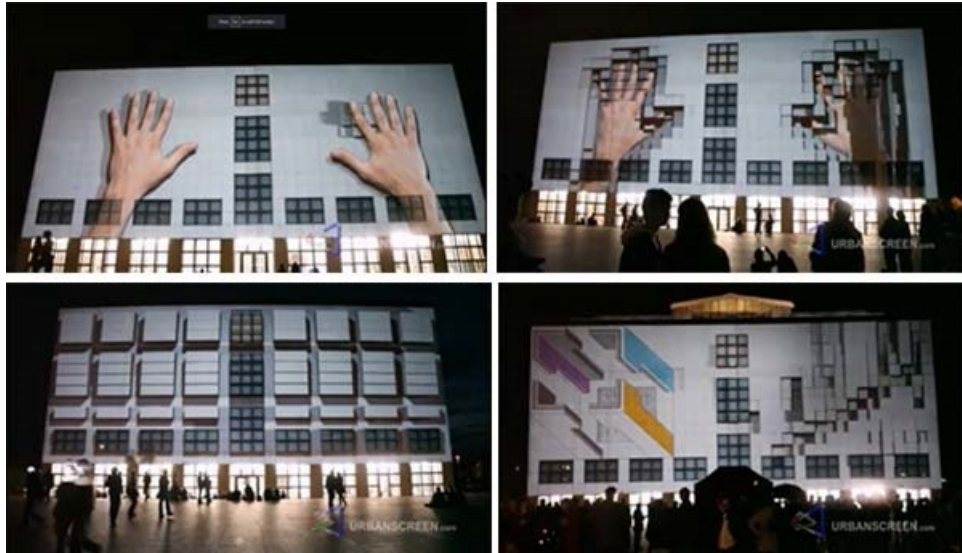


Figure 3. Homeomorphic Projection: Urban 360, How would it be if a house was dreaming, Art Direction: Daniel Rossa, Video moments accessed in June 2022 from the group's website <https://www.urbanscreen.com/555-kubik/>



Figure 4. Homeomorphic and Contextual Projection: Slide projection of former Hebrew bookstore, 1930, Berlin; Linienstrasse 137: Slide projection of police raid on former Jewish residents, 1920, Berlin. Color photograph and on-location installation by artist, Shimon Attie, 1992.

SEE-THROUGH

We position our work as combination of homeomorphic and contextual projections as we aim to highlight wasteful energy use that has immense public impact in order to induce owners, occupants or managers to mitigate public harm. In its completed implementation, the project would begin with a digital app that is part of an urban pervasive game.¹⁸ The game would involve community members

tagging buildings suspected of wasting energy in the digital app.¹⁹ The research team (egameslab) would select the candidate buildings based on numbers and types of e-tags from the community. Detailed thermography of the buildings' facades completed at different times of year, would be used to study the facades' performance. If the building's facade is found to be wasteful, we would open up a dialogue with owners, managers and users of the building while simultaneously making preparation for projecting thermographic images on the building itself. The thermographic images for each facade that have been collected, would be stitched into a seamless composite thermal image, in preparation for a projective event. The final stage, the See-Through, would be a community event where collected and analyzed thermography is projected on the building in public. The research goal is to instigate action through dialogue and celebrate the work done to make the building more efficient by projecting the pre- and post-thermography of the building. However, in cases of no response, See-Through would take the form of a projective protest. In all the stages of the building the research group (egameslab) would award game points to original taggers and gamers as the project progresses.

Thermography: Documentation and Projection

Thermography is commonly used as a non-destructive diagnostics tool²⁰ for building to identify problem areas impacting building performance such as missing, discontinuous or inadequate, insulation, air and moisture leaks.²¹ Additionally, thermography may be used as an analysis tool for building performance enabling quantitative analysis and visual analysis of multiple buildings at a time or analyze heat scores at the urban scale.²² For this research, a simple understanding of thermography by the public is crucial for the desired impact. Thermal imaging produces an image, a thermogram, or the thermal pattern, of the surface being imaged. Therefore when photographed with a thermal infrared camera, the temperatures of the building surface are mapped as colors on a range based on the differences in surface temperature across the area being imaged. On the thermogram of a building, red ranges represent higher surface temperatures and blue ranges lower surface temperatures. Therefore the redder the thermogram in the winter, the higher the surface temperatures on the building surface; in the absence of mitigating factors, this may indicate building facade inefficiency and heat leaks.²³ In order to describe the various stages of photography, thermography and projections experiments that we have conducted, we structure this part of the narrative based partially on Part 2 (*Tools: Elements, Surface, Roles and Superpowers*), the taxonomy developed by Momeni and Sherman in the Manual of Urban Projections.²⁴

Surface: The projection site

We considered several building facades on the University of Minnesota campus, taking into account year of construction or renovation, height and width of the facade, type of building, and distance and angle of projection location around the building. We finally selected two buildings, Rapson Hall, a building that houses classrooms, offices, studios and laboratories, and Tate Hall, which houses classrooms, offices and laboratories. Both Rapson Hall and Tate Hall (Figure 5) incorporate original construction and renovation/addition facades, and both buildings allow for ample space for projection location. Rapson Hall's interior corner (at a projecting wing of the building) allowed us to experiment with projecting on two surfaces with one projector and also using multiple projectors simultaneously in case we were not able to gain access to a powerful single projector.



Figure 5. Rapson Hall and Tate Hall, University of Minnesota campus, photographed by Nate Anderson

Elements: The equipment

In order to test that thermography could be contributed by community members nominating buildings for protest, which could in turn be used for projections, we decided to use an affordable FLIR One Pro for iPhone to complete the documentary thermography and evaluated the quality of the projections. Photography to document the process of projections was done with a Canon DSLR and iPhone cameras. We conducted the thermography of Rapson Hall under varying weather conditions in December 2020 (winter), April 2021 (spring), July 2021 (summer), and October 2021 (fall). The thermography was conducted during overcast and clear conditions, during dusk, dawn, and afternoon times. The difference between the interior and exterior ambient temperature varied at different times of the year. As expected, with daytime thermography especially on clear days, thermal conductivity and emissivity of materials, reflections on the surface, incident solar radiation and shadows on the surface impacted the surface temperature and thus the thermal patterns on the image (Figure 6).²⁵ Other exterior factors such as ambient air temperature, airflow, wind or other convection, rain, snow or any kind of precipitation, and other conditions may also impact the thermal image but were not in the scope of this work.²⁶

In order to mitigate influences related to the ambient conditions, we quickly learned that the distance from the surface being photographed was an important factor. As expected, more detail was captured in the thermographic image if the distance to the facade was closer. Taking the photographs from angles and distances that minimized reflections, shades and shadows was an important consideration in the final projected composite image.

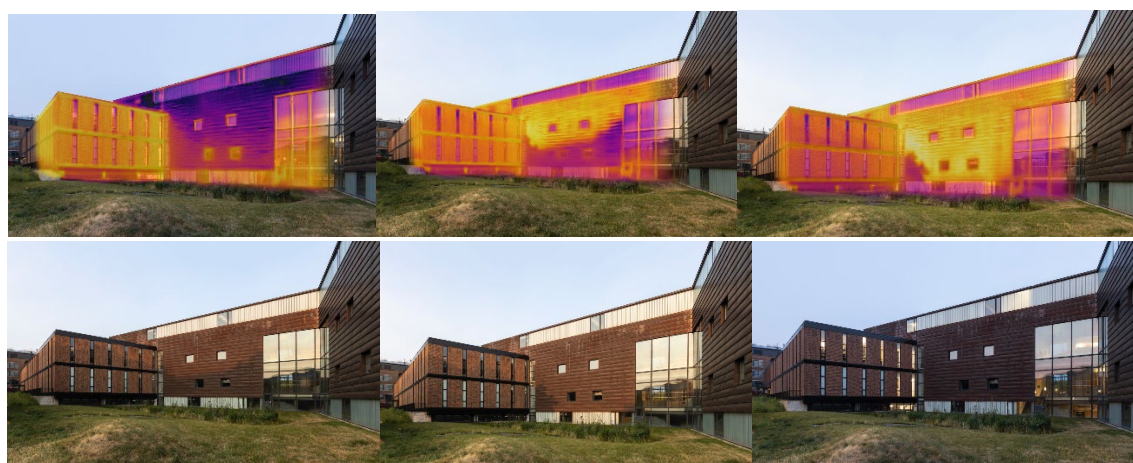


Figure 6. Rapson Hall thermograms and photographs at 5.33am, 6.33am and 7.48am studying the impact of solar radiation and material emissivity (thermography and photography by Nate Anderson)

The final thermographic image was a composite of facade sections captured from a shorter distance to maximize quality and accuracy and to minimize the influence of surrounding objects, shadows and

reflections (Figure 7). Other post-processing on the images included the calibration of emissivity, reflected temperature, atmospheric conditions, exterior optics temperature, and exterior optics transmission and relative humidity settings. The minimum and maximum temperatures of the photographs were calibrated to 60 deg F maximum and 21 deg F minimum. Additional post-processing²⁷ included overlaying the thermographic images onto the photography done with the DSLR camera to show the comparisons between what the thermal camera revealed and what the eye could see.

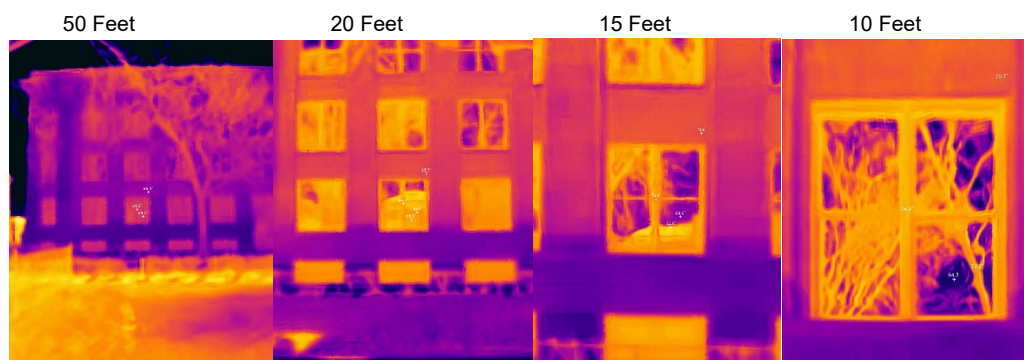


Figure 7. Tate Hall thermograms studying distance and impact on resolution and detail (thermography by Nate Anderson)

Roles and Superpowers: The Dialogue

Momeni and Sherman describe the projective event's potential to create dialogue with the group in authority through notification and negotiation, a superpower of the group that has the role of the protestor. In order to complete See-Through, the projections stage of the work, we contacted University of Minnesota campus police to notify them of the projections and worked with the Facilities Management team of Rapson Hall. Conversations with Facilities Management revolved around the purpose of our work, the projection setup and the availability of power for the generator. Since we were only testing our ability to do a homeomorphic mapping of the thermogram on the building, we did not engage the Facilities Management unit in a dialogue about Rapson Hall's performance or strategies for improvement. We hope to pursue this in future phases of the work. Additionally, we sent notices to the administrators of the College of Design, School of Architecture, Landscape Architecture and Product Design to notify building occupants about the projection and the bright lights that would illuminate the building, afterhours.

Trial Event: The Projection Mapping

On November 17, 2021, (a cold evening, approximately 34 deg F with light snow), we worked with Nathaniel Dameron, a video technician, who provided a Barco UDX 4K32 large venue laser projector (31,000 lumens) with a Barco 7.5-11.2 lens (Figure 8). The projector was powered by a gas-powered generator. Four hours of work included transportation, setup, projection and pack-up and cost the team \$2,700. We worked through several adjustments of projection angle, projector location and lens resolution adjustments, ultimately achieving convincing accuracy that the thermograms were coplanar with the building surface for a homeomorphic and contextual projection (Figure 9). We realized that multiple projectors with lower resolution and lumens which use less energy may be able to achieve similar results. However, the brightness, sharpness, accuracy and vibrancy achieved with the Barco UDX 4K32 large venue laser projector (31,000 lumens) needed to be weighed against the energy required to power the projector for two hours.



Figure 8. Setting up for See-Through trial. Photograph by Malini Srivastava.



Figure 9. Projective mapping the winter thermogram on Rapson Hall (a). Photograph by Nate Anderson.



Figure 10. Projections light up the interior of Rapson Hall. Photograph by Malini Srivastava.

Throughout the evening, passersby stopped to ask us questions about the projection or spend up to several minutes watching us working. Eventually groups of students came out of the building and gathered to ask us questions about the projection. We learned from them that the projection was visibly infiltrating the third floor through translucent channel glass (Figure 10). While we had expected and prepared for the light to be visible on the interior, we had not anticipated the impact it would have with creating informal and impromptu dialogue, excitement and curiosity. In the last few minutes of the projection, we hurriedly and partially documented the interior illumination. Curious students asked more questions as we photographed the interior spaces.

CONCLUSION, LIMITATIONS AND FUTURE WORK

In this research, we position the building facade as a problem and an opportunity to fulfil public welfare. By testing the potential of revelatory visualizations in activating people to see building facades as sites for action in the fight against climate change. Thus, we are creating processes for dialogues about the built environment's responsibility in this fight in a visible, non-destructive but aggressive means of public protest. The eventual goal for this research is to instigate action by owners of inefficient buildings to engage architectural and research expertise and work their way towards being net zero or net positive buildings by providing them specific information about the energy waste. Through the successful test for homeomorphic projection mapping and the unplanned, informal curiosity and dialogue it created, we experienced the potential for creating awareness and dialogue in the public and positioning projective events as protest. However, our tests also revealed there are limitations related to this method. While the game component of this work will allow community voice to be heard in how the activism unfolds, it will be limited to those who are able to access the app and some knowledge of energy waste. Thermography and urban projection mapping of this work will depend on the affordability of equipment and expertise. Additionally, following questions need to be further addressed in future phases of this research related to the thermography. Will the thermographic projective induce a dialogue between owners, managers and users of the buildings with game participants? Will it induce the persons in authority to act to tap the expertise of architects and engineers and mitigate energy waste

and address climate change? Will the mobilized community and research group face legal problems as they position building facades as contested and public surface? Does the energy use of the projective event negate its purpose? In future phases of the project, we plan to address these questions. Additionally, we are exploring avenues of this work that cause the revelation of labor, land and histories of the buildings' materiality through homeomorphic and contextual projections.²⁸

ACKNOWLEDGEMENTS

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Nathaniel Dameron, Projectionist and Video Technician of Dameron Production Services completed the setup and the projections for the trial See-Through event.

NOTES

¹ John Emmeus Davis, *Contested Ground: Collective Action and the Urban Neighborhood* (Cornell University Press, 1991), 11. From the chapter, "The Mobilized Community: Protest and Participation." <http://www.jstor.org/stable/10.7591/j.ctv3s8rpt.11>.

² Davis, *Contested Ground: Collective Action and the Urban Neighborhood*, 4.

³ Alejandro Zaera-Polo and Jeffrey S. Anderson, *The Ecologies of the Building Envelope, A Material History and Theory of Architectural Surfaces*, (New York, Barcelona: Actar Publishers, 2018), from the chapter, Media Facades: From Information to Atmosphere (397-413), 398; Zaera-Polo and Anderson, *The Ecologies of the Building Envelope*, 410.

⁴ Image-projections have at least a couple of thousand year history and exists in traditional and contemporaneous practices such as shadow shows, camera obscura, chinese/japanese magic mirrors, and the first reference to a projection lantern in 1420 by Giovanni deFontana and subsequent history of the magic lanterns. It further exists in media applications in the forms of signs and symbols which create the Shibuyas, Times Squares, to the expressive and designed media facades of Toyo Ito's Tower of Winds in a changing immaterial expression, where the physical and digital meet. Other examples of performance purposefulness of media facades can be found in Jean Nouvel's Arab Institute, R Loonen's cataloguing of adaptive building shells and Doris Sung's responsive skins.

⁵ Daniel Schmitt, Marine Thébaud, and Ludovic Burczykowski, eds. *Image Beyond the Screen: Projection Mapping*. John Wiley & Sons, 2020.22.

⁶ Sotiraki Virginia. "Urban Projection Mapping." Division of Art History and Visual Studies, Department of Arts and Cultural Sciences, Lund University, KOVN13, Histories of modern visuality, Tutors: Joacim Sprung and Björn Fritz.

⁷ Read Mark. "Reflections of an Illuminator." *Visual Inquiry* 6, no. 2 (2017): 283.

⁸ Jane Rendell, *Critical Spatial Practice*, 2003. <https://criticalspatialpractice.co.uk/>; Dave Colangelo, *We Live Here: Media Architecture as Critical Spatial Practice*, Space and Culture 2021, Vol. 24(4) 501–516, 2019, DOI: 10.1177/1206331219843809, journals.sagepub.com/home/sac

⁹ Davis, *Contested Ground: Collective Action and the Urban Neighborhood*, 4.

¹⁰ Mike Lydon, and Anthony Garcia, *Tactical Urbanism: A tactical urbanism how-to.* (Island Press, Washington, DC, 2015), 11.

¹¹ Lydon and Garcia, *Tactical urbanism*, 10.

¹² Davis, *Contested Ground: Collective Action and the Urban Neighborhood*, 4.

¹³ Davis, *Contested Ground: Collective Action and the Urban Neighborhood*, 101, 141-174.

¹⁴ Sung Doris. "A new look at building facades as infrastructure." *Engineering* 2, no. 1 (2016): 63-68. 64, 68. Dr Sung states, "The time is ripe to advance major change, reduce the use of energy, and assume a major role in controlling the urban climate by making the outside surfaces of buildings contribute to urban welfare, public health, and pedestrian comfort. The two sides of a building facade should each perform for the side it faces—one for the inside and the other for the outside. Once this concept takes hold, the perception of what architecture should be or do will change dramatically."

¹⁵ Mikaela Lefraek, "Robin Bell Spent Four Years Projecting Protest Messages On The Trump Hotel. Now What?," NPR, 2021. <https://www.npr.org/local/305/2021/01/26/960753513/robin-bell-spent-four-years-projecting-protest-messages-on-the-trump-hotel-now-what>

¹⁶ 555 Kubik, "How it would be if a house was dreaming," UrbanScreen.com, <https://www.urbanscreen.com/555-kubik/>, accessed in July 2022. Art Direction: Daniel Rossa; Technical Director: Thorsten Bauer; 3D-Design: David Starmann; Sound Design: Jonas Wiese; Realized with mxwendler.net mediaserver.

¹⁷ Attie Shimon, "The Writing on the Wall," accessed on June 13, 2022 from <http://shimonattie.net/portfolio/the-writing-on-the-wall/#jp-carousel-1223>. The artist notes that, "For The Writing on the Wall project, I slide projected portions of pre-world war II photographs of Jewish street life in Berlin onto the same or nearby addresses where the photos were originally taken 60 years earlier. By using slide projection on location, fragments of the past were thus introduced into the visual field of the present. Thus parts of long destroyed Jewish community life were visually simulated, momentarily recreated. The projections were visible to street traffic, neighborhood residents, and passersby. As much of my art practice is a marriage between photography and installation art, during the course of the installations, I photographed the projections. The Writing on the Wall project was realized in one of Berlin's former Jewish quarters, the Scheunenviertel, located in the Eastern part of the city, close to the Alexanderplatz."

¹⁸ Malini Srivastava, "Efargo Energy Challenge: Architecture as a Gaming Board in Pervasive Energy Games." (Routledge, 2019), In *The Routledge Companion to Games in Architecture and Urban Planning*, pp. 109-125; Malini Srivastava, "Purposeful Play" (DDes diss., Carnegie Mellon University, 2020), 3.1.

¹⁹ This work is currently under development with the support of an American Institute of Architects Upjohn grant. https://www.architectmagazine.com/awards/aia-names-the-2020-upjohn-research-initiative-grant-recipients_o

²⁰ Balaras and Argiriou, "Infrared thermography for building diagnostics," *Energy and Buildings* 34: p. 171-183. 6. Mohd Shawal Jadin, Shahid Kabir, Soib Taib. (2011): 212; Soib Taib, Mohd Shawal Jadin, and Shahid Kabir., Thermal imaging for enhancing inspection reliability: Detection and characterization. *Infrared Thermography*, P3 (2012): 209.

²¹ Paljak and Pettersson, Thermography of Buildings. The National Swedish Institute for Building Research. *Swedish Council for Building Research; Stockholm, Sweden*: 1972. Report No. T-12/1972. 2 of 27; Pettersson and Axen, "Thermography: testing of the thermal insulation and airtightness of buildings". United States. 1980; Vavilov Grinzato and Kauppinen, Quantitative infrared thermography in buildings. *Energy Build.* 1998;29:1–9. doi: 10.1016/S0378-7788(97)00039-X; H Nowak, Application of Infrared Thermography in Building, (*Wrocław University of Science and Technology Publishing House; Wrocław, Poland*), 2012.

²² H Nowak. *Application of Infrared*, 2012.

²³ C. Argitiou Balaras, A.A. Argiriou, (2012). Infrared thermography for building diagnostics. *Energy and Buildings*. 34: p. 171-183. 6. Mohd Shawal Jadin, Shahid Kabir, Soib Taib, (2011). Thermal imaging for qualitative based measurements of thermal anomalies in electrical components. 212

²⁴ Ali Momeni and Stephanie Sherman, *Manual for Urban Projections*. (Modern Press, Minnesota, 2017), Editor: Josh Boyette.

²⁵ "Thermal Imaging Guidebook for Buildings," FLIR MEDIA, accessed on July 26, 2022,

http://www.flirmedia.com/MMC/THG/Brochures/T820325/T820325_EN.pdf

²⁶ Balaras and Argiriou, *Infrared thermography for building diagnostics*. 6.

²⁷ The softwares that are useful for the post-processing of images (especially when automated for processing several files at once) include the following:

1.FLIR Tools: <https://www.flir.com/products/flir-tools/>

FLIR Tools was used to extract data and adjust the parameters such as temperature range, emissivity etc.

2.ThermalFolder.exe:

If the process involves several images, batch editing thermal images makes the work more efficient. Adjusting colour palette, emissivity, temperature range, and exporting images to csv for hundreds of images in seconds.

http://flir-de.custhelp.com/app/answers/print/a_id/1702

3. FLIR Thermal Studio: <https://www.flir.com/products/thermal-studio-pro/>

Exporting thermal images to csv files, with temperature values of each pixel in the image.

4.Lightroom: <https://blogs.adobe.com/richardcurtis/2014/08/>

Map module component in Lightroom can map all the thermal images taken (which have geographic coordinates associated with them). This can be especially helpful in ascertaining the locations and any 3d model constructions that might be necessary to create composite images for image-mapping.

5.Adobe Photoshop: For manual adjustments to image sizes and angles to match the photography completed with SLR camera. This may not be a necessary step because most thermal cameras have the ability to take and save a photograph at the same time as they are doing the thermography.

²⁸ Malini Srivastava, "Materiality: Before, During, After," University of Minnesota, accessed in July 2022. <https://sites.google.com/umn.edu/catalys22/home?authuser=0>

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MEDIA REHABILITATION IN SACRED PLACES

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INTRODUCTION

This article focuses on space occupation scenarios, not from the tectonic perspective which has always been associated with architecture, but from a fluid, ethereal and electronic aspect, linked to media technology. By reflecting on space and how it's occupied, architects present us with alternatives, projects and ideas so that space becomes synchronous with modern society's concepts, technology and evolution of mentality. Technological innovation, while expanding its part in human experience, leads us to contemplate on the transformation of specific spaces such as religious places and their adaptability to the new cultural, social and even spiritual goals which that same technology has facilitated.¹

Countless questions plague architects in their attempt to explore modern societies' new awareness and perception of place. The creation and use of places of worship or symbol-dedicated sacred places is as old as man himself, ever since the first cave paintings were made and the cave became in itself a place of contemplation. The place of worship ahead of being a place of belief, is a place of sensory experience produced in a creative process. This process prompts the architect, the painter or the sculptor to catalyse cultural, social and spiritual stimuli that translate into the work.²

Sacred places have been losing their aura as a result of the conscious reasoning of human beings about our own existence and our place in the universe. However, in these locations the essence of the place still remains a sensorial experience connected to light, sound and to the objects that stay and shape the interiors.³ It is here that the proposal of this paper arises: to rehabilitate and incite new sensory impressions in religious or contemplative places by way of media technology; to contribute to the enrichment of the effects of proprioceptive stimulation, caused by internalised external stimulations; and consequently, to add value for the adjustment and fair evolution of the quadrants and operatives in the various social systems. Whether or not it is connected to spiritual or religious movements, a sacred place can be a sensorial, architectural and technological experience. Yesterday as today, the sacred place has always exerted a powerful attraction on the human spirit. Christians, Muslims, Buddhists, Hindus, Jews and many other religious organisations and manifestations have used the contemplative place as an interface for answers to the complex questions that still, today, are being asked.⁴ Changes in human attitude and thought allied to the technological evolution of human society have clarified many metaphysical and supernatural issues. With increased skills in cognitive and «techno-operative» functions, human beings have created their own interface for efficient and clear answers to the most complex questions. Religious places thus begin to lose the prominence and relevance of the past, but remain, however, as a historical document of beliefs and personalities. The distancing from these places and the adoption of spiritual sensorial alternatives by human beings have left many places abandoned and degraded. Regardless of spiritual and/or religious options, contemplative places do not remain

indifferent to experience when visited and contemplated. They are a reflection of cultural, historical and religious heritage.

It is a fact that architectural places affect the sensory impressions of human beings, on account of architecture being an expressive and representational form of three-dimensional modelling that appeals to most senses. Our starting point is a clear and objective observation of the architectural place, specifically the religious or contemplative place and its relationship with the individuals who walk through it, experience it, feel it and think about it. Architecture is a manifestation of the various components of human existence and the occupation of space is a reflection of the perception of reality. The aim of this work is to propose ways of (re)using religious places at a time when, on one hand, media technology is an integral part of our current experience and, on the other hand, a certain emotional and spiritual disposition is beginning to take on scientific contours.

After numerous visits to sacred places, a specific iconographic set was gathered on the state of use, maintenance and dynamisation of these places. It became evident that there are a large number of places that have been closed down and/or abandoned without any spiritual or cultural re-dynamisation. From this realisation came the idea of rehabilitating places through media technology in a way that would promote and expand a new perspective of the place. In a world increasingly powered by the fluidity of media technology, the question arose of how to integrate these devices in specific places.



Figure 1. Santa Clara Church, Santarém, Jorge Duarte Sá.

Media experimentation in religious places is hardly a new concept in itself. However, the vision and the perception of these places has changed considerably in recent centuries. Nowadays, architectural sacred places are still a means to intensify religious experience, but they also open up alternative experiences to such encounters, may they be spiritual, cultural, or even technological. Religious places can be a receptive and introjected experience of sensory stimuli induced not by worship nor by the veneration of a religious iconography and narrative, but by a new expression of the digital times, in which image and interaction become a perceptive, aesthetic and cultural sensory experience. Objectively, it is not usual to use religious places for media experimentation, but it can be reasoned that there is an increasing open-mindedness and a broader acceptance of the use of technological arts in this specific context.

MEDIA REHABILITATION

The dynamic and interactive pluralism that can be found in religious places has nothing to do with specific rituals or celebrations, but with the space itself, as it provokes sensorial and perceptual particularities and specificities in the visitor.

Nowadays, architectural spaces associated with the sacred are not just limited to cult practice, but are also places of cultural and social convergence (and it is this facet that can be explored by new devices). Despite some resistance to new artistic technology within sacred places, it is in such a redefinition and reinterpretation of that place that those sensory impressions beyond established religious convention can be born.

There are no works of art of an essentially technological nature in sacred places in Portugal. The works on display are part of the contemporary world, and resort to painting and sculpture. Architecture, however, has begun to bring forward proposals that reflect aesthetic and technical innovations. This is evident in new churches where there is some change in the morphology of the space and its design such as the church of Santo António in Portalegre by Carrilho da Graça, the Restelo de Troufa Real church or the Marco de Canavezes church by Siza Vieira.

In Architecture, the term rehabilitation appears associated with a set of changes that are carried out in a structure or space, allowing for the requalification and the redesign of the image of the architectural object. Rehabilitation brings about regeneration, reactivation, replacement, or it simply renews and innovates something which is inactive or without dynamics. In order to synchronise function with contemporary time and space we may ask ourselves if architectural structures, whether public, private, religious or cultural, can also be rehabilitated via new media technology. The integration of new technologies in religious places is a relatively recent field when compared to the use of painting or sculpture or even compared to experimentations with magic lanterns or darkrooms. However, the rehabilitation of places of worship could be a developing field of work in the near future. Such rehabilitation could be done via the re-service of the place by conferring new guises and dynamics to it and by scouting new sensory and aesthetic dimensions. Furthermore, but more challenging, this rehabilitation could consider integrating such places in the cultural hospitality industry and events, within a commercial role, or some other means of heritage valorization.

The field of study in this paper is focused mainly on the specificities of those places meant for the cult of the senses, in addition to the hierarchy creation and management of mental mechanisms inherent to beliefs and spirituality. These places are characterised by a very particular image of their own, which determines a design of space in accordance to specific symbolic concepts and meanings. It is even worth mentioning a certain aura of media virginity that characterises the contemplative space, which makes it tempting from an artistic and architectural point of view. In the course of History, we have witnessed a constant mutation of spiritual places, developing in parallel with the times' prevailing mentalities and thought patterns. Society's evolutionary itinerary has evolved along with and has been closely linked to doctrinal rigidity or flexibility. Possibly, it is within these places that the great artistic and architectural sensory experiences are felt, as a result of a connection between that which is sensorial and the human creative spirit. The conceptual proposal of media rehabilitation aims to integrate in places of worship current technology which is synchronous with contemporary thinking. Spirituality and the plane of sensation have changed over recent centuries, breaking the heavy heritage of religiosity. Nowadays we witness and experience new and stimulating sensory experiences due to these technologies. Thus arises the relevance of rehabilitating spaces with new sensory experiences, opening the door to a new field of creative possibilities, which present the opportunity not only to stimulate artistic creation but also dynamise inactive places.

Nowadays, there is an apparent openness to sensorial and emotional conscience that increasingly links art, science and spirituality. Therefore, it seems pertinent to move forward with a proposal for revitalisation and «media rehabilitation», in this case in sacred places. Within the framework of a facilitating and insightful vision of the future, with regard to the development and adjustment of social systems (which are required to be open), media rehabilitation in the near future could be a field of work as natural as architectural rehabilitation or restoration.



Figure 2. Jorge Duarte Sá, Nimbus Radiance Gate Project, Santa Clara Church, Santarém.

New communication technology, as an essential structural component, is now beginning to be integrated within current places of worship. Implementation of this same technology in future rehabilitation of places may become a reality. Many places of contemplation have lost their aura of sacred worship and have become tourist destinations and objects of heritage marketing or even been taken over by other functionalities and uses. However, they have not failed to emanate a spiritual essence. This is not indifferent to the visitor, and its ambience is positioned as the core of that which is to be explored – by combination with new technology, the aim is to create a medium extension of the religious place.

Architecture is full of examples that contemplate and stimulate the spiritual aspect of the human being. Sacred places have become, nowadays, not only places of worship, but have evolved into museological exhibitions where cultural and artistic heritage can be contemplated independently of religious beliefs.⁵ This presents an «inter-religious» openness and transforms them into multifunctional places where art and spirituality are fully united via the observer.

In the concept of media and architecture, there is a fusion between kinetic communication and architectural structures. They gradually acquire sensory and perceptive readings that penetrate the physical surroundings.⁶ This process can be applied in a micro-territory, in a religious place where the surroundings and the signals emitted by it may be perceived in an entirely new way. This increases the endemic spirituality of the space itself. Sensorial experience seems to be increasingly linked to a biopsych technological process: research on brain cartography appears now to reveal specific locations for spiritual activity.⁷ Concepts and beliefs that no longer have a place in human experience fall apart with the discovery of new territories of human reality. In their place, other concepts and beliefs are created from fragments of the rubble, as if by the emanation of material from new mental and valorization constellations. Despite the changes, images and spaces remain that may in the future acquire new readings and thus reveal new perspectives of the sensory realm. In this way, humanity created an iconographic and architectural universe that becomes an inexhaustible source of new forms of expression of the technological arts⁸. It still appears early to technologically scrutinise the exploration of spirituality through media technologies, but some effort is being made, albeit in a controlled way, for example in the works of Helen Eastwood and Lauren Brun, and Poklong Anading. Other works are being created in places of contemplation, thus renewing the readings and perspectives of space, such as the work of Stéfane Perraud, in St. Germain l'Auxerrois, Paris, (2008), the work of Sacred Places in St. Michael's Church, Leuven, Belgium, Emily Tracy in London, and Pat van Boeckel from the Netherlands. Anne Patterson, *Graced By Light*, Grace Cathedral, San Francisco, USA, (2014).

Architecture in its endemic practice implies a project and a practical application. That is to say, it is something that is built from an idea and is materialised in the occupation of space, by taking into account specific conditions of the programme and the environment. Since the first architectural treatises, a

fundamental premise that has remained unchanged is the importance of place. Architecture develops based on places which in their own turn condition the act of building. In the case of Media Architecture, this premise remains valid because the fusion of media and architecture precedes the study of the place of intervention well as the study of the way in which it can communicate. In this context, media use in Architecture represents an attempt to create a new vision in sacred places and thus acquires a markedly spiritual aspect. Thus it explores an aesthetic of its own, appropriate to the space in question. Examples seem to emerge not only in Western churches (namely Christian), but they also occur in mosques and synagogues, as is the case with the works of Bill Seaman's Epiphany at the Synagogue Šamorín in Slovakia and by Sarkis Zabunyan at the Great Mosque in Paris.

This media rehabilitation in places of worship is a concept that can be extended to future interventions in other humanised or natural spaces, thus putting technology at the service of spatial dynamism and human experiences, even if circumstantial.



Figure 3. Jorge Duarte Sá, Nimbus Radiance Gate Project, Santa Clara Church, Santarém.

Evidently, the impact that the use of media in architecture may have on current urban societies is still under-explored, under-implemented and not defined enough. The experiments that have been carried out only testify to some of the possibilities and changes that the architectural place can undergo with the inclusion of media technology. The urgency of anthropological, sociological, psychological and neuropsychological studies makes itself noticeable while experiments that now begin to contaminate the urban space grow in number. The so-called visual culture may have here an imposing field of work, rich in social, cultural and spiritual approaches. This work may very well focus on better evaluating the impact of this new visibility of the architectural space.

The proposal of Kinetic Architecture, technological and sensorial media, with direct connections to the human being, is somewhat recent.⁹ Those experiments carried out are reflected in the domain of the psychological and neurological experience of the human being. The fact that a tectonic structure responds to human sensory impulses can have unexpected results in the private and public lives of individuals.

It is also very alluring, currently, to look for understanding on how the potential and use of large-scale media technology is experienced; on how this affects and conditions human beings in our relationship with surrounding places and external realities - intra and extra vital psychological spaces. The interaction of architecture and media with human beings is a field of research to be explored more deeply, drawing on areas such as Psychology, Neuropsychology, Imaging, Design and digital creation.¹⁰

NOTES

¹ David Noble. *The Religion of Technology*.

² Alexei Lidov. *Hierotopy. the creation of sacred spaces as a form of creativity and subject of cultural history*.

³ Alexei Confront Lidov. *Hierotopy. the creation of sacred spaces as a form of creativity and subject of cultural history*.

⁴ Mircea Eliade. *Symbolism, the Sacred, and the Arts*.

⁵ James Elkins. *On strange Place of Religion in Contemporary Art*.

⁶ Uta Caspary. *Digital Media as Ornament in Contemporary Architecture Facades: Its Historic Dimension*.

⁷ Juhani Pallasmaa. *The eyes of the skin*.

⁸ Juhani Pallasmaa. *A imagem Corporea - Imaginação e Imaginário na Arquitetura*.

⁹ Caspary, Uta. *Digital Media as Ornament in Contemporary Architecture Facades: Its Historic Dimension*.

¹⁰ Caspary, Uta. *Digital Media as Ornament in Contemporary Architecture Facades: Its Historic Dimension*.

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EXPLORING THE USE OF GENERATIVE ADVERSARIAL NETWORKS WITHIN THE WORKING PROCESSES OF FINE ART PRINTMAKING: AN AUTOETHNOGRAPHIC, PRACTICE-BASED PERSPECTIVE

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INTRODUCTION

How is the creative process of printmaking affected when a printmaker incorporates Generative Adversarial Networks (GANs) into their process?

This question led to a practice and process-driven research project. This research project was inspired by the working processes of GANs and resulted in their implementation in the printmaking process. Recording the results of using GANs as a tool, the paper to follow describes how the printmaking process was affected. It also outlines the similarities that I found to exist between the two image-making technologies.

The paper is presented in three parts. The first section addresses GANs and GANism, key artists and their works, and how their practice has influenced my own. The second section briefly focuses on printmaking as an image-making technology. Lastly, I outline my experience using GANs within my printmaking process.

GANs as image-making technology

A GAN is a computer technology that produces original images. The technology emerged in 2014 and owes its development to machine learning and neural networks.¹ Machine learning is a field of enquiry that works within the organised structures of computer coding to understand and build processes to perform tasks required of computers. The basic structure of machine learning is called the neural network.² Neural networks are structured and coded according to specific architectures or models to achieve the directed tasks for that particular network.

GAN technology is at a relatively early stage in its development, and computer scientists are constantly researching and advancing its functionalities and capabilities. Ian Goodfellow developed the GAN algorithm in 2014 and used the idea of a game to explain how it worked.³ He likened GANs to a two-player game, where the two computer-coded models are the two players. The two players in this specific game are known as the Generator (G) and the Discriminator (D). While the game is in play, the models work simultaneously, each trying to win the game by successfully fulfilling their particular directive. The game is reliant on a body of data, in the form of images, being fed into the system which is used by the two models to compose a scheme used to generate or discriminate, respectively. The G aims to generate images that closely resemble the original dataset and tries to 'trick' the D into classifying them

as real data. The D's role is to accurately classify the generated dataset as fake, compared to the original dataset.

A number of artists have used GANs as their medium of expression. This genre, where artists strictly use the capabilities of GANs to produce art objects, has been called GANism. Artists working in GANism are concerned with how the GAN models are coded, and their artistic intervention lies in how they choose to use this code to produce their GAN-generated output images.⁴ By altering the coding, the artist working in GANism disrupts the GAN's architecture, causing the GAN to produce an output image that is, to some extent, under their conceptual control.

Before discussing my own work, it is necessary to discuss some key GANism artists and some of the works that have influenced my process. One significant difference between my process and theirs lies in my lack of computer science experience. Unlike the artists discussed, I am not able to code and manipulate the architecture of the GANs. I outsource this process and attempt to work with the GANs to draw inspiration from their output images rather than using the technology as the medium. In fact, I play a 'game' with the GANs by curating the datasets I feed them. This game consists of a number of iterative rounds. In each round, the GAN responds to my artwork (an original dataset) by generating a new dataset. In turn, I respond to the GAN's dataset by generating new artworks. These new artworks then act as further datasets that are fed into the same GAN system.

GANism

While artists working in GANism are inspired by the GAN's process, they often choose different aspects of the process to highlight in their artworks. Common aesthetic traits within GANism provide a challenge for artists to create works that do not appear generic in aesthetic. As Dejan Grba notes, "[t]his expressive issue reaffirms the importance of the artist's decision-making and overall poetic articulation."⁵ How artists disrupt their GANs is a means of controlling the traits they include within their final artworks. The following artists disrupted the GAN's process in a way that inspired my own practice.

Artists such as Mario Klingemann are deeply inspired by the inner workings of GANs. He creates artworks that show the GAN's latent space, that is, the thousands of iterations in the process. His artwork, *Memories of Passersby* (Fig. 1) is a video installation of continuous iterations, where he coded his GANs to generate a constant loop of thousands of morphing portraits. The viewer watches the hauntingly surreal morphing of one portrait into the next, essentially observing the inner game between the GAN's Generator and Discriminator.

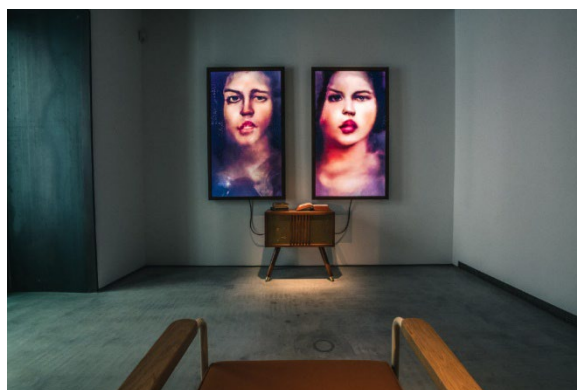


Figure 1. Mario Klingemann, *Memories of Passersby*, 2018, video installation (Notaro 2020)

Klingemann is further inspired by latent glitches in the GAN's process. The term "glitches" refers to malfunctions or inadequacies within the programming that cause the output image to have elements that are visually incorrect or inaccurate.⁶ For Klingemann, these glitches provide the creative or artistic style

that inspires him.⁷ He uses both the algorithm and its glitches as his ‘paint brushes’.⁸ His process is intrinsically linked to how he sets up and programs his GAN’s algorithms – ultimately getting the GAN to create glitches in the portraits.

In *Myriad (Tulips)* (Fig. 2),⁹ Anna Ridler took 10 000 polaroid photographs of individual Dutch tulips, labelled and categorised the images, and uploaded them into her GAN. In doing so, the artist controlled the GAN’s input process. However, instead of displaying the images generated by the GAN, Ridler chose to display her dataset as the artwork. Ridler’s conceptual reasoning for this decision is concerned with data bias. She asserts that the GAN’s output images are always influenced by the human decisions that go into creating the dataset. Therefore, the GAN’s output images are always a reflection of the artist themselves. Ridler presents her data bias as the artwork. The labels – handwritten and scratched out, corrected and re-written – are a view into the biased choices the artist makes. Ridler’s work also speaks about the amount of human effort that goes into creating the dataset and running a GAN.

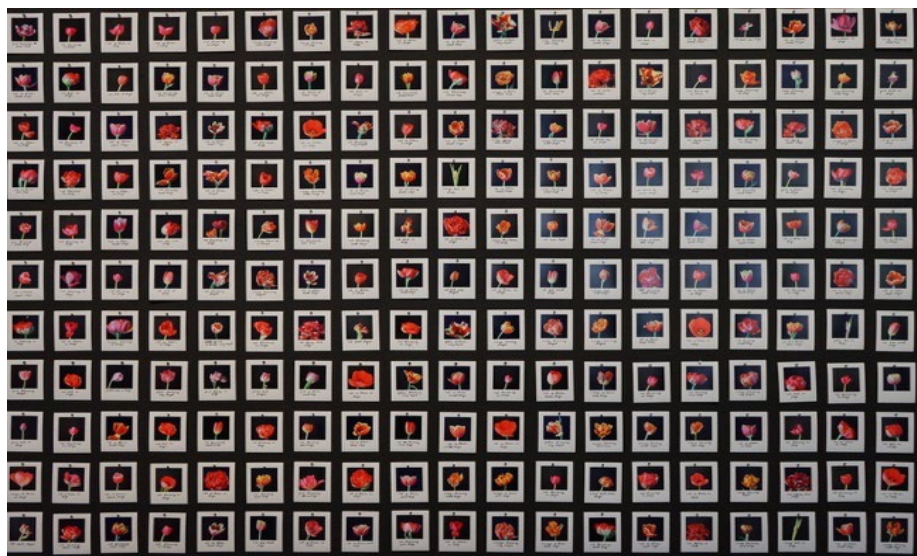


Figure 2. Anna Ridler, *Myriad (Tulips)* Anna Ridler, Year, labelled polaroid photographs (Ridler 2018)

Obvious’ work, *Sacred Heights* (Fig. 3),¹⁰ is another example of a GAN artwork where a non-digital medium is the final representation. Using a dataset of Japanese woodcuts in the genre of Ukiyo-e, *Obvious* generated a source image, which was then replicated using the same traditional printmaking process by printmaker Ben Uki Ga (b. unknown). With the final, collaborative artwork being an Ukiyo-e print, this work can be seen as being part GAN- and part printmaking-led. The printmaker’s role was technical, and the artwork’s inspiration was credited to the GAN’s capabilities.

At first glance, the woodblock print would seem to contain all of the stylistic features of Ukiyo-e woodblock printing. However, upon closer inspection, the landscape is made up of elements that are unclear. The trees in the background, for example, are loosely shaped random squiggles of colour that merely resemble the shapes and patterns of trees. The printmaker replicated this visual indeterminacy¹¹ implicit in the GAN’s generated image and has imbued the print with meaning associated with the tradition of Ukiyo-e printing¹².



Figure 3. *Obvious and Beno Uki Ga, Sacred Heights, 2020, Woodcut (Obvious 2020)*

Artist Tom White trains his GANs with the intention of generating abstract, silkscreen-like images that he then silkscreens or risoprints as the final artwork. His work can be seen as a collaboration between him and the neural network he is coding. White's intent is to use GANs as a tool within his working process to create abstract representations of objects in the real world. In order to achieve this, he disrupts the GAN's basic algorithm by coding the GAN to generate abstracted output images, such as Banana (Fig. 4).



Figure 4. *Tom White, Banana, 2019, Screenprint (dribnet 2019)*

Printmaking and its connection to other image-making technologies

Printmaking is essentially a form of image-making technology and is therefore intrinsically connected to the development of image-making technologies. For most of its history, printmaking has been used as a tool to spread ideas.¹³ The ability to create multiple prints was the driving force behind many of printmaking's technical advances. The ability to make multiple prints was only made possible by the inventions of the mechanical, electronic and digital machinery and tools used within printmaking. These were often commercial developments adapted by printmakers.

A clear pattern throughout the history of printmaking is its adaptation and integration of new image-making technologies to make printing easier, more environmentally friendly, and more economical.¹⁴ Running alongside the development of these technologies is the advancement of the artist-printmaker's skills and their curious exploration of them. Prior to the nineteenth century, the innovations adopted by the medium were mechanical and industrial. With the invention of electricity and the computer, the innovations of the late 20th century ushered in electronic and digital advances.¹⁵

The invention of the computer has been influential to printmaking and artist-printmakers.¹⁶ The computer became a tool for artist-printmakers, providing them with an "electronic palette" and the ability to duplicate, paste, erase, and move images with ease on a new substrate: the computer screen.¹⁷

As newer software for image-making develops, new possibilities for computer prints emerge. At present, the degree to which the artist uses the computer to make printed works of art can be entirely conceptualised and rendered using a computer and digital printer, with a pencil only used to sign the printed outcome. Alternatively, the artist-printmaker's process can be partly computer-led. For example, colour separations for CMYK screenprinting is done digitally, but the process of exposing the screens with the CMYK positives and printing each layer is carried out by the printmaker-artist.¹⁸ Future integrations of computer software and printmaking are logically connected to the advancing capabilities of computers.

These inventions and advances position GANs to similarly inspire printmaker-artists to experiment and further develop the medium of printmaking by exploring and creatively applying this new medium in their processes. Jenn Law¹⁹ suggests that “often, it is the ways in which existing knowledge systems and technologies are combined that is innovative.” As such, innovation could be said to occur when the artist-printmaker combines a new technology (GANs) with their existing knowledge system (the traditions of printmaking). This innovative combination of new and old image-making technologies is a form of hybrid printmaking. Hybrid printmaking is a term Coldwell²⁰ uses to describe any process of printmaking that combines digital and traditional processes. Jim Noble's²¹ term, “computer print” is also descriptive of this combination of processes.²²

The artist-printmaker's use of GANs introduces a lack of control in that the artist no longer needs to control the creation of the artefact. This kind of loss of control, Lovejoy²³ argues, creates the potential for more creativity. Considered in relation to GANs, this potential for creativity emerges when the artist is the position to observe and select the generated images or to use these images as inspiration for further work. In *Philosophy of Art*, Theodore Gracyk²⁴ provides a chronological understanding of the philosophy of creativity and claims that “artists are inspired by forces outside of themselves, forces that they cannot control.” This further supports the argument that if the artist-printmaker incorporates the uncontrollable and unpredictable image-making capabilities of GANs into their process, they may encounter inspiration.

Incorporating GANs into my printmaking process

My research process was modelled on an autoethnographic, practice-based approach. I documented my process and thoughts that emerged from this in my journal and sketchbooks. Going into my research, I had a basic understanding of what GANs were and how they functioned. Since I had limited access to GANs and do not have the computer coding skills necessary to code a GAN myself, this part of my process was outsourced. My control in this process was in generating the datasets that would then be given to the engineer to run. When I received the resulting GAN-generated images, I would then respond to these in a number of interventions. As mentioned earlier this felt like a back-and-forth game between myself and the GANs.

At the start of my research, I created a dataset of 1000 images of my work. These consisted of paintings, prints, drawings, and sketches that I had made over a ten-year period as a practising artist-printmaker. GANs need a dataset of upwards of 10 000 images to run effectively, so I knew that the GAN would struggle to generate images that resembled anything real. This was not a concern to me. The GAN was able to generate images that were mostly abstract planes of colour and texture. My original dataset had such a large variety of styles and subject matter that the resulting GAN-generated images were reflective of this diversity. Figure 5 shows a selection of the original dataset alongside a selection of the GAN-generated images. What can be immediately noted is that the GAN was able to pick up on common colours and compositions within my work, such as pink, green, gold, and the use of circular motifs.

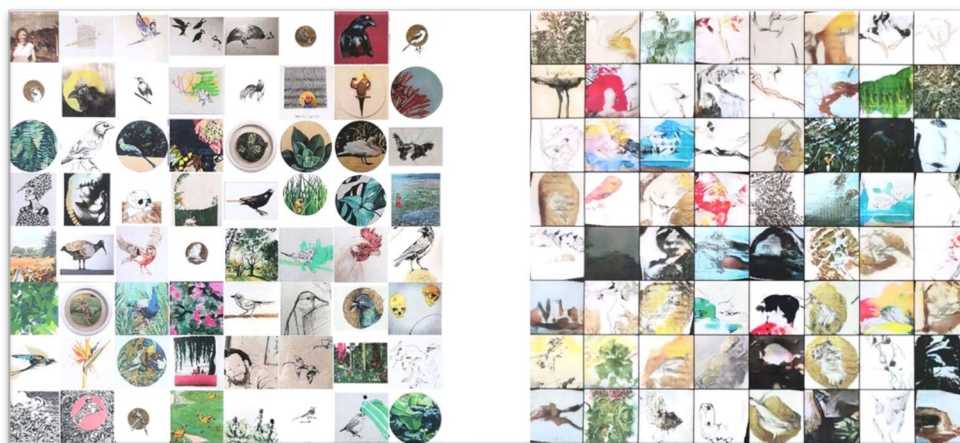


Figure 5. On the left is an example of the types of images I fed into the GAN from my body of work. These were used to train the GAN, resulting in the images on the right.

After working with the GAN in this manner for a number of iterations, I began to see and understand how the GAN was generating images. The new images created by the GAN were re-assemblages of images from the original dataset. Understanding this process influenced how I was going to be inspired by the GAN. Moving forward, my work would use these GAN-generated images in the generative phase of my creation.²⁵ In other words, I would go on to use these images as inspiration during the initial brainstorming and ideation phase of my process. They would not be used as final artworks themselves. My first body of prints made in response to the GAN's outputs is titled *Imaginary Landscapes*. What fascinated me about the GAN-generated images was that I had fed the GAN a dataset consisting mostly of artworks of birds, florals and portraits, and yet, when I looked at the GAN-generated images, they seemed to resemble abstract landscapes. This was significant to me as I had always wanted to create loose, abstract landscapes, but my personal style is very detailed and controlled, so I struggled to feel satisfied with my attempts at this. I chose a selection of GAN-generated images that, in my assessment, resembled the elements of a landscape, and I used these as the direct inspiration for a body of work. In Figure 6, you can see my process to produce these prints. In the first image below, the GAN-generated output image is shown. While the image is made up of non-descript objects, I felt this image resembled a field of trees, with grass in the foreground. In the middle image, I used Adobe Photoshop to create a half-tone stencil of the GAN's image. This stencil was then burnt onto a silkscreen using a photo-sensitive emulsion. I exposed the stencil onto the screen with a UV lightbulb for 4 minutes. This process created a stencil of the GAN's image on the screen, which could be printed on paper.



Figure 6. The process of my series, *Imaginary Landscapes*

The paper I chose to use was handmade paper that I made by tearing down old drawings and prints to make a new paper pulp. The resulting paper has tiny specs of colour and texture from the torn-up

artworks. This was conceptually significant as it mimicked the GAN's process itself. Just like the GAN broke down my digital dataset into pixels and reassembled these pixels into patterns, my handmade paper broke down my physical artworks to create a new art object: the paper.

The screenprint stencil of the GAN's image was then screenprinted onto this handmade paper with a neon pink ink. I chose this colour as it was a dominant feature in the GAN's generated images. This layer functioned like a 'map' of the GAN's landscape. The final layer was created by using this 'map' as a guide for painting the colours of the landscape onto an open silkscreen.²⁶ This method was uncontrollable, to a large extent. I attempted to paint the colours onto the screen to resemble the GAN's image as closely as possible, but the misregistration of the two layers – the neon pink halftone 'map' and the silkscreen monotype – was inevitable. The last image of Figure 6 shows the final artwork with the misregistration between layers. The halftone map and the screenprint monotype are in direct conversation with each other, similar to how the two screens in Elwes' *Closed Loop* directly respond to each other.

The next body of work I created was inspired by these screenprint monotypes. This next series, however, was more indirectly inspired by the GAN's images. This time, I did not try to copy them directly. The previous body of work, *Imaginary Landscapes*, had enabled me to generate landscapes that were loose and abstract. I wanted to see if I could continue this without using the GAN-generated images as a 'map'. In this next series, I would study the GAN's images and choose a number of them to work with. I would observe the image carefully and attempt to recreate the colour palette or composition of the image in some sense while painting directly onto my silkscreen. Figure 7 shows a few examples.



Figure 7. A selection of screenprint monotype landscapes

When I initially began working on this series, I would clean my screen after every print. After some time, I decided to reapply new paint over the printed screen and keep pulling prints before cleaning. With each print, I would apply new paint to the same areas as before. As a result, the screen became densely saturated with ink and colour. The resulting prints became multiple smaller series within the larger series. These works morph into each other, illustrating the GAN's own iterations, much like Klingemann's morphing portraits *Memories of Passersby*. Figure 8 shows how the progression of these prints moved from loosely abstract landscapes into saturated planes of colour. I enjoyed how this process mimicked the way that the GAN, after running hundreds and thousands of iterations, began producing images that were oversaturated with colour and texture.



Figure 8. A series of screenprint monotypes printed one after the next, without cleaning the screen in between prints. Over the 5 prints, the screen becomes densely saturated in ink, mimicking the process of GANs.

At this point, inspired by the works of Anna Ridler, I wanted to create a new dataset for the GANs. In the first GAN, the input dataset contained too much variety to create an output image that resembled anything other than an abstract representation. This time, I wanted to try to control the GAN-generated images more. I created a dataset of 200 pencil line drawings of daisies. This dataset was fed into the GAN and resulted in output images that resembled daisies. The two datasets can be seen in Figure 9. Using the GAN-generated images, I chose one of the daisies and drew it onto my screen. This daisy was then printed. I did not wash my screen immediately, so the drawing of the daisy was still visible in the screen. I used this as a guide and re-drew the same daisy. I repeated this process hundreds of times to create a series of 500 daisies. The daisies all look exactly the same at first, but on closer inspection, they each differ slightly from each other, as it is impossible to hand draw the daisy precisely the same each time.

Metaphorically, this series could be likened to the childhood game of broken telephone wire. In this game, one child whispers a sentence into another child's ear. That child then whispers what they heard into the next child's ear, and so forth. At the end, the last child says out loud what they heard. Inevitably, this is different from the original sentence. My daisy series was a broken telephone game between the GAN and myself, as well as the screen and myself.



Figure 9. On the left is a selection of my own hand-drawn daisies. On the right are the resulting output images generated by the GAN.

My final GAN-inspired body of work was a series of collages. After interacting with the GAN for the previous series of works, I became more aware of how the GAN's output images were always a re-assemblage of my initial datasets. This re-assemblage reminded me of collage. For my collages, I cut up old prints and drawings and re-assembled them into new collage artworks. Figure 10 illustrates this process. Collage, as a technique, falls under printmaking, as it is historically related to the cutting and pasting together of pages of texts or images from books to create a new image.²⁷ Within GANism, the artist-programmer goes through a process of cutting and pasting the algorithm in order to generate

output images. Aesthetically, the elements of the output images themselves also have a surrealistic, Dada-esque, collaged feel.



*Figure 10: On the left, the eight artworks used to create the collage in the middle are shown. Elements from each artwork were cut up and re-assembled to create a new artwork. The final iteration, on the right, used the collage as inspiration for a multi-layer screenprint, *Unrequited Love**

The final iteration of my research process involved taking the collages I had made and translating them into final screenprints. In the last image of Figure 10, the final, three-layer multicoloured screenprint on the right was created in response to the collage in the left. The title of the print is *Unrequited Love*. This artwork refers to how I have found GANism and the medium of printmaking to be treated by the contemporary art world. Due to printmaking's ability to generate multiples, and GANism's reliance on an uncontrollable computer process, both mediums are often perceived to be inferior to the 'elite' art of painting and sculpture. The authenticity of works created using these mediums is also commonly questioned.

A comparison between printmaking processes and GAN processes

Through my continuous, three-year process of working with GANs, a number of similarities between GANs and printmaking have emerged. The synchronicity of the two strengthens the argument that using GANs as a tool within the printmaking processes can expand the field of printmaking towards ongoing hybrid printmaking techniques and mediums. Below are some of the insights I generated.

First, both GANism and printmaking are reliant on machinery and technology.²⁸ Printmaking is inherently reliant on technology and the machine (the printing press) to produce art objects. GANism is reliant on the computer (as machine) and its capabilities towards machine learning to produce art objects. This reliance on machinery and technology intrinsic to both mediums creates a certain lack of control in the process. A partially uncontrolled process exists because of the 'interferences' the machinery and technology provide, and the final outcomes are therefore not completely predictable.

The second similarity between the GAN's process and the printmaking process is that a matrix is used to create the art object. In printmaking, a range of matrices exist, from woodblocks to silkscreens, while in GANism, the computer algorithm is the matrix of the art object. For both, the art object exists only because it has been transferred from or through the initial matrix (the silkscreen; the computer algorithm) onto a substrate, forming the final art object.

A third similarity is that the outcomes of both mediums' processes are marked by multiplicity. For printmaking, that multiplicity is the print edition: the reproduction of the same image multiple times through the previously noted transfer from the matrix to substrate. The GAN's process ends in mode collapse: the reproduction by the GAN's generator, which generates the same exact image over and

over. Although *mode collapse* is not the goal of the process (as editioning a series of identical prints is with traditional printmaking), it does indicate conclusion of the algorithmic process.

Forth, both mediums make use of collage. GANism pieces together pixels from an original dataset into new patterns to form output images. In printmaking, the piecing together of layers is inherent in the production of a print. Specific to my own process and studying the GANs, I have found this similarity between GANs and printmaking to be significant. The more I worked with the GANs, the more I realised that the output images were re-assemblages of the original dataset – that the images being created were not entirely ‘new’. They were new and unique in as much as they were assembled differently from the original dataset; however, some aspects still heavily resembled the original data. In my own collages, I have created new artworks made entirely from older prints. The new prints contain collage elements that resemble older prints. The new prints are made up of bits and pieces of older prints.

The last parallel that can be drawn between printmaking and GANs pertains specifically to the technique of screenprinting. Within screen-printmaking, a physical screen is used to physically push ink through a mesh, transferring a stenciled image onto the substrate. In GANism, the computer screen is used to digitally transfer the GAN’s algorithm into a generated output image. I am particularly interested in this similarity, as screenprinting is my medium of choice. This links to the first similarity above – the reliance on machinery for both mediums – however, the specific machinery here is the use of a screen. The screen transfers the information from the creator (the printmaker; the GAN) to the final artwork. For both screenprint and GANs, the screen also acts as a separation between the artist and the artwork, and the artwork cannot exist without the screen. The artist wields the screen, but there is always an uncontrollable translation that takes place as the information moves through the screen. For the GANs, the algorithm is the ‘screen’ that the pixels move through to assemble on the other side. In screenprinting, the ink moves through the mesh of the silkscreen. For both, it is only once the screen is lifted that the artwork (GAN’s output image, or the screenprinted image) is revealed.

CONCLUSION

In incorporating GANs into my Fine Art printmaking process, I have been inspired by the GAN’s process itself and have used this to make new prints. Some of these prints were GAN-inspired, while for others, I worked more directly with the GAN’s output images. This practice-based research process mostly incorporated the GAN’s images into the generative phase of my process, where I planned new artworks.

My process as a printmaker was disrupted by working with GANs, and this resulted in a number of series of prints. The earlier series (*Imagined Landscapes*) was inspired by the GANs most closely and led me to create works that were significantly different from my previous body of artwork. As the process continued, I was able to use the GAN’s process of re-assembling and collaging images together to influence a new series of artworks, *The Final Iteration* (Fig. 10). These works were, in my opinion, closer to my previous body of work, and it felt like the two mediums (the GAN and printmaking) were beginning to work more cohesively together.

The research project focused on my process as a printmaker and seeing what effect implementing GANs into my familiar practice would have on my work. During the three-year period of this experiment, I became fascinated with what GANs would generate. At first, their limited capabilities frustrated me when I realised that their output images would be abstract and non-representational. However, this became a strength in the project, as it enabled me to be inspired by the GAN’s images rather than seeking to replicate them. In other words, the abstract, visual indeterminacy of GAN-generated images became a means to inspire prints. By generating my own datasets, I was familiar with the original data

and enjoyed seeing how the GAN responded to them and how it reassembled the data in the final output images.

At the onset of the project, I had some assumptions that the process between myself and the GAN would be similar to a Rorschach test. I imagined that the GANs would produce images that looked like something, or triggered something in my imagination that I could then recreate in my style and medium. The reality of the project was far less prescriptive and challenged me to look at the GAN's images that were so dramatically different from my work and respond to them by creating something inspired by them, while staying true to my own practice. I believe that this process resulted in highly creative responses that I would never have been able to predict or produce were it not for incorporating GANs into my practice.

A modern-day proverb is that to become an expert at something, you should practice it for ten thousand hours.²⁹ For a GAN to produce images that resemble literal objects, they require datasets of upwards of ten thousand images. In my project, I found that making datasets of two hundred similar images resulted in interesting and semi-representational GAN-generated output images. This has informed my practice and has encouraged me to work in series or to create separate bodies of work. Each series contains at least two hundred images that can then be fed into a GAN. The driving force behind this form of working is my curiosity of what the GANs might generate with each iteration – what response will they give me?

Printmakers working in hybrid printmaking (the mix of digital and traditional printmaking techniques) may certainly benefit from using GANs to inform their processes. Their choice of how GAN-led or GAN-inspired their art practice can be will emerge from curiously working with the new image-making technology and incorporating this into their already familiar working processes. This will inevitably generate interesting outcomes. In some way, this is a continuation of a well-worn path, where printmakers have always sought to find new and interesting technologies that can be assimilated into the processes of printmaking, and where problem solving continues to lie at the heart of the practice.

NOTES

- ¹ Ian J. Goodfellow et al., "Generative adversarial nets" (paper presented at Advances in neural information processing systems), Montreal, Canada, 8-11 December 2014.
- ² Laura Burke and James P. Ignizio, "A practical overview of neural networks," *Journal of Intelligent Manufacturing* 8, no. 3 (1997): 157-165.
- ³ Ian J. Goodfellow et al., "Generative adversarial nets."
- ⁴ Dejan Grba, "Deep Else: A Critical Framework for AI Art," *Digital 2* no. 1 (2022).
- ⁵ Dejan Grba, "Deep Else: A Critical Framework for AI Art," 10.
- ⁶ Laura Burke and James P. Ignizio, "A practical overview of neural networks."
- ⁷ Phillip Schmitt, "Augmented Imagination: Machine Learning Art as Automatism," *Plot(s), the Design Studies Journal* 5 no. 2 . (2018).
- ⁸ Emily L. Spratt. "Creation, curation, and classification: Mario Klingemann and Emily L. Spratt in conversation." *XRDS: Crossroads, The ACM Magazine for Students* 24 no. 3 (2018): 34-43.
- ⁹ Anna Ridler, "Myriad (Tulips)," 2018, accessed March 16, 2022, <http://annaridler.com/myriad-tulips>.
- ¹⁰ Obvious. "About Obvious," accessed August 27, 2020, <https://obvious-art.com/page-about-obvious/>.
- ¹¹ "Visual indeterminacy" is an aesthetic feature typical to GANism. Aaron Hertzmann notes how there is "a common GAN aesthetic: images that seem realistic but yet somehow unrecognizable" (2020: 424). When observing a GAN's generated image, it appears at first to mimic a human-generated image. On closer inspection, the image is seen to be made up of elements that do not seem to make sense.
- ¹² Ukiyo-e printing has specific features and are steeped in meaning about the ephemeral aspects of life. The conceptual strength of these prints relies on key features within the aesthetics of the image: stark simplicity, depth, a sense of aging and the passing of time, and the feel of calm mystery. In *Sacred Heights* the ephemeral nature of the GANs latent space has been translated through the use of Ukiyo-e woodblock printing. The GANs process is continuously cyclical, but here, one moment within that cycle is made timeless, caught in a moment forever transfixed in this image. While it has a sense of tranquillity, there is also an unsettled feeling created by the surreal, irregular shapes and composition, the floating trees, the red looming figure in the foreground and the dark shadows. The blurry feel of the image further pushes the sense of mystery within this image. At first glance you see a landscape, but on closer inspection the disjointed, surrealist image is not necessarily a simple landscape at all.
- ¹³ Margot Lovejoy, *Postmodern currents: art and artists in the age of electronic media* (Second Edition) (Ann Arbor: UMI Research Press, 1992).
- ¹⁴ Fritz Eichenberg, *The art of the print: masterpieces, history, techniques*. (London: Thames and Hudson, 1976).
- ¹⁵ Paul Coldwell 2015
- ¹⁶ Jim Noble, "Fatal attraction: print meets computer," in *Computers and art*, ed. Stuart Mealing (Oregon: Intellect Books, 2002), 59-72.
- ¹⁷ Michael Rush, *New media in late 20th-century art*, (London: Thames & Hudson, 1999), 177.
- ¹⁸ Donald Saff and Donald Sacilotto, *Printmaking: history and process*, (New York: Holt, Rinehart and Winston, 1978).
- ¹⁹ Jenn Law, "Thinking through print: an evolutionary approach to imagining graphic futures," in *Printmaking in the expanded field*, ed. Jan Pettersson (Oslo: Kunsthøgskolen, 2017), 265.
- ²⁰ Paul Coldwell, "Hybrid practices within printmaking," *Journal of Visual Art Practice* 14 no. 3 (2015): 175-178.
- ²¹ Jim Noble, "Fatal attraction: print meets computer."
- ²² The reason that this research chooses to use the term "hybrid printmaking" rather than "computer print" is that the main area of research is focused on printmaking and to a lesser degree, the role of computer technology.
- ²³ Margot Lovejoy, *Postmodern currents: art and artists in the age of electronic media*. (Ann Arbor: UMI Research Press, 1991).
- ²⁴ Theodore Gracyk, *The philosophy of art: an introduction*. (Cambridge: Polity Press, 2012): 43
- ²⁵ The Genevieve model of creativity, developed by Ronald A. Finke, Thomas B. Ward and Steven M. Smith, and described in the book *Creative Cognition* (Cambridge US: MIT Press, 1996), states that creativity happens in two phases. The first phase is the generative phase. This is the brainstorming ideation phase. The second phase is the explorative phase. The two phases can repeat several times until the final artefact is complete (Kauffman & Sternberg 2007: 55).
- ²⁶ This process is called a silkscreen monotype. There is no stencil on the screen. The mesh is open, and paint is applied directly onto it. The paint is then pushed through the screen and onto the paper using a squeegee.

²⁷ William C. Maxwell, *Printmaking, a beginning handbook*. (New Jersey: Prentice Hall, 1977); John Dawson, *Prints & printmaking*. (London: New Burlington Books, 1988).

²⁸ Joanna Zylińska, *AI art: machine visions and warped dreams*. (Open Humanities Press, 2020): 181; Walter Benjamin, "The work of art in the age of mechanical reproduction," in *Illuminations*, ed. Hannah Arendt, trans. Harry Zohn (New York: Schocken, 2007 first published 1936): 217-251.

²⁹ Malcolm Gladwell, *Outliers: the story of success*. (San Francisco: Little, Brown and Company, 2008).

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PSYCHOLOGISING THE METAVERSE, A PLACE FOR CULTURAL EXTENSION

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INTRODUCTION

Culture is an intangible entity that manifests in the built environment. It develops over a long history of social interaction and is crucial in the shaping of space and identity. The outside environment is inherently linked with our inner subjectivity and our cognition of self in space. This exists in a relational construct. Our very notion of identity is in many ways virtual, linked with external factors and perceptual encounters that transcend physical space. In fact, subjectivity arises from an interaction with a virtual space- the mirror.¹ Psychologists and philosophers like Lacan, Merleau-Ponty, Sartre and Schilder had theorized about subjectivity as it relates to perception and an unnamed notion of the virtuality of experience but they were working in a context that hadn't yet seen the likes of digital lives and the Metaverse.

While these theories are dated, they provide valuable insight into subjective understandings of perception and the body in relation to the self and other that still have applications today. This paper considers these theories, reinterpreting them, in order to speculate about the implications of new social stratospheres that have developed around virtual spaces. In this contemporary 'Cultural Revolution', virtual reality (VR) space works in a more complex network than has before been created throughout history. It will draw upon understandings of perception and the sensorial to provide a reading on the 'virtual' in both historical and contemporary contexts. It will examine the involvement of these spaces, both physical and digital, in shaping identity and subjectivity. And it will examine how culture extends itself into the virtual space providing a time capsule that exposes societal values.

It draws from the work of contemporary philosophers like Elizabeth Grosz who analyzes these theories in relation to architecture. The paper also references current movements in the production of digital assets and the metaverse to speculate the impact of new digital spaces and design methodologies on architecture and culture. It is concerned with the development of metaverses as spaces of civic and community growth and the parameters that have been and will be used to define these rather than the actual spaces themselves.² Ultimately this paper asserts the belief that the digital virtual realities of today are really no different than the lineage of spaces that strove to do this throughout history,³ they provide an extension of culture that reflects society. However, the new mediums of VR space provide novel opportunities for human interaction and the expression of culture and identity.

The paper is structured in three parts. In the first part, the more theoretical discourse will be dissected. It provides a way to understand the body in space and subjectivity that can then be applied to the second part. In the second part, historical VR case studies will be examined from the perspective of their cultural context and the narratives they have encapsulated. The intention is not to provide a

comprehensive historical overview, which has been done in other literature, but rather to recognize the value systems that are reflected in different VR spaces throughout history. Finally, contemporary VR spaces and the metaverse will be discussed, drawing upon parallels between historical examples, reality and these new VR spaces of interaction.

THROUGH A LOOKING GLASS

Human ability to understand their relationship to space and other bodies comes out of synthesis of bodily stimuli. Neurological processes allow for the experience of sense and can be stimulated by both 'natural' and synthetic objects. But all of this would be irrelevant without the body image and subjectivity. In order to process neurological data, the body requires a subjective point of reference, which produces a psychical double called the body image. The body image is an amalgamation of perceptual data from previous experience that allows the body to process future experience.⁴ From this, the mind is able to develop perceptual approximations of the 'outside' that then allow for the body to move within and negotiate space. To deconstruct this, the paper will first reference Lacan's mirror stage theory.⁵ This theory deals with infants in their first year of life and ascertains that at around six months of age the baby will see its reflection, in a mirror, and recognize itself. Prior to this moment the child believes it is omnipotent. It sees itself as one with everything else rather than having a distinct identity.⁶ However, at mirror stage, this recognition of the self, which requires the objectification of the 'other,' comes from an understanding and distinguishing of what is self and what is other and allows for the subjectivity to form. What makes this moment even more relevant is that the birth of subjectivity comes from that which is virtual- the mirror image.⁷ Subjectivity and identity rely on a relational separation of outside and inside and this virtual encounter. This is an important point that will be expanded upon later in the paper in relation to culture and heritage.

Sartre's work also looks at the development of subjectivity throughout a person's life. In his work in *Being and Nothingness*, he explains that subjectivity is as a result of three processes, or what he calls the ontological dimensions: the body for self, the body for other, and the body for self as seen by the other. The body for self deals with perception of space, how we see our environment and other bodies- it is our subjective body.⁸ The body for other is our objectivised body- our body as an object for the other's gaze. And the body for self as seen by the other is our self-objectivised body, how we perceive our own body from the perspective of an other.⁹ These three ontological dimensions show the importance of our environment on our subjectivity.¹⁰ They are wholly linked. In fact, J.J. Gibson writes (in reference to visual perception) that our perception of self is continuously linked with our perception of our environment.¹¹

Perception is an integral part of subjectivity and body image, so Merlau-Ponty's text *The Phenomenology of Perception* provides valuable insight on the way in which our perception is affected. He describes this in two ways. Firstly, our clothing and the devices on the body affect our negotiation of space and create an extension of the perceiving body. Specifically he uses the example of a blind person's walking stick and how the stick allows the person to have a 'visual' sense of space through touch- it extends their perceiving capability.¹² These external objects become part of the perceiving body. Secondly, the environmental conditions can have radical affects on the perception of space. For this point, Merlau-Ponty references the Muller-Lyer illusion as well as other illusions. Depending on what surrounds the lines, the eyes perceive one as longer and the other as shorter.¹³

The ability to manipulate an environmental condition in order to effect perception has become the basis of many illusions in art and architecture that are reflective of a cultural fascination with the subject in space. This is what links subjectivity to architectural space, whether physical or digital, and provides a way in which to examine culture through architecture. Thinking of it in this way, it can be argued that architecture produces a virtual condition. Architecture shapes space, creating an inside and an outside.

If we were to look at this from a Deleuzian perspective, architecture (digital or not), the inside, becomes a 'fold.' It arises from the outside so it can be thought of as an extension of the outside.¹⁴ The parameters of the outside, including culture and society, are what then structure this 'inside.'¹⁵ These virtual spaces can be looked at from two perspectives. The first is the 'physical' boundaries that produce an inside and an outside. And the second is the cultural aspects that are embedded in the space. Using these two perspectives, we can analyze several virtual reality spaces¹⁶ that have been produced throughout history and see these as time capsules that can tell us about their respective cultural and social ideologies.¹⁷ They are created using different means of technology or mediums, but all produce virtual space that is a reflection of their society. The next section will select a few virtual realities to examine. This methodology will then be used to consider contemporary examples and their implications.

THE WALL, THE ROOM, THE SPACE, THE VERSE

Grau writes that humans have created a long lineage of VR spaces that can arguably be traced back to cave paintings and that serve as predecessors for today's VR. Each of these historical precedents becomes a way to represent experience and being. What makes them different from one another are the mediums used and the experiences or ideologies being represented. Through the act of producing architecture and the image, narrative is recorded.¹⁸ There have been multiple forms of representation in this process that capitalize upon both two-dimensional and three-dimensional methods and that have been largely linked to the technologies and ideologies available in the respective time.

While, arguably, all architecture and design records culture and narrative and these can be considered virtual in their own right, there have been more obvious virtual reality spaces created since antiquity. While some may seem simpler, like the B.C. frescos found in many villas in Ancient Rome, even these utilized an element of technology in representing depth and perspective. Of course, at the time, there was no linear perspective, but fresco artists used a technique called atmospheric perspective to create this illusion of an extension of the room. They used a few design techniques in order to create a fresco space that extended out of the physical. These will be discussed in more detail shortly.

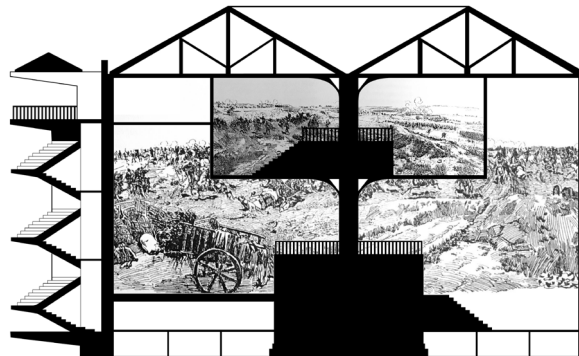


Figure 1. Collage sketch of a panorama rotunda, by author

A seemingly more complex physical example can be found looking at the panorama rotundas that became popular at the end of the eighteenth century.¹⁹ These spaces were specifically intended to produce immersions and many of them implemented multiple technologies that engaged with different sensorial experience.²⁰ They were controversial since there were people who found them too illusionistic or thought that they were trying to produce a second reality. These critiques saw them as a danger to perception and consciousness, which are arguments that we still encounter today. Because of the historical context in Europe at the time, many of these panoramas were used for more nationalistic or propagandistic purposes.²¹ Battle scenes accounted for thirty percent of the panoramic representations. These panoramas would not stay in one place, but would be disassembled and

reassembled in many locations so that as many people as possible could experience them and the messages they contained. They were intended to shape public opinion of political and social history and were an important visual and immersive device.²²

One such panorama, The Battle of Sedan 1870, depicted this battle from the Franco Prussian War. It is clear how this was meant to celebrate the Prussians. Prussian soldiers are shown as individuals with clear faces while the French are painted without faces and as an anonymous mass. It is meant to show the Prussians as disciplined, obedient and superior and the French as unorganized and undisciplined. It creates a culture of nationalism and patriotism and shows how this process is cyclical. The cultural context informed the architectural representation and immersive attitude which then shapes the identity and culture of the people. Oettermann conservatively estimates that ten million people viewed this panorama.²³ After the popularity of the panorama rotundas waned, several other iterations of these spaces continued to be made at a smaller scale, coming down to the size of hand held devices and headsets that used optical techniques to produce the appearance of three-dimensionality and motion.²⁴



Figure 2. Photo of Room 5 at the Villa dei Misteri, by author

Before focusing attention on contemporary VR spaces, the paper would like to direct attention once more to that of antiquity, specifically Ancient Rome and the frescos found in many Roman Villas. As briefly mentioned, these were painted in atmospheric perspective where artists attempted to capture the effects of light and shadow, haziness and clarity, in order to portray a sense of spatial depth. Looking at an example like Room 5 in the Villa dei Misteri, another common technique is used to create the illusion of an extension of the floor with the colour banding found at the base of the fresco wall. It is a framing technique that gives the appearance of the physical space continuing into that of the fresco.²⁵ Not only did this technique provide an illusion of expansive space, it also lifted the height of the painted figures so those within the room would not obstruct their view. The figures surrounding the space direct their gaze and attention back onto the centre of the room and its occupants. It is a dynamic and incredibly theatrical space that gave way to the production of knowledge and discourse.²⁶

These ancient fresco spaces were used as memory palaces that created a spatio-temporal way to remember narrative.²⁷ This is significant because it offered a non-linear narrative model, something that is lost in written text. The three-dimensional spaces depicted in the images produced a planar complexity that linked the virtual spaces of the frescos with the physical spaces of the villa.²⁸ The Ancient Roman frescos provide compelling examples that show the complexity of these spaces and the new perspectives and interactions they propagated.²⁹ This history of these spaces illustrate how different societies across history have encapsulated their value systems through narrative and, in the case of the examples provided, the image to produce virtual spaces that become a mode of communicating social and cultural ideology.

A NEW LOOKING GLASS AND ITS NETWORKS

While VR spaces throughout history have used different mediums, scales and modes of representation, there are parallels that can be made between them and contemporary examples. The notion of the metaverse today provides a space to explore new representations and what these might mean for human experience in virtual space. In some respects they function like panorama spaces that use technologies of today to immerse people into the digital space. There are obvious differences from historical precedents but out of this come novel opportunities to explore human experience of space and other bodies.

Just like the panorama rotundas, there are those that critique the creation of these virtual spaces, arguing that a) these spaces provide an escape from reality or concurrently a blank canvas for new society and; b) that avatars and digital verses jeopardize identity and social systems. However, as can be seen in art and architectural history and the “desire to be in the picture, in both the metaphorical and nonmetaphorical sense,”³⁰ humans have constantly negotiated virtuality.



Figure 3. Avatar generated by Ready Player Me, <https://readyplayer.me/>

To refer back to Deleuze’s notion of the fold, the metaverse simply becomes another inside of the outside. Humans exist in a constant stream of virtual realities and go from one inside to another that all exist within a greater outside. They exist in relation to the outside, which, for the purpose of this paper, includes culture and society, and therefore become a reflection of this, in dialogue with the ideologies and aspirations of any given culture and society. They encapsulate a historical moment and provide a new looking glass that helps shape identity and subjectivity.

From a psychological perspective, humans constantly negotiate multiple personas dependent on their environments,³¹ so alternative verses or the metaverse simply provide another virtual space that the body adapts to. Where these new spaces get interesting is in the possibilities that the medium provides and how these spaces will be shaped and governed in relation to this. For example, while in the past historical VR spaces that rely on the image had to contend with the same laws of physics, in digital VR space, different rules can be assigned. This also applies to the rules of governance and value systems put in place. However, all of these will be informed by a history of experience that has shaped society up until now and inherently incorporate this. It is impossible to separate subjectivity from the environment.³²

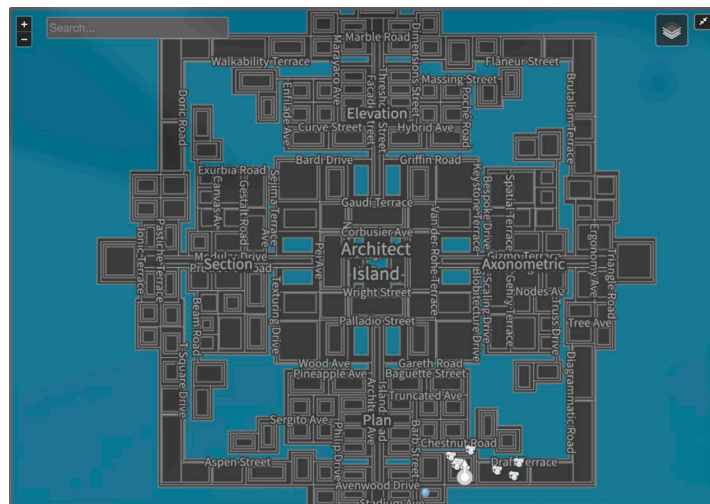


Figure 4. Plan of Architect Island in Cryptovoxels, <https://www.voxels.com/>

Many digital virtual spaces are striving to produce accessible democratic and civic spaces for all. However, there are very real and non-virtual infrastructures that make these spaces possible. They require energy, data storage, physical space and money, so out of these constraints come ethical questions.³³ There is already the development of several versions of governance forming within these spaces, many of which are community driven and provide the opportunity for anybody to be involved in the creation process.³⁴ On the other hand, there is clear commercial value in these spaces that is being capitalized upon by many industries.³⁵ This puts us at a pivotal moment in determining how these spaces will serve us and how they will be governed, supported, used, and funded.

CONCLUSION

Humans have always in some capacity created virtual spaces. Perhaps this can be attributed to the consequence of subjectivity arising due to that first virtual encounter with the mirror. From an architectural perspective, the metaverse provides the production of new community spaces that can be accessed from all around the world, bringing together people from diverse backgrounds and perspectives in a way that could be radical and sets it apart from virtual realities throughout history. The question then becomes: what culture and social ideology will be projected onto these spaces and what will that expose about our contemporary society?

Reflecting on the lineage of representation and virtual reality spaces throughout history allows for an interrogation of architectural practice and the role of the architect/designer in the production of the VR and the safeguarding of culture. Incorporating literature that dissects subjectivity in space provides a means to understand the influence of society on the subject and how this might then embed itself in design. The paper examines VR space in this way to begin a dialogue around the implications of the metaverse and what these new spaces of immersion might say about our times.

NOTES

¹ Lacan's 'Mirror Stage Theory' describes this.

² Inevitably, due to the rapid nature of technology and design, the spaces of immersion will evolve and previous iterations will become dated. But the methodologies of understanding their relationship to culture and the process of analysis will still be applicable.

³ Grau's text *Virtual Art: From Illusion to Immersion* provides a comprehensive catalogue of historical VR space.

⁴ See Paul Schilder, *The Image and Appearance of the Human Body*. (London: Routledge, 2014)

⁵ See Jacques Lacan, 'The Mirror Stage as Formative of the I Function as Revealed in Psychoanalytic Experience', in *Ecrits*, trans. by Bruce Fink. (New York, N.Y.: W.W. Norton & Company, 1999), Pg. 75–81.

⁶ Another psychoanalyst, Donald Winnicott, describes this with his texts on the Subjective Omnipotence phase in child development. The newborn child sees itself as one with the mother (or the carer) rather than as a separate entity. It believes that it is able to manifest everything it requires. However, due to the delay from the baby crying and the mother being able to feed it, the baby slowly transitions to understand that it is separate from the mother. This is the point at which it can begin to recognize its identity with the mirror stage theory. See Donald Winnicott, *Playing and Reality*. (England: Penguin Books, 1971)

⁷ The body is then subsequently exposed to other virtual experiences that shape the development of the subject.

⁸ That can be thought of in relation to Freud's voyeur.

⁹ This can be thought of in relation to Freud's narcissist.

These can also be related to Kant's and Husserl's transcendental and empirical subjects. This is what they refer to as the paradox of subjectivity and the split subject. See David Carr, *The Paradox of Subjectivity, The Self in the Transcendental Tradition*. (New York: Oxford University Press, 1999)

¹⁰ See Jean-Paul Sartre, *Being and nothingness : an essay on phenomenological ontology*. trans. by Hazel E. Barnes; introduction by Mary Warnock. (London: Routledge, 1996)

¹¹ We always perceive the tip of our nose when perceiving any space (though this is generally edited out by our brain). See James J. Gibson, *The Ecological Approach to Visual Perception*. (New York: Psychology Press, 2014)

¹² He also references the fact that clothing, like a tall hat, needs to be considered in the body image in order for the body to be able to move comfortably within space.

¹³ See Maurice Merleau-Ponty, *Phenomenology of Perception*. (Psychology Press, 2002)

"Perception becomes an 'interpretation' of the signs that our senses provide in accordance with the bodily stimuli, a 'hypothesis' that the mind evolves to 'explain its impressions to itself'." (Merleau-Ponty, 2002)

This is also discussed by Gibson looking at conditions of light and shadow. Every perceptual experience is subjective and has consequence and previous perceptual memories structure experiences had now and in the future.

¹⁴ They are inevitably connected, created by the same line. Rather than the space being considered something 'other,' it is just "the inside of the outside." See Gilles Deleuze, *Foucault*. trans. by Seán Hand. (Minnesota: University of Minnesota Press, 1988)

¹⁵ Virtual space can also be read like this, in relation to what is referred to as 'real' space.

¹⁶ For a comprehensive text on this, see Oliver Grau, *Virtual Art: From Illusion to Immersion*. (MIT Press, 2003)

¹⁷ This is not limited to image based representations but can also take the form of language and the spoken word. In ancient times, oration was a significant skill since it was a means to pass down culture, fantasy and history. Frances Yates describes the process of memorization and its value in *The Art of Memory*, especially in this link between images and language. The Ancient Romans represented mythology and narrative in order to present a set of values and pass down a heritage in much the same way that the Christian church represented the stories of the bible throughout the medieval period, Renaissance and beyond. It was a means of connecting with the subject, immersing them within the respective story and instilling a way of being. Culture influenced the representations, which were meant to influence the constituents, which comes full circle and shapes culture going forward (with slight variations over time, through a questioning of culture and the representation, which cause a cultural evolution).

¹⁸ The importance of narrative and architecture is also evidenced in Victor Hugo's fear of what the printing press would mean for the aesthetic and role of architecture. He famously contemplates the effect of the written word through the line in *Notre-Dame de Paris*: "This will kill that." In other words, he acknowledges the role that architecture has played as a cultural symbol and a means of recording history. The invention of the printing press and the greater accessibility of written text to the people meant that books would then become the primary resource of historical and cultural record, which for him signified the death of architecture- he specifically says that the book will kill the edifice. However, architectural space still today carries the weight of its culture and history. The book did not kill the edifice, it simply provided an alternate mode of representation.

¹⁹ For a comprehensive overview of panorama rotunda spaces, see Stephan Oettermann, *The Panorama: History of a Mass Medium*. (New York: Zone Books, 1997)

²⁰ With regards to technology, some panoramas used rules of optics and physiology of perception in order to create even more convincing representations. They would place the large painted canvases at a specific distance (typically 12 meters) from the viewer where the eyes lose the ability to distinguish depth. This was then coupled with faux terrain elements that created a blending from the physical space into the representational space. There were even rotundas that had rotating viewing platforms that moved imperceptibly around to create a sense of motion. Acoustical elements were also included such as orchestras playing military marches and cannons. While this is an example of a 360° image space, which was a technique used since antiquity, the virtual reality space is not limited to this format. Art, whether visual or otherwise, has been a means of creating new worlds or visions that immerse people. These representations depict aspects of reality and reflect the cultural and social conditions of their respective times.

²¹ It was the time towards the end of the age of Monarchs who funded colonial expeditions in the name of crown, country and religion. In the 1700s, there were several revolutions and rebellions. There was, of course, the American Revolution between 1765 and 1784 and with this the further creation of alliances that bolstered the idea of territory and national borders. By the end of the century and into the next, France was at war with many European nations and Napoleon rose to power.

²² See Oliver Grau, *Virtual Art: From Illusion to Immersion*. (MIT Press, 2003)

²³ More information about the panorama rotundas can be found in chapters 2 and 3 of Grau's *Virtual Art: From Illusion to Immersion* and Oettermann's *The Panorama: History of a Mass Medium*.

²⁴ See Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*. (MIT Press, 1992)

²⁵ While the notion of framing may seem contradictory to produce a VR space, Plat and Squire argue in *The Frame in Classical Art* that Graeco-Roman notions of the frame allow us to examine the applicability of the framework put forward by Derrida, Simmel and Kant (frame defines and creates separation to avoid a dissolution of the art, placing it at a distance from which it can be enjoyed) beyond modern western cultural perspective. This paper also argues that the frame is crucial to the virtual reality (even though it requires dissolution of the self into the space) because an immersion into an experience of space require bounds.

²⁶ See Bettina Bergmann et al. *Roman Frescoes from Boscoreale, The Villa of Publius Synistor in Reality and Virtual Reality*. (The Metropolitan Museum of Art, 2010)

²⁷ See Bettina Bergmann, 'The Roman House as Memory Theater: The House of the Tragic Poet in Pompeii', *The Art Bulletin*, 76.2, (1994) Pg. 225–256.

Techniques of memory can also be found in Frances A. Yates, *The Art of Memory*. (London: Routledge, 2014)

²⁸ See Verity Plat & Michael Squire, *The Frame in Classical Art, A Cultural History*. (Cambridge: Cambridge University Press, 2017)

²⁹ "These paintings speak to us today because they are about experience and perception, and just as Roman inhabitants did, we can place ourselves within their finely crafted illusions. With exposure over time, the painted interior promotes different modes of seeing and of being in space, in this case a space also inhabited by gods." (Bergmann et al., 32)

³⁰ Oliver Grau, *Virtual Art: From Illusion to Immersion*. (MIT Press, 2003) Pg. 141.

³¹ This is supported by both Sartre's ontological dimensions and Merleau-Ponty's analysis of perception. Subjectivity works in a relational way with 'the outside'.

³² There is a reason why current digital VR spaces follow a likeness with reality. If the space is too radically different, our subjectivities will not be able to comprehend the experience. Like language, the shifts need to happen gradually so that there is a point of reference. We can see this in examples like the panorama rotundas that produced 'panorama sickness' since the transition was too dramatic and in the contemporary context, users unfamiliar with VR headsets often times experience disorientation when first trying them. Designers will need to assign parameters that include recognizable indicators from reality in order to have productive spaces of civic engagement.

³³ Some questions include: What are the communities/environments that may be compromised to support this infrastructure? Where will these infrastructures be built? Who might be displaced? What consequences will the construction (like that of any architecture) produce?

³⁴ Platforms like Mona aim to allow for any creator to develop their own world. – This also creates additional questions about the types of metaverse worlds allowed (if they are inclusive or not and does that matter, which the author argues does) and who is making these decisions?

³⁵ Currently, land ownership works in a similar way to 'reality' where a finite amount of digital land has been allocated in order to produce value. However, digital space does not have to operate like this. It doesn't even need to operate in a planimetric way, which is how metaverse spaces like Decentraland or Cryptovoxels work. Parcels of digital land need to be adjacent to one another. This is an interesting design decision given that spaces could

be instead accessed by portals and exist together mapped in a more 4-dimensional way. However, the decision to make it planar more closely resembles mapping techniques that humans have used for centuries, making it easier to understand. Perhaps over time metaverses will incorporate different dimensions of access, which would take us beyond our traditional mapping structures.

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POLITICAL IDEOLOGY-BASED GOVERNMENT POLICIES TO PROMOTE CULTURAL HERITAGE SITES OF RELIGIOUS IMPORTANCE AND USE OF INFORMATION AND COMMUNICATION TECHNOLOGY

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INTRODUCTION

The history of Indian culture is very old. Many invaders ruled the country but the century old civilization and cultural heritage is still inherited in India. Many old cities, places and monuments are still narrating the glory of the rich history of the country. Kashi or Banaras is the oldest cities of India is recently been added in the tentative list of UNESCO world heritage sites. Kashi or Varanasi or Banaras is the city of religious importance and is also recognized for its architectural excellence.

Kashi Vishwanath Temple Corridor project¹ was inaugurated on 8th March 2019 by the Prime Minister of India, Shri Narendra Modi. This project will cost about ₹ 800 crore overall. Political will & motivation plays important role in the protection and safeguarding of the cultural heritage of any country. Public sentiments also play important role in the subject of religious and cultural importance. The land of Varanasi (Kashi) has been the ultimate pilgrimage spot for Hindus for ages. Varanasi has also been a great centre of learning for ages. Varanasi is associated with promotion of spiritualism, mysticism, Sanskrit (old classical language of Southeast Asia), yoga (ancient practice of physical poses, concentration and deep breathing), Hindi language and honoured authors. Mrs. Annie Besant chose Varanasi as the home for her 'Theosophical Society'.



Figure 1. Kashi Vishwanath Temple

1. Kashi Vishwanath Dham Temple Corridor Project, which aims to transform the area around the centuries-old temple in Varanasi with state-of-the-art buildings and provide a clear access to the Ganga.



Figure 2. Kashi Vishwanath Temple

Kashi is mostly famous for the Vishwanath temple. One of the oldest temples of Lord Shiva² is Kashi Vishwanath Temple, situated in Varanasi. The Kashi Vishwanath temple is situated on the bank of river Ganga in Varanasi, Uttar Pradesh. For Hindus, the temple is extremely important since it is one of Lord Shiva's 12 Jyotirlingas. The main deity of this temple is 'Vishweshwara' (lord of the universe) another name of Lord Shiva.

The Jyotirlinga in the temple has a circumference of 90 centimeters with a height of 60 centimeters. The three domes of the temple are surrounded by many other shrines of God. Annapurna (Goddess of food) temple is situated near the Vishwanath temple. It was constructed by Peshwa Bajirao in the 18th century. The Kaal Bhairav temple is also situated near the Vishwanath temple. It is one of the oldest temples of Varanasi whose exact construction date is not known. The temple is located in the congested lane of the Vishwanath Galli located near the Dashashwamedh ghat. Most of the devotees take bath in the holy river Ganga and then move to the temple to worship God. But due to the excessive crowd and lean routes, people found it difficult to visit the temple properly. This led to the idea of reconstruction of the temple premises. On average, the temple receives almost 3000 visitors every day. Every year millions of devotees register their arrival in this temple.



Figure 3.-Kashi Vishwanath Temple

2.Shiva (Siva) is one of the most important gods in the Hindu Pantheon and is considered a member of the holy Trinity (trimurti) of Hinduism with Brahma and Vishnu

The main purpose behind the construction of the Kashi Vishwanath Temple Corridor was to provide the devotees with a convenient way to worship the god. People can now take bath in the holy river and

through a direct route to the temple they can easily worship the god. For the convenience of senior citizens and physically disabled people, an escalator facility is also available. Therefore, people will not have to face the heavy crowd to enter the temple. However, the beauty of the temple is preserved. No tempering is done with the architecture of the temple. The corridor is constructed by keeping the ancient sculptures undisturbed.

The corridor is 50-feet wide going to increase near the Kashi Vishwanath Temple and connect with two ghats of the river Ganga. The Varanasi corridor is located between the Chowk and The Dashashwamedh Ghat in Vishwanath Galli. Makrana marble, Mandana stones, Baleshwar stones, kota granite, and red stones from Chunar, have been used in the construction of the Varanasi corridor. This will transform the area of the temple and pilgrims will no longer need to walk through cramped lanes, often causing crowds, to reach the temple. Kashi Vishwanath Temple Corridor project is built on an area of 5000 hectares and seeks to decongest the area for a better experience for pilgrims. The earlier premises were limited to just around 3,000 square feet.

More than 60 ancient temples have come to the light of the authorities during the clearing work of the Kashi Vishwanath Dham Project. These temples were hidden amongst the residential and commercial buildings of the city which are being cleared under the project. The restoration work will include 3-D mapping, reconstruction of some portions of the temples, and strengthening the present structure of the temples.



Figure 4.- Temple rediscovered during corridor construction



Figure 5.- Temple rediscovered during corridor construction



Figure 6.- Temple rediscovered during corridor construction

A virtual museum-cum-web repository of 60 ancient temples and sculptures found among the buildings acquired for the development of the Kashi Vishwanath Corridor, will be created to preserve and showcase the history and art of these structures and artefacts. This paper analyses the events related to the development and protection of cultural heritage of Kashi, Kashi Vishwanath Temple Corridor Project and use of information and communication technology to preserve and showcase the history of this cultural heritage.



Figure 7.- Reestablishment of Discovered Old Temples from Corridor Site



Figure 8.- Reestablishment of Discovered Old Temples from Corridor Site



Figure 9.- Reestablishment of Discovered Old Temples from Corridor Site

KASHI: AN ANCIENT CITY

Kashi, or Varanasi (also known as Banaras) is one of the oldest living cities in the world. Varanasi's Prominence in Hindu mythology is virtually unrevealed. Mark Twain, the English author, who was enthralled by the legend and sanctity of Banaras, once wrote, "Banaras is older than history, older than tradition, older even than legend and looks twice as old as all of them put together". Kashi is the ancient city of India and is considered among the seven Moksha³ Puris. It is located in the state of Uttar Pradesh on the bank of the holy river Ganga.

1. Moksha in English means salvation. Hindus believe in the doctrine of karma. According to this doctrine, there are four aims in life, namely dharma (duty), Artha (wealth), kama (desire), and moksha (salvation). Each is equally important. But moksha is the ultimate ideal of human life (purushartha).

Kashi is now known by other names like Banaras or Varanasi. Kashi is famous for its rich culture, tradition, and spirituality. The lands of Kashi are considered pure, people believe that dying in the land of Kashi and cremating at the river Ganga will help them to achieve 'Moksha'. In Rigveda,⁴ the collection of Sanskrit hymns was called 'Kashi', that's how the city got its name which depicts the 'city of lights'. The name 'Varanasi' was taken from the river Varuna and Assi ghat. Kashi is famous for its ghats.⁵ Dashashwamedh Ghat, Assi ghat, Harishchandra ghat, Manikarnika ghat, etc are among the famous ghats of Kashi.

Ramnagar fort, Kashi Vishwanath temple, Sankat Mochan temple, Bharat Mata Mandir, Sarnath, TulsiManas Mandir, etc are the famous places visited by the tourists. The famous university, BHU (Banaras Hindu University) is situated in Kashi. Kashi is the land of many famous writers like TulsiDas, Kabir Das, and Ravidas. Other notable artists of Kashi were Bismillah Khan, Girija Devi, Sitara Devi, Lalmani Misra, etc.



Figure 10. -Photographic Overview Of The City

2.This Rigveda is considered to be one of the four sacred Veda texts in Hindu religion. The depth of the texts in the canonical is called the Rigveda Samhita. This is a collection of over a thousand hymns known as suktas and well above ten thousand verses which have been created into ten mandalas or books.

3.Ghats in Varanasi are riverfront steps leading to the banks of the river Ganges. The city has 88 ghats. Most of the ghats are bathing and puja ceremony ghats, while two ghats are used exclusively as cremation sites

BRIEF BACKGROUND OF KASHI VISHWANATH TEMPLE

The Kashi Vishwanath temple was discovered in 1490, according to archives. Many renowned and not-so-famous kings have ruled over Kashi. The Mughals destroyed the temples numerous times. The original temples were reconstructed, then demolished and rebuilt again. At the time of Mughal Emperor Akbar, Raja Man Singh built the temple of Kashi Vishwanath. In 1585, the temple was further built by Raja Todar Mal. This temple was destroyed many times by the Mughal emperor. The last time it was destroyed was by the sixth Mughal Emperor Aurangzeb. He constructed the Gyanvapi mosque at the site of the Vishwanath temple.

When information of Aurangzeb's efforts to destroy the shrine reached him, it is reported that the statue of Shiva was concealed in a well to safeguard it from destruction. The "well of wisdom," as it is known, still remains between the mosque and the temple. The sacred sanctuary is visited by more than 7 million worshippers each year, and the PM Narendra Modi-led government has renovated and adorned it with the Kashi Vishwanath Dham initiative.

The Queen of Indore, Rani Ahilya Bai Holkar, was the last to rebuild and restore the Vishwanath temple to its former splendour. She made an effort and donated the finances to repair the temple. After that, it was managed by the government of Uttar Pradesh in 1983. In 1835, one ton of gold was donated by Maharaja Ranjit Singh, Sikh empire for the plating of the temple's dome. Later, silver was donated to the temple by Raghuji Bhonsle III of Nagpur.

KASHI VISHWANATH TEMPLE CORRIDOR PROJECT

The Kashi Vishwanath Temple Corridor project in Varanasi connects the iconic Kashi Vishwanath temple and the ghats along the river Ganga. The project is aimed at ensuring easy movement of pilgrims and devotees between the ghats and the temple. Earlier, they had to pass through congested streets to reach the temple.

The first phase is spread across an area of about 5 lakh sq. feet and comprises 23 buildings. The first phase of the project, was inaugurated by India's Prime Minister Shri Narendra Modi on 13 December 2021 has been built at a cost of ₹ 339 crore. Over 300 properties have been acquired to implement the grand plan. About 1,400 shopkeepers, tenants and homeowners were rehabilitated, more than 40 ancient temples were rediscovered during the work on the project. They were restored while ensuring there is no change in the original structure.

23 new buildings were also inaugurated in the first phase of the project. This includes several facilities for pilgrims, including 'yatri suvidha kendras', a tourist facilitation centre, vedic kendra, mumukshu bhavan, bhogshala, city museum, viewing gallery, food court among others. The project involved purchase and acquisitions of more than 300 properties around Shri Kashi Vishwanath Temple. The construction work was done without any looseness and thus the project was completed at the estimated time period. The project's formulation and implementation were given to the Kashi Vishwanath Special Area Development Board (KVSADB).

The lightening of the temple adds a different level of beauty to the temple. The blue theme lighting is done in order to keep the heritage of the temple alive. The pilgrims will be able to rest in waiting areas along the corridor. There will be a gallery and an auditorium dedicated to Varanasi's ancient history and culture. For religious functions such as havan, worshippers will find separate Yagyashalas. Priests, volunteers, and pilgrims have their own accommodations.

An information centre located along the corridor to provide tourists with information about the city and other tourist destinations. Tourists will be served delicious Banarasi and Awadhi cuisine on a food street. For meetings, gatherings, and temple events, there is an Auditorium. Tourists can enjoy a clear glimpse of the holy river from the Ganga viewing gallery. A Dev Darshan gallery has built where artefacts and religious objects discovered from the homes of people will be displayed."

Because all of the infrastructures have been built to handle the large footfall of pilgrims, the growth of this corridor is expected to enhance the region's entire economy. For the uninitiated, the temple attracts over 7 million devotees and tourists each year, with over 10,000 local devotees offering daily prayers at the famed Mandir. Around 2.5-3 lakh tourists flock to the temple during the holy month of Shrawan (Rainy Season), whereas the number swells to 4 lakh on Mahashivratri festival. The initiative aims to make it easier for pilgrims and devotees to go between the ghats and the temple.

The architecture is splendid in its symmetry. And in its isolation. There is a 330-metre distance between Lalita Ghat and the temple. That has been redeveloped as a direct corridor between the Ganga and Kashi Vishwanath temple. That's Phase 1 of the project. The key learning from Phase 1 has been that even in a dense urban setting, it is possible to bring about a transformative change. And seemingly impossible logistical challenges can be tackled in a straightforward manner if a problem-solving approach is applied."

International Cooperation and Convention Centre 'Rudraksh'⁶ to facilitate business conferences and tourism in the city. The building has a seating of 1,200 people and is designed like a 'Shivalinga'.⁷ It has 108 Rudrakshas on its facade. With modern facilities like art galleries, multi-purpose pre-function areas, divisible meeting rooms the Centre has grown up to be a major tourist attraction of the city. The well-known heritage places of the city have been installed with 'smart signages' with a Quick Response (QR) code. On a scan, the code will provide a tourist with all the necessary information and history of any particular place. It will also provide further information on the 84 ancient ghats of Varanasi and the

culture that has developed around the sites. To facilitate tourism and ensure safety, the city has also been equipped with 300 CCTV cameras across 720 locations. The stolen statue of Annapurna temple is found on 11 November 2021 after more than 100 years ago from Canada.

1. The Varanasi International Cooperation and Convention Centre, named "Rudraksh", will be the state of the art convention centre in India. With Rudraksh, Varanasi will become a more prominent centre of art, culture and heritage.

2. The Shiva lingam is a representation of the Hindu divinity shiva and is used for worship in temples and homes. In traditional Indian culture the shivalingam is fairly seen as image of the energy and capabilities of Lord Shiva himself.

CHALLENGES IN THE CONSTRUCTION OF CORRIDOR

There were many difficulties in the construction of Kashi Vishwanath Temple Corridor. The major challenge was space. Varanasi is the oldest city with an unplanned locality structure. The congested lanes of the area created many hurdles during the construction work. It was also the main concern that the sewer lines or supply of the electricity is not harmed. Due to the overcrowded population near the temple, it was very difficult to rehabilitate people and property. Another problem was the negotiation; it was not an easy task to convince people to shift. Many buildings belonging to the religious bodies or the owners are not available at the moment. Another challenge was to rebuild the temple premises without affecting its beauty and culture. Besides this construction process, another major concern was that the entry of the devotees should not be interrupted. However, the emergence of the Corona pandemic added another challenge to this task.

OTHER EXPECTED CHANGES AND USE OF INFORMATION AND COMMUNICATION TECHNOLOGY

To boost the tourist attraction in the Kashi, various other plans are also implemented. The Ganga⁸ cruise will be started for tourists. Led screens would be placed everywhere that will represent the art and culture of the Kashi. It will help tourists to understand the history and architecture of the city.

There will be an air-conditioned waiting hall in the Banaras (formerly as Manduadih) railway station. The Vishwanath temple aarti and the Ganga aarti⁹ will be shown on screens throughout the city.

SECOND PHASE OF THE PROJECT

In the second phase, the sewage treatment plant in front of Lalita Ghat¹⁰ will be relocated. New facilities will be created for Manikarnika Ghat, and a café will be added atop Lalita Ghat. There will be no further demolition on site for this project. The remaining work of phase II includes a gate at Jalasen ghat, Ganga viewing gallery with ramp for physically disabled devotees, boundary wall, etc. Phase 2 of the project moves to the other end, the riverside, and will feature a massive jetty station, and 82 sandstone steps leading from the ghat to the corridor entrance. There will also be escalators and a ramp for easy access. Once this phase is complete, devotees can, purportedly like in ancient times, take a dip in the river, and carry holy water to the temple.

1. The Ganges (Ganga) River runs through northern India and is sacred to those who follow Hinduism. The Ganges River originates in the Himalaya Mountains at Gomukh, the terminus of the Gongotri Glacier.

2. *Arti* (also spelled *arati* and *aarti*) is a Hindu ritual performed to express love and gratitude to a god. The term is derived from the Sanskrit word, *aratrika*, which refers to the light that removes *ratri*, or "darkness."

3. The long stretch from Raj Rajeshwari Ghat to Vishnu Ghat is known as Lalita Ghat, and it is dotted with some of the most famous temples in the world. It has been named after the Hindu Goddess Lalita and is revered to be the center of spiritual belief and enlightenment.

Elsewhere in the city, LED screens will display information for tourists, including on the history, architecture, and art of Kashi. The famous Ganga Aarti and the aarti at the Kashi Vishwanath temple will be shown on the screens throughout the city. The Deen Dayal Hastkala Sankul, a trade facilitation centre for weavers, craftsmen, and artisans of Varanasi that was opened in 2017, acts as both a public place and a marketing platform for local artisans. Ganga cruises are planned for tourists, road infrastructure has been upgraded, and the Banaras railway station in the city's Manduadih area has been revamped with the addition of an air-conditioned waiting lounge.

TRAFFIC CONTROL AND TECHNOLOGY

The well-known heritage places of the city have been installed with 'smart signages' with a Quick Response (QR) code. On a scan, the code will provide a tourist with all the necessary information and history of any particular place. It will also provide further information on the 84 ancient ghats of Varanasi and the culture that has developed around the sites. To facilitate tourism and ensure safety, the city has also been equipped with 3,00 CCTV cameras across 720 locations.

CONCLUSION

Kashi Vishwanath Temple Corridor project is a good example of protecting an age-old cultural heritage for the future generation. It is also a good example of blending old with new. In a developing country like India where society is still divided into different economic sections and a large percentage of population is still living below the poverty line in such situation taking such projects and completing them on time is a big challenge. People mostly weight such projects with their usability, monetary benefits and usability. They raise multiple questions. Also shifting people from a place where they are living since so many years and rehabilitation at some other place is another major challenge. At the same time working on a project which has religious angle is another risk which normally specifically in democratic set up do not want to take. It not only a threat for the governments in political contexts but also creates division in the society. Protecting any cultural heritage requires multiple resources, expertise, planning, execution and political will. Protection of a heritage like Kashi Vishwanth Temple is not only protecting old monuments but also it is like protecting old rich heritage but protecting a monument which still have answers of so many answered questions.

NOTES

- ¹ Sudhir Kumar. *Kashi Vishwanath Corridor: Sacred site gets a mega facelift*. Hindustan Times. (2021). <https://www.hindustantimes.com/india-news/kashi-vishwanath-corridor-sacred-site-gets-a-mega-facelift-101639333323745.html>.
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- ⁹ *Arti*. (n.d.). Yogapedia.com. <https://www.yogapedia.com/definition/6604/arti>
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CALLIMACHUS AND THE CORINTHIAN CAPITAL. ANIMATING FRANCESCO DI GIORGIO MARTINI'S INTERPRETATION OF VITRUVIUS 4. 1. 9-10.

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INTRODUCTION

Animation has a long-standing history as a form of communication that can translate abstract or complex concepts into intuitive visualisations. However, these competencies and experience are challenged when animation is asked to communicate the visual content of depicted objects from illuminated codices that document the early stages of modern science, technology, engineering, mathematics, medicine, and architecture. The reason is that the relationship between text and images crafted for practitioners centuries ago needs to be decoded with philological accuracy and encoded into a new medium to communicate to a diversified audience. To accomplish this objective, the research team assembled competencies from fields like codicology, palaeography, history of architecture, and animation.

The interdisciplinary method described in this paper can be adopted by scholars in the humanities and practitioners in animation to map and decode the knowledge embedded in drawings depicted in Renaissance treatises on architecture and science, technology, and medicine manuscripts. The investigation focuses on the visual communication of Callimachus' invention of the Corinthian capital as recorded by Vitruvius (*De Architectura*, 4. 1. 9-10) according to Francesco di Giorgio Martini's visual interpretations in MS Ashburnham 361 (Biblioteca Medicea Laurenziana, Florence, 1479-1481, folio 13 *verso*) and MS Saluzzo 148 (Musei Reali, Biblioteca, Turin, 1481-1486, folio 14 *verso*). The 3D visualisation of the drawings related to the Corinthian capital demonstrated that digital animation could be an effective tool to visually investigate and reverse engineer the creative process of Francesco di Giorgio and produce philologically correct 3D models of the depicted objects. This kind of virtual reconstruction can be displayed on different innovative platforms and contribute to the advancement of learning in the study of Renaissance treatises on civil and military architecture.¹

HISTORY-BASED ANIMATION

The potential for animation to contextualise and disseminate ideas and abstract knowledge has long been documented within the archives of academia. However, the relationship between text and images crafted centuries ago that we can find in Renaissance Manuscripts like Francesco di Giorgio Martini's treatise on Architecture and Military needs to be decoded with philological accuracy encoded into a

new medium to communicate to a diversified audience². With the use of animation, complicated topics and abstract ideas are made easier to understand. In addition, as Roe notes, the "intermediality" of animation and other audio-visual media allows the audience to understand a subject in a more nuanced light while providing an immersive experience concerning the subject matter.³

From scientific to medical films, many examples can be highlighted with different objectives, from educational to propaganda to training, with information embedded within pseudo storytelling to data-driven infomercials where the information is almost dry and devoid of any narrative and entertainment-driven connotation. In the 1965 essay titled, 'Computer Animation: A new Scientific and Educational Tool,' Zajac argues that the educational material that can be produced with animation has the potential to "build into a library for subsequent uses of sorts." By utilising animation, scientists and scholars could communicate directly through the "film medium" in their "native language of mathematics and sciences."⁴

As a scientific communicative tool, Zajac notes that animation has the "great potential" for scientists to communicate with one another and other non-specialists. In addition, animation can help individuals "absorb vast amounts of data"; thus, the audience can "see" the study results instead of perusing complicated papers.

Training type of films is another example of established practice where animation can aggregate information for a specific audience; as a well-known example, we can mention the films that the Walt Disney Studios and the Schlesinger Studios created during WW2 for the USA government. These animations contained "military training materials" that included "schematic explanations on how to use the firearm Boy MK-1 Anti-Tank rifle", from loading/reloading, aiming, unloading, and cleaning.⁵

These films are part of a larger discourse, and the audience addressed plays a significant role in shaping the type of animation produced. For example, in a 2009 study, Riaza Rias notes how animation is part of a more extensive multimedia learning aid that "enables individuals to memorise concepts leading to an increased clarity".⁶ In 2017, Chris McGillion led a team of animators from the Charles Sturt University of Australia to produce an animated video to help disseminate agricultural knowledge to subsistence labourers in Timor-Leste. McGillion argued that because of the low literacy rate in Timor-Leste within the subsistence farmers' community, textual resources and similar knowledge might not be the most efficient way to inform farmers on high-yielding agricultural practices.⁷

The examples above rely heavily on the established theories and practices to produce an animation that helps contextualise and present abstract ideas and critical information to a wide range of audiences.

"Animated-Documentary" and "History-Driven Animation" are among the most innovative emerging fields in contemporary global communication. By the general trend in our societies toward an ideal of dynamic and increasingly specialised knowledge. Both animated documentary and history-driven animation can bridge linguistic, cultural and age boundaries due to the versatility of their "language", making it a potent vehicle for disseminating complex contents. The difference is that the former is narrative-laden, while historical sources drive the latter as its primary impetus. The idea of "inform-animation" is an opportunity and potential research area and application for animators and communication designers. Animation is a versatile communication tool for anyone in need of efficiently conveying complex and structured content.

We can argue that if animation relies on primary historical sources to objectively present historical and scientific data, it can be classified as 'History-Driven Animation.' Theoretically, this subgenre is typically devoid of a traditional "storyline" instead of other animation types that centre around a linear narrative. The primary and historical sources used in these animations become the main driving force of its final product and content. Due to the nature of its "language," History-Driven Animation have the potential to bridge textual, ethnic, and age boundaries, thus making it an effective medium for disseminating historical content that would otherwise be too convoluted in print format. As noted by

Wells, this “history-driven animation” should be defined by a “visual, technical and subject-oriented consistency.” It “recognises certain visual and iconography” that serve as “key signifiers of an implied common language shared by the creator and their audience, which in turn defines the cinematic construction” of the historical text. These historical contexts and facts comprise the “mode of order and integration and may be recognised as the determining factor maintaining the core historical narrative.” Most importantly, “history-driven animation” as a sub-genre can invite “traditional models but encourages re-definition through pastiche, exaggeration and intertextual play”.⁸ This framework can identify History-Driven animation as a subgenre that is not constrained by a “linear narrative” or “story arc” but instead focuses on bridging the gap between the philological and the visual representation of historical data interdisciplinary level.⁹

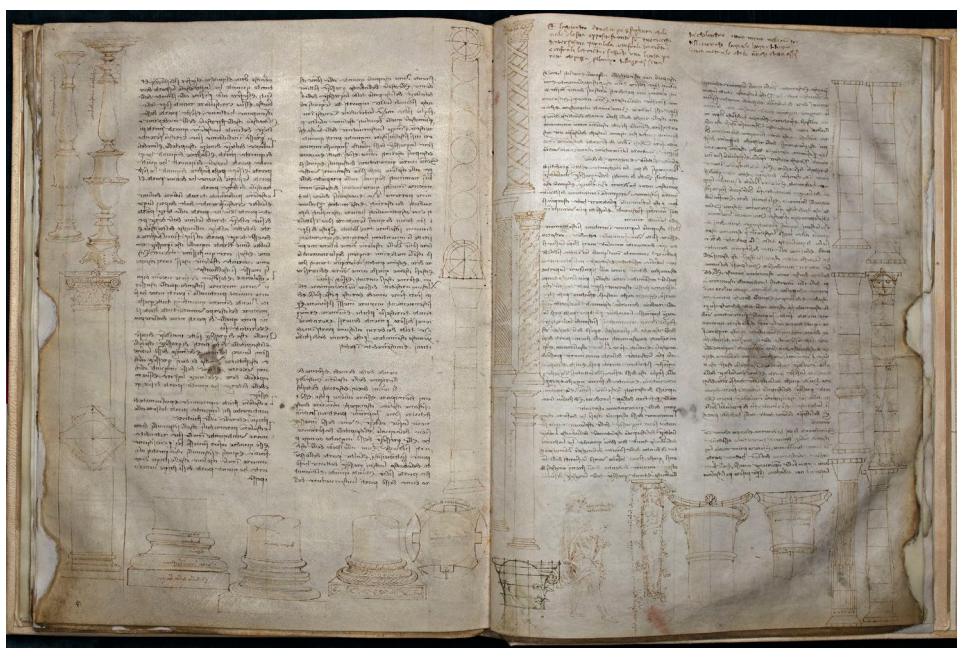


Figure 1. Folium 13V-14R

The subsequent section will discuss the interdisciplinary research to study the fifteenth-century renaissance manuscript (Francesco di Giorgio Martini's MS Ashb. 361 (ca 1479-1481 CE) on folio 13 verso fig1 and the visual elements embedded within the text to produce a short video.

The virtual reconstruction of the depicted objects in the manuscript complements the virtual critical edition of the Francesco di Giorgio Martini treatise on civil and military engineering. The website that houses the virtual reconstruction is an ongoing research project and involves multiple international and multidisciplinary collaborations with the mission to deliver historical knowledge virtually with interactive applications.

VISUALISATION TECHNIQUES FOR THE STUDY OF FRANCESCO DI GIORGIO MARTINI'S INTERPRETATION OF VITRUVIUS 4. 1. 9-10

The illuminated manuscript of Francesco di Giorgio Martini's Treatise on Architecture, preserved at the Laurentian Library in Florence, has been digitally reproduced at high resolution to appreciate the extensive iconographic apparatus accompanying the text in its first version. In writing this work, Francesco di Giorgio Martini interprets and translates into Italian (vernacular) parts of Vitruvius' treatise *De Architectura* written around 30 B.C. and dedicated to Octavian Augustus, the future emperor of Rome. The sources of Greek literature are thus very close to the Roman author and are taken up in various parts of the treatise that inspired Francesco di Giorgio's Architecture. In the treatment of the

classical architectural orders, these references are explicit in the text and in the intentions of the figures that illustrate it, particularly the story of the invention of the Corinthian order by the Greek sculptor Callimachus.

By observing the drawings accompanying the text, however, one notices vague contaminations between the orders that later critics classified as Corinthian and Composite. In drafting these drawings, Francesco di Giorgio (or the illuminator who edited the copy of our manuscript under his supervision) probably refers to examples of classical architectural fragments that could be seen in various reuses of ancient architectural materials in medieval churches or buildings in Tuscany, Umbria and Lazio¹⁰.

When adequately conceived, the philologically accurate 3D models made from the drawings have the potential to aid in the analysis of depicted artefacts in the Renaissance treaties on architecture and engineering; to provide scholars of the Humanities and the animation field with a design process to understand the visual detail and the embodied in texts connection. However, in practice, this paper will demonstrate that this design process is much more complex than one could anticipate as the competencies of experts from various fields to analyse the narrative of the birth of the Corinthian capital architectural order described in the text.

Before modelling the 3D elements, it is crucial to grasp the narrative behind the designs. The ultimate goal is not to extrapolate a realistic image of the capital but to extrapolate the information hidden in the drawing and, at the same time to remain faithful to the manuscript iconographic representation. One important decision was on how far the reconstruction representation should go in creating a 3D model; do we recreate an actual real object or omit details that are not there but are somehow implicit for a trained eye? The intervention of an expert familiar with classical architectural orders is fundamental in helping to establish the starting parameters on which to build a proper methodology.

The team has broken down the process of creating a philologically correct digital visualisation of these drawings into five main steps:

- Visual translation
- Visualisation of the decomposition
- Non-Photorealistic Rendering
- 3D visualisation
- Short, animated video

The short film focuses on five designs at the bottom of Folium 13 and the text that describes these drawings. Based on Martini's text, the Corinthian order is an imitation of the slenderness of a maiden. The lady's figure depicts the column in the drawings, and the lady is drawn inside a basket surrounded by leaves. The original story describes the burial of a maiden where a vase (calathus) containing offering was placed over the tomb and covered with a tile. A plant of Acanthus grew under, wrapping the vase with his leaves. Callimachus, the architect who, according to tradition, designed the Corinthian capitals, was inspired by what he saw. There is a difference in the textual description from the original Vitruvian text: Vitruvius describes the leaves growing around the vase; Martini's translation results in the leaves coming up from the capital; hence, he draws the Acanthus leaves growing between the Abacus and the 'Ovolo and associates the leaves with the Volute.

The team had to examine existing architectural elements and break down the different parts composing Corinthian and Composite capitals, exemplifying the proportions between the various aspects. These proportions can be found in the description of the ideal Corinthian Order in the text associating the proportions of a Human head with the different elements.

The team looked at the architectural elements that are still extant and used them as a reference. For example, we examined capitals close to the time of Vitruvius's descriptions and then looked at aspects of architectural reuse in churches, Renaissance buildings, or elements that Martini and his disciples designed.

The animators considered the visual and textual description to give a dimensional view of an axonometric drawing and used non-photorealistic rendering based on the drawing in Ashb.361. The final 3D models were done using Maya and Zbrush and rendered non-photo realistically to mimic the manuscript drawings with a rendering software developed in Singapore.¹¹

For the final rendering, a very long lens of 150mm was used so that the rendering perspective is flattered to approximate the design further.

A short animation was created to show how the different elements can be separated and assembled. The downfall of this approach was that, for a non-scholar, this visualisation could be misleading as these elements were carved from a single piece of stone and not made of different parts and then plastered together. If correctly executed, 3D visualisation and digital animation become an effective tool to reverse engineer the architect's creative process. For instance, the *campana* is shaped as a cup instead of a vase, bell or “basket” described in the Vitruvius. The embellishments in-between the Abacus and the *campana* are not typical features of the Corinthian capital.

Furthermore, the ovolo/voluta proportions must follow the golden ratio. This level of detail is essential to produce philologically accurate models; classical architecture adhered to a strict proportion and system when carving the Corinthian capital from a single piece of material. User interpretation falls short without the proper knowledge and contextual information necessary to reproduce the drawings located within the manuscript.

Grey notes that “the founding theory of drawn pre-visualisation accompanied by processing persists even in entirely interactive mediums”.¹² In other words, the well-established animation pipeline (concept and storyboard production) still exists. It should be a fundamental practice in producing all animation types, primarily when one must deliver structured information that requires the marriage of different disciplines. Hence, storyboards were created based on the text in Martini’s Trattato (translation by John Melville Jones; for a diplomatic transcription, refer to Marani 1979, 115).¹³ These storyboards also gave direction for the short-form animated video. The storyboard was done to explain the drawings located within the Vitruvius by carefully selecting each drawing to explain the historical context behind each illustration.

The research team has collated, analysed, and compared different sources of information, drawing from all the other competencies and created the final video shared on the EHM web page.

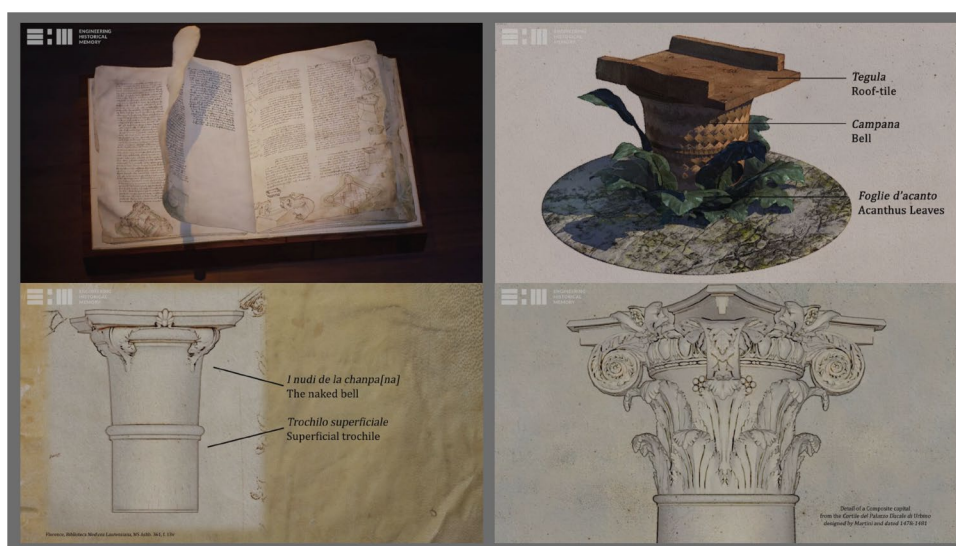


Figure 2. Frames from the final video

CONCLUSION

The research team has collated, analysed, and compared different sources of information, drawing from all the other competencies and creating a video shared on the EHM web page. This methodology can contribute to the advancement of learning in the study of Renaissance treatises on civil and military architecture.

Visualisation techniques to empower the study of depicted objects in Renaissance codexes/treaties on architecture and engineering can be adopted by humanities scholars and practitioners in animation to map and decode visual information and knowledge embodied in manuscripts.

In describing our process, we have highlighted how the dialogue between the codicology experts, architecture history, and animation is necessary for the successful conclusion of this interdisciplinary research. The animator needs to have a basic knowledge of architectural history and a rich repertoire of suitable reference images to understand and adequately render the drawings. These drawings are more than a simple diagram and exist together with the text for a specialised audience. Through a lengthy translation and connection of textual and visual, the researchers found the need to fill a "cultural gap," i.e., the repertoire of figurative archetypes hidden in the expert's mind and formed from study and experience. As animators can turn to references and materials readily available on the world wide web, they still need to grasp the "hidden" parts of the drawings. As the project's various attempts demonstrate, many trials and errors were required before a satisfactory result could be reached, from understanding the primary volumes of the classic architectural orders to unfolding the storytelling embedded in the figures at the bottom of Folium 13. It can be argued that transferring visual knowledge to different experts is a common problem that affects many fields dealing with visual communication and information. The recipient's knowledge, bias, and expertise drive how one image can be interpreted. The paper concludes by unfolding the final goal derived from analysing the 2D iconographic elements and the textual information. All the parts are coherently presented in an assembled video showing philologically correct narratives and 3D accurate reconstruction of the architectural aspects described by Francesco di Giorgio Martini.

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NOTES

¹ See Andrea Nanetti, Davide Benvenuti, Matteo Bigongiari, and Khoi N. Vu, "Francesco di Giorgio Martini's Treatise I on Civil and Military Architecture (1479-1481 CE)," in *Engineering Historical Memory* (October 2020), <https://engineeringhistoricalmemory.com/FGM.php>.

² See Jessabel Teng, Davide Benvenuti, and Andrea Nanetti, "Animation Solutions for the Exploration of Science, Technology and Medicine manuscripts. The Corinthian Capital in Francesco di Giorgio Martini's Treatise on Architecture (First Version, 1475-1480) as a Showcase," 32nd Annual Conference of the Society for Animation Studies *Animate Energies* (USA, New Orleans, online, 15 June 2021), <https://ehm-video.s3.ap-southeast-1.amazonaws.com/VIDEO+SAS+conference+video.mp4>.

³ See Annabelle H. Roe, *Animated Documentary* (Houndmills, Basingstoke, Hampshire: Palgrave Macmillan, 2013).

⁴ See Edward E. Zajac, "Computer Animation: A New Scientific and Educational Tool," *Journal of the SMPTE* 74, no. 11 (November 1965): 1006-1008, <https://doi.org/10.5594/j05978>.

⁵ See Nicolò Ceccarelli, "Historical Perspective of Animation in Documentary Film," in *I.P. InformAanimation 2011: research, education and design experiences*, ed. Carlo Tuni (Milano: FrancoAngeli, 2012), 118-123.

⁶ See Riaza Perveen Mohd Rias, and Halimah Badioze Zaman, "Using 3-D Animation in Multimedia Learning for Memory Management Concepts," in *Proceedings of the 2009 International Conference on Signal Processing Systems (15-17 May 2009, Singapore)* (Los Alamitos, CA: IEEE Computer Society, 2009), 748-753, <https://doi.org/10.1109/icsps.2009.145>.

⁷ See Chris McGillion, "Animation as a Science Communication Tool in Timor-Leste," *Science Communication* 39, no. 2 (2017): 278-285, <https://doi.org/10.1177/1075547017696164>.

⁸ See Paul Wells, *Animation: Genre and Authorship* (London, UK: Wallflower, 2007).

⁹ See Mahpuz, and Hariman Bahtiar, "Visualization of the Traditional House Architecture of Belek Sembalun Lawang Village by Using 3D Animation," *Journal of Physics: Conference Series* 1539, no. 1 (The 5th Hamzanwadi International Conference of Technology and Education, 5-6 October 2019, Lombok, Indonesia) (2020): 2-5, <https://iopscience.iop.org/article/10.1088/1742-6596/1539/1/012021>.

¹⁰ See Andrea Nanetti, Davide Benvenuti, Matteo Bigongiari, Zaqeer Radzi, and Stefano Bertocci, "Animation for the Study of Renaissance Treatises on Architecture. Francesco di Giorgio Martini's Corinthian Capital as a Showcase," *SCIRES-IT (SCientific REsearch and Information Technology)* 10, no. 2 (December 2020): 19-36, <http://www.sciresit.it/article/view/13390/0>.

¹¹ See Santiago E. Montesdeoca, Hock Soon Seah, Hans-Martin Rall, and Davide Benvenuti, "Art-directed watercolor stylization of 3D animations in real-time," *Computers & Graphics* 65 (2017): 60-72, <https://doi.org/10.1016/j.cag.2017.03.002>.

¹² See Gray Hodgkinson, "Symbolism and the Unreality of Animation," *CONFIA 2020. 8th International Conference on Illustration and Animation (23-24 October 2020)*, (Barcelos, Portugal: Instituto Politécnico do Cávado e do Ave, 2020), 139-145.

¹³ Gray Hodgkinson.

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A SHARED TERMINOLOGY FOR HYPOTHETICAL 3D DIGITAL RECONSTRUCTIONS IN THE FIELD OF CULTURAL HERITAGE

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INTRODUCTION

Working in synergy with experts coming not only from different fields (computer scientists, archaeologists, historians...), but also from different countries, thus speaking a variety of languages, is very often essential in the field of digital 3D reconstructions for cultural heritage, for heuristic rather than entertainment purposes.

This inevitably leads to the comparison of different methods and workflows, each of which is based on its own terminology. Therefore, comparing the terms that are used, following their evolution and, to some extent, attempting to standardise them is a prerequisite for making the reconstruction as objective and reproducible as possible, qualities that are of prime importance especially when the goal is the publication of results in online platforms, so that they are accessible and comprehensible to a wide audience of interested users.

Terminology is only one of the open problems in the field of digital 3D reconstructions, which, as is well known, also faces issues related, for instance, to different software and file formats, or even to data storage and to the platforms used to share them.

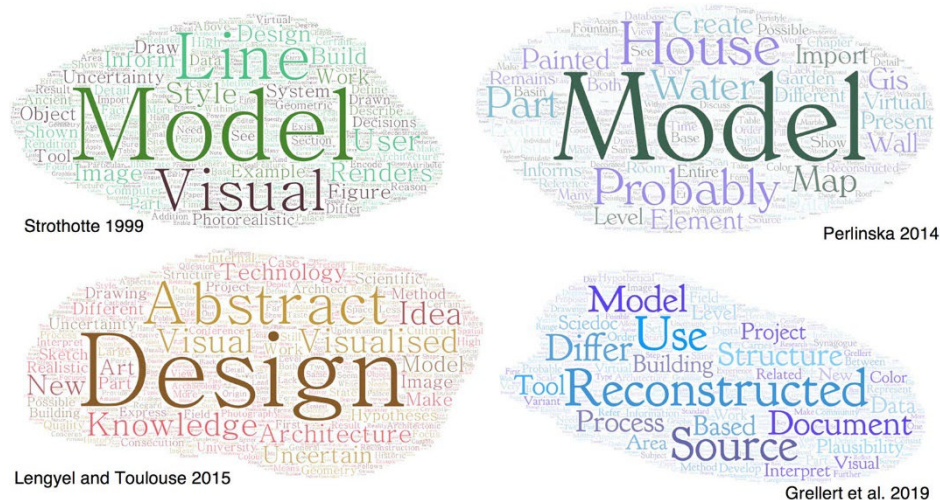
These problems, however, can hardly be tackled without a shared terminology and methodology, which should be the basis of any 3D digital reconstruction used to disseminate (and potentially enrich with new discoveries) cultural heritage, especially when it comes to hypothetical reconstructions of artefacts that have been destroyed or have never been built.

In this case, the dialogue between experts is a central element and it is therefore clear why, first of all, it is necessary to agree on the terms that are used. This study aims to analyse some of the most frequent ones in this sense, especially those relating to the certainty and reliability of a reconstruction, whose data model becomes a social and cultural object that we cannot ignore.

FREQUENCY AND CLASSIFICATION

In this framework, an analysis was conducted on 27 papers¹ concerning hypothetical digital 3D reconstructions, published over a period of 25 years, from 1994 to 2019. For each of them, a word cloud was created (fig. 1) based on the frequency of the words themselves, resulting in a series of values that were then reported in a spreadsheet and from which some graphs were created. Compared to the initial word clouds, at this stage we did not focus so much on words whose high recurrence was almost predictable (trivially “model”, “line”, “design”, “reconstruction”) and which do not really lead us to

It is evident that the frequency of these terms is a value to be taken into account for the drafting of a shared terminology that fosters dialogue between the experts involved in the reconstruction. However, this remains an abstract value and tells us nothing about the use that is made of a term within a text. Furthermore, the papers considered are written in different languages: most of those in fig. 3 are in English, but there is also one in French³ and one in German⁴. The terms analysed in the case of these two languages are as follows: *incertitude*, *crédibilité*, *probabilité* for the former document; *Unsicherheit*, *Glaubwürdigkeit*, *Wahrscheinlichkeit* for the latter. They translate “uncertainty”, “credibility”, “probability” to the extent that a translation can maintain the original meaning of a word. For this reason, it is necessary to go a step further and connect the examined documents according to certain dominant macro-themes. Six main areas have been identified: “virtual archaeology”, “model/visualisation”, “documentation”, “authenticity”, “uncertainty”, “cultural heritage”.



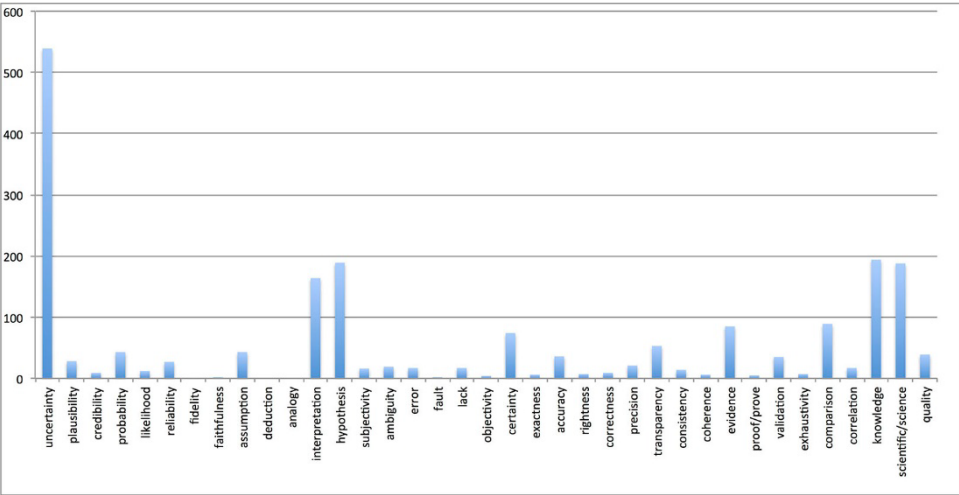


Figure 2. Frequency in the use of words related to the critique of hypothetical reconstructions in 27 representative papers published from 1994 to 2019. © Irene Cazzaro.

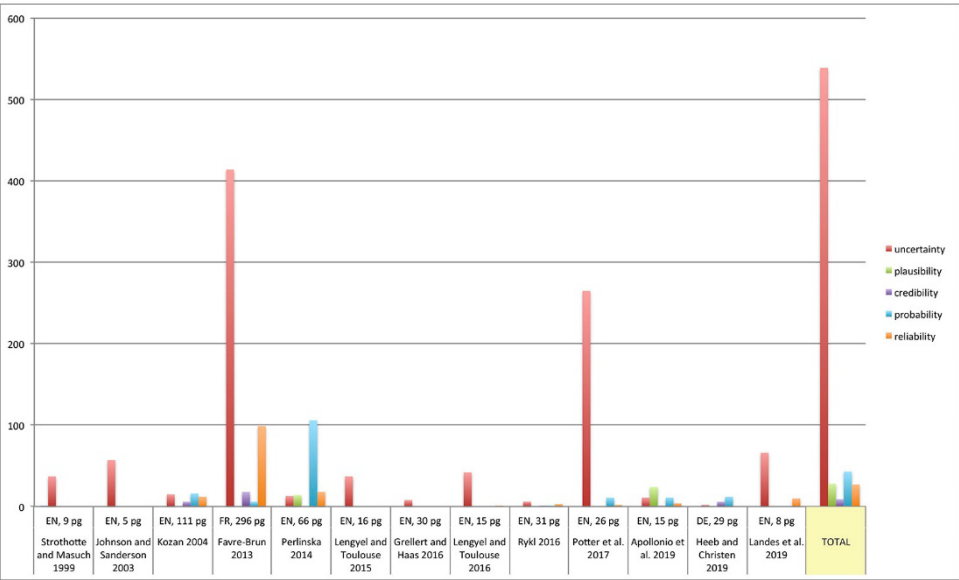


Figure 3. Frequency in the use of words related to certainty in hypothetical reconstructions in 13 representative papers published from 1994 to 2019. © Irene Cazzaro.

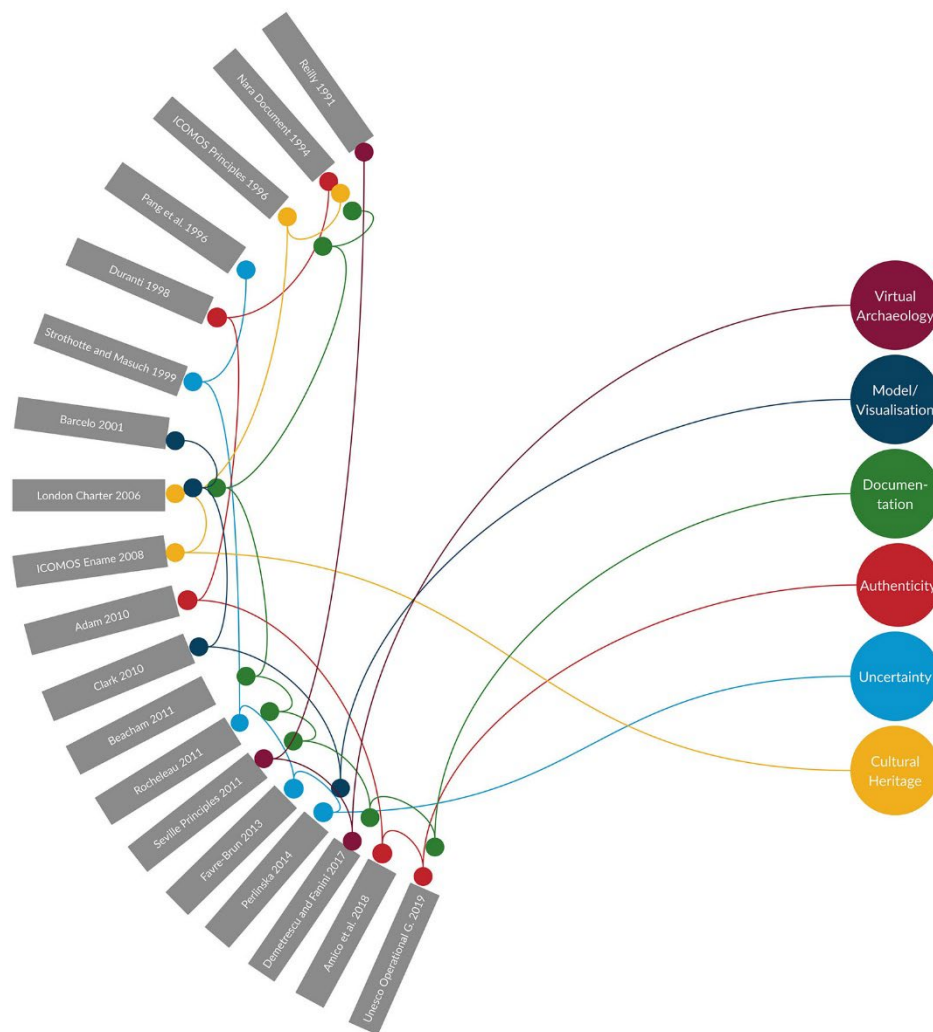


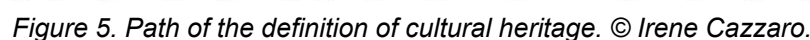
Figure 4. Classification of the papers according to six dominant macro-themes. Compared to those indicated above, the paper by Reilly [1991], important for the definition of virtual archaeology, has been added. © Irene Cazzaro.

PATHS: THREE EXAMPLES

Cultural heritage

Following the path related to the definitions of “cultural heritage” (fig. 5), we can see how they are connected to those of “sources of information (or research)”, “conservation”, “transparency”. In this context, the Icomos and Unesco papers are relevant because, focusing on the conservation of cultural heritage, they also give definitions of specific terms, as we can see for example in the *Nara Document* (1994)⁵ – concerning physical heritage rather than digital models – which defines “conservation” as «all efforts designed to understand cultural heritage» and «ensure its material safeguard». It also defines “information sources” as a list of all the different types of sources that bring knowledge to cultural heritage. The *Icomos Principles for Documenting Monuments, Groups of Buildings and Sites* (1996)⁶ provide definitions regarding other related concepts, such as “recording” understood as the «capture of information which describes the physical configuration, condition and use of monuments, groups of buildings and sites», thus quoting the definition of cultural heritage given in the *Nara Document* and, before that, in the *Unesco World Heritage Convention* (1972),⁷ but now including «tangible as well as intangible evidence». Consequently, documentation can contribute to «the understanding of the heritage

The *Principles of Seville* (2011)¹¹ then specifically apply the guidelines established by the London Charter to the field of archaeology, therefore, instead of generally talking about “cultural heritage”, they focus in particular on “archaeological heritage” (*patrimonio arqueológico*) defined as «the set of tangible assets, both movable and immovable, irrespective of whether they have been extracted or not [...] which together with their context [...] serve as a historical source of knowledge on the history of humankind».



The term “authenticity” (fig. 6) also appears mainly in the Icomos and Unesco documents, which evaluate it as the «degree to which information sources may be understood as credible or truthful»,¹² this definition is also part of the *Unesco Operational Guidelines for the Implementation of the World Heritage Convention* starting from the 2005¹³ version. More specific definitions of “authenticity” can be found in the field of archival studies, which distinguish legal, diplomatic and historical authenticity.¹⁴ However, it is recommended to use the word “faithful” instead of “authentic” in relation to digital objects or physical replicas, which are never original and unique, but always copies that can be replicated and modified.¹⁵

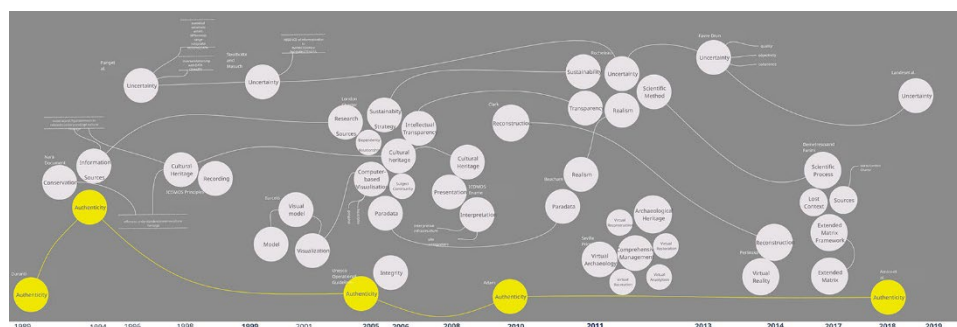


Figure 6. Path of the definition of authenticity. © Irene Cazzaro.

Uncertainty

The path corresponding to the definitions of “uncertainty” (fig. 7) starts from the article by Taylor and Kuyatt,¹⁶ who give a definition related to that of measurement error in physics, having a random and a systematic component: the difference between “error” and “uncertainty” lies in the fact that, in the second case, it is not necessary to know the real value of a quantity. Pang et al.¹⁷ take up this definition and propose some scientific views. Two years later, Gershon¹⁸ inserts “uncertainty” into the broader concept of “imperfection”, which also includes “incompleteness”: with respect to the latter, which refers to a lack of information, in the case of “uncertainty” the information is known, but the user is not sure. Turning to studies directly related to 3D digital reconstructions, Strothotte et al.¹⁹ take up Gershon's terms, but change their hierarchy: this time “imprecision” and “incompleteness” are both part of the more general category of “uncertainty”, defined as the – at least partial – absence of information. Kensek et al.²⁰ refer to “ambiguity, evidence and alternatives” for the analysis of ancient, historical and no longer existing sites, thus highlighting the lack of terminological uniformity. The authors themselves initially speak of the “uncertainty level” of a reconstruction, while later they cite tools to indicate the “types of reliability”. The absence of a declaration on the “level of uncertainty” of a model is listed, according to Blaise and Dudek,²¹ among the limits of its credibility, together with the lack of connection to documentary sources and of dynamic updates as new information elements are collected. A correspondence with similar terms is also established by Rocheleau,²² who links “transparency” (*transparence*) and “intellectual honesty” (*honnêteté intellectuelle*) to “uncertainty” (*incertitude*), inserting the latter among the five rules proposed for obtaining scientific digital reconstructions. Different types of uncertainty have been traced by Favre-Brun,²³ who identifies three main categories related to the quality of information (*qualité de l'information*), its coherence (*cohérence*) and its objectivity (*objectivité*). However, the use of these terms is still under discussion and, according to Perlinska,²⁴ “uncertainty” is «a misleading word», since it refers to our subjective evaluation. “Plausibility” would be the most suitable word, since it «states the possibility of an event to occur» even if it is impossible to mathematically calculate its “probability”. However, at the end she decides to use the word “probability” because, according to her analysis, it turns out to be more frequent. As far as our study is concerned, however, we have seen in the previous tables that “uncertainty” seems to be the most used word in relation to this context: this fact motivates our choice. Even in more recent works, expressions such as “uncertainty” and “uncertain knowledge” are taken into consideration to refer to that state «between knowledge on one hand and lack of knowledge on the other hand»,²⁵ or to the result of missing data²⁶ that cannot be «defined, quantified and expressed with the help of statistical measures».²⁷

In addition to the path of the term “uncertainty”, we also followed that of its representation by means of colour scales in the models relating to hypothetical reconstructions. We can see that it is not always possible to directly compare scales segmented in different ways and terms in different languages

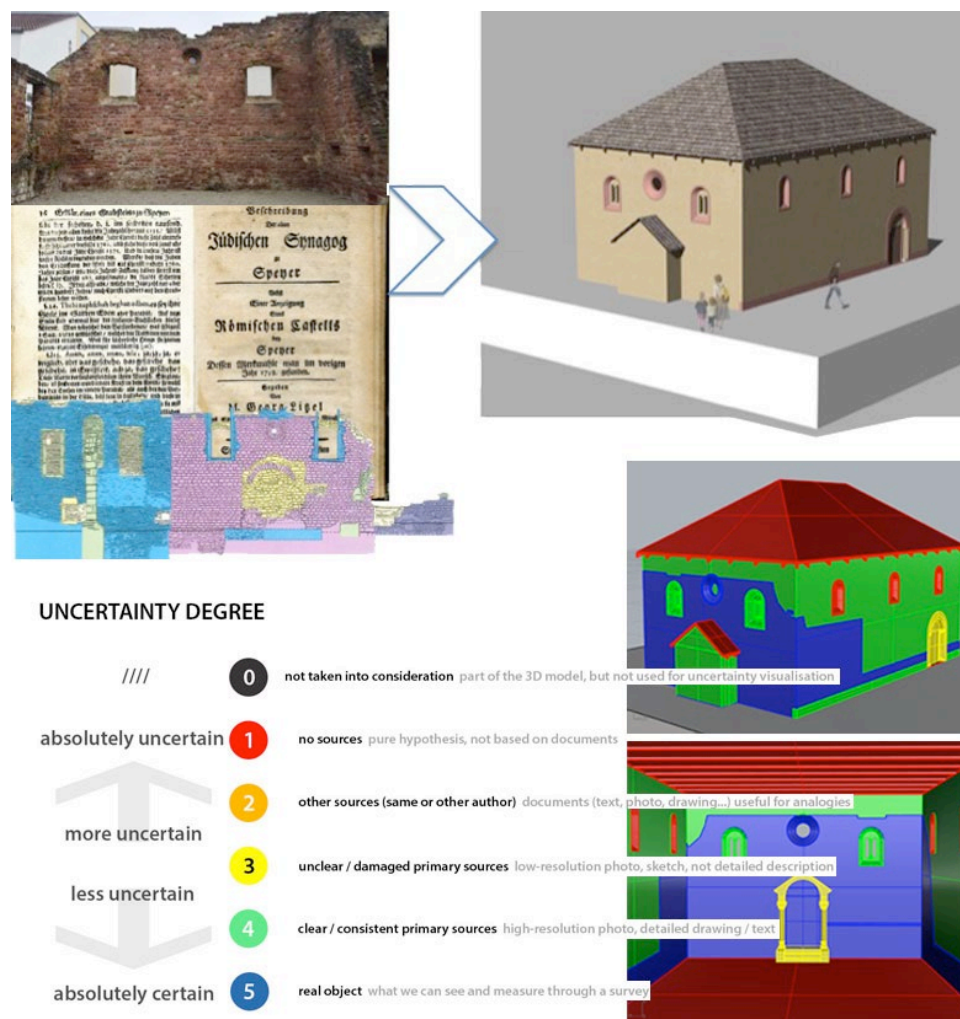


Figure 9. Some of the steps that led to the creation of the source-based 3D model of the medieval synagogue in Speyer. The reconstruction is mainly based on pictures, written descriptions and archaeological reports. Different people were involved in this work, thus a standardisation in both terminology and workflow was necessary. An uncertainty scale, based on the operations made to reconstruct each element of the building, was proposed and tested on models created with different software. The one in this picture was created with Rhinoceros and the information about uncertainty was added in different layers, one for each degree from 0 to 5. © Irene Cazzaro.

An example is the source-based hypothetical reconstruction of the medieval synagogue in Speyer (Germany),²⁸ a building now in ruin. This reconstruction was mainly based on pictures, written descriptions and archaeological reports. After defining a common terminology and sharing all the available sources among the participants in the project, a methodology was set up with a focus on the definition of a hierarchy of elements, as well as on the documentation of each one of them and of the process that led to its creation. An uncertainty scale was proposed and tested on the model (Fig. 9). It is based on the operations made to reconstruct each element of the building, according to this classification:

- Still existing parts that are digitally reconstructed by survey and physical analysis;
- Missing elements reconstructed by deduction, because they should be similar to the existing ones or they are mentioned in documents directly referring to the building (for instance texts, drawings, photos);
- Missing elements reconstructed by analogy starting from other structures of the same historical period;

- Missing elements reconstructed by hypothesis, because there are no available sources for them.

An extra level was then added to identify the elements that were not taken into consideration for the uncertainty estimation: this is the case, for example, of the terrain where the model is situated. A colour and a number in a scale from 0 to 5 were associated to each uncertainty level. The synagogue was modelled using different kinds of software, thus the information about uncertainty was added according to the possibilities offered by each one of them: in some cases, the colour was implemented in the visualisation and the number in the attributes of the various elements; in other cases, different layers were used to refer to these uncertainty levels. The reconstruction of each element was also documented through screenshots and written descriptions: this information was collected in tables that were uploaded to the online platform together with the model itself.

CONCLUSION

The studies on terminology aim to foster dialogue between creators (but also users) of digital 3D models for cultural heritage, especially in view of their publication on online platforms. It is indeed of vital importance to indicate all the choices that are made and the sources that are taken into account, as well as the level of “uncertainty” (using the most frequent term) of each of them, in order to obtain a reconstruction that can be used in a “scientific” way: this documentation and the data model that the reconstruction must bring with it should be based on a shared terminology or, at any rate, on conscious choices.

As far as uncertainty – one of the most discussed terms – is concerned, an accurate definition of it and an analysis of its different segmentations into levels over time ideally aims to arrive at a standard or at least a clear classification with as little ambiguity as possible, so that it can be applied on a large scale in online platforms with 3D viewers (as in the examples in Fig. 10). This would help to keep track of a hypothetical reconstruction process, thus based not only on physical remains (sometimes unavailable), but also and above all on documents that have a different degree of detail and may require more or less interpretation. The use of a shared terminology and methodology is fundamental in this process of declaring which decisions we make and how sure we are of them: ultimately, this would lead us to distance ourselves from reconstructions that are used purely for entertainment purposes and that often represent a perfect, closed and indubitable reality.

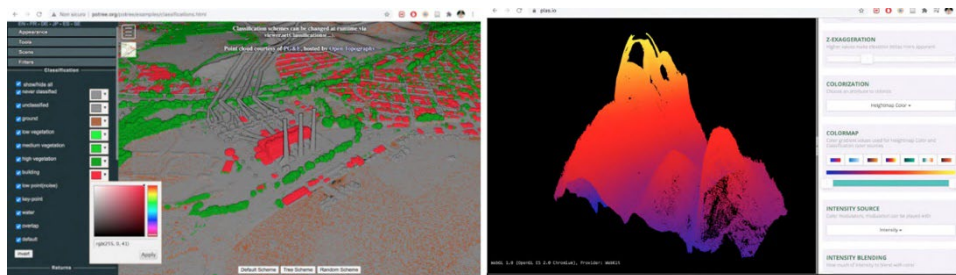


Figure 10. Examples of applying colour scales to models displayed online: in the example on the left (<http://potree.org/potree/examples/classifications.html> consulted on 04.03.2022) different colours (which can be changed by the user) are assigned to the different elements that make up the model (roads, buildings, vegetation...); in the example on the right (<https://plas.io/> consulted on 04.03.2022) a gradient (therefore not exactly a scale composed of defined levels) indicates the height of the different points of a surface. Similarly, also for the representation of uncertainty one could think of a colour scale corresponding to a number of values of a parameter assigned to each element that is considered.

NOTES

¹ The 27 papers considered in the initial analysis (reported in full in the bibliography) and the 13 of them relating to uncertainty (indicated here with an asterisk) are the following: Strothotte et al. 1999*; Johnson and Sanderson 2003*; Kozan 2004*; Kensek 2007; Gooding 2010; López-Menchero Bendicho and Grande 2011; Potter et al. 2012*; Dell'Unto et al. 2013; Dufaÿ and Mora 2013; Favre-Brun 2013*; Perlinska 2014*; Resco 2014; Quattrini and Baleani 2015; Apollonio 2015; Lengyel and Toulouse 2015*; Apollonio 2016; Chandler and Polkinghorne 2016; Grellert and Haas 2016*; Jahn et al. 2016; Lengyel and Toulouse 2016*; Messemer 2016; Rykl 2016*; Ortiz-Cordero et al. 2018; Lercari 2017; Grellert et al. 2019*; Heeb and Christen 2019*; Landes et al. 2019*.

² It should be noted that we decided to use the term “reconstruction” based on the high frequency in the occurrence of the word rather than on its appropriateness. It is clear that we are “always constructing models, whether visual, verbal, or some other type, which are tools for understanding, not statements of reality” (Clark 2010), thus “construction” would be a more suitable word with respect to “reconstruction”. However, “reconstruction” is far more used and it has become a standard in the field of digital 3D models.

³ Aurélie Favre-Brun, “Architecture virtuelle et représentation de l'incertitude: analyse des solutions de visualisation de la représentation 3D. Application à l'église de La Chartreuse de Villeneuve-Lez-Avignon (Gard) et à l'abbaye Saint-Michel de Cuxa (Pyrénées-Orientales)” (PhD thesis, Université d'Aix-Marseille, 2013).

⁴ Niklaus Heeb and Jonas Christen, ‘Strategien Zur Vermittlung von Fakt, Hypothese Und Fiktion in Der Digitalen Architektur-Rekonstruktion’, in *Der Modelle Tugend 2.0*, 2019, 226–54.

⁵ See <https://www.icomos.org/charters/nara-e.pdf> (accessed 30.07.2022).

⁶ See <https://www.icomos.org/charters/archives-e.pdf> (accessed 30.07.2022).

⁷ See <https://whc.unesco.org/archive/convention-en.pdf> and the operational guidelines for its implementation that have been developed in the following years: <https://whc.unesco.org/en/guidelines/> (accessed 30.07.2022).

⁸ See <https://unesdoc.unesco.org/ark:/48223/pf0000179529> (accessed 30.07.2022).

⁹ See <https://www.londoncharter.org/> (accessed 30.07.2022).

¹⁰ See http://icip.icomos.org/downloads/ICOMOS_Interpretation_Charter_ENG_04_10_08.pdf (accessed 30.07.2022).

¹¹ See <http://sevilleprinciples.com/> (accessed 30.07.2022).

¹² *The Nara Document*, <https://www.icomos.org/charters/nara-e.pdf> (accessed 30.07.2022).

¹³ We refer to the following version: <https://whc.unesco.org/archive/opguide05-en.pdf> (accessed 30.07.2022).

¹⁴ Luciana Duranti, ‘Diplomatics: New Uses for an Old Science’, *Archiviaria*, no. 28 (1989): 7–27; Sharon Adam, ‘Preserving Authenticity in the Digital Age’, *Library Hi Tech* 28, no. 4 (November 2010): 595–604.

¹⁵ Nicola Amico et al., ‘Theorizing Authenticity - Practising Reality: The 3D Replica of the Kazaphani Boat’, in *Authenticity and Cultural Heritage in the Age of 3d Digital Reproductions*, ed. Paola Di Giuseppantonio Di Franco, Fabrizio Galeazzi, and Valentina Vassallo (Cambridge: McDonald Institute for Archaeological Research, 2018), 111–22.

¹⁶ Barry N. Taylor and Chris E. Kuyatt, ‘Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results’, *NIST Technical Note 1294*, 1994, 1–20.

¹⁷ Alex T. Pang, Craig M. Wittenbrink, and Suresh K. Lodha, ‘Approaches to Uncertainty Visualization’, *Visual Computer* 13, no. 8 (1996): 370–90.

¹⁸ Nahum Gershon, ‘Visualization of an Imperfect World’, *IEEE Computer Graphics and Applications*, 1998, 43–45.

¹⁹ Thomas Strothotte, Maic Masuch, and Tobias Isenberg, ‘Visualizing Knowledge about Virtual Reconstructions of Ancient Architecture’, *Proceedings - Computer Graphics International, CGI 1999*, no. February (1999): 36–43.

²⁰ Karen M. Kensek, Lynn Swartz Dodd, and Nicholas Cipolla, ‘Fantastic Reconstructions or Reconstructions of the Fantastic? Tracking and Presenting Ambiguity, Alternatives, and Documentation in Virtual Worlds’, *Automation in Construction* 13, no. 2 (2004): 175–86.

²¹ Jean-Yves Blaise and Iwona Dudek, ‘Modélisation Informationnelle: Un Cadre Méthodologique Pour Représenter Des Connaissances Évolutives Spatialisables’, *EGC '06 - Extraction et Gestion Des Connaissances*, August (2006): 347–58.

²² Mathieu Rocheleau, ‘La Modélisation 3D Comme Méthode de Recherche En Sciences Historiques’, *Actes Du 10ème Colloque International Étudiant Du Département d'Histoire*, 2011, 245–65.

²³ Favre-Brun, ‘Architecture Virtuelle et Représentation de l'incertitude: Analyse Des Solutions de Visualisation de La Représentation 3D. Application à l'église de La Chartreuse de Villeneuve-Lez-Avignon (Gard) et à l'abbaye Saint-Michel de Cuxa (Pyrénées-Orientales)’ (Université d'Aix-Marseille, 2013).

²⁴ Marta Perlinska, ‘Palette of Possibilities’ (Lund University, 2014).

²⁵ Dominik Lengyel and Catherine Toulouse, 'The Consecution of Uncertain Knowledge, Hypotheses and the Design of Abstraction', in *CHNT 20 - Proceedings of the 20th International Conference on Cultural Heritage and New Technologies*, 2015.

²⁶ Tom Chandler and Martin Polkinghorne, 'A Review of Sources for Visualising the Royal Palace of Angkor, Cambodia, in the 13th Century', *Virtual Palaces, Part II: Lost Palaces and Their Afterlife: Virtual Reconstruction between Science and Media*, 2016, 149–70.

²⁷ Tania Landes et al., 'Uncertainty Visualization Approaches for 3D Models of Castles Restituted from Archeological Knowledge', *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences* 42, no. 2/W9 (2019): 409–16.

²⁸ The research has been conducted at the Institute of Architecture of the University of Applied Science in Mainz (Germany), where a 3D repository has been developed: see <https://3d-repository.hs-mainz.de/> (accessed 30.07.2022).

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BHERA: THE HISTORIC CITY OF CRAFTS

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INTRODUCTION

The ancient city of Bhera, now in Pakistan, was once one of the most important cities of the subcontinent. It was a thriving trade center of Punjab as it was located at the intersection of two major trade routes, one going North-South, connecting Kashmir to Sindh via River Jehlum, and another that connected Kabul to Delhi.¹ The key location of the city, ensured its economic prosperity and cultural influence on the nearby areas.



Figure 1. Trade routes going through Bhera

As a result, numerous local crafts, which represented the affluence of Bhera, flourished. Within the city, the most prominent evidences of traditional crafts were found in the elaborately decorated facades of buildings. Other than that, well-crafted items used in daily life enhanced the growth of numerous other crafts as well. For example, the metal crafts of Bhera, in the form of cutlery and swords, were exported to Samarkand and Bukhara in Central Asia for being highly durable.

The crafts of Bhera were badly affected by the downfall of the city in the twentieth century. The city lost its financial affluence after the Bolshevik Revolution of 1917 which ended all trade with the Central Asia.² The political significance of the city was adversely effected by the downgrading of town status

from 'tehsil' headquarters to a 'sub-tehsil' in 1921-1922 by the British authorities for the anti-government attitude of Bhera's inhabitants.³ Moreover, after the partition of the subcontinent in 1947, the influential Hindu merchants, responsible for the city's prosperity, migrated to India, leaving a cultural, commercial and economic vacuum. The resulting gap was filled by the indigent and distraught refugees,⁴ who had trouble surviving without aid. Unfortunately, to this day, the majority of Bhera's population is financially strained.

The financially strained migrants who occupied the opulent abandoned properties could not form a connection with their luxurious surroundings. Hence, the maintenance of these buildings stopped and they started deteriorating. Over the years, heavy rainfalls and violent storms have either weakened or completely ruined the old unmaintained buildings. It often results in the loss of life and property.⁵ Today, multiple rooms in such occupied residential buildings are left unused, gathering dust or sometimes being completely blocked by rubble from fallen roofs.

Furthermore, people of Bhera associate financial success and stability with imitating modern western, particularly, European and American lifestyles⁶ whereas, the city of Bhera was built with a traditional approach. In order to achieve the desired financial status, the citizens of Bhera deliberately detached themselves from their traditions and alienated themselves from their heritage. As a result, places of historical significance were eventually isolated.

Today, for an average Pakistani, Bhera is a rest-stop on the Lahore-Islamabad Motorway. People are generally unaware of the historically significant city that lies beyond this rest-stop. In fact, apart from a few academically inclined families, the people of Bhera are also unaware of its historical and cultural significance. Therefore, one of the purposes of this research is to generate awareness, regarding the significance of the heritage of Bhera.

Another problem with this city is the prevailing ignorance, due to which precious evidences of the city's opulence, especially in the form of elaborate architecture, are rapidly vanishing. Therefore, the other purpose of this research is to revive the lost essence of the city by reintroducing its traditional crafts and craftsmanship in the twenty-first century. The crafts of Bhera were an essential part of the city's influence and prosperity when it was a flourishing trade center of Punjab and the subcontinent.

ORIGIN AND HISTORY

While there is no distinct written record of Bhera's origin, there is a general consensus among archaeologists regarding the existence of remains of ancient Bhera on the right bank of River Jhelum. There is an extensive mound of uninvestigated remains on the northern part of Ahmedabad, a small town located at the bank of Jhelum, which is believed to be of ancient Bhera.⁷

The earliest written record of the city is found in Alexander the Great's war records dating all the way back to 326BC. It was mentioned as the capital of Sophytes. Sophytes was the name of the king of the Salt range when Alexander the Great invaded Punjab.⁸

While it's location at the intersection of two major trade routes ensured its economic prosperity, it was also subject to constant invasions by foreign invaders.⁹ For example, Alexander the Great fought against Porus, the ruler of Punjab, at Bhera in 326 BC.¹⁰ The city was sacked by Mahmud of Ghazni in 1004 A.D and again two centuries later by Ghengiz Khan in the tenth and eleventh centuries.¹¹ In 1519, the Mughal Emperor, Babur, held it to ransom for four lakh rupees.¹²

In 1540, the Afghan king, Sher Shah Suri invaded the old city of Bhera- the one on the right bank of river Jhelum. His armies almost completely destroyed the city, which is why he decided to construct a new city on the opposite bank of the river.¹³ As it was a common practice in those days, Sher Shah Suri built a wall around the city with eight gates. Each gate was named after the city it faced, for example, Lahori Gate, Multani Gate, Chiniotee Gate, Kashmiri Gate and Kabuli gate. Only five of the eight gates

are still standing, whereas a part of the sixth gate can be seen in ruins between Multani and Chiniotee gates.

During Sher Shah Suri's reign, a holy man by the name of Pir Kayanath had for some time established himself and died here. His followers resided around the tomb of their spiritual leader. It is believed that as a result of his establishment in the city, the place prospered rapidly and attained the size and importance of a proper city.¹⁴

Under Mughal emperor Akbar, Bhera became the headquarters of one of the subdivisions of the 'Soobah' (province) of Lahore. In the last few centuries, Bhera was an important trading outpost on the road to Kabul and it boasted of a 'taksal', a coin minting place, during the rule of Maharaja Ranjit Singh.¹⁵

TOURS TO BHERA

To spread awareness regarding the existence of Bhera and its cultural and historical significance among the people of Pakistan, this paper proposes 'Tours to Bhera'. They are designed as recreational tours to the city that would give the visitors a glimpse into the remnants of its historic opulence and valuable heritage. The focus of these tours would be Bhera's architecture and the elaborate craftsmanship represented on the elevations of the buildings.

While the wall around the city has disappeared over time, five of the eight gates that were incorporated in the wall are still standing strong. They were reconstructed during the colonial period. However, the boundary of the walled city is now marked by a road that circles around it.

For the purpose of these tours, Bhera was divided into two zones- a historically rich residential zone, marked in pink on Figure 2, and a commercial zone, marked in blue on the same image. Large houses with luxuriously decorated facades are located in the residential zone while the commercial activity is restricted to the zone marked in blue.



Figure 2. The designated Route and Stops for "Tours to Bhera"

Taking the example of ‘City Sightseeing’,¹⁶ a tourist bus service that allows convenient sightseeing, the proposed tours are designed in a closed loop. Starting at the Lahori Gate, they would go through the Katchery Bazaar at Qazianwali Mosque into Chopra Mandi’s residential area before moving out towards Kashmiri Gate on circular road and re-entering the city at the Shrine of Peer Meeran Shah in Pirachanwala Muhallah. Next, they would head towards Multani and Chiniotee Gates after visiting Dar-ul-Uloom and Hafizana Mosque to ultimately reach their initial stop, the Lahori Gate.

To cater to the narrow streets of Bhera, the example of ‘city sightseeing’ tour buses was combined with the example of a ‘Rangeela Rickshaw’,¹⁷ a traditionally decorated rickshaw that people visiting the walled city of Lahore can book to move around the city. Since rickshaws are the preferred mode of transportation in the subcontinent, especially in the congested walled cities, which usually have narrow streets, a rickshaw is better suited to the narrow streets of Bhera as well. They would be used to ease the movement of visitors around the city, allowing them to hop-on and hop-off the rickshaws on the designated stops along the route, at their convenience.

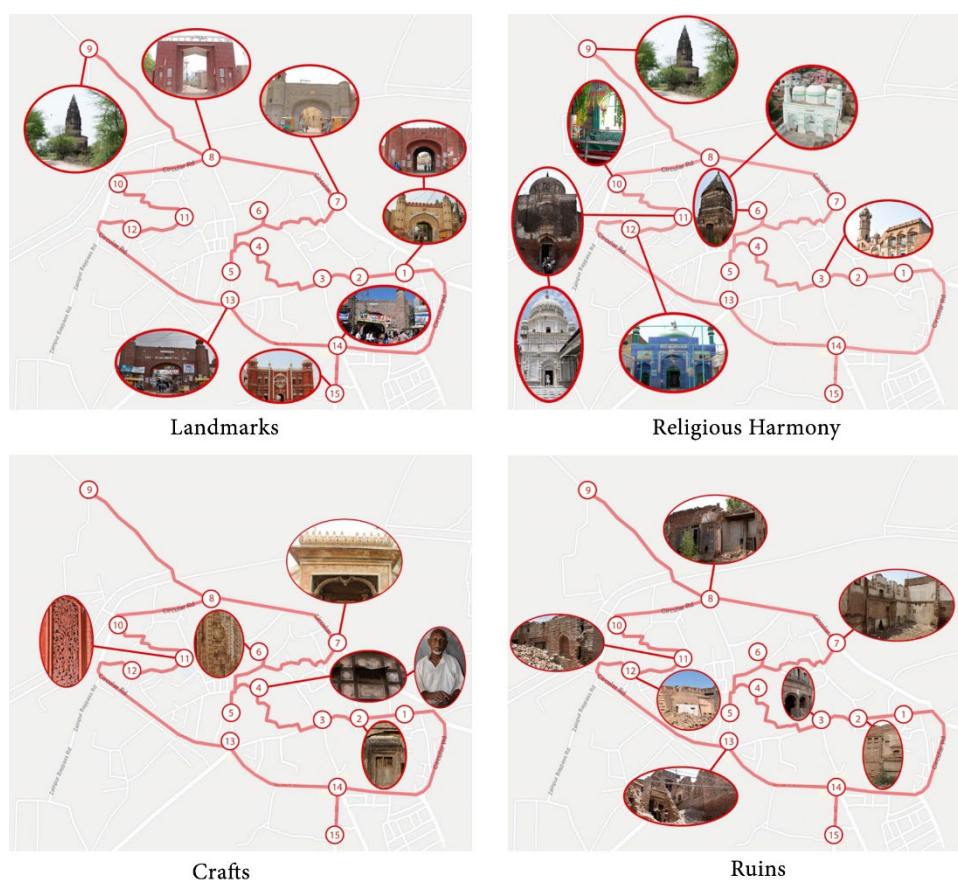


Figure 3. Images of Bhera's architecture along the designed route

As shown in the image above, the ‘Tours to Bhera’ would consist of visits to all the major landmarks around the city, like the remaining five gates, the grand Sher Shah Suri Mosque, and the Shiv temple on the outskirts of the city. The visitors would also get an idea of the religious harmony that existed before the partition of the subcontinent by visiting the shrines of Muslim saints, mosques, temples and gurdwara sahibs within the same vicinity. Evidences of crafts in the form of intricate woodwork, detailed fresco and stucco work, in combination with the cut-brick work on building facades, are scattered throughout the city. The evolution of Bhera’s crafts is most obvious in its architecture. Moreover, the very obvious abandonment of heritage and its ruins stand out at throughout the route.

CRAFTS OF BHERA

To reintroduce the crafts of Bhera in its society, knowing them and understanding the role they played in the prosperity of the city is absolutely essential.

The most prominent form of art, evident to anyone visiting the city even today, is the art of wood carving. Has-san Gardezi, in his book, 'Crafts of the Punjab' wrote "there was hardly any 'mohalla' (town) that did not have rows of multistoried houses with carved wooden facades".¹⁸ Even though Pakistan's forests have now depleted, there was an abundance of wood in the Punjab riverine up until the mid-1800. Consequently, the wood crafts flourished. Deodar (Himalayan cedar) was brought in from Kashmir via River Jehlum and Sheesham (Indian Rosewood) was brought from the Southern plains.¹⁹

Until mid-1800s, Bhera was perhaps Punjab's most significant wood carving center. Skilled artisans were employed by the Kensington School of Arts in London where they represented Bhera's local techniques of wood carving for many years. They also produced a regular supply for the English market. Pieces of Bhera's carved crafts were later acquired for museums in Pakistan, India and England.²⁰ Even almost after a century of the city's decline, Bhera is a living museum for wood craft artifacts. The wood work ranged from small everyday items like a simple comb to structural elements like pillars, beams and 'bukharchas' (rectangular balconies) in the city's built environment.



Figure 4. Examples of Bhera's Wood Crafts. Left to right: Wooden Bukharcha, a beautiful wooden door, a comb ²¹ and ornamentation by lac-turning ²²

As wood crafts flourished, the art of wood ornamentation followed. Lac-turning is one such form of decorating wood which is native to the South-Asia. It uses natural dyes made into crayons to color wood by turning on a wood turner.

Among the textiles of Bhera, 'khais' making was a popular craft. It is a coarse-cotton fabric, used as a shawl or a blanket, woven in multiple designs with different colors. 'Gumti', 'Majnu' and plain are the three types of 'khais' native to Bhera. Moreover, luxurious silk 'lungis' and 'sarees' with gold 'tilla' work were also made here.²³

'Salara,' a unisex garment, worn by men on their shoulders and women to cover their head, shoulders and chest was a popular, locally made, article of clothing. Multi-colored rugs, called 'durries,' were also hand woven. A 'durrie' could be used as a bed spread, floor covering or even a wall hanging.²⁴ Basket and hand-fan weaving was a craft dominated by women, who wove them for their personal use. However, some women used to weave simple baskets and hand-fans commercially as well.²⁵

Bhera's potters used to make kitchen utensils and traditional cooking stoves. They had easy access to good quality clay from the banks of river Jehlum. For their decorations, motifs were block printed on pots and bowls.²⁶

While mother of pearl work is not a self-contained craft, a black smith who made cutlery or swords would incorporate mother of pearl in the handles of swords, spoons, forks and knives or a wood carver would inculcate it in the handles of walking sticks. Before partition, Sikhs were the major consumers of decorated 'kirpans,' curved daggers of religious value carried by Sikhs.²⁷ After partition, as they migrated to India, the demand and production of such specimen suffered and eventually diminished.²⁸



Figure 5. Miscellaneous traditional crafts of Bhera ²⁹

There were other average quality crafts too, which included the making of traditional unisex leather shoes, jewelry making, and block printing on clothes, bed sheets, floor covering, wall hangings and carpet weaving.

MARKAZ-E-DASTKARI

To facilitate the reintroduction of crafts in the society of Bhera, this research proposes a crafts' center by the name of 'Markaz-e-Dastkari'. In the Urdu language, a 'Markaz' means a marketplace and 'dastkari' translates to crafts. So 'Markaz-e-Dastkari' means a marketplace for crafts.

In addition to providing a marketplace for crafts, the proposed crafts' center would be designed to act as a public space, where people from all walks of life would come together to exchange ideas and share their knowledge regarding the city's history, crafts and craftsmen. It is expected to reintroduce the traditional crafts among the youth of the city and to bring them closer to their heritage so that they develop a connection and consequently a sense of responsibility towards its protection and maintenance. For this purpose, it would have gathering spaces of varying sizes scattered throughout the building.



Figure 6. Digital Renders for the proposed Gathering Spaces

This center would also have a small museum in which the artifacts representing the city's crafts and the stories of their makers would be displayed. The museum would heroicize the craftsmen in order to encourage the young generation to indulge themselves in this art form. A large part of the crafts center would house studios to facilitate the reintroduction of craftsmanship in Bhera. The studio spaces would act as training centers.

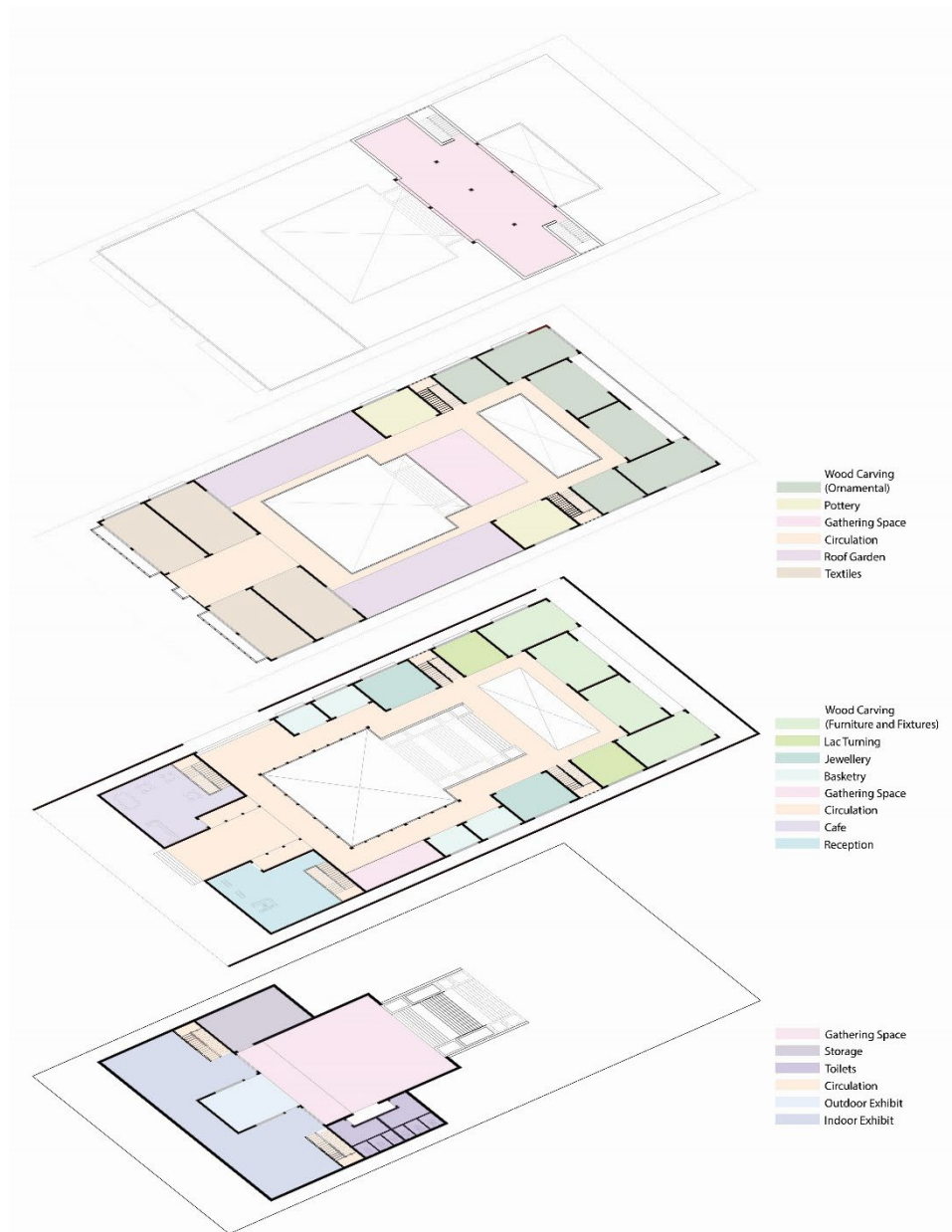


Figure 7. Proposed plans for 'Markaz-e-Dastkari' with labelled programs

Moreover, Markaz-e-Dastkari would house a reception area in combination with a café and visitor information center for anyone willing to take the designed 'Tours to Bhera' mentioned earlier in this paper. The crafts center would be the starting and the ending point of the route. As a result, the visitors would be able to interact with the local people of Bhera, adding to the discussions and conversation regarding the history and local crafts of the city. Their presence is expected to also increase the demand for the artifacts made at this crafts center.

The chosen site for the 'Markaz' is a rectangular piece of land measuring twenty thousand square feet. It is two hundred meters from the inner Lahori Gate. The Lahori gate has two separate physical gates and they encompass a market called the Gunjmandi, which used to serve as a storage space for grains in the colonial period. Past the Lahori gate is a NADRA³⁰ office and a local mosque. Across the street are some tuck shops for the students of the Boys' High school that is situated across the street from the chosen site. Its close proximity to a school reinforces the idea of the proposed building being a learning space.

The inspiration for the facades that are open to streets, the western and southern facades, was taken from the most common architectural elements on the buildings of Bhera. For example, the 'bukharchas,' which are rectangular balconies usually made of wood, supported on wooden or cut-brick brackets, were modernized and simplified to be incorporated on the Southern façade. Similarly, a 'jharokas,' which is a small viewing gallery, intended for one or two persons, was incorporated on the front elevation with a similar approach. On the western façade, the one facing the Boys' high school, had a combined interpretation of a cornice and window shade over the windows.

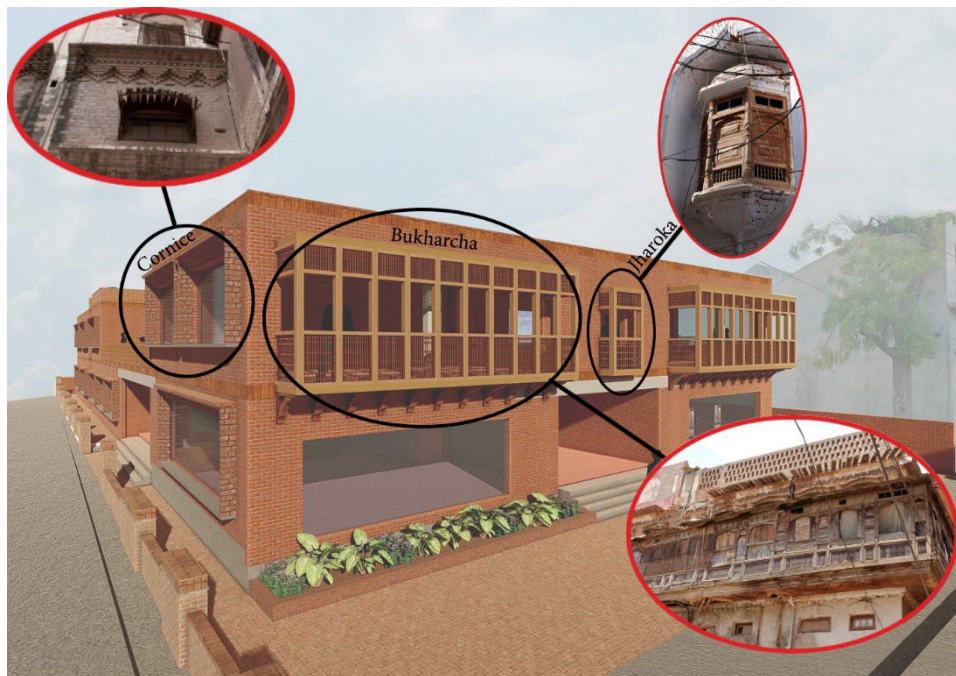


Figure 8. Comparison of traditional architectural elements with proposed modern interpretations

These modern-simplified versions of prominent traditional architectural elements was a deliberate attempt to associate the traditional crafts, which are an essential part of Bhera's heritage, with the future prospects of success - which is generally seen as a direct consequence of modernism. It symbolizes a connection between the past and the present and projects it into a hopeful future.

The use of brick and wood on the facades, as opposed to concrete, a popular material, that has become synonymous with progressiveness and modernity, was a deliberate attempt to build a connection between owning one's heritage to being financially successful and to progress economically.

CONCLUSION

To sum up, in order to spread awareness regarding Bhera's historical significance and cultural influence among the laypersons of Pakistan, this paper proposed 'Tours to Bhera' to be initiated and a crafts' center, 'Markaz-e-Dastkari', to be built so that people living in Bhera and visiting the city understand in totality the reasons that led to Bhera's fortunes in the fourteenth century.

On that account, the role architecture plays to revive the essence of a city could be debated. It could be discussed, if a public space designed to enable a connection between people and their heritage, provide a strong enough precedent for people to embrace and adopt it in their current lives.

NOTES

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- ² Mirza, 4.
- ³ Has-san Gardezi, *Crafts of the Punjab, Bhera* (Lahore, Pakistan: Punjab Small Industries Corporation, 1993)
- ⁴ Mirza, *Analytical Study of Architecture*, 4.
- ⁵ "Three die as a roof of a house collapses in Sargodha," *Arynews*, May 12, 2019, <https://arynews.tv/three-die-roof-collapse-sargodha/>
- ⁶ Fizza Bukhari et al. "Is Modernity Depleting Bhera." *Lahore Journal of Policy Studies*, Vol.6, No.1 (2016): 90-91, 102-103, <http://111.68.102.42:8080/xmlui/bitstream/handle/123456789/14892/LJPS%20VOL%2006-01%20Complete.pdf?sequence=1&isAllowed=y>.
- ⁷ Mirza, *Analytical Study of Architecture*, 3.
- ⁸ Gardezi, *Crafts of the Punjab*, 12.
- ⁹ "Bhera," *Sikhiwiki.org*, accessed August 10, 2019, <https://www.sikhiwiki.org/index.php/Bhera>.
- ¹⁰ Majid Sheikh, "Harking Back: Alexander and why attack on Lahore was avoided." *Dawn*, June 12, 2016, <https://www.dawn.com/news/1264309>.
- ¹¹ Gardezi, *Crafts of the Punjab*, 12-14.
- ¹² Bhera tehsil Sargodha.
- ¹³ Mirza, 4.
- ¹⁴ Gardezi, *Crafts of the Punjab*, 15.
- ¹⁵ "Bhera District Sargodha, Punjab, Pakistan," Bhera Tehsil, accessed August 11, 2019, <http://bheratehsil.blogspot.com/2017/08/bhera-distinct-sargodha-punjab-pakistan.html>.
- ¹⁶ City Sightseeing, https://city-sightseeing.com/en/home?utm_medium=cpc&utm_source=google&utm_campaign=ads-brand-en&utm_content=brand_home_english&utm_term=brand&gclid=CjwKCAjwrZOXBhACEiwA0EoRD3ikLY9aLu2A47hcV9GXJvxgGnol1Wq1ZiYw8Rm9hUzkZzAT7fNFrxCJk0QAvD_BwE
- ¹⁷ "Rangeela Rickshaw," *Walledcitylahore.gop.pk*, <https://walledcitylahore.gop.pk/rikshaw/>
- ¹⁸ Gardezi, *Crafts of the Punjab*, 60.
- ¹⁹ Gardezi, 58-59.
- ²⁰ Gardezi, 59.
- ²¹ Gardezi, 68.
- ²² Gardezi, 65.
- ²³ Gardezi, 72-83.
- ²⁴ Gardezi, 85-87.
- ²⁵ Gardezi, 104, 110-112.
- ²⁶ Gardezi, 105-106.
- ²⁷ Has-san Gardezi, *Crafts of the Punjab* (Punjab Small Industries Corporation, 1993), 95.
- ²⁸ Gardezi, 94-99.
- ²⁹ Gardezi, 76, 77, 82, 85, 91, 96, 104, 105, 108, 112.
- ³⁰ Abbreviation for 'National Database and Registration Authority' of Pakistan.

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MORE THAN BRIC-A-BRAC: BUILDING BRICKS AND MATERIAL CULTURE IN THE HISTORY OF THE WORLD'S LARGEST BIOMEDICAL LIBRARY

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INTRODUCTION

The National Library of Medicine (NLM)—the world's largest biomedical library—is located on the campus of the National Institutes of Health (NIH) in Bethesda, Maryland. It was previously known as the Army Medical Library and co-located, from 1887 until 1962, with the Army Medical Museum on the National Mall in Washington, DC. There, the library and museum occupied a building designed by Adolf Cluss (1825-1905), the influential German American architect, his partner Paul Schulze (1827-1897) and John Shaw Billings (1838-1913), the physician, bibliophile, visionary leader of the Army Medical Library from 1865 to 1883 and curator of library and museum together from 1884 to 1895. In October 1968, the doors of the “Old Red Brick,” as it was called by contemporaries, were ceremoniously closed in preparation for its demolition and the construction of the Smithsonian Institution's Hirshhorn Museum and Sculpture Garden. Sometime after the demolition, staff of the library and museum collected bricks and other objects from the site for keepsakes and to offer as retirement gifts to colleagues and friends. Since that time, many of these objects have returned to the NLM and to the modern iteration of the Army Medical Museum, the National Museum of Health and Medicine (NMHM), as part of materials donated to the institutions by former staff, or by medical and scientific leaders who received these objects as tokens of appreciation. This article is located at the intersection of architectural history, institutional history and material culture studies to reveal the cultural and memorial significance of these objects as they remain preserved in the collections of the institutions of which they were once a physical part.¹

REMAINS OF THE DAY: PART 1

On October 7, 1998, dignitaries and staff of the NLM gathered in the rotunda of the institution to celebrate the 90th birthday of one of its most stalwart supporters, Michael E. DeBakey, MD (1908-2008), the legendary American surgeon, educator and medical statesman. In his speech honoring DeBakey, then NLM Director Donald A.B. Lindberg, MD, praised DeBakey's work in transforming cardiovascular surgery, raising medical education standards and informing national health care policy. Lindberg also detailed DeBakey's accomplishments in pioneering dozens of operative procedures such as aneurysm repair, coronary bypass and endarterectomy, which routinely save thousands of lives each year, performing some of the first heart transplants and inventing the roller pump (a key component of heart-lung machines) as well as artificial hearts and ventricular assist pumps. Lindberg described DeBakey as a driving force not only in building Houston's Baylor University College of Medicine into

a premier medical center but also in playing a pivotal role in the creation of the NLM in the 1950s. Following these recognitions, Lindberg presented DeBakey with two birthday cakes and a remarkable gift: a brick from the previous headquarters of the library on Independence Avenue in Washington, DC. There DeBakey played his pivotal role in the creation of the NLM through his service as an honorary consultant and subsequently, in the new home of the NLM at the NIH, on the NLM Board of Regents.² This ceremonial moment in the recent history of the NLM opens an intriguing window onto its material past shared with the NMHM and the persistence of this materiality in the collections of these institutions. This moment also helps to surface the cultural and memorial significance of the NLM and the NMHM on the landscape of US National Capital Area and in the eyes of generations of civil servants and contemporary supporters.



Figure 1. Left: Michael E. DeBakey, MD, at the National Library of Medicine, National Institutes of Health, on the occasion of his 90th birthday in 1998. Right: DeBakey, standing, second from right, among the honorary consultants to the Army Medical Library, 1950. National Library of Medicine, National Institutes of Health

BEGINNINGS TO BILLINGS

Studies of the Army Medical Library and Museum published since the turn of the twentieth century are integral to surfacing the architectural, material, and memorial history of these institutions when they were co-located on the National Mall.

As Kenneth M. Koyle explains, the official history of the NLM dates to 1836 when the US secretary of war requested funding to purchase medical books for officers in the field. However, the roots of the library are eighteen years earlier in the establishment of the US Army Medical Department and the appointment of the first surgeon general, 30-year-old Joseph Lovell. In his office, books from his personal collection became core of what would eventually grow to be the world's largest biomedical library.³ James Cassedy, Michael G. Rhode, James Labosier, and Anne Rothfeld variously document how this growth occurred progressively through the third quarter of the nineteenth century when the former Civil War surgeon, bibliophile and building designer John Shaw Billings led the library and the museum.⁴ They explain how Billings set out to transform the library of the surgeon general into a national medical library, envisioning it as a medical counterpart to the collection of the Library of Congress by holding every American medical publication possible.⁵ His effort involved collecting aggressively and broadly across medical subjects, and internationally, as well as seeking a more suitable home for the library as it grew. Up to the early 1880s, the library occupied the remodeled Ford's Theatre on Tenth Street in Washington, DC, sharing space with the Army Medical Museum. After President Lincoln's assassination in this theatre in April 1865, contemporaries believed that the building was no

longer appropriate as an entertainment venue, so they converted it to house a variety of military offices, including the library and museum. However, over time in this site, both institutions outgrew their allotted spaces, their respective and interrelated collections growing faster than acquisitions and storage capacities would allow.⁶



Figure 2. John Shaw Billings, c. 1862. National Portrait Gallery, Smithsonian Institution

Rhode and Rothfeld elucidate how Billings spent years conceiving designs and lobbying Congress for funds to build a new building for the library and museum. To develop the overall concept, he drew upon his experiences of surveying Army hospital facilities during the Civil War and working with the trustees of the Johns Hopkins estate to design the Johns Hopkins Hospital in Baltimore, Maryland.⁷ Rhode and Sabrina Dugan point out that in 1885 the US Congress appropriated \$200,000 for the construction of a new building. This was a \$50,000 shortfall of required funds which forced Billings and his colleagues, the architects Adolf Cluss and Paul Schulze, to economize their plans and use less expensive materials and construction methods in order to achieve “the solidity, sanitary condition and dignity due to a public building erected upon a prominent Government reservation.” Specifically, Cluss “proposed using terracotta rosettes to enliven the rather plain pressed-brick facades.” The overall design conceived by Billings, Cluss and Schulze was a four-story roughly H-shaped building in the Romanesque Revival style with large arched windows on the exterior walls and two large wings with monitor skylights.⁸

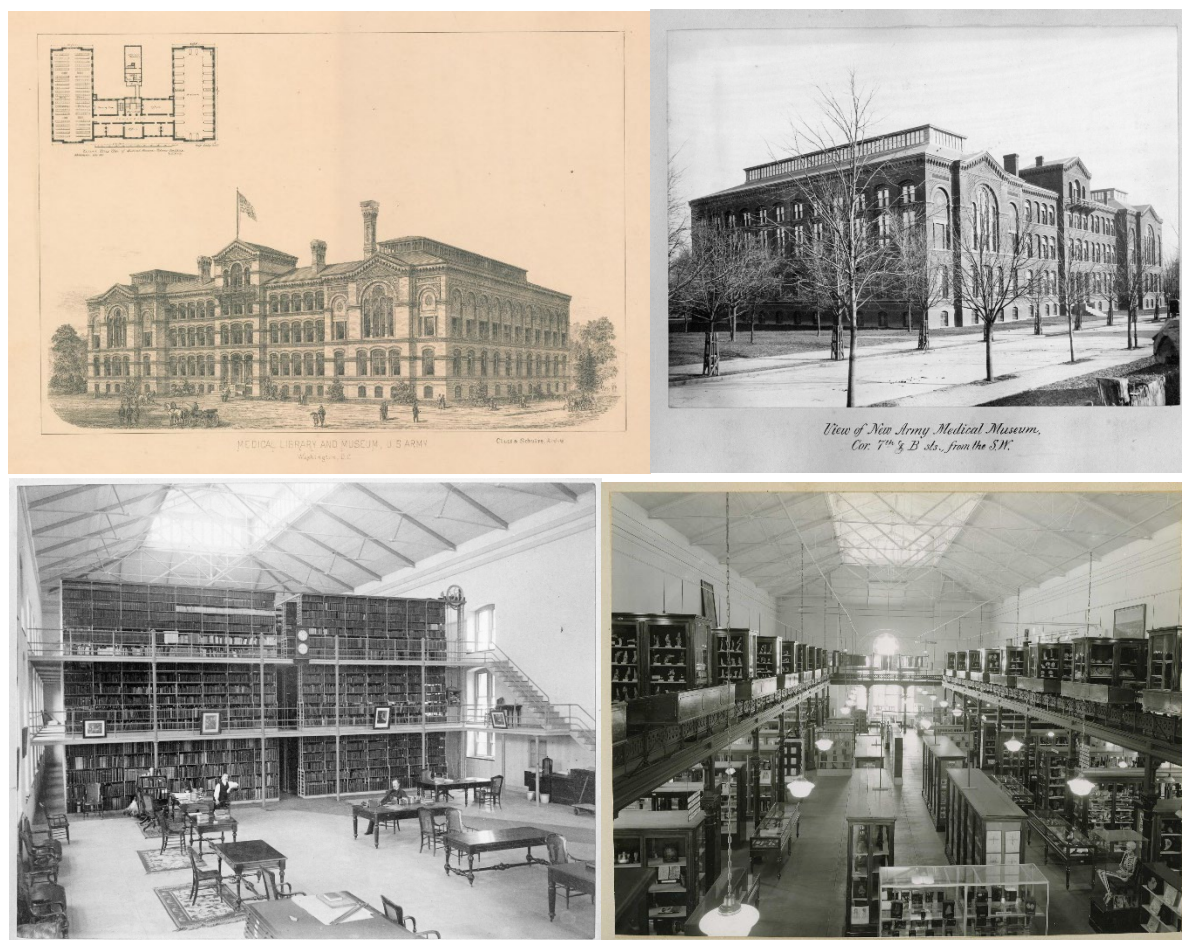


Figure 3. Top-left: Architectural plans for the new Army Medical Library and Museum, c. 1885. National Library of Medicine, National Institutes of Health

Top-right: Photograph of the “Old Red Brick,” 1887. National Library of Medicine, National Institutes of Health

Bottom-right: Photograph of the wing of the new building dedicated to displays of the Army Medical Museum, likely ca. 1890s. National Museum of Health and Medicine

Bottom-left: Photograph of the wing of the new building dedicated to the library and its reading room, known by contemporaries as Library Hall, 1887. National Library of Medicine, National Institutes of Health

The Army Medical Library and Museum moved to this location in 1887. As Rhode and Rothfeld document further, it was a tremendous improvement over Ford’s Theatre but fell short of the best possible environment, with poor internal lighting and progressively less space for collections.⁹ By 1910, the roof of the building leaked, the interior plumbing periodically flooded and the plaster walls crumbled. The first renovation began in 1911 but Congress allocated only enough funding to complete essential repairs, leaving minor structural problems to be addressed and become worse of over time.¹⁰ Despite its deteriorating physical condition, the Army Medical Library and Museum became a centerpiece on the landscape of Washington, DC. Once advertisements for the library—one depicting it as a tree of medical knowledge—located it prominently between Capitol Hill and the Washington Monument. Another clearly located it on a map of major sites to be visited.

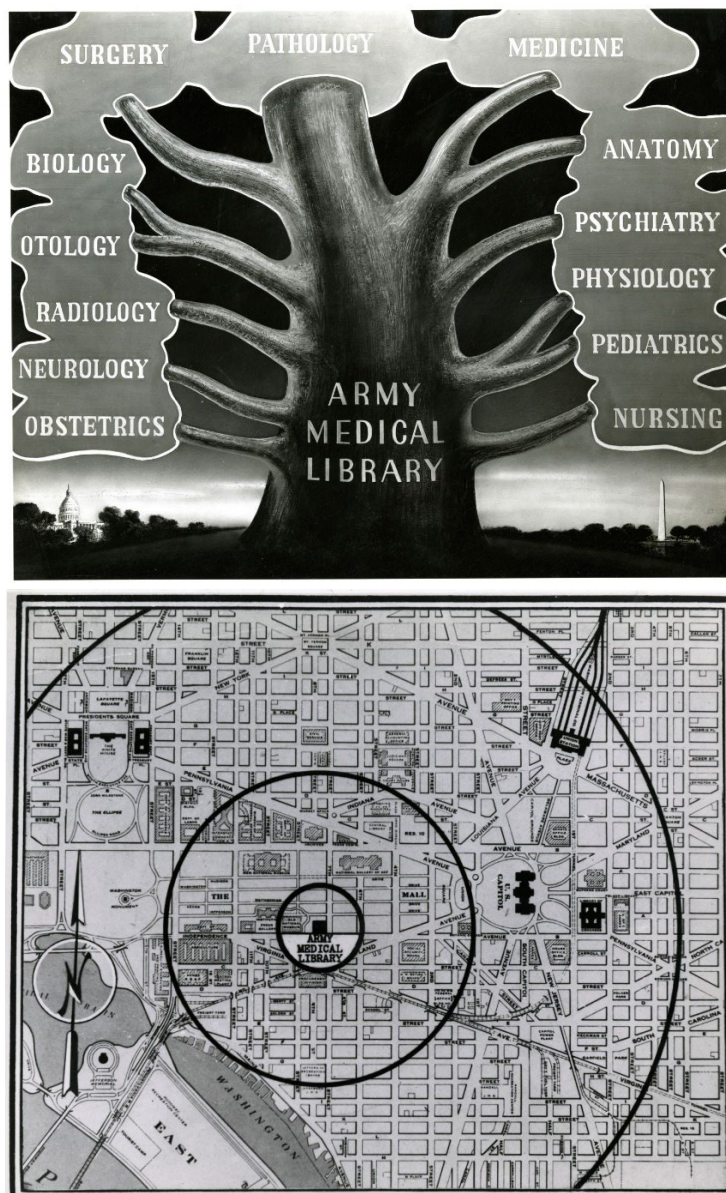


Figure 4. Advertisements produced by the US Army to encourage public visits to the Army Medical Library, c. 1940s. National Library of Medicine, National Institutes of Health

During the 1960s, the building was listed on the National Register of Historic Buildings. However, in October 1968, its doors were ceremoniously closed in preparation for its demolition and the construction of the Hirshhorn Museum and Sculpture Garden. The demolition occurred in early 1969.



Figure 5. Demolition of the “Old Red Brick,” February 1969.
Smithsonian Institution Archives

THE “OLD RED BRICK” AND ITS PASSING

Over time, staff increasingly referred to the site of the Army Medical Library and Museum as the “Old Red Brick.” One of the most significant uses of this name appears in April 1971, when Captain Bruce H. Smith published “The Passing of The Old Red Brick” in the journal *Military Medicine*. Here, Smith recounts the history of the building, the significance of the institutions it housed and its gradual deterioration which led to its ultimate demise. Given what transpired in conjunction with the demolition of the “Old Red Brick” the very title of Smith’s article holds significant double meaning.

Sometime after the demolition, staff collected bricks and related objects from the site for keepsakes and to offer as retirement gifts to colleagues and friends of the library and museum. Since that time, some of these objects have returned to the NLM and to the NMHM, as part of materials donated by former staff, or by medical and scientific leaders who received them as tokens of appreciation. Formally accessioned into the collections of each institution, these objects are physically separated but nonetheless remain intimately connected through the narrative of history, the efforts of Billings, Cluss and Schultz and the very act of past and recent generations taking action to preserve parts of the institution they held dear as their “Old Red Brick.”



Figure 6. Bricks from the Old Red Brick preserved in the collections of the National Library of Medicine, National Institutes of Health

Significantly, remains of the “Old Red Bick” reside close to where it once stood, as revealed by a 1992 issue of *Smithsonian Preservation Quarterly*, a newsletter of the Smithsonian Office of Architectural History and Historic Preservation. Herein, staff of the office explain that one of the museum’s geometric tile floors, saved at the time of the demolition of the “Old Red Brick,” was installed in 1989 at the north vestibule entrance to the Great Hall of the Smithsonian Institution Building, commonly known as the “Castle” and located less than a quarter mile from the original site of the “Old Red Brick.” The office recommended this reuse of the tiles for several reasons related directly to the legacy of Adolf Cluss on the National Mall and in Washington, DC. He designed the entrance space of this building and was responsible for its renovation after a fire in 1865. He was also the architect of the National Museum Building, commonly known as the Smithsonian Arts and Industries Building. “Then as now,” the newsletter concluded, “thick tiles were recognized for providing colorful, decorative and especially durable floor surfacing in heavily trafficked areas.”¹¹

Today, increasingly fewer individuals have a memory of the “Old Red Bick” on the National Mall. Even fewer have knowledge of its fragments persisting in the Smithsonian Castle and preserved in the collections of the NLM and the NMHM. This article has surfaced this knowledge and related architectural and material culture history to help make these persistent material parts themselves part of the persistent memory-making processes involving the “Old Red Bick” and its successor institutions.

Description	Image	Approx Sq. Footage
Color: Terra Cotta Shape: Square Size: 6" X 6" x 0.5" Box 1 quantity (approx): 60*		15
Color: Tan Shape: Octagonal Size: 6" X 6" x 0.5" (1.5" x 1.5" cutouts) Box 1 quantity (approx): 60* Box 2 quantity (approx): 45* Box 3 quantity (approx): 50* Box 4 quantity (approx): 45* Box 5 quantity (approx): 50* Box 6 quantity (approx): 60*		77.5
Color: Chocolate Shape: Square Size: 6" X 6" x 0.5" Box 1 quantity (approx): 60* Box 2 quantity (approx): 50* Box 3 quantity (approx): 65*		43.75
Estimated Subtotal Square Footage		108.75
Color: Terra Cotta Shape: Octagonal Size: 6" X 6" x 0.5" (1.5" x 1.5" cutouts) Includes 1.5" x 1.5" black squares Currently on floor of Huntington Conference room and slated to be used in the new building's conference room.		96
Estimated Total Square Footage		204.75




Figure 7. Left: National Museum of Health and Medicine collections catalog details of floor tiles from the Army Medical Museum building (1888-1968). National Museum of Health and Medicine Right: One of a series of photographs documenting the reuse of tiles from the “Old Red Bick”, 1989. Smithsonian Institution Archives
Bottom: Other collected pieces of the “Old Red Brick” preserved in the collections of the National Museum of Health and Medicine. National Museum of Health and Medicine

REMAINS OF THE DAY: PART II

In the spring of 2015, colleagues, dignitaries, friends and staff of the NLM and NIH, gathered to pay tribute to the NLM Director Donald A.B. Lindberg, MD, on his retirement after 31 years heading the world’s largest medical library. Trained as a pathologist, Lindberg went on to become a pioneer in the use of computers and medicine and the founding president of the American Medical Informatics

Association (AMIA). He was the longest serving director of the library and one of the longest-serving leaders at the NIH.¹² During one of the tributes to Lindberg, attendees viewed a video recording of highlights from his 1984 swearing-in ceremony speech, which many believed was more remarkable on the occasion of his retirement than it was when he originally offered it. Lindberg predicted a time when “the book or journal on the shelf will become increasingly too remote for immediate patient-care decisions,” and the computers will become increasingly useful; when “medical informatics will emerge as a formal research field and academic discipline;” and when progress in “cancer research and molecular biology will be to the average citizen not an idle curiosity or newspaper headline, but a matter of immediate personal concern.”¹³ Reflecting on Lindberg’s vision, NIH Director Francis Collins, MD, PhD, stated, “I hope you saw how true and prescient his observations were.” Adding to this praise, Anthony S. Fauci, MD, director of NIH’s National Institute of Allergy and Infectious Diseases, observed, “Don created programs that transformed our approach to information. Your influence has been profound. The kind of capabilities you put at our fingertips made what we do possible.” Amidst this remarkable week of reflective proceedings was a presentation to Lindberg of a remarkable object that was warmly received by him: a piece of the “Old Red Brick.”



Figure 8. Brick from the “Old Red Brick” presented to Dr. Donald A. B. Lindberg in 2015, along with a reproduction of the c. 1885 architectural plans for the Army Medical Library and Museum. National Library of Medicine, National Institutes of Health

As the presenter of the brick explained to Lindberg, it was:

...handed down from generation to generation here at the NLM. Similar to the one presented by you to Dr. Michael E. DeBakey in 1998, it is from of the ornamented portion of the ‘Old Red Bick’ that is plainly visible in contemporary images of the building. This object, therefore, dating from the 1880s and the time of John Shaw Billings, represents the persistence and growth of the library through the years, until the ‘Old Red Brick’ saw its demise in 1969, making way for the Hirshhorn Museum and Sculpture Garden. By then, the library had moved to the NIH campus, where it has grown ever since. This brick is not merely an artifact of the past. It is a symbol of the 179-year history of the library, the successes it has achieved, the changes it has endured and the future it will have thanks to your own unwavering leadership.¹⁴

Thus, as Lindberg presented DeBakey with a brick seventeen years earlier, so now did Lindberg receive his own brick, carrying forward a tradition of memory making through the very *materiél* which once constituted the very institutions being remembered.

CONCLUSION

These ceremonial moments involving DeBakey and Lindberg aptly bookend a complex story of institutional achievement and physical change, preservation of *materiel* and persistence of meaning and memory. More than bric-a-brac, the bricks ceremoniously received by DeBakey and Lindberg make meaningful—indeed tangible—the very history and cultural significance of the “Old Red Brick.” The fact that staff of the NLM and NMHM accessioned these objects into the collections of their respective institutions—preserving them—makes their materiality and memorial power all the more meaningful. Moreover, the fact that portions of the “Old Red Brick” are today a part of the north vestibule entrance to the Smithsonian Castle makes the very history of Army Medical Library and Museum a part of the current landscape of the venerable National Mall, despite the “Old Red Brick” itself no longer standing on that landscape.

DeBakey and Lindberg understood this persistent material meaning. They literally embraced it as they received their respective bricks, holding dear the history of the Army Medical Library and Museum and encouraging their contemporaries to do the same. More research deserves to be undertaken to elucidate this material meaning and lift it beyond institution history into the field of material culture studies so a new history of the Army Medical Library and Museum could be meaningfully constructed—like the building which jointly housed them—one brick at a time.

ACKNOWLEDGEMENTS

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NOTES

¹ This article is informed by various works in the fields of architectural and material culture studies including, among others, Stephanie Anderson and Cierra Webster, *Objects in Context: Theorizing Material Culture* (Lulu.com, 2013); Arjun Appadurai, *The Social Life of Things: Commodities in Cultural Perspective* (Cambridge: Cambridge University Press, 1986); Wim M. J. van Binsbergen and Peter Geschiere, eds., *Commodification: and identities*, eds., *Commodification: Things, Agency, and Identities (The Social Life of Things Revisited)* (Münster: LIT, 2005); James W. Goode, *Capital Losses: A Cultural History of Washington's Destroyed Buildings* (Washington, DC: Smithsonian Books, 2003); Paul R. Mullins, "The Importance of Innocuous Things: Prosaic Materiality, Everyday Life, and Historical Archaeology," in *Historical Archaeology and the Importance of Material Things II*, eds. J.M. Schablitsky & M.P. Leone (Missoula, MT: Society for Historical Archaeology, 2012) 31-44; John R. Spencer, Robert A. Mullins, and Aaron J. Brody, eds., *Material Culture Matters: Essays on the Archaeology of the Southern Levant in Honor of Seymour Gitin* (University Park, PA: Penn State University Press, 2014). It also draws and builds on specific works in material culture studies which have critically examined the subject of building bricks, including Charles D. Hockensmith, *Bricks and Brick Making in Frankfort: An Archival and Archaeological Study of the Kentucky History Center Site* (Frankfort, KY: Kentucky Heritage Council, 1996) and *A Study of Bricks from the Kentucky River Mills Site, Frankfort, Franklin County, Kentucky* (Frankfort, KY: Kentucky Heritage Council, 1998), and Larry Prochner, "Their Little Wooden Bricks: A History of the Material Culture of Kindergarten in the United States," *Paedagogica Historica: International Journal of the History of Education* 47, no. 3 (2011): 355-75. Through these disciplinary perspectives, this article contributes to and advances a discrete body of research on the public institutions of the Army Medical Library and Museum, including James Cassedy, *John Shaw Billings: Science and Medicine in the Gilded Age* (Bethesda: Xlibris Corp., 2009), <https://collections.nlm.nih.gov/catalog.nlm.nlmuid-101527754-bk>; J.T.H. Connor and Michael G. Rhode, "Shoot Soldiers: Civil War Medical Images, Memory, and Identity in America," *InVisible Culture: An Electronic Journal for Visual Culture*, no. 5 (winter 2003), <https://ivc.lib.rochester.edu/shooting-soldiers-civil-war-medical-images-memory-and-identity-in-america/>; Shauna Devine, *Learning from the Wounded: The Civil War and the Rise of American Medical Science* (Chapel Hill: The University of North Carolina Press, 2014); Robert S. Henry, *The Armed Forces Institute of Pathology: Its First Century, 1862-1962* (Washington, DC: Office of the Surgeon General, Department of the Army, 1964), <https://apps.dtic.mil/sti/pdfs/ADA304669.pdf>; Wyndham D Miles, *A History of the National Library of Medicine: The Nation's Treasury of Medical Knowledge* (Washington, DC: US Government Printing Office, 1982), <http://resource.nlm.nih.gov/8218545>, and Michael G. Rhode, "The Rise and Fall of the Army Medical Museum and Library," *Washington History* 18, no. 1 (2006): 78-97, https://www.academia.edu/709748/The_Rise_and_Fall_of_the_Army_Medical_Museum_and_Library. This article also draws on and advances studies of the Army Medical Library and Museum by author himself and his colleagues at the National Library of Medicine, including Stephen J. Greenberg, Kenneth M. Koyle, James Labosier, Anne Rothfeld and Susan Speaker, all of whom, as noted throughout this text, are contributing authors to Jeffrey S. Reznick and Kenneth M. Koyle, eds., *Images of America: U.S. National Library of Medicine* (Mount Pleasant, South Carolina: Arcadia Publishing, 2017), <http://collections.nlm.nih.gov/ImagesofAmericaNLM>.

² Jeffrey S. Reznick and Kenneth M. Koyle, "History with Heart—and Impact: The National Library of Medicine Michael E. DeBakey Fellowship in the History of Medicine," *Methodist DeBakey Cardiovascular Journal* 17, no. 5 (2021): 100-105, <http://doi.org/10.14797/mdcvj.1047>. See also Jeffrey S. Reznick and Kenneth M. Koyle, "Expanding the Legacy: The National Library of Medicine Michael E. DeBakey Lecture in the History of Medicine," *Methodist DeBakey Cardiovascular Journal*, forthcoming.

³ Koyle, "Origins and Early Years," in *Images of America*, 9-10.

⁴ Cassedy, 75ff, Labosier, "The Civil War and the Era of John Shaw Billings," and Rothfeld "The 'Old Red Brick,'" both in *Images of America*, 17-18 and 31-32, respectively. See also Rhode, "The Rise and Fall of the Army Medical Museum and Library."

⁵ Significantly, as Rhode makes clear, Billings was also "the man most determined to transform the Army Medical Museum into a National Medical Museum," hoping "his success in compiling a national medical library could be repeated with a national medical museum." Rhode, "The Rise and Fall of the Army Medical Museum and Library," 85.

⁶ Cassedy, 36ff, Rhode, "The Rise and Fall of the Army Medical Museum and Library," 93, and Labosier, 18.

⁷ Cassedy, 56ff and Rothfeld "The 'Old Red Brick,'" 31-32.

⁸ Sabrina Dugan, "The Army Medical Museum and Library," The Adolf Cluss Exhibition Project: Shaping a Capital City Worthy of a Republic, <http://www.adolf-clus.org/index.php?sub=3.5.29&lang=en&content=w&topSub=washington>. Herein, Dugan quotes Cluss from a letter held by Smithsonian Institution Archives in Accession 06-225: Smithsonian Institution. Office of Architectural History and Historic Preservation. Building Files, circa 1850-2006, Box 5 of 59, https://siarchives.si.edu/collections/siris_arc_282638#Box_5_. Rhode offers the most

comprehensive architectural description of the building. See Rhode, "The Rise and Fall of the Army Medical Museum and Library," 87.

⁹ Rhode, "The Rise and Fall of the Army Medical Museum and Library," 93, and Rothfeld, 32.

¹⁰ Rothfeld, 32.

¹¹ "Photo-Op," *Smithsonian Preservation Quarterly*, winter 1992, 5.

¹² "The End of an Era: Director Lindberg Retires After 31 Years Leading NLM," *NLM In Focus* (blog), April 14, 2015, <https://infocus.nlm.nih.gov/2015/04/14/the-end-of-an-era-director-lindberg-retires-after-31-years-leading-nlm/>.

¹³ "Dr. Lindberg Sworn in as Director," *National Library of Medicine News* 39:10 (October 1984), 1; 11. See also National Library of Medicine, National Institutes of Health, "Dr. Donald Lindberg Swearing-In Ceremonies," October 11, 1984, YouTube video, 20:21, <https://youtu.be/Mmc5ObO7Keo>.

¹⁴ Jeffrey S. Reznick, email to Todd Danielson, National Library of Medicine, March 25, 2015.

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ARCHITECTURAL DESIGN IN SOCIAL HOUSING: UNDERSTANDING, DECISION-MAKING AND PARAMETRIC MODELLING

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INTRODUCTION

For decades Brazil has been implementing housing programmes with a formal discourse of solving the problem of housing for the low-income population. The architectural project is one of the fundamental elements of this process, which requires constant monitoring. Having social housing as a theme and the architectural project as primary interest, we present here some considerations aimed at: the reflection on the understanding of technical drawing in the architectural project by the people who will be served by housing programmes; the presentation of the experience of participatory design in the preparation of the Serra Azul community housing project in Maracanaú, Ceará, pointing out some details of the architectural project arising from this experience, in order to suggest a physical model as a facilitator instrument in decision-making by the target community with respect to their housing facilities, and to highlight the potential use of parametric modeling in the production of social housing projects..

Layman's perception of architectural design

The graphic depiction of the architectural project is a set of technical drawings with a standardized language for easy reading, universalized through technical standards that guide the enforcement of the design so that the information contained therein is easily understood by those who participate in the construction works. The lower-income population, potential clients of housing policies, are commonly called to the discussions, to present their stance and take part in the decision-making process related to the construction, which forces them to deal with documents comprising different technical parts, with their nuances represented in two-dimensional drawings that are not always easy to understand.

Most of these people attended public schools where the National Core Curriculum includes mathematics and geometry in elementary and secondary education with the argument that geometric concepts constitute an important part of the mathematics curriculum in elementary education and the student will develop a logical thinking that will allow him to understand, describe and represent, in an organized way, the world in which he lives.

The teaching of geometry in schools may develop a certain spatial vision, but it does not seem to be sufficient to allow for a good understanding of a technical drawing as specific as architectural drawing. Someone who has not taken a technical drawing course runs the risk of misinterpretation, no matter how simple the drawing may seem. Orthogonal projections with only two dimensions are far from representing the three-dimensional world in which we live (figure 01) and technical drawing seems a

fertile field for the application of Gestalt laws, where objects grouped in a whole are different than the simple sum of their parts, being interpreted as a whole¹.



Figure 1. Technical drawing of a common everyday object where, to the layperson's eyes, the front view even accompanied by two other drawings, could be understood as a ladder due to the absence of depth.

In the technical drawing of an architectural project, understanding can become even more complex when we are faced with transversal and longitudinal sections. If the graphic depiction of facades, elevations, at first seems easier to grasp because they are already part of a lexicon of images cultivated since our childhood, as in the case of the classic drawing of the little house with door, window and roof; the sections, on the other hand, are much more complex because they demand from the lay viewer (or not) a greater exercise of abstraction where, as if by enchantment, the building was cut in half as if it had been sliced by a large blade or a powerful laserbeam.

How can one understand the space produced from that depiction if it is hard to understand the drawing that intends to represent it? In his publication *Saber Ver A Arquitetura* (Knowing how to see architecture) Bruno Zevi, quoting Geoffray Scotta, reminds us that besides the spaces with two dimensions, that is, the surfaces which we only look at, architecture renders spaces with three dimensions, capable of housing persons,² suggesting that the more visited and experienced the space produced is, the better it will be perceived by the user. But how to do this when it comes to a social housing proposal generally intended for many people? How to make people who must make decisions understand the space proposed in architectural drawings? One of the solutions sought was to make these lay people participate more directly in the creation of the project, i.e., in its conception, in a participatory design system.

PARTICIPATORY DESIGN OF SOCIAL HOUSING IN THE SERRA AZUL HOUSING PROJECT IN MARACANAÚ, CEARÁ - BRAZIL

The case presented in this paper is the result of a community collaborative design experience in a housing cooperative carried out in the Municipality of Maracanaú (Fortaleza-Ceará Metropolitan Region) with the participation of 150 families who previously applied in accordance with the criteria set out by the Housing Company of Ceará - COHAB. The city government, seeking alternative solutions to the problem, signed an agreement with COHAB-CE and the French NGO GRET - Research Group and Technological Exchange, to build the houses in a regime of joint effort in the locality called Serra Azul, where the community should be involved in the participatory design.

Despite the time spent in organizing and discussing these meetings, the result was satisfactory; it may be observed, however, that the low level of education of the participants in that community rendered many difficulties in understanding the architectural project. The nomenclatures were adapted and simplified for better understanding, but the technical requirements continued to guide the decisions.

This experience resulted in the architectural project of houses with 32 Sq. m. in a plan with a single ground floor and a logical division (Figure 02).

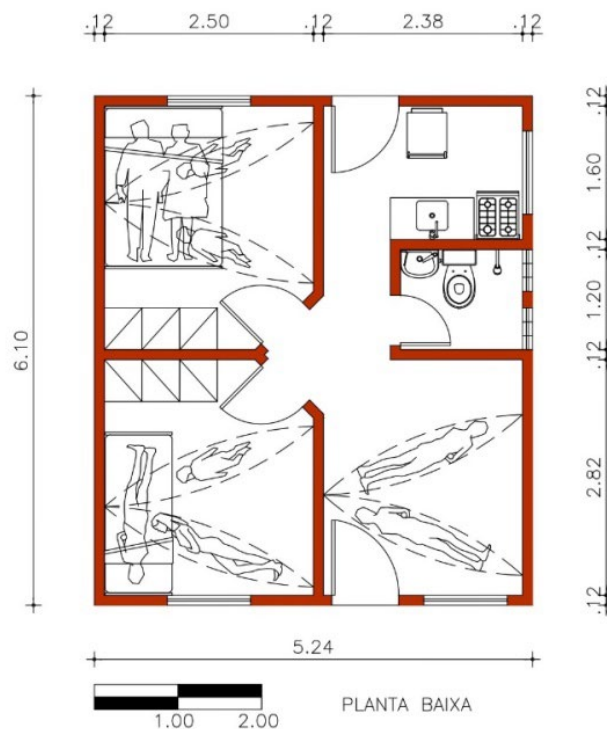


Figure 2. Schematic floor plan with indication of the possibility of nine people at rest.

ABOUT THE PROJECT

Simple or simplistic architecture? Or would it not even be architecture? Questionings like those, loaded with pre-established concepts about the projects developed during experiences in housing collective efforts (community housing projects) are often heard. Would it be possible to analyse this small building exclusively by the triad form, function and technique and ignore that it incorporates legal achievements, solutions to serious housing problems and fulfilled dreams?

In this paper we will briefly analyse this 30 Sq. m. building, considering form, function and technique from the point of view of the production of the spaces created, taking into account some particular features in its use, knowing, however, that in another moment it will be necessary to further the analyses, evaluations and proposals that can add quality to the final project.

Having said that, we can verify that in this project (as in so many others of social housing) the function overrides the form, the technique is limited by the costs that, in turn, are subordinated to the construction industry associated to public management.

In the issue of needs we noticed similarities with middle class residences: a living room, bedrooms, a kitchen, and a bathroom, but here there is a difference between what the project proposes and the way the space is used. Given the larger number of people that make up the families, all the rooms of the small house have variable occupancy, all can serve as a bedroom at night, as well as the living room can be a place for work and commerce, the kitchen, in addition to its conventional functions, can become a study space so that an adult can be close to a child, not to mention the backyard, which, although not built, is viewed as a part of the house.

This house was built by mutual self-help groups using community labour. Technically, the process had to be known by all, i.e., brick masonry. The initial idea was discussed and conceived in a collective way, including in the discussions the thermal comfort, which is often left in second place in housing, especially in social housing. A proposal was then developed with cross and zenithal ventilation that can be seen in the schematic section with the openings in the upper part of the structural wall in the centre of the house. This wall projects itself above the front roof and allows openings that allow for the circulation and exchange of air masses close to the ceramic tile roof (figure 03).

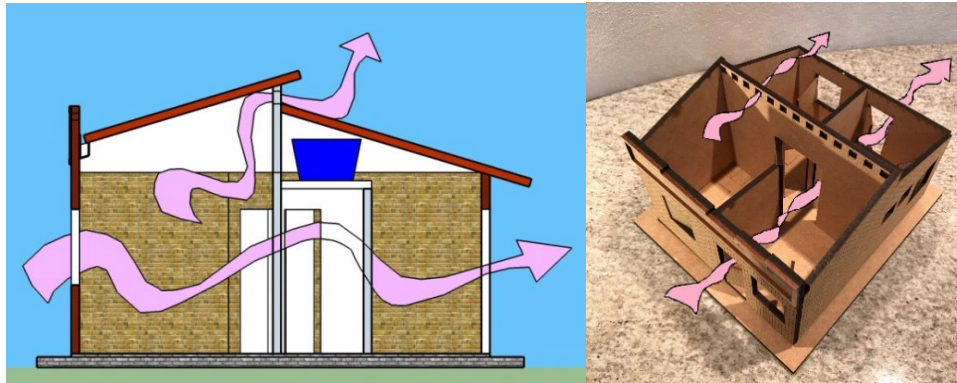


Figure 3. Schematic section and photo of the physical model with indication of zenithal and cross ventilation

Following a requirement of COHAB all the houses should observe the same pattern, that is, be standardised, which at first did not seem to be a problem for the community. However, when it came to discussing the façade the participants of the Collective Effort had a demand: we want a porch! No matter how much the technical team argued that the use of platbands would imply the use of gutters and that there could be future problems with infiltration, the locals insisted on the idea of differentiating their "whole" from others that had an apparent roof with eaves.

We can interpret this demand in a few ways: the introduction of an element present in middle-class houses with the intention of adding value to their own house, as an attempt to differentiate the houses of this housing complex from others that have eaves on the front façades, but it could also be a way of maintaining an aesthetic connection with houses in the countryside and country towns where many of the participants had roots. (Figure 04).



Figure 4. screenshot Google maps July 2012 with Rua General Piragibe, houses with platbands in the historic center of Icó, Ceará - Brazil

There were so many difficulties for the community to understand in this process that, revisiting the project, contacting people from the working group, reviewing the GRET publication, I realized that the tools present today would be fundamental for improving this understanding, and that a physical model would have been of great value at that time, which was an invitation to draw up a model of that Social Interest Housing.

THE PHYSICAL MODEL

There are many possibilities to depict the three dimensions in two-dimensional plans that facilitate the understanding of the resulting space of a built architectural project, but even considering the most modern 3D modeling software and images with photographic fidelity the physical model still exerts on the observer a certain ludic fascination of palpable object that facilitates the perception of space, obviously in reduced scale, but still eliminating the need for knowledge of technical drawing that often prevents this perception.

Here we take as exercise the physical model of the social housing of Maracanaú that was carried out in 1/25 scale. To do this, the project was first redrawn in Autocad, then the house was modeled in Sketchup 2017 software, had its items separated and previously planned, and finally exported in a DXF extension compatible with the laser cutter to then be cut out in MDF 6mm proportional to the dimensions of the solid brick. (Figure 05)

The process of making a physical model is like the execution of the work itself, especially about planning. Redesigning a project, preparing the planning of the pieces with details of fitting, going on to the stage of cuts and assembly, make it so that, at each step, the solutions are confirmed, or the project is modified and all this with real perception of the three dimensions in a way that will always have a handmade stamp and, therefore, animated, with soul!

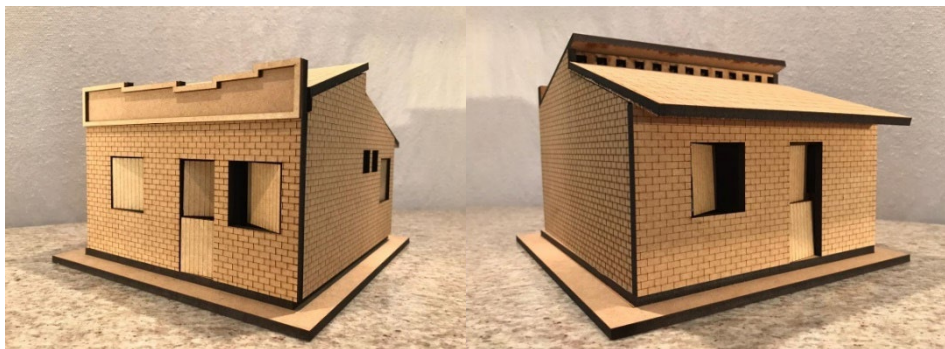


Figure 5. Front and back photographs of the physical model

Physical models are also the result of some academic work by architecture students. This was one of the issues that arose in this process. The architecture and urbanism courses, working on social housing projects, could provide a service of social relevance where students in contact with realities often different from their own would have the opportunity to try out an exchange of experiences where models would be assembled with the communities while the community itself, as clients, would interfere in the conception of the project with the possibility of contributing to the way of perceiving the world and how a future architect could work.

ONE QUESTION

Architecture courses seem to be gradually turning the education of their students more elitist. The lack of interest in studies on the social areas is visible, often restricting them to urban planning programs. Over the years, social housing seems to have been relegated to a second plan in the architecture courses, disregarding the final product of public housing policy: the house. Why then would one place any

importance to its conception, its architectural design? We respectfully disagree with the Dutchman Johan Van Lengen, the admirable barefoot architect, when in the 90s, in a lecture given at the architecture course of the Federal University of Ceará, he said that architects are like prostitutes in search for money, but but we fear that elitism in training may create a certain lack of interest in the social role of the architect.

THE POSSIBILITY OF PARAMETRIC MODELLING IN SOCIAL HOUSING

Considering the current technologies available in the field of architectural drawing and design, we can realize that we have reached a moment in the production of architecture where the project seems to open to a new situation, especially regarding the way it is produced. In this sense, there is a need for a review of the production process of the built space, considering a greater commitment of the stakeholders involved and their effective participation throughout the design process, where the architect's role would be equivalent to that of all the other professionals involved.

In the case of social housing, a new way of designing in a parametric way will possibly allow for a greater flexibility in the design proposals with the possibility of facilitating combinations of customised spaces through algorithms that allow for a range of combinations that meet the different needs of the different families that will live in these buildings. Such new combinations presuppose several different designs for this same purpose, which would be the breaking of a strong paradigm in a social housing context, as we are used to groups of standardized, depersonalized dwellings, of low architectural quality and that besides everything still ignore the local cultures and habits of the future resident population.

The parameterization would also allow for the forecasting of costs with greater accuracy and in a shorter time, as compared to the traditional way, enabling the budget of the works anticipating costs and modifying them when necessary in the planning phase, leading us to a consequent rational use of the amounts invested.

Another element to consider in this same process of parameterization of social housing projects is the use of materials. According to Rivka Oxman we are witnessing a transition within the digital world and the production of a new materiality arising from interests in materials and their tectonic relationship where the architect and other design professions are retrieving an important degree of knowledge and control of materials and material processes in their designs. Based on this statement can we envision the possibility of a new materiality related to social housing? Would it be possible to rethink the "brick by brick in logical design" construction? Until today the most commonly used material in housing is still brick, either solid or ceramic, manufactured or industrialised, and it continues to be the most democratic material in the construction of housing for low-income populations. Would it be possible new tectonics for this old material? A new *modus operandi* capable of producing an architecture which would allow more adequate and suitable spaces for the people who will live in them and which at the same time would present itself as a quality architecture, but using available and more accessible materials?

The production of a new tectonics for known materials, such as steel, concrete, glass, and others, already exists and is usually available for large and complex projects developed with parametric architecture using sophisticated software and calculations to create differentiated architectural works, but this does not prevent us from seeking another, or a new, way of construction for social housing, even if using old materials. If within parametric modelling there is an understanding of the use of materials capable of suggesting a "new materiality", then we can do the same in social housing.

CONCLUSION

Since the Brazilian Constitution of 1988 established the social right to housing, the union, states and municipalities are legally responsible and required to implement housing programs³. Such programs have been put into practice over the years, going through evaluations before and after the occupation of the built spaces, but in this country with historical and persistent social inequalities where constitutional rights are not always respected, especially the right to housing, the vast majority of the population has difficulty securing a place to live. Public policies and housing programs exist to aid part of this population, especially when we are reminded that the great majority of this population is still homeless. These programmes carry out urbanization projects in several areas and, in most cases, the architectural design of the housing unit is part of the "service package" to be provided by the winner of a public bidding, not always suitable.

It may be observed that in housing programmes in which the architectural project is developed by the technical team of the contractors themselves, a fundamental aspect of the design process, the specific needs of the people for whom the project is intended, is easily overlooked. In this process, a residential project, whether a single or multi-family complex, becomes a rational distribution of spaces based on a standardised programme of needs, far from the target public, and which, according to the designer, will meet the needs of the future resident.

If we understand the building for social housing as the materialisation of an architectural project, we will realise how important this stage is in the production of these buildings. We need to consider that the architectural design of social housing is as important as the designs of museums, music halls, theatres and other examples from around the world, the reason for international competitions among renowned architects in their designs. We need to give the social housing project an importance equal to other projects, including the use of technologies that allow for better preparations and conceptions, breaking paradigms and disregarding prejudices and thus reaffirming the real social function of the architect.

ACKNOWLEDGEMENTS

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NOTES

¹ Mauricio Dallastra et al. "Psicologia e arquitetura: como a *eingefühlung* e a *gestalt* atuam nos ambientes." *Revista Multidisciplinar de Psicologia* 12, no.39 (2018): 658-673. ISSN: 1981-1179.

² Bruno Zevi. *Apprendre à voir l'architecture*. Ed. de Minuit, 1984, p 185.

³ Guaranteed by the 1988 Federal Constitution, the right to housing is a common competence of the Union, the states and the municipalities. As the Constitution points out, they are responsible for "promoting housing construction programmes and the improvement of housing conditions and basic sanitation".

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3D DIGITAL MODELS USING PHOTOGRAMMETRY APPLIED TO WORKS OF ART

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INTRODUCTION

The complexity of the process in the conservation of cultural assets means that new perspectives of studies and implementations are constantly being formulated to achieve the recommendations of UNESCO; safeguard landscapes, natural environments and those created by man, which are of cultural or aesthetic interest or form a harmonious natural whole.¹ All these recommendations are elaborated with a perfect technique to achieve the proposed objectives. In other words, cultural heritage (CH) is a substantial and dynamic repository of knowledge, considered a unique and irreplaceable source of aesthetic, historical and cultural values and must be documented to avoid the loss of the object and its knowledge. Consequently, the works inserted in an architectural context are constituted as a world category and constitute, in themselves, work areas with universal value. The architectural heritage made up of buildings, civil structures and objects that are part of these structures are part of this unique value due to its nature. There are three determining factors to establish whether a cultural asset is worthy of being classified as heritage; the historical, aesthetic, and architectural importance,² although in other scientific readings they establish the integrity and context, as other relevant factors. In this area, the conservation of architectural heritage (HB) is a process of knowledge, management, and improvement to preserve complex historic buildings. Generally, both low and high relief sculptures are inserted in this architectural context, for example, tombs, altarpieces, and friezes among other objects. There are two important factors in the scientific recognition of a work of art, on the one hand, the geometric documentation considered as an essential instrument for archaeologists and historians, since it reflects the dimensional reality of the object at levels of millimeter precision and, on the other hand, there are the mechanisms cataloging of cultural assets. The basic operational instrument for knowledge of heritage is the inventory, a mechanism that facilitates the management and protection of cultural assets.³ For their part, catalogs require a higher level of knowledge since they involve research, an element that begins with the development of the inventory. Geometric information is acquired with massive data capture techniques using topographical instruments. The 3D digital reconstruction is acquired through software that implements geodetic measurements and processes digital models. The important issue is the unification between cataloging procedures and their insertion in digital replicas of works of art. Multimedia technologies developed in the late 1980s have favored digital models. Both archeology and architecture have benefited from these digital resources to improve heritage management and dissemination processes. One of the main applications of multimedia technologies is 3D registration as

a documentation mechanism. In fact, there are institutions in the European sphere such as DigitalEurope that enthusiastically welcome the fact that in the planning process of heritage works, a digital version of the project must be delivered before it is built and the physical artifact must be a digital twin.⁴ Here the meaning of the term DT has to do with a geometric replica, where the potential of Digital Twins has to do with the monitoring and control of assets with semantic model structures. Let's not forget that the main components of the DT are considered as; physical components, virtual models, and the data that connect them. The fusion of the DT is to predict and optimize performance, and for this, simulation methods or a data-based method can be used.⁵ The connection between BIM and DT could focus on the ability of BIM to structure semantic models. This position opens a new scenario when it comes to working with heritage objects, with an approach of construction in the area of architectural and sculptural rehabilitation and restoration to the spaces of the industry that respond to a new gap in knowledge.

State of the art

Geodetic measurement methods, either through passive sensors or active sensors, are used to obtain accurate and quality 3D records. It is evident that the order between one variable and another depends on the priority of the project. There are few studies that use the terrestrial TLS laser scanner for small objects. Therefore, passive sensors are less used in sculpture, works of art, or other small objects, including the human body, in medical research. TLS requires equipment that is expensive for most professionals or academics with few resources. In addition, it requires experts to control not only the capture, but also the post-processing of the records, since, when capturing the geometry of the complete object, it is necessary to merge several scanner shots in the field work. In this sense, there is also a work effort for the alignment⁶ of the TLS point cloud for common regions between 2.5D views, where the author uses the face of a Pompeian statuette. Most of the studies carried out for objects of small dimension use the latest generation passive sensors. The improvement of image capture algorithms has allowed progress to be made over time, although there are gaps where work is currently being done to improve the robustness, accuracy of the final model,⁷ integrity and scalability.⁸ The use of small object studies for reverse engineering in industry and in the medical sector initiates the analysis of works in the field of sculptures and small objects belonging to the CH. When low-cost scanners appear, research tries to identify the process and methodology for the acquisition of geometric shapes.⁹ The use of low-cost structural light scanners has the advantage that they can be easily transported, since they are a small piece of equipment and can be taken to museums and archaeological sites. But these optical imaging sensor technologies, the integration of optical and electronic components, play an essential role.¹⁰ Most of the studies focused on small objects in archeology focus on 3D implementation.

Applications in archeology and cultural heritage protection include those defined by Li and Zha,¹¹ the creation of digital files, creation of 3D lines, 3D virtual restoration. The holding of the general archives are unpublished documents that are preserved for future intervention projects, the creation of 3D lines allows to decipher geometric or organic figures that determine impossible drawings in the sculptures, the 3D virtual restoration allows to obtain orthophotos and Digital Elevation Model (DEM) or the Digital Terrain Model (DTM) from the 3D model that integrates detailed and precise information in the digital plan of the archaeological excavation.¹² Then there are the studies that implement 3D in the analysis of archaeological objects such as¹³ in some cases they determine the similarity of the geometric shapes.

Photogrammetric processing

The development of the quality of 3D reconstruction is closely related to the massive data acquisition techniques Massive Data Capture Systems (MDCSs). And in turn, the quality of the 3D content has a direct correlation to the scan size of the object. Scanning a small sculpture is not the same as scanning

a church or cathedral. The use of appropriate instruments corresponds to the scale and its format. Therefore, the three-dimensional representation depends on many factors, such as: level of detail, reliability, precision, costs, and operational aspects.¹⁴

Other important factors of obtaining geodetic and photogrammetric measurements allow monitoring the status of objects and there are countries such as Germany and England that have data files to model the spatial geometric properties of cultural assets.

The expected 3D result accuracy can be calculated according to the following formula:¹⁵

$$R = \frac{L_s \times D}{c \times L} \quad (1)$$

$$P = 3 \times R \quad (2)$$

Where:

c = focal length of the camera (mm)

LS = the greater size of the sensor (mm)

D = the distance between the camera and the subject (m)

L = the greater size of the photograph (in Pixel)

R = the spatial ground resolution of the photos in (m/Pixel)

P = the precision of spatial positioning of the vertices of the 3D mesh.

Because LS, c and L are usually fixed from a using camera, the only way to improve accuracy is to decrease the flight height. This will also result in taking more images to cover the same area. P is the relative precision of the 3D mesh. The absolute precision of 3D model only make sense if it is geo-referenced. The model can be geo-referenced by using the position of the images or by adding ground control points with known geodetic coordinates.

Digital tools encourage collaborative work and allow for better information management at each stage of the project. Techniques such as photogrammetry and the availability of components of structured light electronic equipment play an essential role in the registration of works of art. In this context, this work develops an evaluation of the accuracy of the most economical methods that can be found on the market. For this, they work on an artistic work, the sculpture frieze of the cattedrale di San Corrado Duomo di Molfetta. The scope is photogrammetry, a low-cost equipment. The results determine the proximity of the data of the technical files, as well as the knowledge of the variables that intervene in the technique used. Photogrammetry obtained very positive results. It is accepted in the scientific community that advanced digital tools allow better information management at each stage of the project.¹⁶



Figure 1. Sculpture frieze of the cattedrale di San Corrado Duomo di Molfetta

For the photogrammetric survey, a Nikon D80 reflex digital camera was used with a resolution of 12 megapixels, an altitude of 9 m, a YO ASI of 200, an APS-C CMOS sensor (23.5 x 15.6 mm², an exposure of 1/400 square feet 3.5 and Agisoft Metashape software was used for image processing to produce 3D models from oriented and scaled images with random control points.¹⁷

Next, a diagram¹⁸ is shown in which the steps carried out until the final result of the model can be observed.

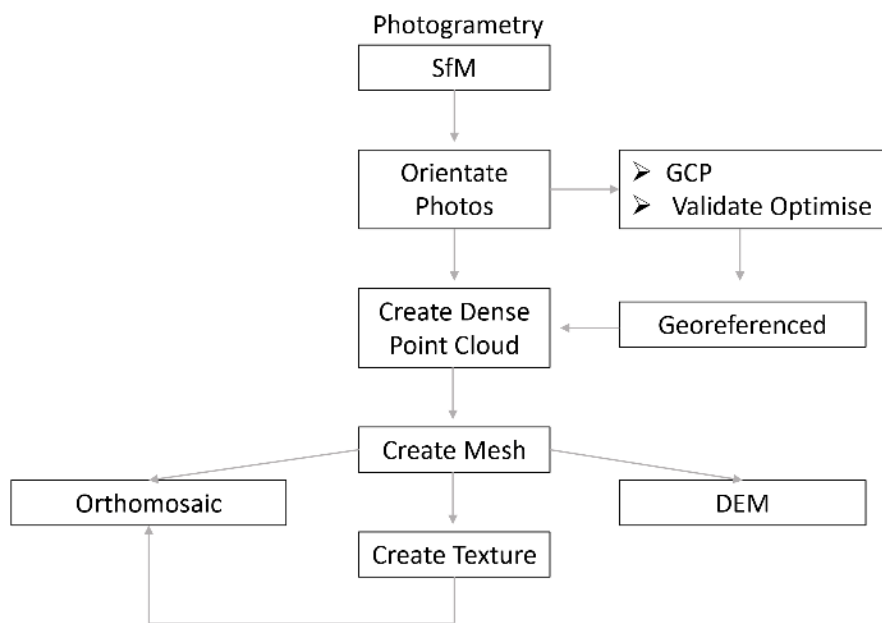


Figure 2. Working diagram

Photogrammetry uses photographic images to obtain the three-dimensional positions of the points and the surface of an object, as we can see in Figure 3 according to the indications of the investigation.¹⁹

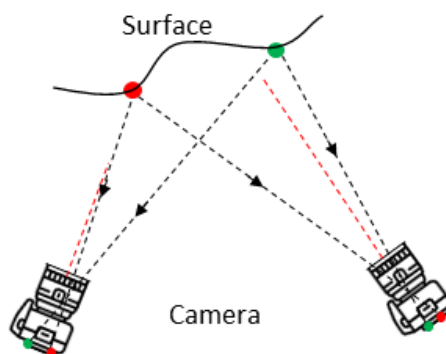


Figure 3. Camera position

This technique requires multiple images from different viewpoints as input. Figure 4 shows the result of this photo sweep around the frieze in the Agisoft Metashape photogrammetry program.

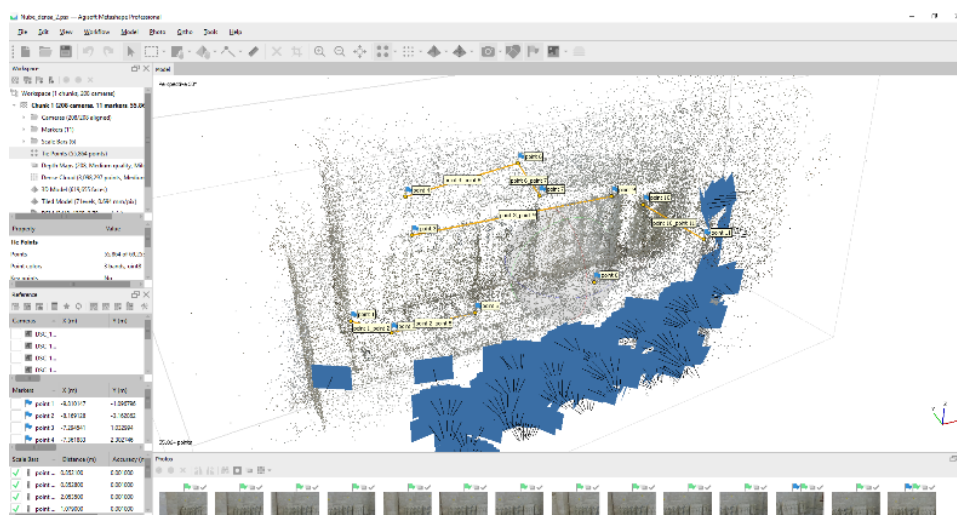


Figure 4. Multiple images from different points of view

Three-dimensional digitization is the generation of a 3D computer model²⁰ where the digital model occupies an essential space to generate images, virtual recreations and construction models. Evaluate the accuracy of the created model based on the results of the 3D model. In our case, the result of the dense cloud was 3,098,297 points in total, as can be seen in figure 5. The digital model obtained in photogrammetry, as seen in figure 6 and, finally, the final result of the orthomosaic model, figure 7.

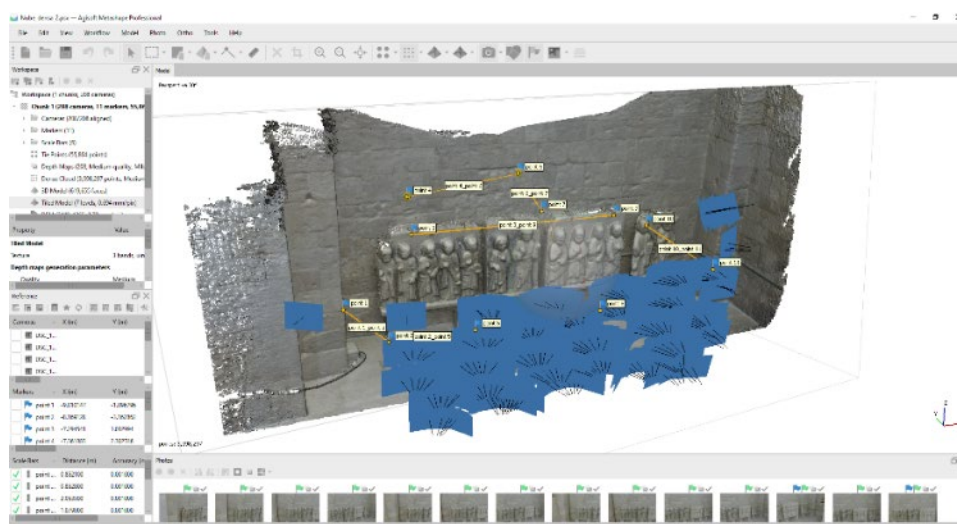


Figure 5. Point cloud result

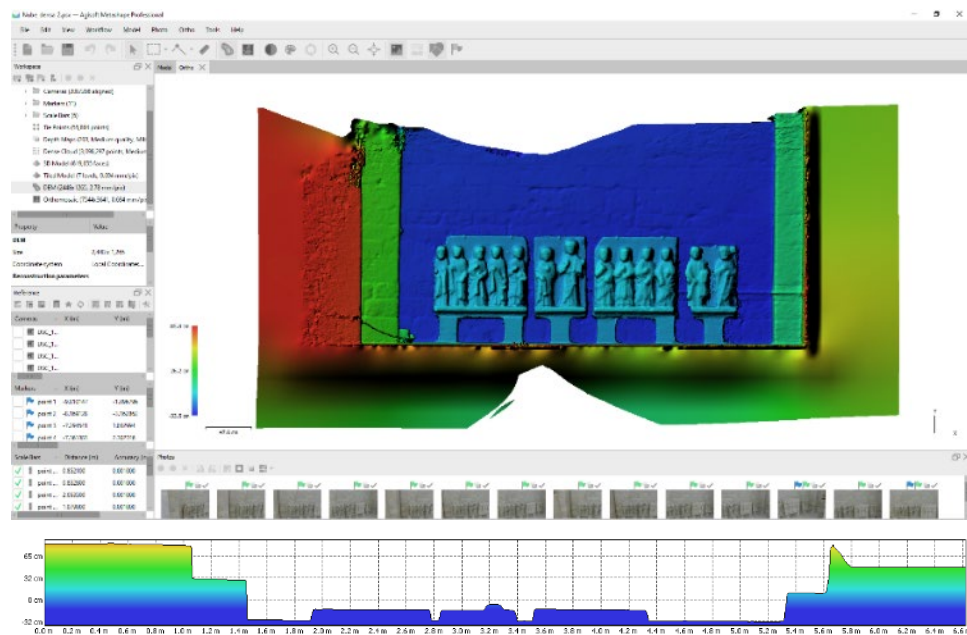


Figure 6. Digital model surface

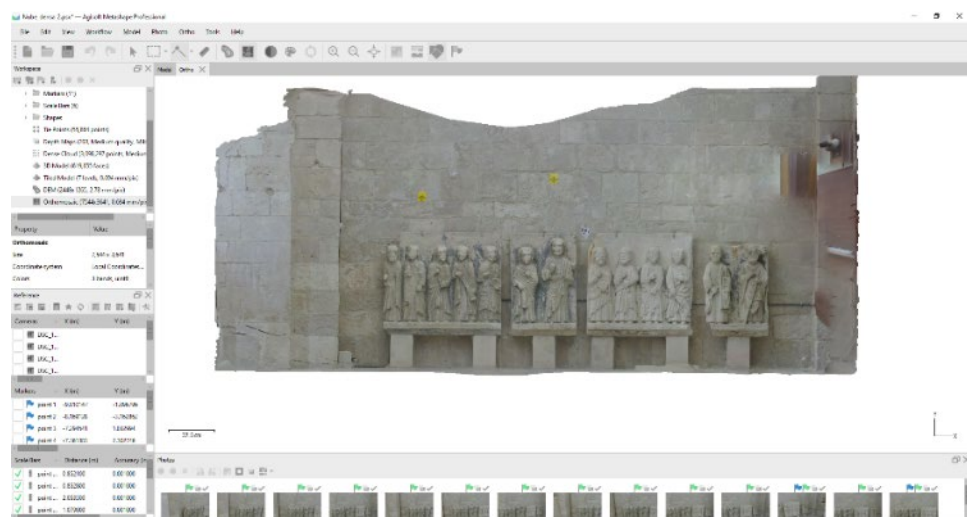


Figure 7. Orthomosaic Model

Incorporation of the digital twin in a BIM environment

Currently, there is research that demonstrates the benefits of Historic Building Information Modeling (HBIM), both for collaborative management of conservation project operators and monitoring and recording of the life cycle of the project itself. As BIM also has the possibility of introducing reports and managing input variables, and in automation technology it can allow through IoT (Internet of Things) the development of sensors to capture data in real time from the physical model, the connection with the Model Building Information. The implementation of DT (Digital Twin) for the management of prevention, maintenance and restoration in CH requires the adoption of an integrated approach of collaboration between specialists;²¹ Construction physicists, data engineers, restorers, historians, and surveyors.

Another important aspect is how to incorporate the concept of the Digital Twin into Cultural Heritage and if it would be possible to add this term to works of art. The term Digital Twins (DT), has several meanings, thus Al-Sehrawy and Kumar²² determined up to 18 different definitions, defined in three aspects; identity and nature, objective and purpose, and finally, the third in the main constituents,

elements, and components. Of all of them, the digital twin was found as a construction of digital information on a physical system, an element defined by Grieves and Vickers.²³ In this sense, Grieves presented DT for the first time at a conference in 2002 at the University of Michigan. From then on, NASA incorporated this term in satellites that were not accessible for research inspections. This new concept requires generating precision in the measurements and obtaining results related to new physical models. Therefore, converting the analysis case studies of this project using BIM models into a digital twin allows i) collection, ii) analysis and iii) visualization of the data, that is, the monitoring of the gradients of temperature, humidity and flows of water heat in a digital model. Advances in digital twins can serve as enabling technologies. Tao et al.²⁴ worked on the six important points to build a digital twin. One of the main steps is the reconstruction of a virtual representation and incorporating data to facilitate design decisions and simulations of virtual systems. Digital twins therefore monitor the life cycle of a process by reproducing its operation in a virtual model. Angjeliu et al.²⁵ in a reduced term, speaks of a digital replica of physical reality. Hence the importance of reconstructing case studies in BIM models that, in addition to representing complex geometric structures, can control the semantic content.²⁶ Although it may seem that the parameters added in a study platform dedicated to works of art are "quasi-static" parameters such as generic models, the incorporation of other parameters such as material tests, non-invasive tests, among others, allows a dynamic aggregation in the life cycle of these sculptures. This way of proceeding further lays out the principles of an approach to easily replicate heritage objects.

The potential of the digital twin under the BIM environment for heritage is the representation of an accurate 3D model, with real capture of the physical model through the tools of Massive Data Capture Systems (MDCSs) and converted into intelligent models by incorporating the enriched semantics from sensors. Nagakura and Sung²⁷ state that having a digital model of historical heritage means obtaining a tool that allows buildings to be taken to laboratories or registered in museum galleries, and from this sense the advantage of having a DT is to bring the laboratory to the heritage building. In this sense, the control and recording of a wide variety of physical parameters, such as sensors, allow researchers to establish the environmental conditions of works of art within the heritage building as a museum. Therefore, the monitoring of dynamic parameters is produced, helping to identify problems and potential threats related to the location of objects such as paintings or, in this case, sculpture.

The procedure for the interrelation between HBIM and DT suggests a static and dynamic database,²⁸ the first incorporating the geometric and spatial entities of the 3D information model, the second referring to the operational information in real time, which can be called monitoring of parameters or sensors that can affect the work of art. In this way, the processing of the geometry of the analyzed sculpture would be the first category to insert in a HBIM-DT relationship, the second category would be to establish the interoperability mechanisms between sensor software and the BIM environment for the insertion of dynamic data.

CONCLUSION

The creation of a digital twin of the sculpture frieze of the cattedrale di San Corrado Duomo di Molfetta (XII-XIII sec.) was studied with the data acquisition technique through SfM photogrammetry. With the applicability of this technology, it is possible to capture and record the true geometry, create predictive models of degradation, evaluation of the painting in the framework of the sculpture, and, in general, detect pathologies in relation to the mineralogy of the stone. In this research, a digital twin of the sculpture frieze taken to BIM is built from an evaluation of the resulting model based on photogrammetry. 3D scan point cloud data is used to create parametric BIM objects in complex shapes in the field of artistic sculpture. The results show that it is possible to create a sculpture model in which the information that carries the strategic lines of intervention is dumped.

NOTES

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- ² Abobakr Al-Sakkaf, Tarek Zayed, and Ashutosh Bagchi. "A sustainability based framework for evaluating the heritage buildings." *International Journal of Energy Optimization and Engineering (IJEEO)* 9, no. 2 (2020): 49-73.
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- ⁴ DigitalEurope. "Digital Building Transformations for Europe's Green Renovations: Sustainable Living and Working." 2021. <https://www.digitaleurope.org/resources/digital-building-transformations-for-europes-green-renovations-sustainable-living-and-working/>.
- ⁵ Dirk Hartmann, and Herman van der Auweraer. "Digital Twins." *SEMA SIMAI Springer Series* 5 (2020): 3–17. <https://arxiv.org/abs/2001.09747v1>.
- ⁶ Alberto Guarnieri, Antonio Vettore, Martina Camarda, and Costantino Domenica. "Automatic registration of large range datasets with spin-images." *Journal of Cultural Heritage* 12, no. 4 (2011): 476-484.
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SAFEGUARDING INTANGIBLE CULTURAL HERITAGE (TWO CASE STUDIES OF LIVING HUMAN TREASURES IN IRAN)

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INTRODUCTION

Few countries are as rich as Iran in terms of cultural heritage in both quality and quantity. A great deal of Iranian tangible and intangible cultural heritage as well as natural and documentary heritage has so far been recognized, while much more that is less-known or unknown remains to be acknowledged and registered. There have been laudable and substantial efforts to safeguard Iran's cultural heritage. But there is more to this than meets the eye. Some Iranian cultural heritage has been protected, but cultural heritage risk being lost. Today, cultural heritage is less neglected, since most Iranians somewhat recognize its material value, and there is a much greater willingness to protect it. This wider public awareness is the fruit of cultural heritage efforts. Although there is a legitimate concern about what the loss has cost, this emerging awareness is a welcome step regardless of the need for extensive, high-quality, and costly preservation efforts. However, two things should not be overlooked:

1. The survival, and to a great extent, the decline of communities and nations depend on how well they preserve their cultural heritage. Therefore, cultural heritage should not be considered something decorative and non-functional;
2. Overly simplistic and negligent efforts are unacceptable; especially in the case of intangible cultural heritage because even delinquency can lead to irreversible damage.

An important preliminary measure for safeguarding intangible cultural heritage is to ensure its identification by drawing up and regularly updating national inventories¹. However, in addition to this initial identification stage, one of the most effective ways to achieve the sustainable safeguarding of intangible cultural heritage would be to guarantee that the bearers of that heritage continue to further develop their knowledge and skills and transmit their knowledge to younger generations. Bearing in mind this double perspective, the bearers of intangible cultural heritage must be identified, among whom some will be given official recognition and encouraged to continue to develop and transmit their knowledge and skills.

DEFINITIONS OF INTANGIBLE CULTURAL HERITAGE AND LIVING HUMAN TREASURES

Intangible cultural heritage, or living heritage, consists of practices and expressions, as well as the knowledge, skills and values associated with practices that communities and groups recognize as part of their cultural heritage. This heritage is transmitted from generation to generation, for the most part orally through shared practices and events. Intangible cultural heritage is constantly recreated in social

and cultural contexts. This provides individuals, groups and communities with a sense of identity and continuity and constitutes a guarantee of sustainable development.

“Intangible cultural heritage” is manifested inter alia in the following domains, on the understanding that the expressions of intangible cultural can simultaneously belong to several of these domains:

- Oral traditions and expressions including language as a vehicle of the intangible cultural heritage;
- Performing arts;
- Social practices, rituals and festive events;
- Knowledge and practices concerning nature and the universe;
- Traditional craftsmanship.

Living Human Treasures is a term used to designate persons who possess a high degree of the knowledge and skills required for performing or re-creating specific elements of intangible cultural heritage. There are already a variety of titles used in different countries: Master of Art (France), Bearer of Popular Crafts Tradition (Czech Republic), National Living Treasure (Republic of Korea), and Holder of an Important Intangible Cultural Property (Japan and Republic of Korea).

OBJECTIVES TO SUPPORT LIVING HUMAN TREASURES

The primary purpose of Living Human Treasures is to preserve the knowledge and skills necessary for the performance, enactment or recreation of intangible cultural heritage elements with high historical, artistic or cultural value. Including measures for the provision of, for example, special grants/subsidies to designated Living Human Treasures, so that they can assume their responsibilities for the safeguarding of intangible cultural heritage. These measures aim especially at:

- 1.The perpetuation and development of their knowledge and skills;
- 2.The transmission of their knowledge and skills to the younger generations through formal or non-formal training programmes;
- 3.Contributing to the documenting and recording of the intangible cultural heritage concerned (for example with video or audio recording, publications);

Also encouraging younger people to learn and acquire the knowledge and skills required for the enactment or recreation of elements of the intangible cultural heritage by providing them with public recognition and support at the community, national or international levels.

SELECTION CRITERIA FOR LIVING HUMAN TREASURES

In nominating a person or a group to the rank of “Living Human Treasures”, the following criteria are considered for eligibility:

- The excellence in the application of the knowledge and skills displayed;
- The dedication of the person or group;
- The ability of the person or group to further develop his or her knowledge and skills;
- The ability of the person or group to pass on the knowledge and skills to trainees.

MEASURES FOR A SUSTAINABLE SAFEGUARDING

Transmission

Appropriate training, whether at formal educational institutions or through direct and traditional master/pupil apprenticeships, is essential to ensure that the knowledge and skills are transmitted from the Living Human Treasures to young people.

Documentation

Recommendations include the creation of appropriate documentation about the knowledge and skills employed by Living Human Treasures, using all available methods (such as collection, cataloguing and transcription). This documentation can establish inventories of institutions, archives and documentation systems, museums or ethnographical departments, existing museums concerned with intangible cultural heritage, and ways to train collectors, archivists, maintain document and list of specialists.

Promotion

This may involve:

- Awareness-raising and promotion by regularly organizing performances, demonstrations, exhibitions. Creation of audiences will motivate, the Living Human Treasures to practice and further develop their knowledge and skills, and those who, among the young generations, wish to be trained, will be provided with opportunities to enrich their experiences;
- Provision of subventions to enable research and publishing of printed, audio, video and multi-media documents related to intangible cultural heritage concerned and its bearers;
- Introduction of intangible culture into educational curricula.

RECOGNITION AND REWARDS

The principal reward for a Living Human Treasures is public recognition. However, the goal is to ensure the transmission of knowledge and skills that these bearers master and make efforts to ensure the perpetuity of the expression of intangible cultural heritage concerned. Therefore, financial rewards should be considered, in order to encourage the Living Human Treasures to assume their responsibilities of transmission, documentation and promotion. This may involve the provision of raw materials, or equipment and supplies in cases where the construction or costs of running workshops and training facilities are burdensome. Other types of rewards could also be considered. For example, when there is no public health service, the grant of medical and hospitalization benefits would be a considerable benefit.

LIVING HUMAN TREASURES: A FORMER PROGRAMME OF UNESCO

Set up in 1993 and discontinued when the 2003 Convention entered into force, the Living Human Treasures programme aimed at encouraging the Member States to grant official recognition to talented tradition bearers and practitioners, thus contributing to the transmission of their knowledge and skills to the younger generations. States selected such persons based on their accomplishments and their willingness to convey their knowledge and skills to others. The selection was also based on the value of the traditions and expressions concerned as a testimony of the human creative genius, their roots in cultural and social traditions, and their representative character for a given community, as well as their risk of disappearance.²

Until now 53 persons were recognized in the national list of Living Human Treasures in Iran as bearers and practitioners, including Ayman Baji who is a 73-year-old woman and Gholamreza Nabipour who passed away some years ago, unfortunately. One of the regrettable losses was Zobeydeh Asadzadeh, who passed away without recognition in this list. Zobeydeh was the last bearer of the old folk music associated with the nationally-significant ritual of "Zardeg Beh Dar". She was the only person in her day to have learned every folk song and custom related to the ritual directly from her predecessors and she also learned how to perform them. Zobeydeh was a *rara avis* of our times but remained obscure because she lacked big-city hipness and appeal. She lived and died in loneliness, leaving us deprived of the treasury of her knowledge. There are still jewels like "Master Gholamreza the Qanat-Maker" (systems of underground aqueducts used especially for the purpose of irrigation) and "Lady Zobeydeh" in every corner of this land, yet we are blind to them. Let us hope that these unknown gems—that truly

deserve to be called Living Human Treasures—are one day discovered and introduced via the cameras or pens of international researchers or tourists and this motivates us to appreciate them too, if for no other reasons than to catch up with the trend of recognizing intangible culture heritage.

Individuals on the list possess outstanding and rare knowledge and skills in different areas of intangible cultural heritage. Among them are Shir-Mohammad Espandar,³ Najaf Daryabandri,⁴ Hamzeh Ilkhanizadeh,⁵ Dervish Ali Maddah Vazvani,⁶ and Gholam Agh.⁷ A brief look at the National List of Intangible cultural heritage reveals that women play a superb and influential role in originating, continuing, and transmitting intangible cultural heritage. Compared to men, women's contribution to the safeguarding of intangible cultural heritage is so substantial that they may be regarded as crucial to this important endeavour. Two important examples of people who led in the preservation of intangible cultural heritage are briefly described as examples of leaders.

AYMANBAJI, A SIYAH-DOOZI MASTER



Figure 1. Ayman Baji

Umm Ayman Dehghan, (Ayman Baji), was inscribed as a Living Human Treasures on the national list of Iran on September 9, 2018, becoming the first Iranian woman to receive this honour. An accomplished embroiderer, Ayman Baji was born in 1949 in the village of Shahkuh-e Sofla,⁸ Gorgan County. At the age of ten, she started learning embroidery and its regional variant known as siyah-doozi,⁹ as well as jajim weaving, traditional-style weaving with wool and cotton, sock knitting, and spinning from her mother, Khandan, and grandmother. Now, having passed 70 years of age, she is still keeping the precious art of siyah-doozi alive and has taught it to her daughters and sisters-in-law, as well as the young women of her village. Her former students are now using the craft to embellish the clothes of Shahkuh women.

Siyah-doozi is one of Gorgan¹⁰'s most delicate and distinguishable offerings, with few other Iranian crafts matching its excellence. A type of embroidery, it involves decorating women's clothing¹¹ with folk designs. The dominant colour in this needlework style is black. In siyah-doozi, boteh and simple floral motifs, as well as angular and curved lines, are stitched freehand into light-coloured fibres, producing designs differing from those used in other forms of needlework practiced in Gorgan.

Ayman Baji also wore the Shahkuh folk costume to public events to help safeguard and promote the traditional culture of the region—and her effort proved influential. This seasoned craftswoman and

teacher, has showcased her work at numerous national and international exhibitions, receiving praise from various organizations.

Although Ayman Baji can no longer produce work herself, many women in her village, who have learned siyah-doozi from her, are keeping the flame of this old and precious art burning. Currently, Shahkuh is the main producer of siyah-doozi, though there are home workshops also in the rest of Gorgan County (the village of Mohammadabad) and the counties of Kordkuy¹² and Gonbad-e Kavus¹³ decorate folk costumes, women's manteaus and scarfs, cushions, tablecloths, curtains, and similar items. In addition to being professionally practiced, the craft is also taught the traditional way, that is, non-formally and hands-on—the same way Ayman Baji trained her children, her sisters-in-law, and the girls in her village. However, formal siyah-doozi training has also become common recently and is offered by handicraft schools in Gorgan County and its village of Mohammadabad, as well as Gonbad-e Kavus County.



Figure 2. Ayman Baji

Happening at a dizzying pace, industrial and economic changes and the expansion of communication has transformed intangible cultural heritage. The current situation has diminished the appeal and relevance of traditional artifacts and rendered the related businesses unprofitable. The traditional production of handicrafts such as siyah-doozi and other forms of folk embroidery is having a hard time competing against its industrial counterpart, which offers more design variety, costs less, and industrial production is faster.

GHOLAMREZA NABIPOUR, A QANAT-MAKER MASTER

Gholmareza Nabipour was a veteran qanat constructor, who lived in Gonabad¹⁴ and was impressively knowledgeable and skilled in identifying, conserving, and managing qanats. Since he was a teenager, he was engaged in learning in construction of qanat. When he was 17, he achieved the necessary skills for teaching this considerable expertise.

In the arid regions of Iran, agricultural and permanent settlements are supported by the ancient qanat system of tapping alluvial aquifers at the heads of valleys and conducting the water along underground tunnels by gravity, often over many kilometres. The eleven qanats representing this system include rest areas for workers, water reservoirs and watermills. The traditional communal management system still in place allows equitable and sustainable water sharing and distribution. The qanats provide exceptional testimony to cultural traditions and civilizations in desert areas with an arid climate. The levels, gradient and length of the qanat are calculated by traditional methods requiring the skills of experienced qanat workers and have been handed down over centuries. The traditional communal management system

still in place allows equitable and sustainable water sharing and distribution. Based on complex calculations and exceptional architectural qualities, water was collected and transported by mere gravity over long distances and these transport systems were maintained over centuries and, at times, millennia. The eleven qanats forming this property are still active water carriers and have retained not only their architectural and technological structures but also their function. They continue to provide the essential resource of water sustaining Iranian settlements and gardens and remain maintained and managed through traditional communal management systems. These management systems have remained intact and have been transferred from the distant past thanks to the collaboration of people and users. The authenticity of the eleven qanats has been respected regarding design, technology, building materials, traditions, techniques, management systems as well as intangible heritage associations based on knowledge of the natural environment, material technology and the indigenous culture. Qanats have been founded and constructed based on social collaboration, communal trust and honesty as well as common sense. Furthermore, their stability and functionality have been managed, preserved, expanded and developed based on such cooperation. The eleven qanats are managed under the traditional supervision of qanat councils, each qanat with its local qanat council composed of those knowledgeable in the respective region. The traditional management systems of the inscribed qanats contribute to their unique value but are also essential to their continued preservation and transmission to future generations. Historical knowledge and craft skills preserved over many generations need to be continuously handed down to ensure the future viability of this property. This management system, set up by owners, distributors, consumers and ordinary people, has developed and evolved with time which has made qanats survive until today and will be the key to their future conservation.¹⁵

Nabipour was born in 1923 in Razavi Khorasan Province of Iran. He considered himself responsible for transferring this valuable knowledge to future generations. He was strongly against digging deep wells, considering this wells are a main threat to the qanats. Unfortunately, Gholmareza Nabipour was discovered too late. A brief look at the significance of Gonabad¹⁶'s Qanat of Ghasabeh¹⁷ is enough to understand the gravity of this loss. In 2016, UNESCO designated it as a World Heritage Site for having outstanding international significance. This unique master made progress in identifying, protecting and introducing and in the process of preparing the file of The Persian Qanat. Also, traditional knowledge of qanat construction in Gonabad was inscribed in documentation on the Urgent Safeguarding Intangible cultural heritage of Iran in 2014. Gholamreza Nabipour's house is going through restoration and it will become a museum in as well as displaying a statue of Nabipour in the Gonabad Museum of Anthropology.

The exact date of the qanat's construction is unclear. Some archaeologists put its age at around 2000 years. Its ancientness was documented about a thousand years ago by Nasir Khusraw,¹⁸ visiting the Qanat on his way back from his famous journey; "It is said to have been commissioned by Kay Khosrow¹⁹ " We would not have inherited the qanat of Ghasabeh from the depths of history if it was not for the efforts of unknown qanat constructors such as Mr. Nabipour.



Figure 3. Gholamreza Nabipour

CONCLUSION

One of the general criteria for evaluating successful safeguarding measures is the amount of participation in the continuation of these practices. According to field studies, more people especially women and youth are interested to learn Siyah-doozi compared to Qanat making. Another criterion is about passing it on to the next generation. For example one of the practitioners of Ahar muqahar papers who did not want to transmit this tradition to the next generation thus not contributing to it being recognized as a Living Human Treasures. However, our case studies demonstrate that practitioners with an insatiable desire to pass their knowledge to the next generation contribute to increasing the visibility of the Intangible cultural heritage. Other criteria are the degree of success in monitoring the status of the carriers and performers of the new generation (apprentices, students, performers and other participants) and the amount of non-governmental support (such as the establishment of public financial support funds.) In both case studies to some extent, these criteria have been realized, but comprehensive safeguarding strategies are required because as mentioned above, any negligence in safeguarding intangible cultural heritage and spreading the knowledge and skills of their bearers and practitioners will lead to irreparable damages.

NOTES

- ¹ Cf. "Article 12 of the Convention for the Safeguarding of the Intangible Cultural Heritage," UNESCO Organization, accessed July 22, 2022 for the Safeguarding of the Intangible Cultural Heritage
- ² "Living Human Treasures: a former programme of UNESCO," UNESCO Organization, accessed July 22, 2022. <https://ich.unesco.org/en/living-human-treasures>
- ³ Baloch Folk Music category
- ⁴ Died in May 2020; Documentation and Popularization of Culinary Heritage category
- ⁵ Safeguarding Polo category
- ⁶ Died in June/July 2021; Preservation of the Naqqali Tradition category
- ⁷ Traditional Craft of Turkmen Jewelry Making category
- ⁸ Village in Iran
- ⁹ lit. "black-sewing"
- ¹⁰ A Province in IRAN
- ¹¹ The region's folk costume for women consists of a headscarf, a shirt, a short pleated skirt (charkh shalvar), black pants (tonban), a vest, a hat, and a wool jacket.
- ¹² City in Iran
- ¹³ City in Iran
- ¹⁴ Gonabad is a city located 285 km south of Mashhad, the capital of Razavi Khorasan Province of IRAN.
- ¹⁵ "The Persian Qanat," UNESCO WORLD HERITAGE CONVENTION, accessed July 22, 2022 <https://whc.unesco.org/en/list/1506/>
- ¹⁶ City in Iran
- ¹⁷ The deepest Qanat in the world and the most excellent Qanat engineering.
- ¹⁸ Poet
- ¹⁹ Book character

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VIRAL CULTURAL HERITAGE: A CASE STUDY APPLYING HYBRID DISCOURSE ANALYSIS

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INTRODUCTION

This text briefly presents a research developed by the author, since 2020, about contemporary social and cultural processes that contextualize the '*viral cultural heritage*'. This concept may be briefly defined as the cultural heritage overwhelmed and transformed by the Covid-19 pandemic conjuncture. Such research is being pursued within the *Observatory on Cultural Heritage, Digital Arts and Urban Tourism: for the Politics of the Territory*, at the University of Minho, Portugal, inside the articulated areas of urban sociology and new media methodologies.

More concretely, this essay aims to understand some central connections between, on one hand, *cultural heritage* and, on the other hand, the *covid-19* pandemic within the urban social fabric, that is, *cultural heritage at risk*.

THE SOCIOLOGICAL DEBATE ON CULTURAL HERITAGE AT RISK

As a contextual sociological perspective, this text used the contributions of three central sociologists (see Figure 1): Ulrich Beck¹ who coined the concept 'Risk Society'; Manuel Castells,² who initiated an influent discussion about the 'Network Society'; and John Urry,³ who argue that 'urban mobilities' is paramount to understand the social life of the urban fabric. Such discussion has proven to be useful, in order to develop a sociological debate on cultural heritage at risk. In fact, one recent global risk is the Corona virus pandemic, which is hugely contributing to transform our social formations into a '*Viral society*'. This is a concept coined in previous studies, mostly undertaken in 2020, since the rising if the Covid-19 pandemic, articulated with the above-mentioned authors' ideas⁴

[Some viral society's characteristics are the following:] *Viral economies and technologies*, based on capitalism global fragilities and economic crises, caused not only by computer viruses, but also and increasingly, by biological viruses; *viral politics and politicians*, for example the possibility that certain States, institutions, organizations, associations, or other social agents, use various types of viruses as local or global weapons of threat, aggression or surveillance; *viral cultures and cults*, meaning modes of exercising Science and the arts, or other knowledge and leisure, through virulent strategies, that is, according to the idea that the more followers and / or friends (or, in certain cases, the more enemies) they articulate or branch with a given individual or collective subject, the more cultural and cult value that subject accumulates and / or distributes across the social fabric (p. 58).⁵

The centrality of the social dimensions of this process, is confirmed by several early studies about the Corona virus pandemic, notably on a structural macro dimension, the parallel economic crisis;⁶ and

concerning the agents' micro dimensions, e.g., doctors and nurses perceived as 'heroes of the pandemic';⁷ or the dialects of global and local dimensions, visible in the dramatic situation in Italy, the first European country to be hit in the first months of the outbreak.⁸

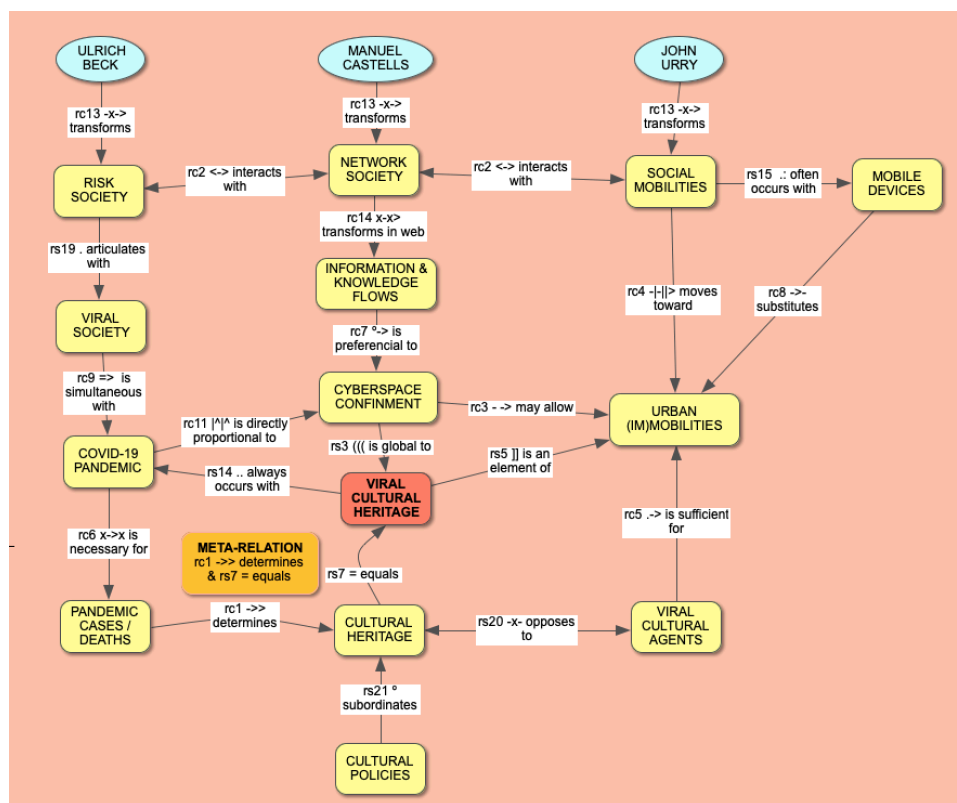


Figure 1 The debate on viral cultural heritage

This idea of Viral Society is applied here within a debate about an emerging process named 'viral cultural heritage' (see Figure 1). In this image, it is possible to observe some relationships among the concepts coined by the referred authors, extracted from an *Alphabet of Interconceptual Relations*.⁹ Such alphabet circumscribes 37 sociological and logical relations: 23 connections showing a social structural nature; and 14 links of conjunctural nature, translating more specific social events and actions. Figure 4 also show the codes corresponding to each of these connections. E.g., 'r5 .->' is a code that signifies 'sufficient condition'. The 'r5' part indicates the 5th relation defined within the 'conjunctural sociological class', and it is named 'conjunctural relation n° 5'. This link is expressed in the Figure 4 as 'r6 .-> sufficient condition', because it articulates: (a) on one side, the 'anterior concept' (conditions, causes, etc.) in a sentence in a natural language e.g. English (and in the correspondent sociological proposition), in this case 'viral cultural agents'; (b) to, on the other side, the 'posterior concept' in a sentence/proposition (consequences, effects, etc.), here called 'urban (im)mobilities'.

In the sociological analysis reported below, these or other relations will be interpreted both qualitatively using softwares such as NVivo, and quantitatively via statistical softwares.

METHOD: HYBRID DISCOURSE ANALYSIS

Precedent contents are analyzed and interpreted here, besides classical sociological procedures, via a qualitative and quantitative sociological method that the author developed, named *Hybrid Discourse Analysis*. Using this methodology, some interrogations and conjectures may now be enunciated and tested, in what regards the content of the selected corpus, Wikipedia pages about Covid-19 pandemic¹⁰ and on Cultural Heritage.¹¹ Such questions may be put in particular on *hybrid social processes*, through

the construction of subjacent *discursive and sociological propositions*. These propositions may be identified as collective or individual logical sentences, socially and culturally produced, disseminated and consumed via natural and national language sentences, that are spoken or written daily by social agents. In sum, a dialectics among the social fabric, social logics and (Socio)logics is exposed in the forward lines. Hybrid discourse analysis utilizes several QDA (Qualitative Data Analysis) software, such as NVivo.

According to Ludwig Wittgenstein, such language sentences and their correspondent logic propositions may be hybridized through ‘language games’,¹² and languages games can be analyzed via the *Hybrid Discourse Analysis* method, with the help of the *Alphabet of Interconceptual Relations*, already introduced.

Please note that ‘*hybrid*’ here means that the analyzed sentences/propositions may exchange their own natures, within various social fabric realms. That is: language sentences may receive or give intrinsic or social characteristics, within interactions with other sentences and with the respective social agents who exchange them (e.g., collective actors such as the authors of the Wikipedia pages here analyzed). And (socio)logic propositions may import or export properties from other (socio)logic propositions, within a given social context interpreted by a sociologist. In addition, relationships among concepts may be related with other relationships, as well inside social situations, in this case producing *meta-relations* (see examples below).

Analysis and Interpretation of the Corpus.

Questions and Hypotheses within Hybrid Discourse Analysis

At this point, some questions and hypotheses within Hybrid Discourse Analysis were The present case study essentially puts the following questions to the Wikipedia pages which discuss “Covid-19 pandemic” and “Cultural Heritage”, in articulation with Cultural Studies or other school of thought.

Among the themes associated with Covid-19 and Cultural Heritage, which *social processes* are the most relevant, for the authors of that pages, and for their inherent social and cultural discourse?

What are the *central concepts* that represent the precedent social phenomena?

What *social relations* articulate such concepts?

Meta-relations, that is, relationships which associate other relationships, can be identified within the corpus?

Sociological networks, that is, conceptual constellations that give a synthesis of the spoken/written reality, may be constructed inside the selected Wikipedia pages? Sociological networks are specified below into *Semantic-logic networks* that transform the semantic meanings that social actors produce via sentences and words belonging to natural languages (English, Portuguese, etc.). Inside a Semantic-logic networks, common words, usually substantives are translated into *concepts*; verbs are used as *inter-conceptual relations*; and daily sentences are modified into *(socio)logical propositions*.

Social and Sociological Dimensions of Viral Cultural Heritage

Concepts

Hybrid Discourse Analysis begins with a conceptual analysis. This strategy extracts both the main concepts that structure the text, and their social and sociological dimensions. Within the selected corpus, social structures are the most frequent social dimension, with 2233 mentions inside the sentences of the text, previously divided into (socio)logical propositions (cf. Figure 2, the first column).

The second more cited analytic category is *relations among concepts* are (1503 references in the analyzed texts).

Inside the dimension ‘social structures’, the process of ‘cultural heritage’ is better understood sociologically as a social discursive structure. The present corpus registers 2233 propositions that

include mentions to *social structures*, and 1352 sentences relative to *discursive structures* (see Figure 2, column 2), e.g. ‘arts and cultures’ (206 propositions). Another social structures that are pertinent to this study were classified in the social-semantic class ‘medicine and health’, which gathers 564 mentions inside the text propositions (Figure 2, column 3).

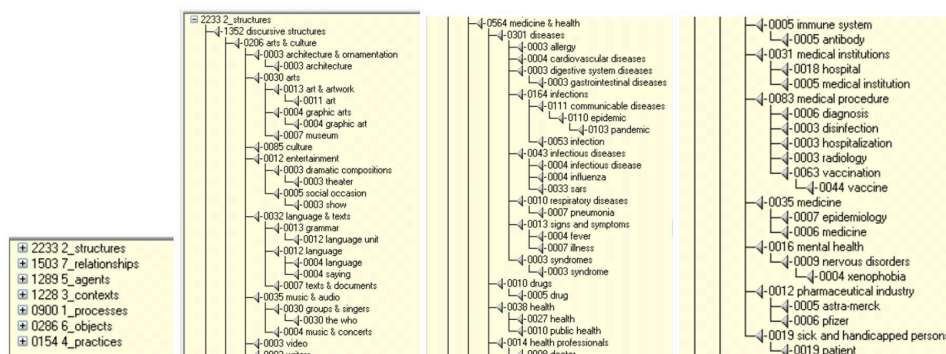


Figure 2 Social and sociological dimensions, discursive structures and social agents' health

Social agents is other social dimension reported the Wikipedia pages in the corpus, especially those related with social structures '*medicine and health*'. The main social agents reported are 'doctor' (8) and 'patient' (19).

Inside the sub-class 'infections', 103 references to 'pandemic' appear. 'Sars' receive 33 mentions, inside the sub-category 'infectious diseases'.

63 citations are directed to 'vaccination', And within the 'pharmaceutic industry' (Figure 2, column 4), the vaccines more designated are Pfizer and Astra-merck and (6 and 5 indications, respectively).

Semantic-Logical Networks

Semantic-logical networks are sociological conceptual configurations that translate social meanings into sociological signifiers. They can be used to make concepts more understandable through the respective relationships.

Figure 3, on its left, shows an 'Orbital' semantic-logical network, where the concept '*social inheritance*' is surrounded by other concepts, via concentric circles that signify a greater or lesser degree of association in what regards the central concept. 'Inheritance' here means a dialectical and not static legacy, subjacent to a social formation. Therefore, a social inheritance includes not just cultural heritages, but also economic, ecologic and political heritages, among other social legacies, that may constitute sufficient pillars for the necessary social transformations, in a given historical conjuncture. Within the horizontal direction, the network denotes the conditional position of concepts inside the total set of written sentences or all corresponding (socio)logical propositions. Observe on the left, the antecedent concepts (causes, etc.), for instance 'cultural heritage' and its 'protection' related to cultural policies. The network right side unveils the subsequent concepts (effects, etc.). E.g., 'management' and 'conservation' of cultural heritage, or the discursive role on cultural heritage by 'Wikipedia'.



Figure 3 At left, an 'Orbital' network shows the concept "inheritance" and its 'satellite concepts'; at right, an 'Axial' network presents actant/acted social processes/sociological concepts

Another type of semantic-logic network, the ‘Axial’ web, is shown in Figure 3, on its right. Social inheritance is here located as ‘actant’, which signifies a conditionality relatively to other social phenomena represented by concepts, the ‘acted’ ones. For example, in this corpus, social inheritance appears as a core factor to other social phenomena, such as the pandemic outbreak of Covid-19. Other processes/concepts connote as well such conditionality, e.g., cultural heritage ‘protection’ by ‘governments’, and the protection of ‘people’ by the ‘World Health Organization’. Or countries as Italy where the pandemic initiated in the West. Curiously, China is located in an ambiguous position, at the confluence of the vertical and horizontal axes in the image, both as cause of the pandemic, and one of the countries that combated it more systematically.

Concepts are represented by spheres, as in the Orbital network. The lines show (socio)logical relationships among such concepts. Moreover, this network hybridizes qualitative and quantitative approaches.

Firstly, a qualitative prism is observable via the actant/acted ratio, at the horizontal X-axis: again, the notions to the left, noted in blue, mean anterior / antecedent / precedent / previous words within the social languages sentences and in the (socio)logical propositions. The concepts to the right, in green, represent the posterior consequent / following / resulting notions, inside the total sociological propositions of the corpus.

Secondly, a quantitative posture is activated via the relations, for each concept, that are focused around the vertical Y-axis. At the top of the network, the more intense relationships emerge, and at its bottom, the weakest ones are allocated. A solid line connotes a frequent association, and a dotted line means an infrequent link.

Another Semantic-Logical Network constellation genre, the ‘Star’ web, can be seen in Figure 4, also hybridizing qualitative interpretations and quantitative measurements.

The qualitative approach can be observed through the social and semantic (qualitative) relationships, that are now more ordered and distributed between two lists of concepts in a star form, the anterior ones and the posterior ones, around the central concept.

As for the quantitative positioning, at the top the higher frequencies of articulations are ordered (quantitatively) until the lower occurrences at the bottom *structures*. E.g., ‘cultural heritage’ is related to social inheritance in 8 sentences / propositions, which denotes the strong association between the two. Moreover, social inheritance is connoted with other ‘heritages’, such as ‘economic heritages’ via the word ‘management’, or with ‘political heritages’, e.g. through the term ‘protection’ of culture.

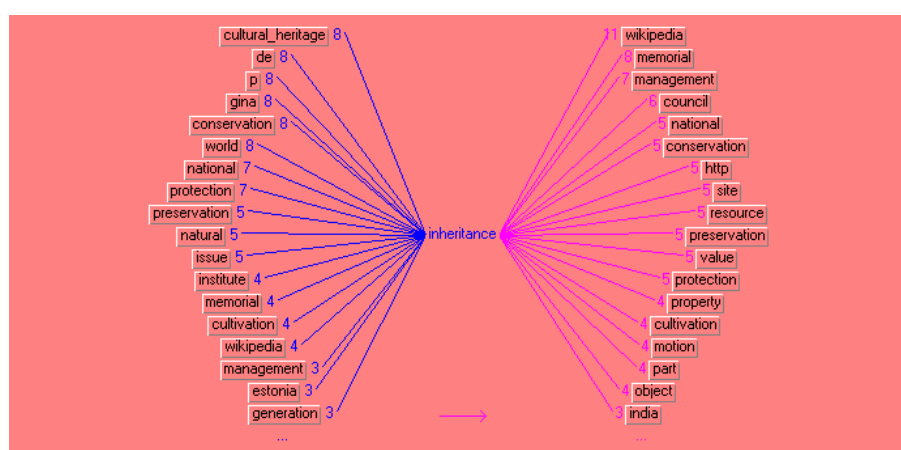


Figure 4 ‘Star’ Semantic-Logical Network, about social inheritance presenting concepts frequencies

It is also possible to conduct a Hybrid Discourse Analysis to a more profound level, by *changing the social and conceptual 'point of view'*. In fact, the researcher may use as well, as a central lens, the social process 'covid' as a core sociological concept, in relation with other social phenomena and social interpretations (see Figure 5 on the left). For instance, the referred 'World Health Organization' and the 'vaccine' may constitute effective weapons against Covid-19. And, among the 'virus' social effects, arose numerous 'infections' in '2020' in 'patients', and an exponential 'outbreak' of 'cases'.



Figure 5 At left, an 'Orbital' network shows the concept 'inheritance' and its 'satellite concepts'; at right, an 'Axial' network presents actant/acted social processes/sociological concepts

Note that, in Figure 5 on the right, Corona virus is more directly related with social inheritance than in Figure 5 on the left, by using the *actant/acted* prism, represented in the horizontal axis. There, the researcher is able to connect, more clearly in the same image, the two core themes here analyzed (social inheritance' and Covid-19). An analytic movement that changes different ideas as a core concept within one or several conceptual networks, is called '*transitivity*'. Here, the notion 'covid' is protagonist in the interpretation work, and the main direct relations with other concepts become more visible. Such strong connections are again noted in blue.

For instance, the relation between Covid and China is very significative. In fact, this country emerged as a decisive factor for the outbreak and spread of the pandemic. The relationships among China and the other social phenomena are testified via the connections that appear as lines. Figure 6 quantifies those relationships. Observe as well that China acts as a *mediating concept*¹³, insofar as it intermediates two other dimensions of society, a social structure (inheritance) and a social agent (Covid-19).

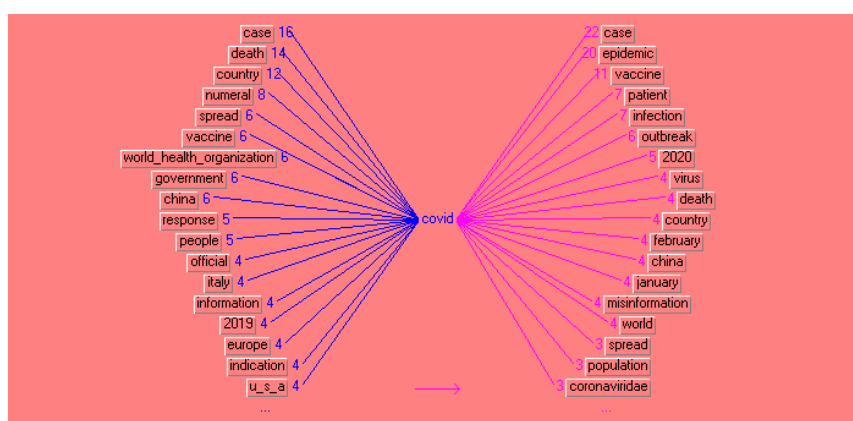


Figure 6 'Star' Semantic-Logical Network about Covid-19 presenting concepts frequencies

An example are presented below, in what regards the above-mentioned occurrences and relationships, shown in the actual text in English, within the Wikipedia page on Covid-19 pandemic.¹⁴ The number between [] indicate the order of the propositions after analysis.

[307] China as of 14 July 2020, there are 83,545 cases confirmed in China, excluding 114 asymptomatic cases.

RELATIONAL ANALYSIS & INTERPRETATION

A second stage of Hybrid Discourse Analysis, after considering concepts, is relational, through an application of the *Alphabet of Inter-conceptual relationships*. Within the selected corpus, 1503 occurrences of relations, extracted from this (socio)logical alphabet, emerged. (Socio)logical relations coded with 'rs' are *structural relations*, e.g. the 'globalization' relation, coded 'rs3 (((is global to'. And those coded with 'rc' are *conjunctural relations*, for example the 'digital network transformation' relation, coded as 'rc14 x-x> transforms in web'.

'Equality' relationship is the most common, among the structural relations. It is coded as 'rs7 = equal to', and was mentioned 307 times. Secondly, the 'wholeness' relation stands out, coded as 'rs1 (contains', and registering 118 references.

Among the conjunctural relations, the 'determination' relationship, coded as 'rc1 ->> determines', is the most numerous, with 169 occurrences. The second more frequent is the 'sufficient condition' relation, coded as 'rc5 .-> is sufficient for', and referenced 59 times. In Figure 7, see the other conceptual connections and their relative relevance in the corpus can be seen.

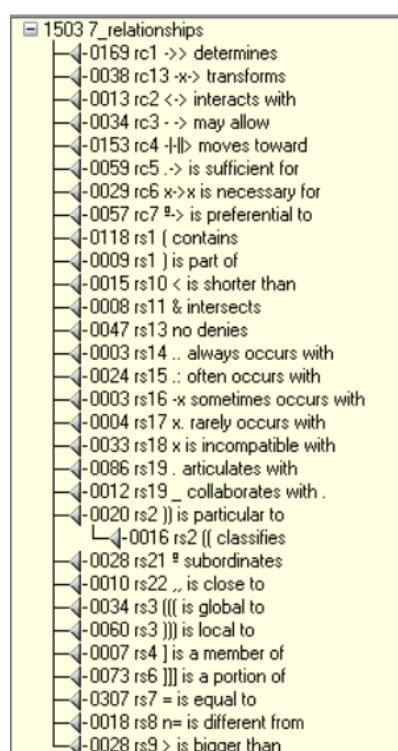


Figure 7 (Socio)logical relationships among concepts

Within the perspective of Hybrid Discourse Analysis, the next networks show how *a relation may be articulated with anterior and posterior concepts*. For instance, the 'interaction relationship' (Figure 8), is now promoted to a core idea, and therefore located at the center of the network. With this interpretation move, the 'interaction' relation obtains, at its left, anterior concepts and, at its right, posterior terms. Put in another way, the 'interaction link' is now comprehended as a '*relation-concept*'¹⁵ Moreover, the relation-concept, epistemologically, receives the status of a *hybrid concept* or, if you want, the connotation of a *hybrid relationship*, as it hybridizes concepts with relations, and vice-versa. Some of its more commonly associated antecedent concepts (acting sometimes as causes), connected with the '*interaction relationship*', are: government, information, inheritance, Europe, hospital, people. In what regards subsequent concepts (working e.g. as consequences of effects), virus, inhabitant, people, mutation, 2020 are relevant.

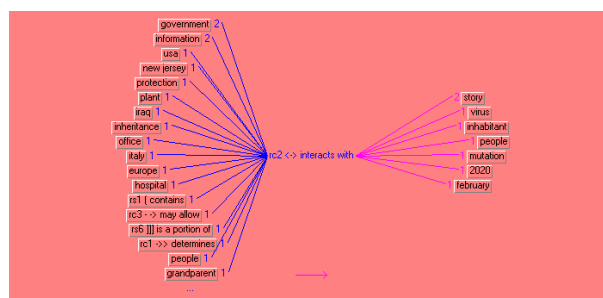


Figure 8 Relation 'determines' and its anterior and posterior concepts

An illustration of the terms used in the English language of Wikipedia Page about 'Covid pandemic' ¹⁶ and classified as belonging to the relationship 'interaction', is presented below, in *italic*.

[74] Deceased in a refrigerated 'mobile morgue' outside a hospital in Hackensack, New Jersey, U.S. More than 95 per cent of the people who *contract* Covid-19 recover.

Other interpretation strategy is using the above-mentioned *transitivity*, in a more profound way. Recall that this means to switch among core concepts, in a same or in different networks. For instance, we may go to a network (see Figure 9, on the left) that takes one concept (inheritance) connected with a relation-concept (determination) coded as 'rc1 ->> determine) as the network's core idea, therefore placed in the network centre. This signifies that such center is itself hybridized, as it fusions a concept and a relationship into a partial proposition. Observe the frequencies of the antecedent and subsequent concepts in what concerns the core idea. The anterior concept 'culture' is closely related with inheritance, via 65 propositions. As for posterior terms, inheritance may determine any one of them, e.g., the spread of the pandemic.

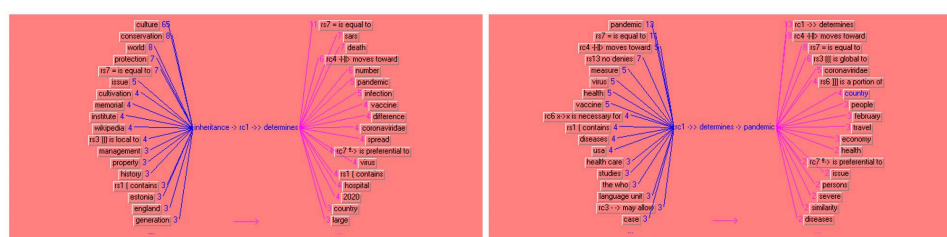


Figure 9 On the left: antecedent and consequent concepts to a proposition including the concept 'tourism' and relation 'transforms'; on the right: antecedent and consequent concepts to a proposition including the relation 'determines' and the concept 'pandemic'

An example of term 'Heritage' in the corpus is indicated in *italics*, and the relation 'determines' is noted in MAIUSCULES.

[75] contrast the misuse of Significant was the Convention Concerning the Protection privileges" (<https://www.youtube.com/of/WorldCulturalandNaturalHeritage> that was ADOPTED by playlist? If we now transit to the posterior concept 'pandemic', hybridized with the relation 'determine', both taken as the network central concept, we obtain one of the possible second parts of the precedent proposition represented in Figure 9, on its right. For example:

[388] Although it was THOUGHT [this is a word in the corpus indicating the relation 'determine'] originally the *pandemic* reached France on 24_January 2020,

Still other interpretation moves may be interesting to pursue, such as a hybridization between two relations-concepts, which may be considered as a central idea within a Semantic (socio)logical network (fig. 10). For instance, the relation 'determination' coded 'rc1 ->> determines' hybridized with the relation denominated 'equality'. coded 'rs7 = equal to'. Such association between two relations is named *meta-relation*. By so doing, a more profound comprehension of the object of study may be

achieved. Among the anterior concepts, ‘pandemic’ is the most common, with 13 occurrences. The same concept occurs less times (8) as a posterior concept. This seems indicate that the pandemic, at least within the discourse of Wikipedia, is more connoted with a cause of something, that as an effect. Moreover, the network central idea seems to corroborate such hypothesis. In fact, one of the words in common English that represent ‘determination’ is ‘cause’. And one of the English language terms that translate the relation ‘is equal to’ is ‘is’.

To observe what this means inside the corpus, a citation is exemplified below, located within the Wikipedia page named ‘Covid-19 pandemic’.¹⁷ The relation ‘determines’ is indicated in MAIUSCULES, and the relation ‘is equal to’ is noted in *italics*,

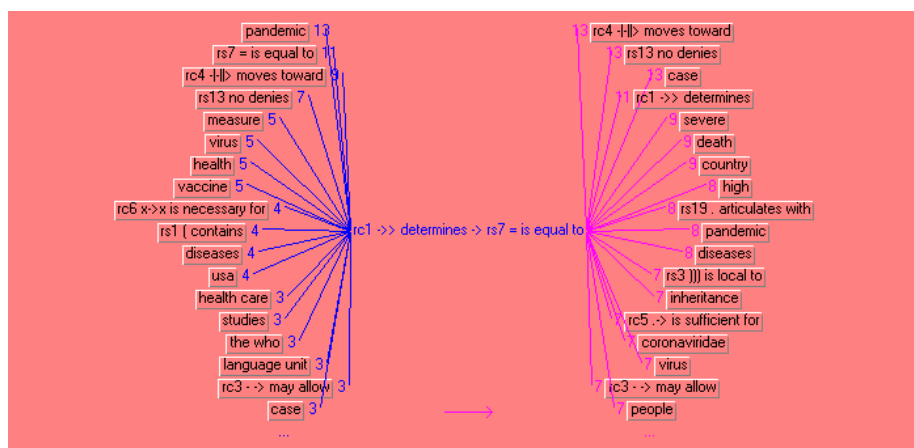


Figure 10 Prior and following concepts to relation ‘determines’ hybridized with relation ‘is equal to’

[30] The virus that CAUSED the outbreak *is known as* severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2), a newly discovered virus closely related to bat coronaviruses.

CONCLUSION

Within a substantive perspective, the (re)search posture above discussed, aims to develop both interesting and enjoyable content, by focusing on social and intercultural *hybrid processes*.

Within an epistemological lens, the *sociological hybrid hermeneutics* debated in this text may deal with a strong degree of social and cultural knowledge, and not just information about culture. Inside it, and methodologically, *Hybrid Discourse Analysis* is understood as a possible methodology for augmenting the interest of large audiences in what regards Cultural Heritage.

However, such hybrid conceptual and empirical strategy is still a work in progress, and a more profound development of its virtualities must be postponed to future opportunities.

NOTES

¹ Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage, 1992); Ulrich Beck, *World at Risk* (Cambridge: Polity, 2013); Ulrich Beck, *The Metamorphosis of the World: How Climate Change is Transforming Our Concept of the World* (Cambridge: Polity, 2016).

² Manuel Castells, *The Rise of the Network Society* (Hoboken: Wiley Blackwell, 1996).

³ John Urry, *Mobilities* (Cambridge: Polity Press, 2007); John Urry and Jonas Larsen, *The Tourist Gaze 3.0* (Thousand Oaks: Sage, 2011).

⁴ Pedro Andrade, Site *Viral & Intercultural Tourism City*, accessed December 29, 2020, <https://www.sites.google.com/view/viral-tourism-city>; Pedro Andrade, "Poema ao Corona Virus," Museu da Quarentena [poem written on march 7, 2020], accessed april 4, 2020c, <https://www.thierryferreira.com/museu-da-quarentena-arte-em-casa/>; Pedro Andrade, "Pessoa Effect," SOS ART PT, accessed april 8, 2020b, https://www.facebook.com/pg/sosartpt/posts/?ref=page_internal; Pedro Andrade, Poem on the Corona virus using Pessoa Effect: an app and e-book anti-virus (Lisbon: Social Web Lab Publishers, 2020a). [app accessible at: <https://sites.google.com/view/pedro-de-andrade-art-works/pessoa-effect>]; Pedro Andrade, "Pessoa effect within viral society: viral sociological poetry using apps and e-books anti-virus." in Proceedings of 2nd International Conference on Transdisciplinary Studies in Arts, Technology and Society, ARTeFACTo2020 (pp. 96-103) (Faro: Universidade do Algarve, Centro de Investigação e Comunicação. 2020d). [in paper, accessible at: <http://hdl.handle.net/1822/70089>]; Pedro Andrade, "(Re)search Art". Viral & Intercultural Tourism City, accessed December 29, 2020, <https://sites.google.com/view/pedro-de-andrade-art-works/research-art>

⁵ Pedro Andrade, "Cultural resistance to Covid-19: an Encyclopedia of Public Art for artists and tourism publics?" *Cadernos de Arte Pública* 2 (2020f): 57-74: <https://hdl.handle.net/1822/70089>

⁶ Joshua Gans, *Economics in the Age of COVID-19* (The MIT Press, 2020).

⁷ Anant Naik, *Heroes of a Pandemic* (Indy Pub, 2020).

⁸ Raffaele Rio, *Turismo in quarantena. Gli effetti del Coronavirus sul sistema italiano* (Tangram Edizioni Scientifiche, 2020).

⁹ Pedro Andrade [The Alphabet of Universal relations (ARU)] « O Alfabeto de Relações Universais (ARU) ». *Revista de Comunicação e Linguagens 'Mediação dos saberes'* 38 (2007): 143-55 [in paper, accessible at: <https://www.icnova.fcsh.unl.pt/wp-content/uploads/sites/38/2019/10/indice-38.pdf>]

¹⁰ "Covid-19 pandemic", Wikipedia, accessed August 23, 2021a, https://en.wikipedia.org/wiki/COVID-19_pandemic

¹¹ "Cultural Heritage", Wikipedia, accessed August 23, 2021b, https://en.wikipedia.org/wiki/Cultural_heritage

¹² Roy Harris, *Language, Saussure and Wittgenstein: How to Play Games with Words* (London: Routledge, 1990).

¹³ Pedro Andrade [The mediatic tavern, a reticular site of social and sociological negotiations] "A Taberna mediática, local reticular de negociações sociais e sociológicas." *Revista Crítica de Ciências Sociais*, 33 (1991): 265-286, 265.

¹⁴ "Covid-19 pandemic", 2021

¹⁵ Pedro Andrade, "Some synthetic ideas to work with qualitative analysis software," *Atalaia/Intermundos* 10/11 (2002): 153-165 [in paper, accessible at: <http://hdl.handle.net/1822/29994>]

¹⁶ "Covid-19 pandemic", 2021

¹⁷ "Covid-19 pandemic", 2021

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‘SOUNDPATHS: HEPTONSTALL’; USING PLACED SOUND AND AUGMENTED REALITY TO ENGAGE AUDIENCES WITH THE HISTORY OF A PERFORMANCE LOCATION

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INTRODUCTION

‘Soundpaths: Heptonstall’ is a site-specific musical work that attempts to engage users in the history of its performance location. It does this through the use of GPS and Augmented Reality (AR) technology. The work is performed through headphones via an app that can be downloaded for free onto GPS enabled Smartphones. Adorno suggested that sound and landscape can be used to “think with”,¹ while Hudson² has written that through ‘site-specific discourse’ it is possible to use art to examine the multiple, overlapping histories embedded within a location. GPS technology allows for the mapping of an audio composition over a landscape so that it is experienced within the context of a very specific geography. Passages of audio can be attached to specific locations, so that as participants move through the landscape they experience audio that is tailored to their journey. Behrendt has termed this type of work “placed sound”.³

“Here, artists or designers curate the distribution of sounds in (outdoor) spaces, often – but not exclusively – by using GPS. The audience typically experiences these sounds via headphones and sometimes via mobile phone speakers or other mobile speakers. The audience does not contribute their own sounds or determine the location of sounds[...] But each member of the audience creates their own version or remix of a ‘placed sound’ piece, depending on their trajectory.”⁴

A placed sound work is tied to a specific location by definition, and this offers the artist an opportunity to tap into deeper layers of meaning associated with that location. Indeed, in their Brief Bibliography and Taxonomy of GPS-Enabled Locative Media, Bleecker and Knowlton show the greatest interest in “experiences that take into account the geographic locale of interest, typically by elevating that geographic locale beyond its instrumentalised status as a ‘latitude longitude coordinated point on earth’ to the level of existential, inhabited, experienced and lived place.”⁵ Placed sound works are at their most effective when engaging with the historical, cultural or environmental context of their location of performance.

Augmented Reality (AR) is often perceived to be in the visual domain; users can view digital content overlaid onto the real world by looking through a phone screen or smartglasses. However, AR experiences can be created for the other senses too⁶; “Audio Augmented Reality”⁷ (AAR) takes place when a real-world soundscape is overlaid with digital sound.⁸ Van Krevelen and Poelman⁹ suggest that in order to be classified as AR, an experience must satisfy three conditions:

1. Combines real and virtual objects in a real environment.

2.Registers (aligns) real and virtual objects with each other.

3.Runs interactively, in three dimensions, and in real time.

Green¹⁰ relates these conditions specifically to AAR and expands upon them accordingly; a listener must be able to engage with the virtual sound layer and their surrounding, real environment concurrently. The virtual layer should also align contextually and/or spatially with aspects of the real environment; therefore virtual content should be included that “sympathises with reality” or that appears to “originate from a comparable point in space”¹¹ to real objects. Finally, in order to be designated an AAR experience, the virtual sound layer must be delivered in real-time and in three-dimensions (the listener should feel immersed), while also responding in some way to the listener’s activity.

As well as listening to recorded material, listeners will experience the soundscape of the performance location in real-time. This interaction of real-time and recorded sound will guarantee a unique listening experience to every participant, but AAR offers the opportunity to do more than that. Behringer and Kastel assert that “Augmented Reality has significant potential for enhancing the human interaction with cultural contexts through enabling a deeper engagement.”¹² The challenge is therefore to use this technology to encourage engagement with the wider context of a location; in the case of ‘Soundpaths: Heptonstall’ an engagement with the history of this remarkable location is the goal.

The history of Heptonstall

Heptonstall is a village of fewer than fifteen hundred people in the Calderdale borough of West Yorkshire in the UK. Sitting high on a hill above the town of Hebden Bridge, it is a small place with a rich history; the village being mentioned as far back as the Domesday Book in 1087. Heptonstall is a beautiful place, but the more I read about it, the more I discovered that much of its history had a dark edge to it. The village is probably most famous as the final resting place of the poet Sylvia Plath, who was buried in the New Graveyard in 1963 following her suicide. In the adjoining Old Graveyard lies ‘King’ David Hartley, leader of notorious local counterfeiting gang, the Cragg Vale Coiners. Hartley was hanged in York in 1770 for forgery and diminishing the coin, but retains a reputation as something of a folk hero in the area; people leave coins on his grave to this day. Legend has it that the Coiners were responsible for the torture and murder of labourer Abraham Ingham in The Cross Inn pub, just a few meters from the Old Graveyard. Ingham was supposedly burned alive in the fireplace of the pub, then known as The Union Cross, for threatening to implicate the Coiners in the murder of a local official. The fireplace in question was uncovered during the renovation of the pub in 2016.¹³

The Old Graveyard alone is thought to contain more than one hundred thousand bodies; a remarkable number for such a small village. Although exact numbers are impossible to confirm, burial registers from 1594 to 1812 account for over twenty-five thousand. The numbers are so large as burials in the Upper Calder Valley could only take place in Halifax or Heptonstall until the 17th Century.¹⁴ The Old Graveyard is actually shared by two churches. St Thomas à Becket Church (more commonly known as Heptonstall Old Church), a striking ruin, dates back to the thirteenth century in places, while the newer Church of St Thomas the Apostle was completed in 1854. The village also has a Methodist chapel; the oldest in existence to have been continually in use since its inauguration. The Methodist leader, John Wesley, laid the foundation stone of the chapel, which was completed in 1764.¹⁵

Lyke Wake Dirge

Given the history of the village, I was drawn to the idea of using a funereal folk song as the melodic basis for my composition. ‘Lyke Wake Dirge’ seemed like an extremely good fit. The song is written in an old form of Yorkshire dialect and is therefore thought to have origins in the area. In 1686, John Aubrey recorded accounts of the song being sung as far back as 1616, but it is likely to be much older than that. It is both a prayer for the dead, and an account of the soul’s journey to purgatory.¹⁶ The song

is therefore thematically appropriate, and has at the very least been in existence for the majority of the historical period to which I aim to draw people's attention.

There are two versions of Lyke Wake Dirge, each with a different melody. The best known version has been recorded by the likes of Pentangle (1969) and Matt Berninger with Andrew Bird (2014). I was drawn to the lesser known version however, for which I was able to find sheet music.¹⁷ To the melodic basis provided by the song, I began to flesh out a harmonic arrangement.

MAPPING MUSIC TO A PHYSICAL LOCATION

The mapping of Lyke Wake Dirge to Heptonstall ties musical structure to real, physical locations. As participants wander through the village they are essentially 'remixing' the song in real time. In order to provide participants with an immersive experience, the mapping had to be done in such a way that the musical passages empathised with the physical locations they were mapped to.



Figure 1. The mapping of audio over the village of Heptonstall

Participants in 'Soundpaths: Heptonstall' do not have to take a set route through the village. Instead, the work encourages a mode of discovery based on exploration. Hight explains of experiences like this, that "in a sense, the ultimate end-author in locative narrative is the movement and patterns of the person navigating the space. The narrative is dictated by their choices, aesthetic bias in the physical world toward certain sections, buildings or objects to move toward and investigate and their duration and breadth of movement. The narrative is composed in sections, but is edited by the movements of the person with the locative device."¹⁸ The work is designed in this way in order to make the experience more engaging. Allowing for unrestricted exploration results in a less linear experience, which in turn makes a work feel more interactive.¹⁹

In total, 41 audio passages were mapped over Heptonstall, covering the entirety of the oldest part of the village. A number of different compositional techniques were used in order to make the experience both musically cohesive and empathetic to its surroundings.

Marking locations through instrumentation and melody

One of Green's requirements for AAR experiences is that virtual and real objects are aligned in space, but he goes on to say that "the contextual alignment of an augmentation with reality is of equal or greater importance than spatial alignment. For contextual alignment, a conceptual link between the virtual and

real realms is needed.”²⁰ The three graveyards in Heptonstall (the Old Graveyard, New Graveyard and the graveyard of the Methodist chapel) are important locations in the village and are also thematically significant to this work. They are the only three locations in the work where voices are used. This ties the locations to one another in the context of the work, while also acting as an echo of how performances of Lyke Wake Dirge would have once been enacted; sung over the body at a wake.²¹

Landmarks in the village are musically annotated in other ways too. The Cross Inn pub, the supposed site of Abraham Ingham’s murder, is marked with a particularly aggressive drone along with scraping atonal strings; perhaps more reminiscent of a folk horror film score than traditional folk music.²² The door to a cell, in use until the early 19th century and known as the ‘lock-up’ or ‘dungeon, is also marked with sinister tones. The ruins of St Thomas à Becket Church feel like a real focal point of the village, and for this reason I chose them to host the only rendition of Lyke Wake Dirge that features lyrics. They therefore become a focal point for this work in turn. As the church is entered, all instrumentation falls away and the song is taken up by a solo voice that is treated to sound as though it is reverberating through the ruins. Gradually the single voice is joined by others, along with a drone that helps to gradually build the song towards a climactic ending.



Figure 2. The ruins of St Thomas à Becket Church are a focal point of the work

Underpinning with drones

The work is underpinned with musical drones – sustained tones, “usually rather low in pitch, providing a sonorous foundation for a melody or melodies sounding at a higher pitch level.”²³ Drones are common in folk music, and so make sense in this musical setting. They also provide a constant bed out of which different melodic elements can emerge and disappear. This was a useful compositional tool; the drones sustain in between various melodic passages – passages that were often tied to landmarks. As participants approach these landmarks, the corresponding melodic element will begin playback, and as they leave, these elements sink back into the underlying drones. Hazzard outlines a further benefit in the use of this kind of technique in his *Guidelines for Composing Locative Soundtracks*; he suggests that upon leaving an area of focus “the soundtrack tenders a stepping down of auditory activity to indicate to the user that they are not in areas of interest, but maintains the auditory stimulus to signify continuation of the experience.”²⁴ The audience are thus subtly fed information regarding where they should focus their attention.

Harmonic variation

In order to sustain interest in the experience, it was deemed that some harmonic variation would be desirable. Two different chord sequences were therefore composed to accompany the Lyke Wake Dirge melody. The first of these chord sequences (A.) is mapped to the southern part of the village, while the

second (B.) is mapped to the northern part. The idea is to further embed the song structure into the geography of Heptonstall; as participants move into a new part of the village, the music takes on a different feel. The mapping of these chord sequences can be seen below.



Figure 3. The mapping of chord sequences used in the work

The two chord sequences were written in different keys. This provides a more obvious and dramatic musical change than if both would have been written in the same key. However, this posed a problem as they needed to be underpinned by drones of different keys and if these drones overlapped, the result would be dissonant. A 'transition zone' was therefore created in which no drones are featured. The music featured in this area was designed to work harmonically with both chord sequences so that the transition zone could overlap with both. Seamless playback of musical material was thus maintained.

Building musical development into a walk through Heptonstall

The importance of musical development when it comes to holding audience attention has already been discussed. Different portions of the village play host to different chord sequences for this reason. A further opportunity for musical development lies in the way that the Lyke Wake Dirge melody is introduced to participants.

A decision was made to mark the two main entrance points into the village with intro/outro passages. These two passages tease fragments of the Lyke Wake Dirge melody; hinting at it and introducing it gradually. If entering the village along the main road from either east or west, one of these passages will therefore act as the introduction section of the work. If leaving the village along the main road, then one of these sections will act as an outro, before fading into a drone that itself fades away as the village is left behind. Of course, it is impossible to know exactly where participants will start their walks; they may well press play for the first time in the middle of the village. Nonetheless, it still seems to make sense to mark the physical boundaries of the work in this way; whenever a participant leaves the area marked out by the work, there should be a satisfying musical conclusion. If they re-enter, they will hear the melody and chords gradually coalesce around the edges of the village, before coming together at the centre of Heptonstall.



Figure 4. The zones containing intro/outro passages are highlighted

Use of field recordings

Alongside traditional folk instrumentation, numerous field recordings – gathered from Heptonstall and the surrounding moors - have been incorporated into this work. Some of these recordings are played back unprocessed, while some have been manipulated into drones or melodic motifs that, in their timbre, still recall local soundscapes. Examples of this are the two drones that have been created from the sounds of crows in the Old Graveyard, sinister rumbles generated from the sound of grouse on the moor, the sound of the bells from the Church of St Thomas the Apostle that have been woven into the music that surrounds it, or synthetic bass tones that have been shaped using bird calls captured at the edges of the village.

The intention is that these sounds add an organic quality to the music. The sounds recorded in the village appear to be embedded in the soundscape of the location; rising out of it and creating moments of interplay with the sounds of the real world. The sounds recorded on the moors evoke older, wilder times and themes of nature, death and rebirth.

CONCLUSION

‘Soundpaths: Heptonstall’ draws attention to specific moments in the history of the village by annotating landmarks with sound, but the aim of the work is not necessarily to draw attention only to a few notable historic events. The nature of the experience dictates that only the bare minimum of detail surrounding these events can be imparted to participants in any case. Instead, the intention of the work is to encourage a meditative exploration of this intriguing place. An opportunity to be immersed in a piece of music and contemplate the meaning of this specific song in this specific location.

The duration of the experience is dependent on the participant, but to explore all of the material provided by the app would take half an hour or more. This is a sustained period of time to explore Heptonstall, during which the participants are encouraged to contemplate the history of the village from a certain perspective. It is hoped that through the provision of an immersive experience that makes use of AR and placed sound, a “deeper engagement”²⁵ (Behringer and Kastel 2016, 197) with the location is fostered; one that will lead to further research into Heptonstall and its history once the experience is over.

NOTES

- ¹ Quoted in Tia DeNora, *After Adorno: Rethinking Music Sociology*, (Cambridge: Cambridge University Press, 2003), 3.
- ² Martyn Hudson, "Archive, Sound and Landscape in Richard Skelton's Landings Sequence," *Landscapes* 16, no. 1 (2015): 63-78, doi: 10.1179/1466203515Z.00000000041.
- ³ The term is interchangeable with the more common phrase "locative audio" but is perhaps more useful in this context as it indicates the intentionality in the audio design.
- ⁴ Frauke Behrendt, "Locative Media as Sonic Interaction Design: Walking through Placed Sounds," *Wi: Journal of Mobile Media* 9, no. 2 (2015).
https://www.researchgate.net/publication/279536284_Locative_Media_as_Sonic_Interaction_Design_Walking_through_Placed_Sounds.
- ⁵ Julian Bleecker and Jeff Knowlton, "Locative Media: A Brief Bibliography And Taxonomy Of GPS-Enabled Locative Media," *Leonardo Electronic Almanac* 14, no. 3 (2006). <https://www.leoalmanac.org/wp-content/uploads/2012/07/Locative-Media-A-Brief-Bibliography-And-Taxonomy-Of-Gps-Enabled-Locative-Media-Vol-14-No-3-July-2006-Leonardo-Electronic-Almanac.pdf>.
- ⁶ Anton Nijholt, "Weaving Augmented Reality into the Fabric of Everyday Life" (paper presented at ISEA 2022: Possibles, Barcelona, Spain, June 10-16, 2022).
- ⁷ The term "Aural Augmented Reality" can also be used.
- ⁸ Reinhold Behringer, "Augmented Reality," in *Encyclopedia of Computer Science and Technology*, ed. Allen Kent and James Williams (New York: Marcel Dekker, 2001), 45-57.
- ⁹ Rick van Krevelen and Ronald Poelman, "A Survey of Augmented Reality Technologies, Applications and Limitations," *International Journal of Virtual Reality* 9, no. 2 (2010): 1-20, doi: 10.20870/IJVR.2010.9.2.2767.
- ¹⁰ Matt Green, "Sounding Out Aural Augmented Reality" (paper presented at the 1st Fascinate Conference: Thoughtful Technology and Beautiful Interfaces, Falmouth, UK, August 28-30, 2013).
- ¹¹ Green, 1.
- ¹² Reinhold Behringer and Thiemo Kastel, "Augmented Reality in Cultural Context," in *Kultur und Informatik: Augmented Reality*, ed. Carsten Busch and Jürgen Sieck (Berlin: Verlag Werner Huelsbusch, 2016), 197.
- ¹³ "Old Fireplace Discovery Stokes Up Coiners' Legend," *Halifax Courier*, June 3, 2016.
<https://www.halifaxcourier.co.uk/news/old-fireplace-discovery-stokes-up-coiners-legend-1233654>.
- ¹⁴ Diana Monahan, Paul Monahan, and David Cant, *Heptonstall Trail*, (Hebden Bridge: Pennine Heritage and Hebden Bridge Local History Society, 2005), 11.
- ¹⁵ Monahan et al., 27-28.
- ¹⁶ Jacqueline Simpson and Steve Roud, ed. "Lyke Wake Dirge," in *A Dictionary of English Folklore* (Oxford: Oxford University Press, 2003). <https://www.oxfordreference.com/view/10.1093/oi/authority.20110803100120525>.
- ¹⁷ "Lyke Wake Dirge: Version 2," The Yorkshire Garland Group, accessed May 22, 2022,
https://yorkshirefolksong.net/song.cfm?songID=86&as_qdr=y25.
- ¹⁸ Jeremy Hight, "Views From Above: Locative Narrative and the Landscape," *Leonardo Electronic Almanac* 14, no. 7-8 (2006). https://www.leoalmanac.org/wp-content/uploads/2012/09/09_JHight.pdf.
- ¹⁹ I am encouraging an approach to place known as "Topos" to the Ancient Greeks. See Parmar's "Geos, Topos, Choros" more information. He defines Topos as being "less concerned with directed travel than peripatetic wanderings and the experiential nature of the journey." (234) It is thus hoped that, by dispensing with a map or signposts, the experiential nature of this experience is foregrounded.
- ²⁰ Green, "Sounding Out", 5.
- ²¹ Simpson and Roud, "Lyke Wake Dirge".
- ²² Recent folk horror soundtracks that have used a similar sound palette include Mark Korven's score for *The Witch* (2016) and Bobby Krlic's score for *Midsommar* (2019).
- ²³ Mark DeVoto, "Drone," in *Encyclopedia Britannica* (Chicago: Encyclopædia Britannica, 2011),
<https://www.britannica.com/art/drone-music>.
- ²⁴ Adrian Hazzard, "Guidelines for Composing Locative Soundtracks," PhD diss., (The University of Nottingham, 2016).
- ²⁵ Behringer and Kastel, *Augmented Reality*, 197.

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REDEFINED-COMS

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INTRODUCTION

Redefined-coms is a research project that explores the possibility of radically redefining personal telecommunication devices to resonate with alternative notions of identity.

Personal Identity is a notoriously difficult concept to characterise. William James famously articulated such complexities in the following statement “Whenever two people meet, there are really six people present. There is each man as he sees himself, each man as the other person sees him, and each man as he really is.”

In contrast, the way in which telecommunications systems identify people is straightforward and unchanging. The ‘international mobile subscriber identity’ is an unchanging number that the network utilises to identify your phone, lacking any of the contextually derived information that our real identity is often sensitive towards.

The dissonance between our complex personal identity and the reductive telecommunications identifiers, can cause tensions. Social interactions and behaviours are often highly context specific but within tele-coms they are conflated into one device, potentially impacting, and impairing the development of our personal identity. Smartphones enable numerous social relations across numerous platforms streamed into our life with few mitigating influences like context, location, social setting, or memory. This research proposes a rethink and an exploration of new possibilities, not in the form of add-ons based within an app, rather a radical rethink of how the fundamentals of the system inform the functionality on an individual level.

The methodology taken in the project utilises ‘redefinition design’ methods, which are a special case within the speculative and critical design approach. Due to the ubiquity of smartphones and the limitations related to possible hardware redesign; the project is contextualised within a counterfactual 1970’s timeline. Thus, enabling a fundamental redesign at the point in which the status quo had not been established as the devices and systems where in a state of flux.

Three semi-functioning devices make palpable three alternative ways in which identity can be manifested within hardware and the redesigned telecom systems.

Identity in contemporary life

“...existence comes before essence – or, if you will, that we must begin from the subjective.”¹

Beginning from the subjective, as Sartre suggests, is not an uncommon position when addressing notions of identity in our contemporary life. For Sartre, back in the 1940s post war Europe, things were different, the institutions of family, church or government had greater sway over individual choice. At the time Sartre’s message of plurality was radical, but in the present day it is now perhaps closer too routine.

Contemporary life within Europe, enables people, broadly speaking, to define themselves and their identity. For instance, social norms like personal gender pronouns exemplify the ubiquity of subjective personal identities. Yet although there has been a liberating effect and shift away from socially conservative views for many, there has also been a constraining or reducing effect of identity within newer technologically mediated platforms.

Social media platforms, private messaging (on social media), Instant messaging systems (like WhatsApp), SMS systems are all relatively new. And although it is true to say these platforms have expanded the methods of communication from the confines of geography or person to person conversations, they have also constrained aspects of our identity. In a recent BBC documentary ‘Social Media, anger and Us’ self-confessed social media addict David Baddiel neatly summarised this idea *“I am of the belief that identity, human identity is a really complicated thing. But what social media does is it creates an opportunity to simplify your identity”*² Unlike social media identities, real identities are complex and multifaceted, as William James states “Whenever two people meet, there are really six people present. There is each man as he sees himself, each man as the other person sees him, and each man as he really is.” James’s quote highlights the innate subjectivity of identity. That it is dependent on perspective, it is also informed by our changing culture, or location or social group. Yet, social media or any other contrived devices operate within limited systems that inevitably enables certain actions and disable others. Against millennia of evolutionary change, the ways we understand ourselves and nuances of communication will always be trimmed and constrained when they need to fit within an app or phone or device. The clipping effect is part of fitting within a system, however perhaps we ought to be conscious of these constraints and that alternative systems will constrain in different ways.

This research paper explores one fundamental aspect within telecommunications that bakes a certain type of identity into the fabric of the hardware and system.

Identity And Identifiers

Real identity is a difficult notion to characterise. In contrast, identities within systems like social media, reduce complexity or nuances of interactions and have a clipping effect on our real identities. One fundamental aspect of telecommunications that might contribute to this issue is the reliance on an unchanging, reductive, and ubiquitous identifiers.

Identifiers are not identities, but the specific characteristics used to determine an identity. In communications they are as old as language itself. For instance, names of individuals, our appearance or perhaps even smell can be identifiers. All person-to-person forms of identification have resonated and evolved slowly alongside our identity in relation to culture and social norms. Technological identifiers, on the other hand, originated as pragmatic solution to technical and financial challenges.

The pragmatic foundations of technological identifiers originate in 18th century. Some of the first identifiers called ‘call signs’ were used within electronic based communication systems on the railways. The ‘Car Telegraph’ was patented on September 13th 1881 by Mr. William Wiley Smith³ and developed with Thomas Edison in 1886. The system utilised telegraph lines that were adjacent to the railway line, utilising capacitive induction. One of the results of this method was multiple trains on one line would all hear the same message, thus call signs were used to determine which train was the intended receiver of the message. Underpinning Mr William Wiley Smiths successful invention was its low retrofit cost, it utilised existing hardware and existing lines.⁴

Similarly, multiplexing and automation have driven down costs and increased efficiency in electronic communication systems. Expanding the amount of information without the requirement of more and more costly cables or base stations.⁵

In many respects identifiers today are used for the same rationale as those back on the ‘Car Telegraph,’ efficiency and cost. The priority of focusing on efficiency and cost in relation to telecommunication

identifiers has meant that little exploration has been conducted in relation to how identifiers relate to broader notions of identity within technologically mediated communication platforms.

Redefining identifiers:

Arguably, the most impactful identifier used today is the IMSI (International mobile subscriber identity), this identifier is used by the telecoms providers to recognise and connect to a given phone on the network. Although the IMSI is critical in personal telecoms, little thought has been given to what it characterises in relation to identity.

IMSI exists within a SIM card to connect to the network, this SIM is unique and often owned by one individual, thus no other person is ever conflated within someone else's number. In contrast identifiers in social settings often have commonalities attributed to family or status or occupation. Our title can identify gender (His/Her/They), marriage status (Miss, Mrs), age (Master, Mr), education (Dr, Professor), religion (Rev) or outstanding public service (Sir, Dame). We all have a host of personal identifiers, but they not only tell us about the individual but how that individual links to the wider world. Thus, social identifiers can tell us as much about our sameness as they do about our uniqueness, they can connect individuals alongside a method to differentiate between them.⁶

On the other hand, the International mobile subscriber identity embodies the notion that our identity is found within an individual. However, to define identity as solely a given person in isolation is an assumption that overlooks the connectedness of our being within society. Thus, perhaps IMSI's are closer to the identifiers found in the seminal dystopian novel 'WE' by Yevgeny Zamyatin - where people are identified by a number.⁷ This dissonance between identifiers in social settings, and those in telecoms makes the notion of redesigning identifiers an intriguing prospect. If practicalities relating to engineering efficiencies and costs were put on hold, and tech identifiers were considered within our wider social framework. Could identifiers be redefined within telecoms to resonate with our common notions of identity?

Redesigning Identifiers.

Redesigning identifiers to resonate with common notions of identity requires an approach that focused on shifting the fundamentals, to move beyond the refractory design situation brought about through the ubiquity and single system of the current technology. Hence, Redefinition Design, which is a special case of speculative and critical design will be employed to enable an approach that focuses on the core assumptions associated with identifiers within telecoms. Redefinition design is 'Focused on... redefining refractory system governed by deep underlying axioms, assumptions and beliefs.'⁸

Changing fundamental aspects of a system often has an abstracting effect, as the altered subject is now in dissonance with its original cultural framework. Thus, to avoid these issues, the altered identifiers will be framed within a counterfactual⁹ 1970's. This framing will distance the devices from the present ubiquity of the technology and take it back to its origins and thus a place in time where the technology might have branched out into other forms. In the mid 1970's, one of the first public cellular phone systems went live in Chicago.¹⁰ At this time the technology was moving from the lab to the market, and the potential of shifting from sim identifier to location based would be feasible, especially given the existing design of the cell network.

The styling of the phones has drawn from the cultural design influences of the time. The designs are influenced by Richard Sappers, 'TS502 radio' and Roberto Pezzetta's industrial product designs like those from Zanussi which brought vibrant colour and humour to the white goods market.

The framing of the three case studies will be as follows:

1. Alter fundamentals of identifiers
2. Day to Day usage of the altered phone

Case Study 1 - Local Identity and Identifiers:

This case study embodies an alternative notion of identity called 'Place Identity' which borrows from Harold M. Proshansky 1978 'The City and Self-identity, *'place-identity is defined as those dimensions of self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, feelings, values, goals, preferences, skills, and behavioral tendencies relevant to a specific environment.'*¹¹



Figure 1. Local identity phone by Austin Houldsworth 2022

The IMSI notion of identity is not dependent upon location, we move from one place to another in the real world, this change in environment and possibly change in 'behavioural tendencies' will not be expressed in the IMSI identifier. What if place identity theory could be used to mitigate this issue?

The cellular network was first proposed by D. H. Ring in 1947 for Bell Labs,¹² where the concept of multiple base stations making a cellular pattern across a landscape. Thus, location is already built into the existing notion of this network, it is simply not explicit as a characteristic. To make this characteristic explicit, would require a relatively simple change in the way the network is organised. Shrinking the power of base stations would enable a smaller more localised versions to occupy specific location that relate to organisations, companies, or other institutions. The design of the identifiers is expressed within the antenna used by the phone as a key to connect to a specific base station.

Day to Day usage of the altered phone:

The day-to-day use of this phone would combine convenience of mobile communications with control for the owner. The top of the phone allows for 5 antennae, each one is designed to connect to a specific base station. For instance, a person working an office job that commutes to the city might have 1 home antenna, 1 public transport antenna (number 22 bus), 1 office antenna and 1 social club antenna.



Figure 2. Local identity phone by Austin Houldsworth 2022

Each of these antennas require a different code to get to the base station, and then a code for the device. For instance: Antenna 1 (home) = 0239 Device = 24581. Thus, phoning the owner at home would be 0239 24581. If the person isn't home, then they could try another location if they knew the person well and the corresponding base station code. This setup gives the owner a level of control, perhaps all contact numbers are given to their family, but only the work code for clients. Equally, the antenna can be physically removed from the device, physically disconnecting the device from the network.

Case Study 2 - Social Identity and Identifiers:

This case study uses an alternative notion of identity called 'social identity theory,' from Blake E. Ashforth 'Social Identity theory and the Organisation' where he suggests "*The individual's social identity may be derived not only from the organisation, but also from his or her work group, department, union, lunch group, age cohort, fast-track group, and so on.*"¹³ Going on to state that "...identification with a group is similar to identification with a person (e.g., one's father, football hero) or a reciprocal role relationship (e.g., husband-wife, doctor-patient) inasmuch as one partly defines oneself in terms of a social referent." If this idea that identification with a group can be like identifying with a person, how might this be manifested as identifiers within a mobile phone? The IMSI identifiers relate to a single owner of a mobile device, not a group in the social identity sense.



Figure 3. Social identity phone by Austin Houldsworth 2022

Shifting from an individual identifier to a group identifier, requires a change in the technology, inspired from an unlikely criminal activity, cloning. Phone cloning was common in the early 1990's,¹⁴ where GSM handsets SIM (Subscriber Identity Module) can be placed into a reader and downloaded onto a PC to re-loaded onto a blank SIM.¹⁵ This resulted in two phones of the same identifiers, and thus a call to the phone would result in both ringing. Similarly, the social identifier could utilise this approach, albeit a legalised aspect of the system.

Day to Day usage of the altered phone:

The day-to-day usage of a social identity phone would be like the hardwired landline phones that dominated most of the 20th century communications. When ringing a home landline phone, often you might not get who you really need, but another family member, 'I'll just go and get them,' was often the reply. Social interactions within the group enabled this setup to work. In fact, it also enables intervention between unintended parties, both positive and negative.



Figure 4. Social identity phone by Austin Houldsworth 2022

The social phone is similar, but also not limited to one type of group within a certain geographical context. Rather the phone allows cloned SIMs to be stacked below its main body. These SIMs relate to a particular social group to which the owner is a member, like family, work, church group etc. When a call to the 'Houldsworth' Family comes in, all the phones ring that have that SIM installed and anyone can answer the call, taking a message or forwarding to the relevant person.

Case Study 3 - Changing Identity and identifiers:

This case study embodies an alternative notion of identity I call 'changing Identity' an idea inspired by the philosopher Derik Parfits writing on personal identity. Parfit claims to follow the bundle theory of self, that *'we can't explain either the unity of consciousness at any time, or the unity of a whole life, by referring to a person. Instead, we must claim that there are long series of different mental states and events—thoughts, sensations, and the like—each series being what we call one life.'*¹⁶ To explain this theory Parfit uses the teletransportation thought experiment. That if a person were to get into a transporter that would copy their entire body and mind and rebuild it on Mars, this new person would be the continuity of the original, but not the original. Some argue this is a fate close to death, however Parfit suggests it's an occurrence that happens all the time. For instance, if a person gets into a rocket and travels to mars over a period of years, then the person that arrives after all sorts of new experiences would not be exactly the same person that got into the rocket in the first instance. Or as T.S. Eliot's states in 'Little Giddling' *'... And the end of all our exploring. Will be to arrive where we started. And know the place for the first time.'*



Figure 5. Changing identity phone by Austin Houldsworth 2022

The identifier within this final mobile phone will resonate with the notion of change. Unlike the the IMSI Identifiers, which is closer to what parfit calls the Ego theory “...that, if we ask what unifies someone’s consciousness... what makes it true... is that these are both experiences which are being had by me, this person, at this time.’

Day to Day usage of the altered phone:

The changing identity phone never stops updating the identifier, reflecting the perpetual change in the real identity of its owner as they move through life. Hence, rather than the IMSI and phone number staying the same, it counts and never stops counting. For instance, an initial phone number of 07729200200 would count at a given rate to 07729200201, 07729200202, 07729200203 and so on. Alongside the device counting, the networks also count, in order to connect to the device. The impact of this counting means no phone number can be written down, that only a select few can be remembered within the phone itself and count at the correct rate. This means a fundamental of the system is to forget and move on. That change is perpetual and actively remembering a given persons contact require effort in the form of limited storage and a drain on computing power.

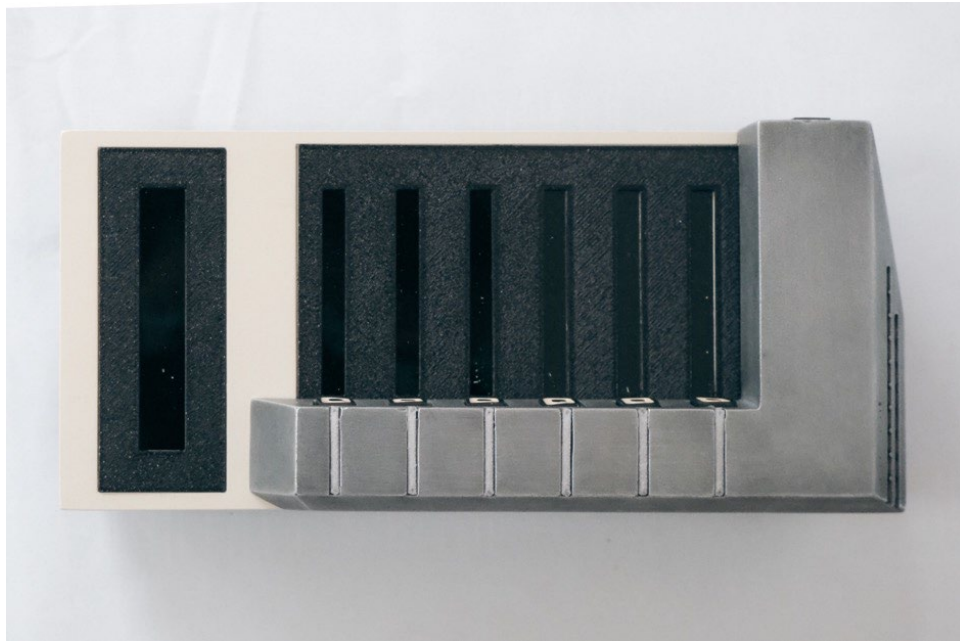


Figure 6. Changing identity phone by Austin Houldsworth 2022

CONCLUSION

In many respects, identifiers in contemporary telecommunications are moulded by the same forces as those of the ‘Car Telegraph;’ efficiency and cost. However, unlike the 18th century, the scope of the communications system has expanded far beyond the initial vision. Almost every facet of our lives is integrated into telecommunications and the full impact is unknown. Also, the speed of technological progress is often far quicker than the research into its consequences. The gap between progress and making sense of it is profound, compounded by our limited grasp of what characterises our human identity in the first place.

Yet the unchanging International mobile subscriber identity, offers the most efficient solution to linking people into a network, but it does not fully reflect the breadth and complexity of identity. The inner reflections and explorations into our human condition are often redundant compared with new technology. I hope in the future we might give more sway and influence to critical thinking while creating sociotechnological systems.

The redefined 1970s phones presented in this paper are not solutions but are intended to illustrate that the fundamental aspects of a system can be designed to resonate with alternative notions of identity. That ubiquity of a system and longstanding way of doing something doesn’t mean to say it is the only way, nor the best way.

ACKNOWLEDGEMENTS

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NOTES

- ¹ Walter Arnold Kaufmann, ed., *Existentialism: From Dostoevsky to Sartre*, Rev. and expanded (New York: New American Library, 1984).
- ² 'David Baddiel: Social Media, Anger and Us', n.d., <https://www.bbc.co.uk/programmes/m0012kf0#credits>.
- ³ William Smith, Car Telegraph, United States Patent Office 247,127, issued 13 September 1881, <https://patentimages.storage.googleapis.com/da/77/3f/2b34c7ed813ccc/US247127.pdf>.
- ⁴ 'The Edison System Of Railway Telegraphy', *Scientific American*, 1886, 3.
- ⁵ Multiplexing is a method of combining different signals into one signal over a shared medium. One of the first multiplexing devices was the Quadruplex Telegraph patented by Benjamin Thompson and Chas. Selden in 1881. Benjamin Thompson and Chas Selden, Quadruplex Telegraph, United States Patent Office 246244, issued 23 August 1881, <https://patentimages.storage.googleapis.com/c8/2e/4c/f1259890d99794/US246244.pdf>.
- ⁶ Henry Tajfel's, originator of 'Social Identity Theory' also points out that we often divide the world into them and us or 'In group' and 'Out group'. Those with differences and those with similarities. Henri Tajfel, 'Experiments in Intergroup Discrimination', *Scientific American* 223, no. 5 (November 1970): 96–102, <https://doi.org/10.1038/scientificamerican1170-96>.
- ⁷ The seminal dystopian science fiction novel that reduced people to numbers in a system. Evgenii Ivanovich Zamiatin, *We*, 2017.
- ⁸ Austin Houldsworth, 'Or Money's Sake: Introducing Redefinition Design- a Method to Break out of the Ubiquitous Monetary Paradigm; in the Hope of Finding Genuine Alternatives' (2018), <https://researchonline.rca.ac.uk/3537/1/Houdsworth%20PhD%20thesis%28CopyRight%20Exclusions%29.pdf>.
- ⁹ Counterfactuals are 'What if' questions related to events in history, recent examples in popular culture include 'The Man in the High Castle', 'The Man in the High Castle' (Amazon Prime Video, January 2015).. Counterfactuals are also known as 'alternative presents,' a term coined by James Auger. James Auger, 'Why Robot? Speculative Design, the Domestication of Technology and the Considered Future' (Royal College of Art, 2012).
- ¹⁰ See Jon Agar, 'Learning from the Mobile Phone', *RSA Journal*, 2004, 3.
- ¹¹ See Harold Proshansky, 'The City and Self-Identity', *Environment and Behavior* 10 (1978): 147–69.
- ¹² See D. H. Ring, 'Mobile Telephony - Wide Area Coverage - Case 20564' (Bell Telephone Laboratories, 11 December 1947), <https://www.theatlantic.com/technology/archive/2011/09/the-1947-paper-that-first-described-a-cell-phone-network/245222/>.
- ¹³ See Blake E Ashforth, 'Social Identity Theory and the Organization', 2022, 21.
- ¹⁴ Upasna Sonal, 'Mobile Phone Cloning', *International Journal of Engineering Research* 3, no. 10 (2015): 5.
- ¹⁵ See Page 2 Sonal.
- ¹⁶ See Derek Parfit, 'Divided Minds and the Nature of Persons', in *Science Fiction and Philosophy*, ed. Susan Schneider (Hoboken, NJ: John Wiley & Sons, Inc, 2016), 91–98, <https://doi.org/10.1002/9781118922590.ch8>.

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HERITAGE PRESERVATION IN THE WAY OF RESILIENT MICRO-REGENERATION: FINDINGS ON PARTICIPATORY HISTORIC COMMUNITY PRESERVATION IN BEIJING, CHINA

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INTRODUCTION

The ecological scientist Crawford Holling was the first to transfer the concept of 'resilience' from physics to ecology.¹ According to Holling, resilience is "a measure of a system's persistence and capacity to absorb change and disruption while preserving the same linkages between populations or state variables." The process of transferring resilience theory from the ecological to the social sciences arena has resulted in further interpretations of resilience, such as evolutionary resilience² and encompassing resilience.³ The concept of 'community resilience' is subject to multiple interpretations at the community level. This paper discusses community resilience as the ability to predict, learn from, and withstand past disturbances while reducing vulnerability to future risks by improving the community's capacity to react. Aiming to cope with changes positively, a community needs to draw upon its resources, social capital, and/or built capital.

During the past decade, Chinese academics have embraced resilience rhetoric in urban research, particularly in the field of urban revitalization. The majority of Chinese megacity clusters, particularly the Pearl River Delta Region, Yangtze River Delta Region, and the Beijing-Tianjin-Hebei Region, which have a higher level of urbanization, have entered the stock-based planning stage.⁴ Practitioners, scholars, and governments are grappling with how to rehabilitate, maintain, and administer resilient and sustainable historic communities. As one of China's most rapidly developing cities with a rich cultural and architectural history, Beijing faces the challenge of preserving these fragile historic residential neighbourhoods. In an effort to protect both tangible and intangible heritages, the city adopted a series of rules and regulations through various institutions and organizations after the 1990-2003 mass demolition redevelopment.

During the period of urban regeneration, difficulties arose. The authorities must determine how to rehabilitate low-quality residential-use heritages while maintaining a balance between urban renewal and preservation of the heritage. It is challenging to simultaneously meet people's needs and strengthen community governance. Some argue that stock-based planning and social governance ought to be integrated.⁵ The central government of China has emphasized the need to modernize and strengthen the governance structure. Moreover, the findings of an EU study,⁶ which emphasized the significance of preserving traditional lifestyles and cultural practices are widely accepted in China. In certain instances, one crucial meaning of "experimental" projects – micro-regeneration projects⁷ – is utilizing practices to

promote the transformation and upgrade of mechanisms and policies.⁸ To scale up the implementation of sustainable and resilient urban regeneration, a top-down system assurance is necessary.

EXPLORING URBAN REGENERATION THROUGH THE LENS OF RESILIENCE

China's urban revitalization can be viewed through a novel and comprehensive lens thanks to the resilience theory. On the one hand, resilience encompasses more than redundancy, robustness, and physical connection, which are physical characteristics that support engineering and ecological resilience methods.⁹ In addition, resilience encompasses social qualities such as social connectedness, capital development, adaptability, and creativity.¹⁰ A city can be viewed as a social-ecological system (SES) made up of its residents and ecological environments. As the fundamental unit of a city, an urban community is a functionally and morphologically distinct area. Moreover, the people in the community form a tight circle of relationships in which each stakeholder has the last word. Residents of a community not only enjoy community services and well-being, but they also participate in the community's construction, management, and enhancement. In addition, each urban community has distinct physical characteristics and a distinct history of development. As an integral component of the urban SES, the urban community and local environment exhibit strong cultural attachment and resource dependence, which manifest as social bonds and resource ties. As a social ecosystem that is both complex and diverse, an urban community's development and evolution are inevitably accompanied by unpredictability and problems. Therefore, when we investigate urban regeneration and community regeneration, resilience theory supports the framework from both the physical and social perspectives, reminding researchers and practitioners to consider both tangible and intangible effects during and after implementation.

Consequently, the current resilience research discourse in China tends to concentrate on disaster avoidance and recovery (such as earthquakes and pandemics). Sustainable neighbourhood development is discussed in all hemispheres, including the Northern Hemisphere, where green technology, carbon footprinting, resource usage, and low-carbon development are all discussed in the context of sustainable neighbourhood development.¹¹ Using assessment techniques, it aims to increase developer competitiveness and foster innovation through the verification of climate resilience. There is, however, little research that has been conducted on the multi-stakeholder process of neighbourhood regeneration, the issues of empowerment and achieving social equity, or the development of collaborative and inclusive communities in resilient transformations. Thus, examining urban regeneration through the lens of resilience can also enhance the explanation provided by resilience theory.

CO-PRODUCING RESILIENCE: THE PARTICIPATORY MICRO GARDEN PROJECT

Micro Garden Series is located in Beijing's Chaoyangmen Subdistrict, Dongcheng District. It is a micro-regeneration project initiated by researchers from the Beijing-based C university in collaboration with residents, the Residents' Committee (hereafter RC), planning institution, non-governmental organization, and local government. The project has two series to date: the first, Micro Garden 1.0, located in the S neighbourhood, began in 2015 and ended in 2019; the second, Micro Garden 2.0, which was expanded to the entire subdistrict, began in February 2021 and is ongoing.

Context and initiation of the project

This project is an integral part of the sub-historic district's district preservation program, promoting community resilience and aiding in the revitalization of the Old City. In the micro-regeneration programme on the sub-district level, a pluralist approach is adopted in order to facilitate participation by diverse stakeholders in the planning and decision-making for the conservation and regeneration of the Old City district. It accomplishes this by incubating a network of community-based citizen projects

and social organizations, utilizing the community museum as a civic hub hosting cultural activities. Dispersed productive practices are implemented in the community, including the regeneration of quadrangle dwellings, the Micro Garden Series, the revitalization of the market, and the recording of oral histories, all of which engage local resources and promote community resilience. Each tiny project location provides space and opportunity for change, and the entire project process provides training and capacity building for the emergence of resilient actions. In other words, it serves as an indispensable prerequisite for achieving resilience. Community gardens have been adapted into other neighbourhood-level micro-regeneration projects and have even been scaled up to city-level initiatives.

In the Micro Garden Series, the focus is on community building,¹² with co-production as the strategy. Community building is the focus of the Micro Garden Series using co-production as a strategy. Linking people's relationships is far more important than creating physical spaces. On the surface, community building appears to fall under the purview of the community, but it will have a direct impact on the city's planning and development, making it a crucial component of the urban renewal process. Co-production has been the primary method of micro-regeneration at the community level, involving multiple stakeholders. It facilitates negotiation and the development of co-governance mechanisms by bringing together actors on a single communication platform.

It is a bottom-up effort that began as a university research topic¹³ in 2014. In the hutong area, which includes the S community, researchers and students from the C university mapped spontaneous gardens (Fig.1). In collaboration with the local non-government organization (SHHPS) based in the S hutong community, the research team held several exhibitions¹⁴ and workshops at the community museum in 2015. In 2017, workshops were held in the museum with the support of the SHHPS and RC. The workshops covered a wide variety of topics, such as transforming old items into potted plants and co-designing residents' micro gardens. Exhibits and workshops have a positive impact on attracting the attention of local authorities and subsequently supporting the research team in implementing physical practice on the ground.

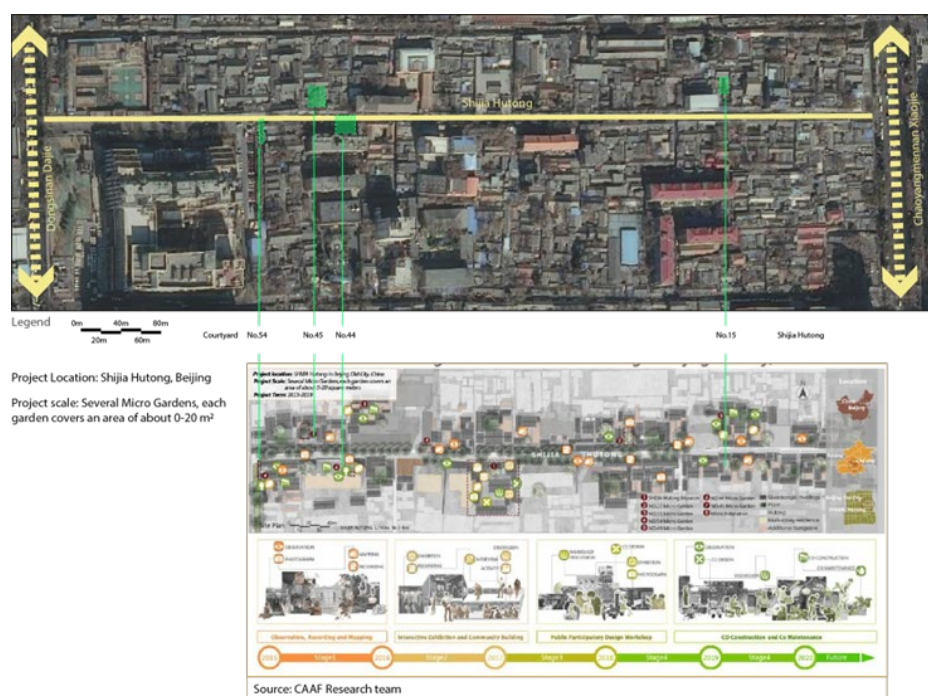


Figure 1. The project location

Co-production procedure

In Micro Garden Series, researchers, designers, and planners act as initiators and facilitators, whereas planners and RC staffs act as mediators to organize broader participation, as opposed to the traditional top-down regeneration project strategies that adhere to strict managerial structures. This expedites the participation of non-specialists and average citizens in the co-production process. Due to the site selection standard, however, there was no collaboration between residents, which led to some problems during the period of governance.

Each participant assumed responsibility for their respective portion of the project. The local government funded the initiative and did not place excessive restrictions on its operation, acting more as a facilitator than a manager. The planning team and the social organization organized the project because they have been in place for several years and are adept at organization. The research team was subsequently responsible for resident co-design and co-construction. In terms of daily contact with residents, the RC acted as a coordinator and aided in the mobilization of participation (Fig.2).

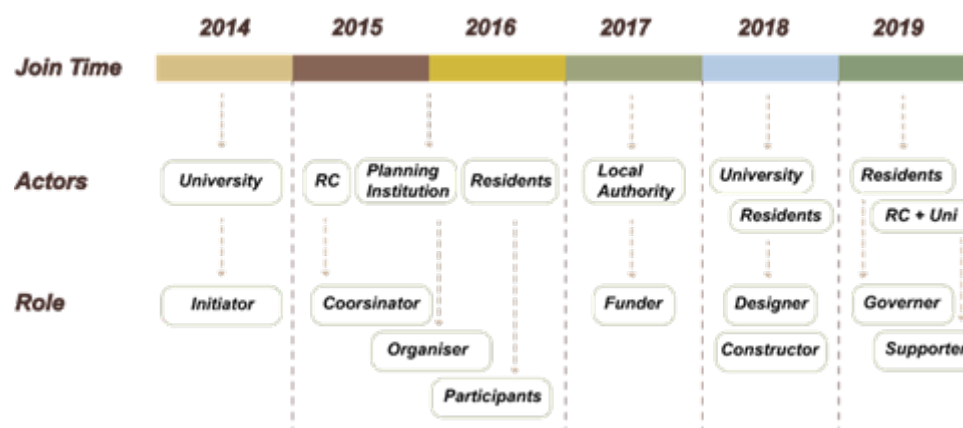


Figure 2. Co-production procedure

Due to the participants' selection, there was a dearth of local co-production. The Micro Garden Series 1.0 was an innovative and experimental endeavour that introduced a novel concept to both the residents and the RC. When mobilizing and selecting participants, the RC and planners were more likely to select those who had previously participated in public affairs and are passionate about gardening, as these individuals were more likely to collaborate with other stakeholders and support the work of designers. Consequently, all the selected participants were single-family homes within their courtyards. From a property rights perspective, all accessible areas within the courtyards are public spaces, despite the fact that micro garden sites have traditionally been maintained by selected individual households. If there is no co-production or agreement between neighbours within a quadrangle residence, there may be hidden dangers at the next governance level.

Micro Garden Series 2.0 makes several adjustments and upgrades for its conceptual principles. One modification is included in the project's scope. The new series project encompasses the entire subdistrict and involves more neighbourhoods. Another modification concerns the educational and demonstrative roles of the micro garden regeneration initiatives. A demonstration courtyard supplies the entire subdistrict. The courtyard, which was previously underutilized, was donated by the local government. It is difficult to commission designers to design each small garden in residential historic districts, due to the variety of sizes and shapes of residual spaces. Therefore, within the demonstration courtyard, there are three different micro-garden designs which can be easily understood and replicated by residents. The third change modification relates to the selection of participants. All residents interested in green initiatives are organized by the RC to participate in micro garden self-building activities. The RC and design team do not currently exclude anyone. Since designers cannot complete full design

schemes for dozens of applicants¹⁵, the design team only conducted a basic survey and provided each applicant with design examples, specific plants, and gardening starter kits. By delivering training, the design team will inspire residents to enhance public spaces and green historic sites on their own in the future. Lastly, there has been a change in the source of financing. The new initiative is financed by a variety of sources. The local government financed the development of the demonstration garden, the social fund is used to promote educational programs (e.g., the micro-garden practice handbook), and RCs finance neighbourhood-scale events and construction. The Micro Garden 2.0 Series is currently in development. The design team and RC are encouraging co-production between neighbours as well as between residents and community-based units as the next step, in addition to collaboration among numerous stakeholders.

Collaborative governance

Both the local government and the RC encourage public participation and strive to foster collaborative governance by not only allowing citizens to participate but also providing them with the necessary knowledge and skills. On the one hand, the RC encourages residents to voluntarily participate in design and information exchange workshops to attract and engage them. In Micro Garden 2.0, the autonomy of residents is maximized. Throughout the pre-application phase, residents encourage one another, which results in mutual support and collaborative governance when the building is completed. During this process, the RC and design team scout capable individuals and develop a gardener group through interactive activities. It has been demonstrated that competent individuals could facilitate collective action and coordinate collaboration in this instance.

Although residents are responsible for the daily maintenance of the gardens, this does not imply that they are solely responsible for governance. The RC provides tools and resources for garden maintenance, while the design team continues to share skills and knowledge after implementation, and residents may provide feedback to both the RC and the design team. In addition, the third party (i.e., the NGO) advances the development of co-governance, especially during the project's early incubation phase. NGO, typically as a long-term in-place partnership, and community self-organization can work together to promote community coordination and community building.¹⁶

SCALING: TOWARDS RESILIENT DEVELOPMENT

Scaling, which emphasizes the widely accepted and transformative impact of brilliant but isolated experiences, provides micro-regeneration projects with a narrative pathway to explain how to improve community resilience.¹⁷ The purpose of this section is to investigate the impact of micro-regeneration projects on resilient development by focusing on horizontal scaling out (impacting more people) and vertical scaling up (impacting laws and policy).

Scaling out: Micro-regeneration projects map in Beijing

Micro Garden Series, a successful pioneer community micro-regeneration project located in a historic district, has attracted considerable attention. As previously stated, this project aims to improve not only the physical and social environment of a specific area but also to develop a participatory planning regime capable of meeting the requirements of the stock-based planning stage, as well as a variety of contemporary environmental and social challenges. As indicated by the increasing number of participatory micro-regeneration projects in Beijing's historic districts and the national forum on community gardens, the impact of this Micro Garden project has been amplified.

Since 2018, more than ten micro-regeneration projects, including community garden construction, common room renovation, and market revitalization, have been implemented in Beijing's Old City (Fig. 3). With the exception of formal co-productive micro-regeneration projects, spontaneous regeneration

activities among citizens also increased. Regarding small-scale spaces, the principle of co-production between local government, RC, social organizations, and residents has been disseminated. Through the collaborative generation of knowledge and application of social media and learning platforms, projects constructed in other regions adapted to the local context. Community-based gardener groups, urban-level gardener groups, and a nationwide community garden forum comprise the learning platforms. The research and design team also created the 'SEEDING' urban level gardener group, which attracts many designers and planners in Beijing who support the Micro Garden concept. As implied by the group's name, each member could serve as a seed in his or her community, fostering the growth of micro/community gardens. As for the nationwide community garden forum, it provided planners and landscape architects with a venue for sharing and exchanging knowledge. The forum invited practitioners and researchers from Shanghai, Beijing, and Chengdu, allowing micro-regeneration concepts and programs to be replicated and disseminated geographically and numerically, while preserving the innovation's integrity.

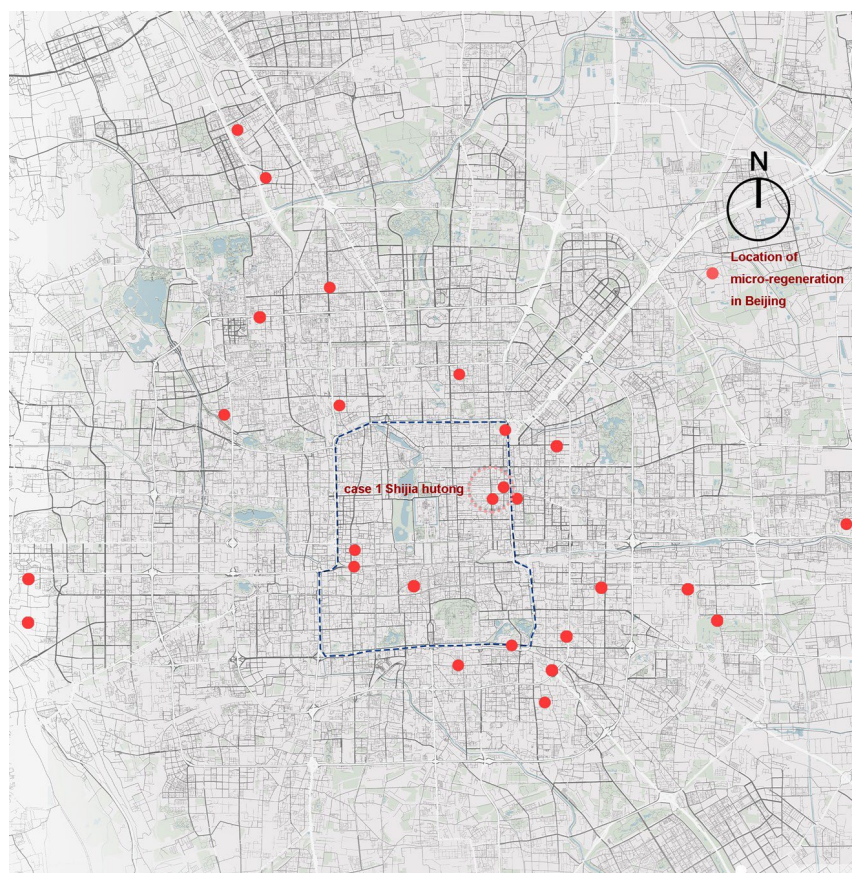


Figure 3. Micro-regeneration projects in Beijing

Scaling up: the establishment of Responsible Planner Policy in Beijing

The Micro Garden project contributes to the establishment of Beijing's Responsible Planner Policy. In 2017, the Responsible Planner Policy was first implemented in the Chaoyangmen subdistrict, and the co-productive Micro Garden was an "experimental" project. The essence of Responsible Planner Policy is consistent with what Taloy (1999) states: In order for planning to become a value-based process, we need to transform it from a task that requires technical expertise into one that requires judgment about environmental change, with planners playing a managerial and coordinating role throughout this process. In his discussion of "advocacy" and "pluralism" in planning, Davidoff (1965) notes that

planning must take into account the interests and needs of vulnerable groups. In addition, the concepts of advocacy in planning, communicative planning, and collaborative planning highlight the importance of communication and negotiation skills for planners as coordinators. All of these considerations influence the implementation of the Responsible Planner Policy, which requires planners to promote grassroots empowerment.¹⁸ As coordinators, planners must encourage diverse groups to express their opinions and prioritize equality and justice among diverse stakeholders.

In the Micro Garden project, the responsible planner acted as the coordinator, bridging the gap between the designers and the residents, explaining the procedures to the residents and gaining an understanding of their immediate and real needs. The empowerment expressed here pertains to the delineation of communication barriers between various stakeholders, the exploration of their potential, and the training of their skills. Thus, responsible planners assisted RC and its residents in acquiring additional resources and methods for enhanced participation, influence, and control over social life. A direct effect of Micro Garden 1.0 is the creation of a social network that enables the RC to initiate project 2.0 without outside assistance. This type of capacity building enhances a community's adaptability and further strengthens its resilience.

CONCLUSION

By emphasizing the scaling impact, this paper makes the case for micro-regeneration projects as a route to community resilience. Additionally, it has been viewed as an "experimental" strategy for dealing with inequality, social injustice, and the degradation of cultural heritage. The importance of the transformation of planners, citizens, and government officials' consciousness is another aspect of the value of micro-regeneration projects like Micro Garden. In co-productive planning, the planner's function has evolved from that of the elites who once "narrated truth to the power" to that of the manager, communicator, and coordinator. The constant dialogue and negotiation between planners, designers, social workers, and residents has improved residents' knowledge of and interest in traditional culture. The success of urban regeneration, the development of numerous agencies, and the improvement of the "capacity to act," which has been identified as the primary component of community resilience, are all impacted by the knowledge and experience exchange between amateurs and experts.¹⁹ It is also important for governments to recognize the value of empowerment. The change that is deeply rooted in people, relationships, and cultures increases the likelihood of scaling out and even produces a scaling-deep effect.

ACKNOWLEDGEMENTS

The author is very appreciative of Dr. Krzysztof Nawraket's assistance from the Sheffield School of Architecture.

NOTES

- ¹ Holling, C S. "Resilience and sustainability of ecological systems" *Annu.Rev.Ecol.Syst.* 4 (1973): 1–23.
- ² Simin Davoudi, Resilience: "A Bridging Concept or a Dead End?" *Planning Theory and Practice* 13, no. 2 (2012): 299–307. doi: 10.1080/14649357.2012.677124.
- ³ Keith Shaw, "'Reframing' Resilience: Challenges for Planning Theory and Practice" *Planning Theory and Practice* 13, no. 2 (2012): 308–312. doi: 10.1080/14649357.2012.677124.
- ⁴ Hongsheng Chen, Xingping Wang, and Zijian Guo, "Transformation of Urban Planning: Thoughts on Incremental Planning, Stock-Based Planning, and Reduction Planning." *China City Planning* 25, no. 2 (2016): 26–31.
- ⁵ See Beijing Responsible Planner Committee, *Taking roots* (in Chinese), VI.
- ⁶ See European Union Research Report. Sustainable Development of Urban Historical Areas through an Active Integration within Towns; OPOCE: Luxembourg, 2005.
- ⁷ Micro-regeneration, which is based on public participation, with micro-community space and public space facilities as the object of renovation and context inheritance and existing resource usage as aims, has become mainstream in historic district regeneration.
- ⁸ The context of the birth of the micro-regeneration concept is in two aspects. First, the rapid urbanization with demolition and construction as the main approach costs a lot of work force and material and financial resources. The concept of urban micro-regeneration, which aims at revitalizing the land space in stock and improving the land use value, is helping to solve the above problems. Second, for a long time in the past, urban construction meant the disappearance of old culture and buildings to some extent. With the continuous improvement of urban space modernization, the unique charm and cultural soul of the city gradually fade away. Micro-regeneration, which aims to preserve the historical and cultural context, provides strategic and practical support to realize the continuation and development of urban tradition
- ⁹ Godschalk, David R. "Urban Hazard Mitigation: Creating Resilient Cities." *Natural Hazards Review* 4, no. 3 (2003): 136–43. Doi: 10.1061/(asce)1527-6988(2003)4:3(136).
- ¹⁰ Taşan-Kok, Tuna et al. "Conceptual Overview of Resilience: History and Context." *GeoJournal Library* 106 (2013): 39–51. Doi: 10.1007/978-94-007-5476-8_3.
- ¹¹ Stevenson, Fionn, and Doina Petrescu. "Co-Producing Neighbourhood Resilience." *Building Research and Information* 44, no. 7 (2016): 695–702. doi: 10.1080/09613218.2016.1213865.
- ¹² Beginning in England in the early twentieth century, community building has a crucial point for the people. See Fang, Bian and Bin, Lyu, *The Urban Community Governance Modes in the USA, the UK, and Japan: A Comparative Perspective*. UPI. Vol.33, No.4 (2018), doi: 10.22217/upi.2016.136
- ¹³ The Micro Garden Series concept is based on Sharon Zukin's (2012) notion of Authentic Urban Places and Kevin Lynch's (1961) viewpoint on the identifiability of public space. The Micro Garden Series, on the other hand, is not a straightforward application of theory. Alternatively, it considers the characteristics of Beijing's Old City and China's political system, attempting to demonstrate how micro-regeneration can improve community cultural, social and physical resilience. See Hou, Xiao Lei, and Wei Guo. "Community Micro-Regeneration: Approaches to the Design Intervention of Old City Public Space of Beijing." *Landscape Architecture*, 2018, 41–47.
- ¹⁴ Exhibitions demonstrated all types of spontaneous garden and summarized them into 4 main categories. During exhibitions, the team collected residents' opinions about the gardens and the endeavour of residents' self-directed greening got recognized and encouraged.
- ¹⁵ The size and shape of places vary in hundreds of ways. As a result, the design team just conducted a basic survey and provided each applicant with a modest design example as well as particular plants and gardening beginning kits. Residents will be energised by the design team to enhance public spaces and green historic places on their own in the future.
- ¹⁶ Hou, Xiao Lei, and Wei Guo. "Community Micro-Regeneration: Approaches to the Design Intervention of Old City Public Space of Beijing." *Landscape Architecture*, 2018, 41–47.
- ¹⁷ Riddell, Darcy, and Michele-Lee Moore. "Scaling Out, Scaling Up, Scaling Deep: Advancing Systemic Social Innovation and the Learning Processes to Support It." *The J.W McConnell Family Foundation*, no. October (2015): 1–36.
- ¹⁸ Tang Yan. "Beijing responsible planner system" *Planner*, 2021(6): 38-44 (in Chinese)
- ¹⁹ See Baibarac, Corelia, and Doina Petrescu. "Open-Source Resilience: A Connected Commons-Based Proposition for Urban Transformation." *Procedia Engineering* 198, no. September 2016 (2017): 227–39. doi: 10.1016/j.proeng.2017.07.157.

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THE LIVES OF SPACES: 166 CAROLINE STREET, BRIXTON, JOHANNESBURG

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INTRODUCTION

Sun streams into the corner shop at 166 Caroline Street in the afternoon, creating shards of light on the floor. Wooden shelves and display cabinets, handmade by Mr Ho Chee Hong, display artifacts and photographs that testify both to the life of the shop and to the lives of the family who inhabited it. Exhibitions generally present their narratives in a neutral space, that is, the content is detached from the space in which it is shown. They are conceived within a ‘blank slate’ that the space offers. Rarely is there a connection between the material and the history of the space in which it is displayed, except, perhaps in ‘house museums’ that preserve the lived experiences of famous individuals.

Therefore, importantly, this paper focusses on an exhibition¹ about the Hong family, which was held in November 2020 in a small corner shop in the suburb of Brixton, Johannesburg, the place where they lived and worked for 56 years.

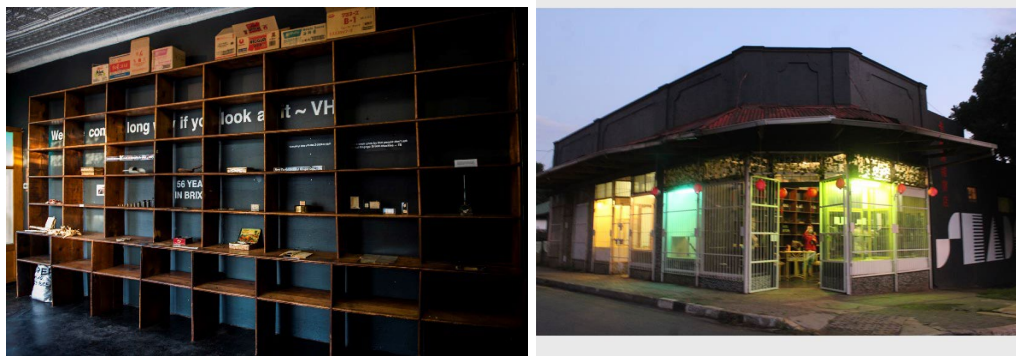


Figure 1. Interior and Exterior views of Caroline Supply Store. Photographs by Alet de Wet

This paper traces grounds for selection and installation of the objects both tangible and intangible, personal testimonies, and the site of the exhibition itself. It focusses on the structure of the corner café which, in the South African context are small convenience stores. Its significance formed an integral part of the social milieu of South Africa’s suburbs during apartheid but, is no longer the case since commercial laws have changed. The material on display offered insight into their lives, and the by-laws that governed café owners, and shaped the story of their lives at 166 Caroline Street.

It tells about the spectrum of their lives in situ and how they overcame the adversities of immigration to a new country, one moreover in which apartheid was the political, social and economic policy. The

exhibition aimed to present a poignant recollection of the space of the corner café and a story of immigration to South Africa at the time. The exhibition offered an array of narratives of the Hong family, including family photographs, Chinese opera tapes, a Chinese cookery book, clothing and everyday belongings owned by the family, official government documents, letters, rental receipts, and receipt books for the running of the shop, that presented diverse perspectives and memories of their lives in Caroline Street.



Figure 2. Installation views. Photographs by Sally Gaule and Craig Maarschalk

This is a story about one family, yet the installation tells a larger tale of apartheid South Africa, of everyday life, of the architecture of the ‘corner café’, and above all of migration and immigration- a theme that resonated for local visitors to the exhibition since a large number of Johannesburg residents are themselves immigrants to the city. Immigration at the time of the Hong’s arrival in South Africa not only required the courage to take up a new life, but also the courage to face a long sea voyage, itself a treacherous trip. Cultural theorist, Stuart Hall describes migration to a new country as an “experience of having survived the longest, hardest journey of their lives: the journey to a new identity”.²(1984, 254). Moreover, it is also a contemporary story that speaks to the forces of global political and economic migration currently underway. Hence, we are reminded of precarious passage on overloaded boats in the Mediterranean and the English Channel, and grueling journeys on the US/Mexico border, the risks and fears of which are barely acknowledged. Indeed, economic and political migration is a feature of our own times. It speaks also of the rhetoric and reality of inclusion and exclusion that overshadows the lives of immigrant communities, of homesickness and yearning for food, language, landscapes, music, a familiar face.

Testimonies from Mrs Hong and her four children, Winston, the oldest, followed by Yvonne, two years younger, then Vernon one year younger, and Bruce, five years younger than Vernon and included

their cousin Tsu King (whose father, Mr Hong's older brother, ran a corner café in Chiswick Street, one block away) formed the organizing principle and the driver of the narrative of the exhibition. As well as recounting the Hong's experiences it echoed some of the present realities of immigration today.



Figure 3. Mr Ho Chee Hong in KMT uniform. Courtesy of the Hong family.

The senior male of the family, Mr Ho Chee Hong (now deceased) was born in 1925 in Guangdong in a small village in the south-east of China³. He joined the Kuomintang (KMT) Chinese nationalist army that opposed the Communist takeover, as a family studio portrait in the exhibition shows. In the 1950s when China began to struggle economically and the tentacles of the communist Mao government tightened for all its citizens, Ho Chee made the decision to leave China. As Winston, his son puts it, “coming to a racially divided country didn’t matter. There was no starvation. Racial discrimination was rife worldwide”.

Ho Chee Hong’s wife, Kway Ping Hong, nee Ho, came from Shantou, also in Guangdong province. She left China in 1957, travelling first to Macau, and then later to Hong Kong, and from there, as a stowaway on a ship with an aunt to Lourenco Marques, now Maputo, in Mozambique. Then, after a couple of years in Maputo, she stowed away alone on a boat to Durban where she was met by an uncle

and together the pair of travelled to Johannesburg. All told, her journey from China to South Africa took three and a half years. Of her reasons for leaving China, Ping Hong remarked that, “when communism came in, everything was state owned, so you worked for the state. The only way to earn a decent living was to leave”.

Although Apartheid laws were a recurring refrain in the oral testimony told by the Hong family, they were not outspoken about it, saying that the Chinese didn’t want to rock the political boat or speak out about their conditions. Rather they lived a life of semi-invisibility, attempting to evade apartheid laws and the whims of bureaucrats or police who might institute reprisals at their lack of compliance. They therefore tried to be as unobtrusive as possible, even when they were rudely treated. They operated in the gaps and silences of apartheid, and remained politically mute, so as to avoid drawing attention to themselves; they worked hard to educate their children to enable them to enter socially respectable professions.

As a result of their exclusion and low profile, the Chinese in Johannesburg maintained strong ties within their own community and had little interaction with other groups. Many individuals were unable to speak English, drive cars, or enter and participate in the civic life of cities. As a result, many Chinese felt marooned here, and relied on their families to share festivities and family events⁴, such as Chinese New Year, and the annual grave cleaning ceremony that continues to this day. Indeed, Mrs Hong never spoke fluent English and still converses in Cantonese with family members. Most of her time was spent in the corner café, serving customers, ordering supplies and managing the shop.

The corner café

The context of the corner shop in Caroline Street provides a moving and telling window through which the experiences of the Hong family are refracted and reflected. The architecture of the urban corner shop represents a very fixed language in South Africa: prosaic, utilitarian, unremarkable. As Chinese people in Brixton, the Hong family would have had to seek permission to live and operate a corner shop in a white group area since South Africa’s cities were divided geographically into areas according to race during apartheid. Moreover, during the 1950s to the 1980s, most shops, such as supermarkets and retail stores were open from 8.00am to 5.00pm, Monday to Friday, and 8.00am to 1.00pm on Saturdays and closed all day on Sundays. Convenience stores such as the Hong’s operated extended hours in those days, long after the supermarkets had closed, positioned on street corners in the suburbs where they could attract customers from two directions⁵. But they frequently doubled as dwellings: those who ran such shops lived adjacent to their cafes. The Hong’s premises was an example. The two front rooms on Caroline Street were the shop with doorways to the street, and the rooms behind were living space. Initially, when the shop was established in the 1950s they could move between private (home) and public (shop) through an interleading door, but after the 1980s a Municipal health by-law prohibited such access, and the doorway was bricked up. Outside was a small garden containing an outdoor lavatory, a fishpond that Mr Hong tended and flower beds where Mrs Hong planted Chinese vegetables, such as bok choi that were difficult to find in Johannesburg.



Figure 4. Mrs Hong in the garden at 166 Caroline Street. Installation view with plan of the building painted on the wall. Collection of Winston Hong and installation photograph by Sally Gaule

The convenience store in South Africa was a place of encounter, one of the few multi-racial spaces that operated during apartheid. It was the place where all races shopped. But they were also ignored spaces, overlooked, prosaic, unimportant and precarious, although well patronized. These were the spaces of racial interactions, but simultaneously overwritten by apartheid laws. Moreover, the structure of 166 Caroline street is familiar: domestic architecture typical of Johannesburg's and South Africa's suburbs. All too familiar, neither impressive, or remarkable or noteworthy – part of the everyday landscape. There were no separate doors for black and white people, as was the case in South African post offices, no separate counters for serving different races, that were part of the architecture of banks; the corner café was a democratic space, but never really acknowledged as such.

The installation of the exhibition created a new narrative about the building, altered and transformed from its original purpose, it became an exhibition space displaying text, objects, photographs and material culture in relation to the architectural and social context of its former life as a corner café under the management of Mrs Hong. The curatorial act was deliberately light, unobtrusive, and discreet. In exercising restraint in this regard, the installation echoed a dimension of the precarity and ethos of life at 166 Caroline street: that of making do, of thrift and frugality.

Contained within the exhibition was a collection of objects and documents and family photographs generously lent by the Hong family. These objects came from their homes and were accompanied by testimonies of interviews conducted with members of the family about their experiences while living there. Material objects became triggers for memories and acquired new and wider significance in the display. How these objects were observed by audiences, subject to perceptions of time and memory contributed to the concepts of aura and authenticity of which museum objects form a part. They echoed what poet and author Gustaf Sobin called “luminous debris” referring to fragments that with care and reconstruction and interpretation provide stories that interlock, interweave and illuminate past and present. In this exhibition, the artefacts and their location illuminate humble aspects of human existence. Its fragility, but also its resilience. For example, a photograph of the shop counter, worn down by Mrs Hong from counting money, speaks of repetitive cycles and everyday actions, and the effects of use over time. Likewise, the old oxo tin box, which was used as the shop's till, offers a way of understanding the day-to-day lifecycles that occurred in the shop.

At the opening of the exhibition, Vernon Hong spoke movingly about how in his time as the son of the owners, commodities such as sugar, flour and mealie meal were not prepackaged, but bought in bulk by traders. In the corner shop, bulk supplies were measured and weighed up into smaller quantities using a scale and weights, and then sealed into brown paper bags without any adhesive. “This”, Vernon remarked, “was a cost saving measure”.



Figure 5. Shop counter with Oxo tin and weights. Photographs Sally Gaule

Mrs Hong also lent her treasured engagement dress for the exhibition. This dress, in pristine condition, was displayed together with the box it had come in, and where it had remained for most of the intervening years. Its display was especially poignant, placed beside a photograph taken on her engagement, it conveyed powerfully and authentically the texture of lived experiences and of valued possessions.



Figure 6. Tiny photographs on display from the Hong family collection, and documents belonging to the Hong family. Photographs by Craig Maarschalk and Sally Gaule

Family Photographs

The family photographs on display in the exhibition formed an extraordinary collection of personal images that convey some of their experiences living and growing up in Brixton, of everyday life. This small but rich archive might be seen to counter more stereotypical images of the Chinese in South Africa, and it offered unprecedented access to a private collection of images⁶. These images are testament to little known lives, revealing perceptions and aspects of the consciousness of a South African-Chinese family during apartheid.

The family's oral testimony gives valuable and poignant insight into their lives and their experiences living in Brixton. Of significance was their relentless work ethic which saw the shop open every day of the year except two of meticulous record keeping and account keeping and their retention of their cultural origins to China. They told of the emotions of living in South Africa, but simultaneously of not quite belonging. As Winston Hong wrote to us, "the thing is, we are guests here. This is not our country. This is better than where we came from. So who are we to complain? We chose to be here so we accepted the law here". This text we decided to juxtapose with a photograph of the family visiting the Union Buildings in Pretoria.

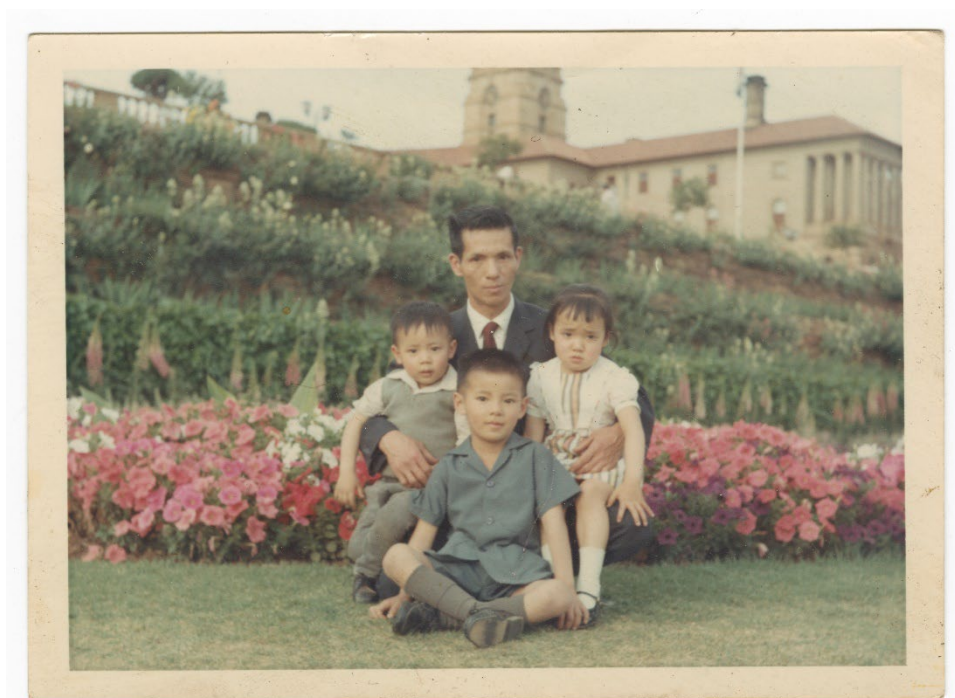


Figure 7. Photograph of the Hong family at the Union Buildings, Pretoria, c 1970. Hong family collection

Its poignancy lies in the group clustered together in the centre of the image, their faces serious, posed and organized formally against the backdrop of the Union Buildings. How are we to interpret this photograph? The children sit against their father, staring uneasily at the photographer and viewer, highlighting their emphatically ambivalent visages. Their physical closeness around their father, who squats down for the photograph suggests a tentative and unstable stance, conveying an undercurrent of anxiety. The photograph was taken about 1969/70 Winston Hong told me, about twenty years after his father had immigrated here. Yet the group appear as tourists. Their poses to not lay claim to their adopted country, nor do they present an aspirational stance. Moreover, the patriarch of the family with his children is perhaps atypical of family photographs, where, more often than not, it is the mother who is photographed with her children⁷. The reason for the absence of Mrs Hong in such photographs is because she was always running her corner café, and always stayed behind because the shop had to remain open.

Another photograph taken in the garden at 166 Caroline Street depicts Vernon holding the family's cat *Buk Neow* in front of a cardboard box, with "sterker witter", "stronger whiter" emblazoned on its side. Taken in the garden at 166 Caroline Street, this photo is striking for the subjectivity of the photographer. Winston, three years older than Vernon, depicts his younger brother's awkwardness and the inadequacy of his small hands to hold the cat comfortably, yet Vernon's awareness of the camera and his absence of artifice convey a strikingly intimate and unguarded moment.



Figure 8. Vernon in the garden at 166 Caroline Street. Collection Winston Hong

A horse and cart with Kway Ping Hong and her eldest son Winston standing beside it, shown in one photograph, was a commonplace occurrence until the 1980s and even the 1990s. Another, of a South African police van on the street outside the shop was an omnipresent sight in the apartheid era, particularly in a suburb like Brixton. It was into those vehicles that black people without a valid 'pass' (identity document) were placed and transported to a police station and thereafter imprisoned and only to be released on the payment of a fine. But what is striking about these early pictures of street scenes in retrospect, is the low boundary walls which have given way, over time to palisades, razor wire, electric fences and high walls in the suburb of Brixton and virtually all other suburbs of South Africa. These ineluctable changes over time signify a paradox: after the barriers of apartheid came tumbling down, high walls and intensifying security against burglaries and highjackings rose up in its place.



Figure 9. Corner of Chiswick and Caroline Street Brixton with police van. C 1970s. Collection Winston Hong

More sinister aspects of the period of apartheid are displayed in the documents section of the exhibition, that show how the family was unable to own the property that they lived and worked in, and sought a trusted ally, a Mr Kalliope Joannou to front for them, while the Hong's paid off the mortgage. Mr Joannou was Greek, and a strong bond formed between himself and Mr Hong. Being an immigrant himself Mr Rousseau was sympathetic to the plight of his friend, who, simply because he was Chinese, was prohibited from owning property, and thus helped him to acquire it. Their relationship also points to slippage in the hegemony of apartheid, much of which was hidden and unacknowledged during that time. Included in this section is a document from the Department of National Education granting the Hong's daughter Yvonne permission to study for a BSc degree at the University of Pretoria in 1992, just before apartheid ended. In addition, documents from the files of the Hong family have Chinese text stapled to them: a measure taken by Mr Hong to ensure that Mrs Hong understood their contents as she did not read English or Afrikaans.

CONCLUSION

Photographs are both physical and tangible but also ephemeral and trigger memories in their viewers through the act of looking at them. Thus, they have an intangible dimension too. Through these combinations of physical objects, the space of the exhibition, and the part played by memory everyday experiences were writ large that gave an experiential dimension to the exhibition. Many of the objects on display, like the building itself, were worn, battered, and prosaic, but which through the context of the display, became visually charged. Moreover, through conceiving of such organizations of objects and spaces, a blurring of the tangible and intangible occurred. Where physical objects offer sensory experiences; these in turn offered a way to understand the lives of others and the spaces of their lives.

NOTES

¹ The exhibition titled *Behind that Window* was curated by Tamzyn Botha and Sally Gaule. It was open to the public from 11 November until 30 November 2020.

² Hall, Stuart, "Reconstruction Work: Images of Postwar Black Settlement." (1984), in *The Everyday Life Reader*, ed. Ben Highmore, (New York and London: Routledge, 2002), 254.

³ The family are not certain of his year of birth as he acquired a new identity when he arrived in South Africa in the 1950s. "Paper Sons" is an expression that describes Chinese immigrants to America and elsewhere who adopted false names in order to enter a country. Melanie Yap and Dianne Leong Man, *Colour, Confusion and Concessions* (Hong Kong: University of Hong Kong Press, 1996), 182.

⁴ See for example Henion Han's moving film, "A letter to my cousin in China", in which he describes his mother's mental anguish in only being able to communicate with a few Chinese South Africans because she spoke a different dialect to them.

⁵ I am grateful to Ms Dianne Leong Man for highlighting this in her opening speech.

⁶ Compare for example the photographs installed in this exhibition to those discussed in Harrison, Yang and Moyo's excellent paper "Visual representations in South Africa and China and the Chinese People".

⁷ Although examples to the contrary can be found, conventional images of family within the photographic archive more frequently depict mothers and their children than fathers.

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DESIGNING THE DIGITAL CHARLES WILLSON PEALE MUSEUM OF NATURAL HISTORY AND ART, INDEPENDENCE HALL, PHILADELPHIA 1802-1827, A WORK IN PROGRESS

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INTRODUCTION

This paper discusses a work in progress, a digital 3D interactive model of Charles Willson Peale's early nineteenth century museum of Natural History and Art. From 1802-1827 the Museum was housed in the old Pennsylvania State House, now known as Independence Hall, Independence National Historical Park (INHP), Philadelphia. The building is renowned as the site of the signing of the Declaration of Independence, 1776 and the U.S. Constitution, 1787. Our working 3D model of the Museum is informed by the watercolor, *The Long Room, Interior of Front Room in Peale's Museum* by Charles Willson Peale and Titian Ramsay Peale,¹ the oil painting, *The Artist in His Museum* by Charles Willson Peale,² historical inventories and descriptive records in the archives of the American Philosophical Society, The Historical Society of Pennsylvania, The Library Company of Philadelphia and numerous scholarly published works.

The paper highlights research and the production of digital 3D models of artifacts and birds displayed in Peale's Long Room Gallery with emphasis on the museum's silhouette portrait studio, the physiognotrace, the device used to make the silhouettes, and on the Moses Williams avatar, the portrait cutter who operated the silhouette concession.

Scholars have long looked to Peale's Museum for insights into early nineteenth century American values about art, science, and the social/cultural order and how these values and ideas continue to impact twenty-first century American experience. Peale's Museum is far less well known or understood as popular cultural heritage. Rendering the Museum as an interactive digital learning environment will raise awareness of its importance as a popular cultural heritage site in the early republic. It can also help to understand which historical/cultural stories get told, by whom to and with whom, when and where. A challenge facing the project is to provide a space for telling stories about the struggle, ". . . to form a more perfect Union,"³ a desire enshrined in the U.S. Constitution signed in Independence Hall.

C.W. Peale was an American portrait and landscape painter of the late eighteenth and early nineteenth centuries.⁴ His many portraits, some of which hung in his Museum, depict American Revolutionary War heroes and those whom Peale referred to as, "distinguished Personages."⁵ At the age of forty-five, in 1786, Peale began a natural history collection in his Philadelphia home. At that time, Philadelphia was the world's second largest English-speaking city after London. It was regarded as the cultural center of the US and served as the nation's capital from 1790-1800.⁶ Peale's collection was ambitious from its

start, and it changed his life from that of a traveling portrait painter to a public educator, naturalist, and museum keeper.⁷ Peale envisioned a museum that would be a vehicle for public education supported by the government as a national institution. While his quest for substantial government support was never realized, the popularity and expanding size of the collection soon outgrew his home. In 1794, Peale moved the collection and his family into the American Philosophical Society's Philosophical Hall.⁸

The collection soon outgrew Philosophical Hall and following the US government's move to its new home, now known as Washington D.C., Peale secured permission from the Pennsylvania Legislature to move his collections to the old Pennsylvania State House, located yards away from Philosophical Hall.⁹ In 1802 he opened his State House Museum to the public. His earliest known museum admission ticket (1788) proclaimed, "Nature, The Birds & Beasts will teach thee! Admit the Bearer to Peale's Museum, Containing the Wonderful works of Nature! and Curious works of Art."¹⁰ From its start, Peale's Museum was a product of the Enlightenment, offering visitors a way to see the world as a fixed system in harmony and with a definite tolerance for inequality. Peale sought to apply Linnaeus' classification system to explain a hierarchical Chain of Being, where everything had its place including nonbiological specimens, art, cultural artifacts and the social/political order.¹¹

TOWARD A DIGITAL 3D MODEL OF PEALE'S MUSEUM

Our intention is to present Peale's Museum as a scalable and flexible digital interactive learning space that may be used in kindergarten through twelfth grade, and at cultural centers. Our primary focus has been to produce an augmented reality treatment of the Museum for visitors to Independence Hall, the site of the signing of the American Declaration of Independence and the U.S. Constitution. Independence Hall is a UNESCO World Heritage Site,¹² and a major attraction in Independence National Historical Park which received over four and a half million visitors in 2019, before the COVID pandemic.¹³ The building offers an ideal space from which to reexamine ideas of art and science, in the context of class, race and religion as presented in Peale's early nineteenth century museum and how those values and ideas continue to ripple through the American present.

The 3D digital models to date have been produced largely through the efforts of Digital Media Department rising sophomores in Drexel University's Students Tackling Advanced Research Scholarship program, known as STAR Scholars.¹⁴ A challenge of working with digital media undergraduates, early in their education, is that while they have fledgling 3D modeling skills, they lack experience and knowledge of using advanced technologies necessary for more complex models. For these we have hired an advanced undergraduate and an alumnus.¹⁵ Another complication is that our digital media curriculum is for the most part entertainment industry focused with little emphasis on the type of research necessary to produce accurate digital historical models. We address this by providing faculty guided research opportunities in Philadelphia archives.¹⁶ including The American Philosophical

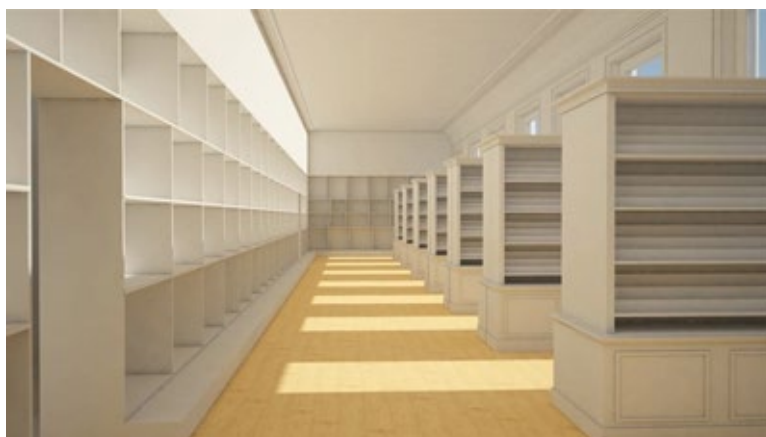


Figure 1. Peale Museum Cases 3D digital models by Matthew Haas and Hannah Winograd

Society, the Historical Society of Pennsylvania, and the Pennsylvania Academy of the Fine Arts. Students also participate in consultation sessions with historians, and curators at Independence National Historical Park and other regional cultural institutions.

Some of the models produced by STAR Scholars include museum exhibit cases (Figure 1), framed portrait paintings of individuals that hung in the Long Room (Figure 2), bird dioramas (Figure 3), and a pipe organ (Figure 4) that may have been like the one used in Peale's Museum.

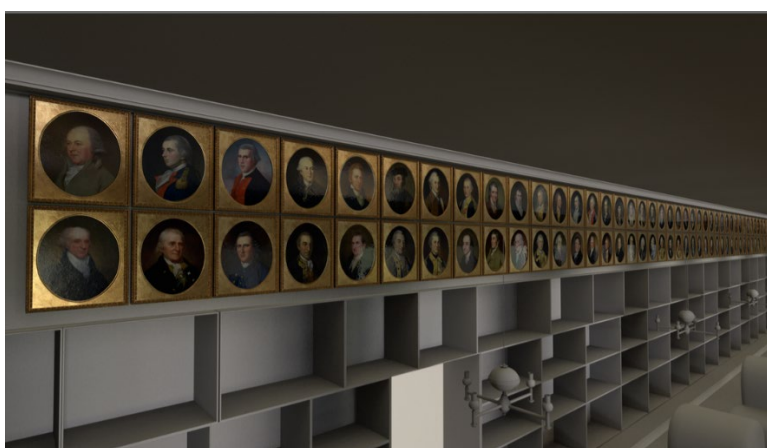


Figure 2. Photographs of eighty-eight portraits were composited into 3D frames and hung above the bird cases. Model rendered by Mariia Osanova

Based on research conducted at INHP's Portrait Gallery, Mariia Osanova produced digital 3D models of gilded frames used to display the double row of portraits in Peale's Museum. She composited the frames and eighty-eight photographs of the portraits from the INHP's photographic collection and placed them in her 3D model of the Room (Figure 3) depicted in the Peales' watercolor and C. W. Peale's painting. To paint the watercolor of the Long Room, C. W. Peale used a drawing machine¹⁷ that provides a linear perspective, deemphasizing dimensional differences in the bird cases. Emily Mah's research revealed the actual dimensions of the bird cases¹⁸ and she produced several dioramas using the historic measurements. We are planning to remodel our render of the Room's south wall to reflect the accurate measurements of the cases.



Figure 3. Diorama cases, Emily Mah. Bird photogrammetry, Snow Owl and Esquimaux Curlew, Jonnathan Mercado

Samantha Seitz was intrigued that Peale had a pipe organ in his museum and that he allowed visitors to play it. She researched pipe organs, read through Peale's papers and conferred with contemporary pipe organ builders for advice before modeling a pipe organ type that may have been like the one used in Peale's Museum. The keyboard is totally functional, and we plan to augment it with sound, so that it will be playable in our virtual museum.



Figure 4. Pipe organ modeled by Samantha Seitz

THE SILHOUETTE STUDIO, THE PHYSIOGNOTRACE AND MOSES WILLIAMS MODELS

In an 1803 letter to Thomas Jefferson, C.W. Peale provides a detailed description of the physiognotrace and included a watercolor drawing of the device.¹⁹ In 2018, based on guidance from Karie Diethorn, Chief Curator of INHP, Peale's letter and a twentieth century reproduction of the physiognotrace in the INHP's collection, Nick Moy produced a digital model of the device. In 2022 Nick set out to enhance his earlier model. The goal was to visually demonstrate the fine workings of the machine, later to be used in animations of Moses Williams operating the device and interacting with portrait sitters. The replica at INHP lacked many of the fine mechanical parts described in Peale's letter and we did not have a sense of how all the parts worked together. Another twentieth century replica of Peale's physiognotrace is in the Smithsonian collection.²⁰ Upon examination of it, Nick was able to produce and animate a detailed 3D model of the physiognotrace.



Figure 5. Left: 2018 model of Nick Moy's model of the physiognotrace. Right: Nick Moy's 2022 model



Figure 6. Detail of the conical point described by Peale making contact with paper held in place with an iron frame on the physiognotrace, digital model by Nick Moy

Nick Moy's silhouette studio model is based on Sellers' diagram of the Long Room's floorplan, locating it in the northwest corner of the Room²¹ and on HABS Long Room measurements.²² As of yet, we have not determined whether the physiognotrace was mounted on the back wall or perhaps the backside of a museum exhibit case. Based on a diary entry of a Museum visitor, we know there were also three trick mirrors in the studio.²³ For now, we have chosen to mount the physiognotrace on the back of a Museum cabinet and will mount the mirrors on the rear wall.



Figure 7. Nick Moy's model of the physiognotrace and stool mounted on the rear of a museum cabinet. Room model by Mariia Osanova

Producing the full body digital 3D model of Moses Williams presents a greater challenge. There were fifteen portrait artists in the Peale family; in addition to many self-portraits, the Peales often painted portraits of each other and of other family members.²⁴ Moses Williams is not known to have been the subject of any portrait. He was born into slavery (1775 circa) in the Peale household. As required by law, Peale manumitted Moses' parents, but kept Moses, an eleven-year-old child, enslaved until the age of twenty-seven, one year away from mandatory manumission.²⁵ As a child, and young adult, Williams assisted in many Museum related activities including collecting specimens, taxidermy and the preparation and promotion of exhibits. Given the silhouette studio concession in 1802, he continued to work in the Museum as a free man. In its first year of operation, the studio is estimated to have produced over 8,000 silhouettes contributing to the popularity and financial success of the Museum.²⁶ Despite his many and varied Museum contributions, if mentioned at all, Williams' efforts are given short shrift in published accounts. As noted by Shaw, in Peale's Museum, Moses Williams, "existed as a shadowy enigma for historians, what Toni Morrison might term an 'Africanist presence' within the well-documented legacy of the Peale family."²⁷ There is growing scholarly and popular interest in bringing to light cultural and scientific contributions of people heretofore excluded from mainstream historical accounts, especially people of color and women of all races.

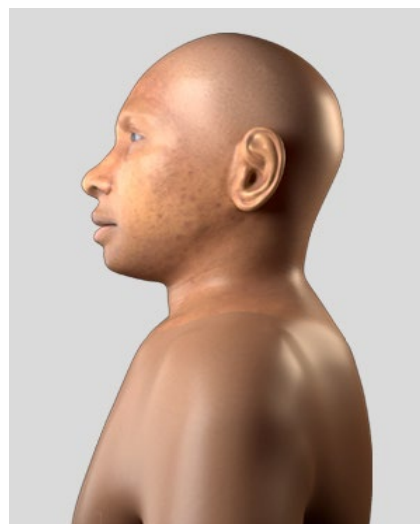


Figure 8. The working 3D model of Moses Williams based on his silhouette profile and Rembrandt Peale's painting of an unidentified male in a feathered cloak and helmet believed to be Moses Williams. Digital model by Tyrone Bullock

Tyrone Bullock's model is based on two sources, a silhouette of Williams,²⁸ possibly a self-portrait,²⁹ and a painting.³⁰ Sacco and Shaw speculate that Moses Williams, referred to by C.W. Peale as, "my Molotto Man Moses,"³¹ is the sitter for the unsigned painting, *Man Wearing a Feather Cloak and Helmet* attributed to Rembrandt Peale.³² The Hawaiian feather cloak and helmet worn in the painting were in Peale collection. The painting is believed to have been painted between 1792-1802, the dates would place Moses in the same age range as the sitter.³³

To research historically accurate attire, Tyrone worked with Kristina Haugland, Associate Curator of Costume and Textiles at the Philadelphia Museum of Art. Modeling the wardrobe was supervised by Professor Kathi Martin in Drexel University's Fashion Program. The model is a work in progress, yet to be modeled are hair and period appropriate shoes. While it is probable that we will never know what Moses Williams looked like, we will make the information that informs our model transparent. Producing a 3D model of Moses Williams will enable us to visually establish his presence and to recognize his contributions to what was for a time, the largest museum in North America.

Together, the digital models of Moses Williams, the physiognotrace and the silhouette studio create a story space for telling stories not only about museum exhibits, but also about the people who worked in the Museum, those who visited it, and those who did not. Records identify visitors and patrons of the Museum, including Philadelphia's leading citizens, national heroes, and international guests. Missing from the guest lists are members of Philadelphia's community of free African Americans, including its religious leaders Absalom Jones and Richard Allen. Of the thousands of silhouettes made at the Museum, the silhouette of Moses Williams and one made by Williams inscribed as "Mr. Shaw's Blackman" are the only two known silhouettes of African Americans.³⁴



Figure 9. Working 3D model of Moses Williams in period appropriate attire. Digital model by Tyrone Bullock

TELLING THE STORY OF MOSES WILLIAMS

While we feel Independence Hall is the most appropriate place to tell the story of Peale's Museum and Moses Williams contributions to it, the location presents logistical problems. The number of Independence Hall daily visitors is limited by timed tickets, twenty-minute guided tours accommodating up to eighty plus visitors at a time. The tour is focused on the signing of the Declaration of Independence, the US Constitution and use of the building in the 1770's. Within the structure and

goals of the existing tour, there is insufficient time to explore the self-guided possibilities of an augmented reality tour featuring Peale's Museum.

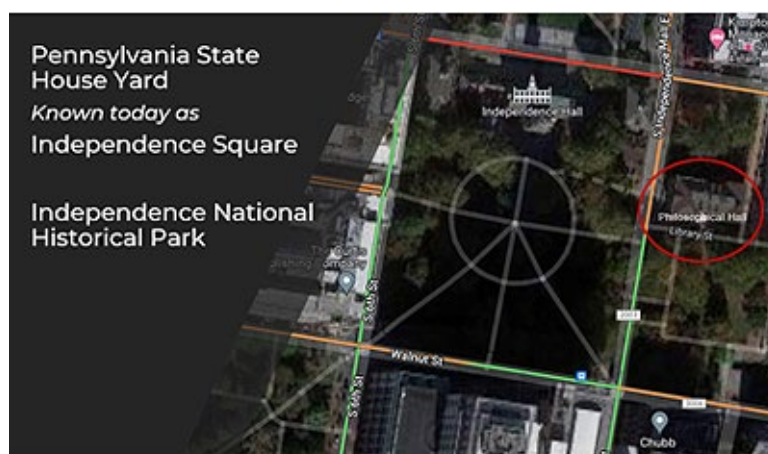


Figure 10. Google map showing Independence Hall, the Square and the location of Philosophical Hall, emphasis added in red

In discussion with INHP we explored possibilities of telling the story outside the building. While this is disappointing, it does offer some interesting possibilities. If the augmented reality tour is offered to visitors in the State House Yard, located behind Independence Hall and now known as Independence Square, it could include Peale's move to Philosophical Hall in 1794 and expansion into Independence Hall. Philosophical Hall is located on the eastern edge of the Square (see Figure 10). Expanding the time frame would enable telling the story of Moses Williams contributions to the Museum as an enslaved youth including feeding animals in Peale's menagerie in the Yard. Peale maintained the menagerie to house animals before slaughtering and mounting them as museum exhibits.³⁵ Telling the story of Peale's Museum in the Square may facilitate accessibility and increase the number of visitors to the virtual site. Whereas the second floor of Independence Hall is accessed by a grand wooden staircase, the second floor is not accessible to the mobility impaired. Access to the Square is free of hindrances. The Square is a popular attraction, open to all and the number of daily visitors is not limited. If Square visitors were made aware of an augmented reality tour, accessible from their smartphones, telling stories about Independence Hall and Philosophical Hall, the grounds and about people who worked in these institutions, it may attract more daily visitors than could be accommodated inside Independence Hall.

ACKNOWLEDGEMENTS

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NOTES

- ¹ For the Peales' watercolor in the collection of the Detroit Institute of Arts, see <https://www.dia.org/art/collection/object/long-room-interior-front-room-peales-museum-56651>, accessed July 2, 2022.
- ² For the Peale painting, in the collection of the Pennsylvania Academy of Fine Arts, Philadelphia, Pennsylvania see <https://www.pafa.org/museum/collection/item/artist-his-museum>, accessed July 2, 2022.
- ³ "The U.S. Constitution," National Constitution Center accessed July 12, 2022, <https://constitutioncenter.org/interactive-constitution/full-text>
- ⁴ Charles Coleman Sellers, *Portraits and Minatures by Charles Willson Peale*. (Philadelphia: American Philosophical Society, 1968)
- ⁵ Charles Willson Peale, "295. CWP: Guide to the Philadelphia Museum Philadelphia, 1804," in *The Selected Papers of Charles Willson Peale And His Family*, ed. Lillian B. Miller (New Haven: Yale University Press, 1988), Volume 2, Part 2, 763.
- ⁶ Constance Greiff and Charles Bridgham Hosmer, *Independence: The Creation of a National Park*. (Philadelphia: University of Pennsylvania Press, 1987), 30.
- ⁷ Miller, *Selected Papers*, Volume 2, Part 1, 1.
- ⁸ Charles Willson Peale, "46. Peale's Museum: Announcement of Move to Philosophical Hall, General Advertiser Philadelphia, September 19, 1794," Miller, *Selected Papers*, Volume 2, Part 1, 98.
- ⁹ For an image of William Birch's 1800 engraving of the "Back of the State House" with a view of Philosophical Hall in the background see: <https://www.ushistory.org/birch/plates/plate22.htm>, accessed July 3, 2022.
- ¹⁰ David R. Brigham, "Ask the Beasts, and They Shall Teach Thee": The Human Lessons of Charles Willson Peale's Natural History Displays," in *Art and Science in America Issues of Representation*, ed. Amy R.W. Meyers (San Marino: 1998), 33.
- ¹¹ See David R. Brigham, *Public Culture in The Early Republic: Peale's Museum and Its Audience*. (Washington D.C.: Smithsonian Institution Press). Ellen Fernandez Sacco, "Spectacular Masculinities: The Museums of Peale, Baker and Bowen in the Early Republic," (PhD diss., University of California, Los Angeles, 1998. ProQuest), 48-130. Gwendolyn DuBois Shaw, *Portraits of a People: Picturing African Americans in the Nineteenth Century*. (Andover, MA: Addison Gallery of American Art, 2006), 45-53.
- ¹² "Independence Hall," UNESCO World Heritage Convention, accessed July 3, 2022, <https://whc.unesco.org/en/list/78/>
- ¹³ "Number of visitors to Independence National Historical Park in the U.S. 2008-2021," Statista Research Department, March 14, 2022. <https://www.statista.com/statistics/254017/number-of-visitors-to-the-independence-national-historical-park/>.
- ¹⁴ For information on the Pennoni Honors College STAR Scholarship Program at Drexel University see <https://drexel.edu/pennoni/urep/undergraduate-research/STAR-scholars/>.
- ¹⁵ Funds for the hires were received from a 2021 Drexel University Summer Creativity Grant, a 2022 Westphal College of Media Arts and Design Mini Grant, and a Pennoni Honors College Undergraduate Research Mini-Grant awarded to Tyrone Bullock.
- ¹⁶ Research has been conducted at The American Philosophical Society, the Historical Society of Pennsylvania, and the Pennsylvania Academy of the Fine Arts. Students also participate in consultation sessions with historians, and curators at Independence National Historical Park and other regional cultural institutions.
- ¹⁷ Charles Willson Peale, "89. CWP to RuP Philadelphia, August 4, 1822," Miller, *Selected Papers*, Volume 4, 169-172.
- ¹⁸ Charles Willson Peale, "526. CWP to Stephen Elliott Philadelphia, February 14, March 26, May 1, 1809," Miller, *Selected Papers*, Vol. 2 pt 2, 1177-1183.
- ¹⁹ Charles Willson Peale, "187. CWP to Thomas Jefferson Philadelphia, January 10, 1803," Miller, *Selected Papers*, Vol. 2 pt 1, 480-482.
- ²⁰ "Physiognotrace, replica made from Peale's drawing," Smithsonian Institution, accessed July 13, 2022, https://npg.si.edu/object/npg_AD_NPG.97.3?destination=edansearch/catalog_of_america%3Fpage%3D4981%26edan_local%3D1%26edan_fq%255B0%255D%3Dobject_type%253A%2522Artists%2527%2520materials%252
- ²¹ Charles Coleman Sellers, *Mr. Peale's Museum: Charles Willson Peale and the First Popular Museum of Natural Science and Art* (New York: W. W. Norton and Company, 1980), 217.
- ²² "HABS PA, 51-PHILA, 6 (sheet 10 of 45) Independence Hall Complex," Historic American Buildings Survey, accessed July 6, 2022, <https://www.loc.gov/resource/hhh.pa0939.sheet/?sp=10&st=image>.
- ²³ A.R. Beck, "Notes of a Visit to Philadelphia, Made by a Moravian Sister in 1810," *The Pennsylvania Magazine of History and Biography* 36, no. 3 (1912):360.

- ²⁴ Carol Eaton Soltis, *The Art of the Peales, Adaptations and Innovations* (Philadelphia: Philadelphia Museum of Art, 2017).
- ²⁵ Brigham, *Public Culture*. Sacco, "Spectacular Masculinities." Shaw, *Portraits of a People*.
- ²⁶ Brigham, *Public Culture*, 70.
- ²⁷ Shaw, *Portraits of a People*, 45.
- ²⁸ For the silhouette portrait of "Moses Williams, cutter of profiles" in the Library Company of Philadelphia see <https://digital.librarycompany.org/islandora/object/digitool%3A130124>, accessed July 3, 2022.
- ²⁹ Shaw, *Portraits of a People*, 51.
- ³⁰ For an image of the painting, "Man Wearing Feather Cloak and Helmet" see, https://upload.wikimedia.org/wikipedia/commons/9/93/%27Man_Wearing_Feather_Cloak_and_Helmit%27%2C_oil_on_canvas_painting_attributed_to_Rembrandt_Peale.jpg
- ³¹ Charles Willson Peale, "99. CWP: Diary 17. A Trip to Cape May, New Jersey Cape May, N.J. May 30-June 12, 1799," Miller, *Selected Papers*, Vol. 2 pt 1, 241.
- ³² Sacco, "Spectacular Masculinities," 110. Shaw, *Portraits of a People*, 48.
- ³³ A. R. Beck, "Notes of a Visit to Philadelphia, Made by a Moravian Sister in 1810." *The Pennsylvania Magazine of History and Biography* 36, no. 3 (1912): 346–61. <http://www.jstor.org/stable/20085606>, accessed July 15, 2022.
- ³⁴ Brigham, *Public Culture*, 71-72. Sacco, "Spectacular Masculinities," 72-73. Shaw, *Portraits of a People*, 50.
- ³⁵ Charles Coleman Sellers, *Charles Willson Peale Later Life: 1790-1827* (Philadelphia: The American Philosophical Society, 1947), 228. For a visitor's description of some of the animals in the menagerie see Beck, "Notes of a Visit," 358-359.

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LAB-OURING: HERITAGE AS LAB WORK

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INTRODUCTION

“How about a VR visitor space within the lab for trials and displays?”

“Would analogue experiences (keeping the FARO far, far away), make the exhibit more felt and more ‘here’?”

“Can we just have an AR mascot (popular as it might be), playing guide to the walkthrough visitor?”

“Would the conceptual aspects need paring down in their presentation to officials?”

“Let’s change the parameters of the onion dome – it won’t work for VR”.

“Meant for whom and for whom would (heritage design) be radically different?”

Though this miscellaneous list of concerns might sound like they’ve been picked up by an antenna with a penchant for the mundane and everyday chatter of a design studio, I hear and see them differently. I see them as issues, thoughts, debates and discussions, that could be molded into discussable questions, having heard them voiced by very different people at many different times on my frequent visits to an Intangible Heritage Lab.

This lab physically occupies a 1000 square feet room, is housed within a department of design, enclosed within a university. I shall keep both the department and the university anonymous. Though the contents of the paper have context-specificity, they also have a global generality. My focus, as opposed to context specific detail, is to present what I consider to be this global generality of the design lab as a space to literally ‘design’ heritage.¹ That is also because my visits to that lab were more to catch up with my colleagues than really to engage in any critical fashion with the work produced there. As an outsider in the lab, I glimpsed and overheard a lot – remarks, lament, praise and the busy yet soberly hum of everyday routines, interrupted only by the crazed frenzy of funding reviews. These visits provided material for me to reflect upon the many behaviors of a studio environment (which I am deeply interested in), peripheral perhaps to the actual work happening there. The output of design work, visceral and visible, is usually the figure, the focus against the not so noticeable background for decisions and the hidden green room for debates. Aligned as I am to view studio life as that in which design is incubated before release into the outer world, I try to tune into the sights and sounds emitted and events created by the studio as it practices negotiating and balancing of multi-directional vectors. Stop by this studio any quick morning and you’ll see a space with all the typical markings of a design lab, empty, but full of Macintosh screens blinking away after a long night

of deadline frenzy and absolutely no wink. And a few friendly and essential Windows machines with signboards – “processing.... please do not touch” – 3D laser scan prints of monuments done in-house, and the remains of a meeting from the day before, VR headsets strewn around coffee mugs on a huddle table, soft music presiding overall. In terms of performance, the studio is exactly like a theatre-space where theoretical positions gain character and are played out. They are tempered within the practical framework of grants, funding, project deadlines, projections of work, output, display and exhibition. These vectors are not really resolved but managed in a way that allows certain kinds of action and performance expected of the lab and its many actors. A lab of design is a creative space tempered by deadlines. This lab needs to be seen in the context of emerging spaces within state-driven coalitions and re-castings between science, technology and heritage.

This paper presents questions, anxieties and concepts at work as the lab and its actors practice, participate and perform.² As an outsider interested in how as actors within conceptual regimes, scripts are given shape, I present here issues that emerge and fester in the lab. I base the paper on a conversation that occurred in the lab when they stepped out from their everyday practice to discuss things driving their work. Housed as it is in the design environment there is a certain kind of material-conceptual practice that it subjects heritage to.³ This document is meant to look at what the notion of heritage gives to design practice or how heritage could become just another premise for design practice to perpetuate itself.

WHAT DOES THIS LAB SPOTLIGHT AS WORK?

The focus of this paper though is triggered by a quote, which is more of a musing - belonging to a design practitioner of heritage in the lab - about applying Manuel Delanda's intelligent materiality to the heritage work:

“Materials are constantly emerging, evolving and transforming. In such a context, the notion of intangibility is meaningless”

This quote, for me brought into contact two attitudes towards materiality, belonging to two very different agendas – material phenomenology and intangible heritage. Viewing intangible heritage from the perspective of a thoroughly convinced material phenomenologist designer, the intangible as a concept appears reductive. And something that is overtly binary (tangible-intangible), is trendy to critique. Something that appears reductive in terms of categorizing the world of matter in contrast to the multiplicity of seeing matter through various kinds of tangibilities. If I were to view intangibility through this perspective, then I could think of it simply as that which is yet to come into attention; yet to be examined. It is not really in the category of not graspable non-materiality. Within the material phenomenological approach, the intangible would still be a material property – just that it has not yet entered the realm of recognizable tangibility⁴. Something that is yet to be made evident.⁵ Foundationally too, the criterion of attention rings true especially when I think of visual perception. For a semiotic system to release its web of meaning, attention should exist in the first place. This is a strange way of seeing a political and global concern like the intangible the original intention of which was to shift focus away from the blinding and overt physical materiality of things. It provides a platform for various heritage organizations and resource people working in the area – to bring to attention, to shine the torch on, to make visible. And in this light, the lab can be seen as an entity primarily oriented towards attending to and garnering an audience for those practices and aspects which are otherwise languishing out of view. The notion of bringing attention to something - though at times I think of it as reductive - has the capacity to assign a new kind of communicative meaning to heritage work where it is led into the field of meaning. The anthropocenic fear regarding the custodianship of the planet is a dominant

reality which is the focus of attention today. The surging coalitions between heritage and planetary conservation and consciousness, become vehicles transporting heritage into zones of spot lit attention.⁶ In this sense, it does not seem very far off from the original need and intention of framing the meaning of intangible heritage. Today, this binary of tangible-intangible has travelled enough distance from the time of its original conception to possess a range of meanings which become visible as it garners interest and care. Through all of these situations, bringing some piece of collective human memory into attention can be seen as a motivating force for agents and agencies at work in the field. In this sense, the studio lab, within the heroism of brainstorming or the clever throwing together of disparate ideas, work out interpretations of intangibility.

The importance of attention as foundational results from a way of seeing things, objects, actions, behaviors as modulations of matter driven, not by a centralized intelligence, but one which emerges from various actions, reactions and interactions.⁷ Modulations are not led by one centralized intelligence but by a distributed and emerging sense via various material actions, reactions and interactions. Though this view seems incompatible when thrown together without prelude with intangible heritage, it definitely resonates matchingly with the point cloud data of the laser scans of the monuments. The cloud of points lends itself very easily to be viewed as molecular materiality to be combined and recombined in various ways. This gaining of meaning in terms of architectural design, aligning itself with trending ideas like Parametricism, Topology, Fold, Surface, etc. give heritage work a kind of design currency that can be exchanged, circulated and enjoyed as experimental or radical in its work with constructions and deposits from the past.

WHAT ARE THE INTANGIBILITIES AT WORK?

I asked this question to frame behaviors that would have otherwise been considered mundane and not really worth serious attention. These involve the everyday concerns of a lab dealing with heritage. By dislocating the intangible from heritage to the labour that makes or designs it, I was able to frame some anxieties related to a predominantly electronics-based labor. The anxieties of working with VR seemed to cluster around new electronic materialities and its attendant challenges. This lab is rife with small and plenty ‘technical’ worries of various kinds, that are at the base of the work which supports and serves larger curatorial meanings and structures of meaning.⁸ The discussions with the lab team constantly bring to surface these realities. For instance, to take care of, maintain and be attentive to the computing machines that grasp, produce, store and project heritage in a particular light. This maintenance is anxiety ridden due to the fear of memory crashes and performance blackouts in software and hardware. This maintenance involves multiple ‘subscriptions’ and cyclic purchases of software and contracts for consultations for the upkeep and functionality of these machines.⁹ The anxieties associated with lapse like memories, memberships, maintenance are issues that the creative labor requires to contend with, and they definitely influence the way output is to be projected.¹⁰

I mention the above apprehensions to suggest types of pressures in the lab environments growing and sustaining these kinds of heritages. In the lab one can witness substantial figuring out of techniques and technicalities via You tube in addition to targeted courses and seminars regarding use of software and hardware, including consulting technical experts when encountering an issue. When we think of the lab as a space which is the source of rituals and experiences of heritage, then it is impossible to ignore the pressure exerted by the technical aspects in the search for novelty of experience design. The lab in that sense is an agent, assembling infrastructure, churning data and information, organizing and disbursing heritage experiences. The electronic labour, in the lab, underneath the creative layer points to the processing of data, information and material into heritage experiences. It is in this sense of bringing into tangible pairings, both technologies and heritage, that the lab in itself is a space that is intangible – a

space of practices, processes and rituals that is hidden behind its assumed irrelevance to serious discourses on heritage.

INTANGIBILITIES OF THE INFORMATIONAL

In particular, I am using the lab discussion of walkthrough as manner of navigating an architectural space, to think about concerns that ground the lab's work on heritage. This navigational modality allowed me to consciously bring Manuel Delanda's intelligent materiality, to extend what was containing in the quote headlining the essay, to bear upon how one might experience an informational heritage environment.¹¹ In contrast, strictly as a map, like in an analogue drawing, it would be considered an icon of a place. In this sense, the informational environment is alert, responds and changes with respect to the location and walkthroughs of those immersed in the head-set experience.¹² The electronic environment in terms of processing and production is optimized to immersive walkthrough viewings and sightings. The indexicality offered by the VR platform, makes heritage an environment that responds to the presence of the navigator bringing with it new kinds of tangibilities.

The designers in the lab debated two types of movements in relation to the screen-based experience of heritage. Both of which wanted to do away with the screen. The first one, heavily electronic, was about immersion in such a way so as to create a smooth electronic experience unalloyed by the presence of the screen as a limiting factor.¹³ The other movement was to think immersion in the real world of culture and place only minimally mediated via electronics. In both these movements I could sense a desire for deeper, involved and felt immersions devoid of screens. One advocated a deep dive into a virtual world, with its own mutable and pliable electronic reality, and the other strongly proposed a resistant return to a world not filtered via electronic screens. Both these seeking to make tangible what would otherwise remain unseeable and untouchable.¹⁴ I couldn't help notice the urgency in both these movements to intensify the experience of heritage, making me wonder - is it not the idea of an intensifying reality that tends to drive work in such design labs? The desire for a more intense and penetrating version of reality was also not free of discussing ways of impressing an audience, the funding folk, peers, etc. by these kinds of deployment. What would it mean to think of heritage as framed within the parameters of an intensifying and performative reality? Performative exactly because the journeys to and through heritage is heavily designed and scripted in both above cases.¹⁵ To think about performativity is also to think about the staging of things. The desire and push for riveting experiences naturally brings forth the notion of staging in both really 'real' and virtually real constructions and projections. This lab and its predominant preoccupations thus furnish a case where the notion of intangibility is flexed, stretched, occupied and made alive in certain ways and through certain forms.

INTANGIBLE AS OPEN

Based on the lab's overall disposition that the past is always substantially intangible because it is more than its physical residue, the questions that recurrently surface were: in what ways can the past be made present, what lines need to be extended to connect some kinds of pasts with other kinds of presents? Since the past as a material affords remix and resurrection, especially now, a conscientious imperative to keep things open backgrounds the work of labs such as these, housed in institutes supported by the state.¹⁶ Keeping things open also stems from the necessity to align democratic openness to the multiplicities and virtualities – some of which get played out and others get played down depending on stakes and stakeholders. The necessity to treat the making of heritage as a continuing practice of incompleteness finds home and opportunity in the notion of intangibility.¹⁷ It stands for this positively incomplete job of heritage work. For the lab, it scopes in the enactment of seeking and exploring 'novel' ways of creating heritage experiences. Sophisticated and popular curation involves a substantial bit of staging, museumizing, storytelling and spot-lit display of fragments and pieces from the past. The term intangible seems to allow various kinds of interpretations in the extended and extending space of

heritage¹⁸. Their use of the word intangible also seems to free the word up from the shadows of the tangible to release its meaning captive within tangible heritage. By recognizing practices in various forms as actually possessing and propagating wealth, wisdom or memory of the times, intangible heritage foregrounds what is otherwise outside the agenda or arena of heritage. It creates modes of agencies and agents who bring out or produce new inheritances in the context of contemporary complexity in grasping what has travelled with us from the past.

CONCLUSION

To summarize, what had really caught my attention about the lab and which I highlighted in the paper is the influence of design practice on heritage. My description of the lab is meant to be a quick illustration of a concrete practical context of design to think this through. The openness of the idea of intangible allows members of the lab to pose artistic enquiries via experience of the intangible. Their play with the notion of the intangible is far distant from the more responsibility-heavy official definition. This opens heritage, both in terms of materials and content to various kinds of play for those interested in new material arrangements and rearrangements. Intangibility gets interpreted, in some instances in the lab chats, as a portal to address that quintessential concern of design – what is the scope for novelty? Intangibility, at times, is used as a turf where the conventional comfort of employing ‘latest’ technology to address the old is played out.

Designed heritage (without any irony), should be seen more as a work of design than heritage work because the aspects of design outweigh that of heritage. Creative affordance allows a questioning of the format of experience itself which in turn allows for the much-celebrated novelty in design practice. In the lab, the affordance of the intangibility concept is tried, tested, and stretched for it to suit the activity of design. This context particularizes the influence of the practice of design and not design in the sense of the ideal meanings of the discipline. It offers a ground which brings to fore the theoretical questions that practitioners have in relation to heritage and collective inheritance. It points to how certain kinds of mobilizations and dispositions coagulate around the ideas of intangible heritage and in turn transform the very ideas themselves. The case of the lab we discussed above is an instance of lab-grown heritage as that which gains tangibility as a product of the lab while losing intangibility as heritage.

ACKNOWLEDGEMENTS

I wish to thank the Intangible Heritage Lab (affiliation: anonymous), and the discussions of the members of the Lab that I participated in, which triggered thinking about how the nature of the lab shapes how heritage is framed. Many thanks also to Aarti Latkar, Department of Global Studies, Aarhus University, Denmark, for the conceptual discussions and editorial suggestions.

NOTES

¹ There is substantial literature on the notion of museumizing and its socio-political connotations. For instance, Appadurai and Breckenridge, "Museums are good to think: Heritage on view in India" in *Grasping the World: The Idea of the Museum* edited by Donald Preziosi and Claire Farago (2004). Museumizing might be inseparable as a conceptual background against which the design work of heritage occurs but here I have completely skirted that literature to focus on the lab/studio.

² This has been highlighted at various instances vociferously by the architectural anthropologist Albena Yaneva, following the pioneering work of Latour in a science lab. See Yaneva's *Latour for Architects* (London: Routledge, 2022), which summarizes her approach towards mapping discourses within architecture and design and also *The Method of Architectural Anthropology* (London: Routledge, 2021).

³ How does theory question or dislocate practice? What rings true existentially and what might be true only in context? And out of all the everyday studio talk, there was one particular quote around which I have pivoted this paper. And that was when, in one of the chats I had with the studio members, there was a theoretical take-off of sorts right in the middle of trying to definitively discuss what Intangible heritage was.

⁴ As a materialist phenomenologist, the world is tangible to the extent that intangibility does not really exist except as a ghost. And a ghost would also actually be just another tangibility not yet absorbed or digested. Very much like a mirage, both environmental effect and phantasm. Similarly, as materialist phenomenologist doing heritage, it is the act of bringing into attention that which has not yet recognized as heritage. This way of doing heritage renders intangible heritage a movement to categorize certain kinds of tangibles as heritage and bring them into the field of heritage work.

⁵ I bring in the idea of attention also because of a resonance that I see in the way Manuel Delanda gives attention the keystone status within the structuring of perception. See Delanda's *Materialist Phenomenology: A Philosophy of Perception* (London: Bloomsbury, 2022)

⁶ Heritage and Planetary consciousness have grown to be together across time due to which Heritage draws narrative power and sustenance from the environmental and climate concerns today. Numerous works have both proposed and examined this relation. For an example of a few texts from the days of examining this relation and especially for revisiting fundamental questions regarding our relation with the past, see Janna Thompson's 'Environment as Cultural Change' in *Environmental Ethics* (Vol 22, Issue 3), 241-258.

⁷ Delanda, points out the primacy of attention in grasping the world. The world opens in a particular fashion when attention is directed at it through apparatuses both biological and artificial. See Manuel Delanda, *Materialist Phenomenology: A Philosophy of Perception*, 2022, (London: Bloomsbury), 67-68, 83-85

⁸ The various adjustments and arrangements around framing something as heritage is especially clear when it comes to living heritage. The muddled complexity of and naming and framing heritage is described well in Michael Haldrup and Jorgen Ole Boerenholdt's 'Heritage as Performance', pp 52-68, in *The Plaggrave Handbook of Contemporary Heritage Research*, eds Emma Waterton and Steve Watson, (London: Palgrave Macmillan), 2015

⁹ Even a lapse as trivial though irritating for the lab members as electricity 'power-shedding' situation in the newly built and still building campus interrupts and threatens the electronics of computing and the output closer to deadlines. Though this example of lapse might seem insignificant in terms of the larger meaning of the project itself, it highlights the criticality of flowing current and beeping electronics to keep the productions and projections of the lab going.

¹⁰ The human-computer cognitive anxieties of electronic work, subscriptions, upkeep etc. are in parallel and in plenty and is inseparable from the grain of the lab infrastructure keeping afloat the work of heritage. The stresses related to the machine-human interaction have been studied very early on. See John S. Craig's 'Managing Computer-Related Anxiety and Stress within Organizations' in *Journal of Educational Technology Systems*, Volume 22, Issue:4

¹¹ In a tiny example to illustrate the kinds of signs that the human brain processes, he mentions how the google map shows the presence or location of the navigator through the sign of a blue dot, due to GPS, making it indexical because the blue dot is an indication of the presence of the navigator. See Manuel Delanda, *Materialist Phenomenology: A Philosophy of Perception*, 2022, Publisher: Bloomsbury, pp 64, 78

¹² Enjoyment and acceptance of technology. The affordances of technical apparatuses to entertain and provide pleasure to the viewers and experiencers play a large role in initially building acceptance and then comfort with the technology such that it stops being in the foreground and disappears into the background.

¹³ The desire for increasingly intensifying experiences especially with the onset of sensory heritage, the manners of immersing and slipping into the experience has multiplied manifold. Expectations increase for both the makers and the consumers as they keep pushing for more possibilities and probabilities. Bendix, Regina. 2022. "Life Itself: An Essay on the Sensory and the (Potential) End of Heritage Making". *Traditiones* 50 (1).

¹⁴ Intangibility is a process of inclusion. It's introduction and initial propagation as a process with this intention also gives it the momentum to keep the project of inclusion open and continuous. For a focused discussion on the three types of heritage, to gain a sense of intangibility as an open and incomplete project, See Barbara Kirshenblatt-gimbett, 'Intangible Heritage as Metacultural Production 1, *Museum International*, Volume 56, Issues 1-2, pp 52-65, 2004, Publisher: Routledge

It is this opening that results in the scope to play, seek and explore. Therefore intangibility is a fertile idea for artists, designers and those seeking creative manners of engaging with heritage.

¹⁵ The performative component of both conceiving and structuring heritage, its appreciation and criticism, both have been highlighted in nuanced ways this aspect. See Solene Prince, Affect and performance in ancestral tourism: stories of everyday life, personal heritage, and the family *Journal of Heritage Tourism*, Volume 17, Issue 1, pp 20-36. In the context of ancestral heritage and living heritage, the author discusses performance as that which makes heritage meaningful.

¹⁶ The circular relation between the present identities and the older ones have always been a negotiable space in the framing of heritage. See the discussion on commoditization and performance in David Harrison's Introductory chapter 'Contested Narratives in the Domain of World Heritage' in *Current Issues in Tourism*, 7:4-5, 281-290

¹⁷ Though the making, recognizing and remembering of heritage is a constantly transforming activity, the openness of the notion of intangibility, makes heritage an incomplete sort of a project. Thus making it a space for newer fabrications (both as construction and myth). This fabrication is thus also open at times to build from erroneously based information and grasp oriented towards marketing. See, Terrence, Witkowski, *Historical research and the marketing of heritage*, J-Stage, 2022 Volume1, Issue 1, 153-162

¹⁸ They use it as a lighter and more intelligent replacement for the loaded inertia and guilt-ridden politics of conserving heritage. Their use of the word tangible seems to stand in for the need of an independent term for practices and forms of the past, free of the physical heritage residing in monuments and artefacts.

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DOMESTICATING HERITAGE – AN EXPANDED HISTORY OF THE 1956 GRANT HOUSE

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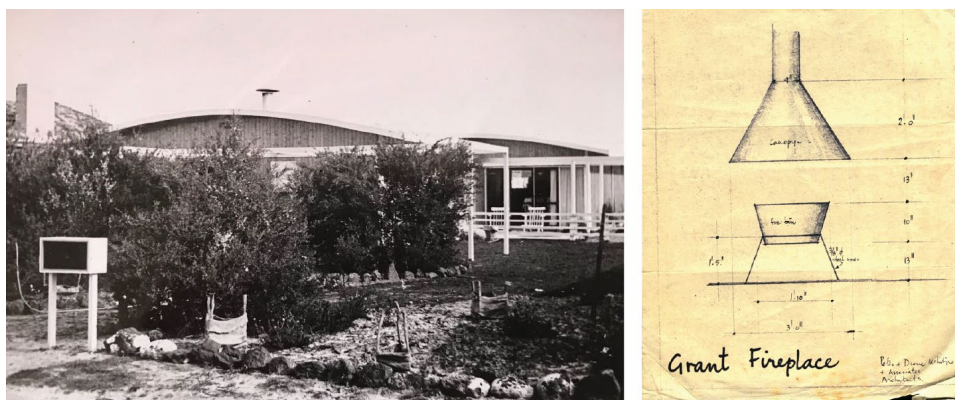


Figure 1. The Grant House, Christmas 1957 (left), and central fireplace elevation.

INTRODUCTION

The heritage-listed 1956 *Grant House*, designed for my Grandparents by prominent Australian architect Peter McIntyre, can be used to read the history of both post-war Melbourne architecture, and post-war Melbourne itself. Uniquely representative of a period of material austerity, the house was heritage-listed in 2019. This evaluation however lies far beyond the building's reality as a poorly insulated, small building on a large and lucrative suburban block. Importantly, too, it is one from which the subsequent history of the building has been struck, as the Grant House is perpetuated not as a family home, but as a frozen Mid-Century image – an object, a context, and a set of value judgments which grow distinct, and detached from the continued lived experience of the building.

Stemming from questions raised in the preservation of the home, and the erasure of my family's history within it, this piece aims to navigate the perceived 'threat' of heritage, asking how the stasis of heritage valuation might be reconciled to a contemporary, continuous domestic life. Drawn equally across built form, family history, ecology and archaeology – alongside discussions with the architect himself – the paper outlines firstly an expanded narrative of the site. Then, through speculative additions to the property, it acts as a case study for how this narrative may be reified in a heritage practice of alteration and change. In doing so, the paper aims, more broadly, to propose a framework to reconcile a disconnect in value judgement which for many property owners triggers the word 'heritage' to loom as a threat, rather than a comfort.¹ Ultimately, it demonstrates that through an understanding of a building as a

continuous, evolving set of relationships, and changes – rather than a discrete, historical object – a heritage framework can be instigated which is not only future-proof, but future-facing.

THE GRANT'S HOUSE – EXPANDING A HISTORY

Designed at a time when housing, materials, and labour were scarce, the Grant House presents as a radical short term, cost-effective solution to the problems which faced Australian homeowners after the Second World War. Through its unexpected longevity, however, the bow-string trusses, prominent free-standing fireplace, exposed concrete footings, and thin Stramit walls have come to represent its architect's experimentation, and the suburban optimism into which it was placed.² Subsequently in 2019 the building was recognised on the Victorian Heritage Register (VHR),³ and evaluated as below.⁴

The Grant House is historically significant for its clear association with post-war residential development in Victoria. It is a fine representative example of small-scale Modernist housing constructed during this period. This is demonstrated through its modest but inventive design and planning, and the use of simple materials at a time when the need for housing was high and building materials were scarce.

While the house reads as an allegory for post-war Melbourne, its continued existence reads as a testament to both the building itself, and to those who dwelt within it. My grandparents Alan and Barbara, along with their three children all adored the house – it was breezy, open, and distinct. Even within Beaumaris, a beachside Melbourne suburb which was a hub for young, experimental architects, there were none like it. Neighbourhood children are remembered as stopping, with awe, as they ran through the house, admiring the aubergine ceiling, and bedrooms of bright yellows, and reds.⁵

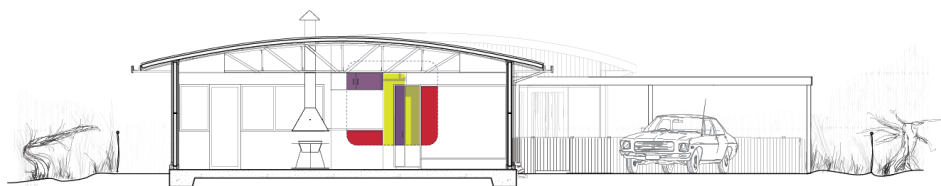


Figure 2. Section, showing original layout and colour scheme

Yet as times changed, so did the house. The Southern sunroom was divided, and divided again as the children grew older; the kitchen was replaced, the aubergine ceiling quickly painted over. When the children moved out, Barbara and Alan redecorated again, painting the house a much friendlier beige, and settling in. By that stage, the suburb, and the house, was full of empty nests and Empty Nesters.

Over such a long period, intentions dissipate and uses change. Home at a later stage to two teenage boys, the once bright sunroom was forgotten, almost boarded up, as end of school summers were lived out behind thick curtains. Painted over and strung with downlights, the trusses remained, yet below them the small bedrooms, meagre insulation, and leaky walls stayed too. That the house did leak, however, is arguably an inalienable part of the building's heritage – it had done so from the moment it had been built. Indeed, it was not until three years after the building was finished that it was watertight, as shrinking lining boards allowed water in and up over the experimental concrete slab. Pure trial and error was all that would eventually save what was at that time a completely novel building construction. Constantly under duress, then, the house had no expectation of longevity.⁶ Yet the house did not abide for so long without work. Countless patches, paint jobs, failed experimentation, and refurbishment – the building exists now as a palimpsest of bracing gestures, a house of straw, held up by 70 years of helping hands.

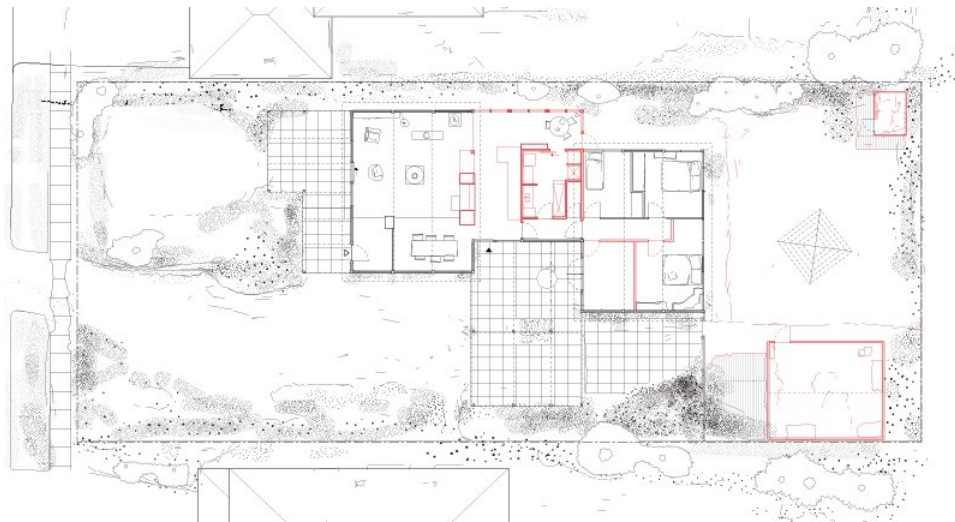


Figure 3. Site Plan, showing original layout, with additions in red (2019)

When the building was heritage listed, however, this history was lost, or at least stricken from the record. The house was reverted to a white box – reduced, scientifically, to a set of built criteria,⁷ and re-evaluated from the outside for what it represented, and not for what it was. Importantly, too, the value tied to this shift is one which is reified only from within an understanding of the small-scale modernist *class* to which it was ascribed. In proliferating the building's heritage value, then, what must be preserved is not only the object itself, but simultaneously the obtuse, intangible context within which it was conceived. In doing so the building is precipitated out into a set of political, social and economic factors which, unfortunately, grow more and more distinct from contemporary experience, and understanding. This is the inherent conflict at the base of this work. The heritage building is dislocated out of a contemporary timeline, and frozen both conceptually, and physically.⁸ Furthermore this process, and the value transfer inherent within it, is legislated to be non-consensual on behalf of Victorian property owners, who need not be consulted once their property is anonymously nominated.⁹ At a time in which the value of intangible, personal heritage is becoming more and more recognised, this type of residential heritage evaluation remains then resolutely *impersonal* - and risks, unfortunately, a rift opening between our fragile mid-century building stock, and those who are entrusted to preserve it.

EXPANDING ATTITUDES TOWARD HERITAGE

This discrepancy in value judgement, furthermore, was highlighted by the architect himself, who visited the home in June of 2020. The family was interested in McIntyre's input into the scope of works which were to take place, yet assumed, perhaps naively, that he would feel a certain sentimental weight in the decisions he had made over 60 years before.



Figure 4. External paint colours revealed during renovation

Confronted, then, with scraps of original colours, intact light fittings, and the bow-string trusses, he was amused, perhaps, but not at all taken aback. To Peter, this history was not something to be idealised, nor objectified – instead these were colours, and fittings, that he had chosen as a very young man, and subsequently grown apart from. With Dionne, his wife, the pair had rebuffed the idea that the garish original colours should be reinstated, stating how unsightly, unliveable, and importantly unmarketable they were now. Whatever the outcome was, whether the faded aubergine was still visible in a few choice cupboards, whether any part of the back volume of the house remained, it did not matter. What was important, in McIntyre’s eyes, was that it would sell. Clashing almost directly with Heritage Victoria, then, Peter’s view is one in which the building is not seen as an embodiment of a past history, but rather a vehicle for continued learning, and continued life.

In many ways, McIntyre’s most famous work outlines the same position. Conceived sometime around 1948 to the tastes and requirements of a bachelor, the *Kew River House* would persist in its initial flamboyant state only briefly, before adapting to suit the needs of McIntyre’s growing family.¹⁰ Re-clad and repainted similarly to the Grant House,¹¹ McIntyre would add a solid ground floor annex to counter the precarious openness of the home. Despite being ignored by heritage authorities, these additions would then come to embody the philosophy which McIntyre turned to later in his career – a self-described ‘Emotional Functionalism’ grounded in shared, personal experience. In preferencing domestic, personal requirements above those of the building itself, McIntyre’s approach aligns remarkably well to contemporary currents in heritage practice. Increasingly in favour of the role that intangible, personal heritage plays,¹² we are now more often listening to stories of those within these houses, rather than stories of houses themselves.¹³ A 2014 literature review conducted by the Heritage Council of Victoria itself concluded:¹⁴

The main avenues to involvement with a specific heritage item are ‘from the bottom up’ through a strong personal connection or interest... Far from being static, many positive aspects of heritage are ‘experiential’.

As we have seen, however, this experiential heritage is ultimately difficult to reconcile to the traditional, hierarchical framework of land ownership in Australia and abroad. Despite an acknowledgement written into the Burra Charter (an Australian adaption of the Venice Charter), its valuation, *as specified*, is still one which comes largely from above, and outside of individual owners. Article 22.2 of the Burra Charter outlines its wider intention, to “respect and have minimal impact on the cultural significance of the place,”¹⁵ yet in defining cultural significance it inadvertently takes agency away from those who are directing the cultural significance itself – landowners and homeowners who may have been invested for half a century, or, in the case of many first nations peoples, for far, far longer.



Figure 5. *A tripartite history - Bendigo Mining Exchange & Allan's Walk, 2020*¹⁶

Within architectural practice, more specifically, these objective narratives and hierarchies are slowly being softened. Practitioners are beginning to look beyond assumed values and histories to recognise a heritage which is multi-layered, and a practice which might intervene beyond an easy old-new binary.¹⁷ On their work with the 1872 Bendigo Mining Exchange, and the mid-century Allans Music store which was set within, Australian firm Williams Boag were recognised for doing exactly this. In recognising the heritage value of the 20th century additions, Peter Williams noted the positive response to a proposal which had initially antagonised legislative desires for a *de-mystified* heritage – one which was required to be digestible for both commercial and public interests.¹⁸ Given the response, however, such a layered approach clearly has merit.

TOWARDS AN EXPANDED UNDERSTANDING

*Preservation is a forward-thinking celebration of life, that it is a way of looking at something that seems to be fading or gone and incubating new life within it - Mark Wigley.*¹⁹

In a private, residential setting, how then could these same hierarchies be challenged? Reflecting Mark Wigley's sentiment, how might heritage protection serve as a *continuation* of life, rather than an idealistic preservation? The key to this lies in fact latent within the very legislation encountered above. Within this legislation – namely the VHR Criteria and Thresholds Guidelines²⁰ – a rigorous value system emerges firstly in which a building, or place, is reified through an associated event, movement, or way of life.²¹ The next step of the same framework, regarding state-level significance, asks whether the place in question then allows this association to be 'better understood'. Yet regarding this goal, what parts of this place, or any place, allow for this transfer of knowledge to take place? Heritage Victoria outlines that the intactness of the Grant House best allows this period of post-war housing to be understood.²² Yet through the nature of heritage-listing as it currently operates, one must ask what exactly is being better understood. The significance of the place, as is routinely mentioned, lies in its bow-string trusses, concrete slab, and Stramit wall sections, yet the intactness of the whole does not belie the effective illumination of these individual parts – only one example of each element, left standing out in the sun, would perhaps infer as much.



Figure 6. Broadcasting a built history – exposed wall section, 2021

Indeed, in being the least intact that it had been in its lifetime, the building broadcast the most about its materials, construction, and genesis. Once the building was hermetically sealed, however, it lost this ability to inform regarding both its construction, and the life it enables. Furthermore, given that so much of this history lies within the continued presence of its occupants, it is arguably *this* association which best allows the building to be understood, and understood as the flexible, malleable family home that it was intended to be. If, instead, the stated goal of heritage-listing was shifted away from preservation, for preservations sake, towards the continued understanding of a site's complete, personal history, then a new heritage practice starts to coalesce from within the legislation itself. Work done to the property, then, might function as both as a continuation of its narrative, but also as a didactic tool – as points at which both the original building, and its place within a contemporary reality may be better understood. In this way, the 1970s shed might be re-evaluated as an important marker for the scale, and lack of storage in the original; a new extension added as a way to way celebrate the evolving site, not detract from it.

This expanded narrative, then, is used as touchpoints for a practice which goes beyond preservation of the building's 70-year-old intention, and instead preserves, and importantly recognises the life which still exists within it. It is a way of freeing the site, wherein the timeline of the building is repositioned to face forwards, capable of growth, and change, and the 'threat' of heritage listing is reconciled to firstly the housing market, and its continuous drive forward, but also, more importantly, the possibility of new stories and histories which may emerge within the site.

A DOMESTICATED HERITAGE

Lastly, speculative additions to the Grant House, at different scales, aim to take this methodology through from start to finish – looking firstly to expand the heritage narrative of the site, and then to find ways in which this narrative might be both reified, and broadcast. At a tectonic scale, firstly, McIntyre's original schedule outlines just how remarkably thin the Stramit walls of the original building are.

Composed of 2" compressed straw panels and clad in vertical lining boards, the building's walls are 2.5" thick – just over half the width of a conventional timber stud.

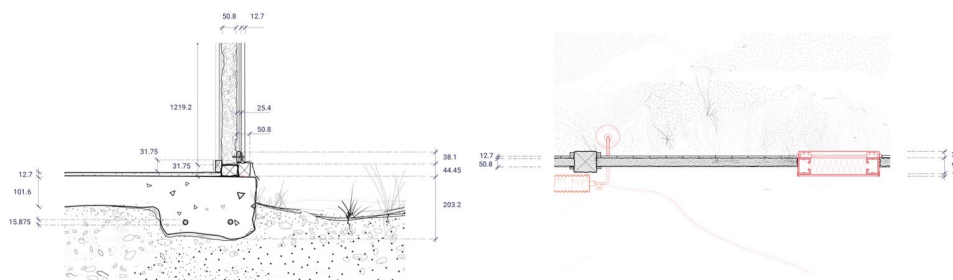


Figure 7. Stramit wall section and proposed juxtaposition of contemporary wall section (in red)

However, the historically significant model from which this thinness derives is almost impossible to read. As a static object, the building's novel construction lies outside of contemporary experience, and only through demolition could it ever be seen. What if, instead, the mid-century system was re-introduced into the contemporary, and juxtaposed against it. Here, in taking out an existing old gas heater, this difference in width is framed, and reintroduced to the life around it.²³

At a larger scale, a similar methodology can start to reconcile pragmatic, domestic requirements to the perceived threat of heritage. In deliberately eschewing stasis, an incision and an extension to the existing built fabric is seen as an opportunity, rather than a risk. In this case, the Southern wall serves as a link between the existing building, and an extension which continues and importantly recontextualises McIntyre's modesty in scale, and modular logic. Regarding leaks, and water ingress, the wall itself continues to be one of the most problematic – at one point flooding into the bedroom behind, with Barbara writing to McIntyre to state how water had poured into the house.²⁴ In cutting an opening through this wall, then, one could start to read, firstly, the materiality of the Stramit panelling, completely uncovered, yet also the stained patina of the uncovered concrete slab beneath. Instead of washing away this history, and presenting an idealised, mid-century image, the experimentation, and subsequent challenges of McIntyre's work might then be sealed, and celebrated.



Figure 8. Juxtaposition of wall elements in existing living room

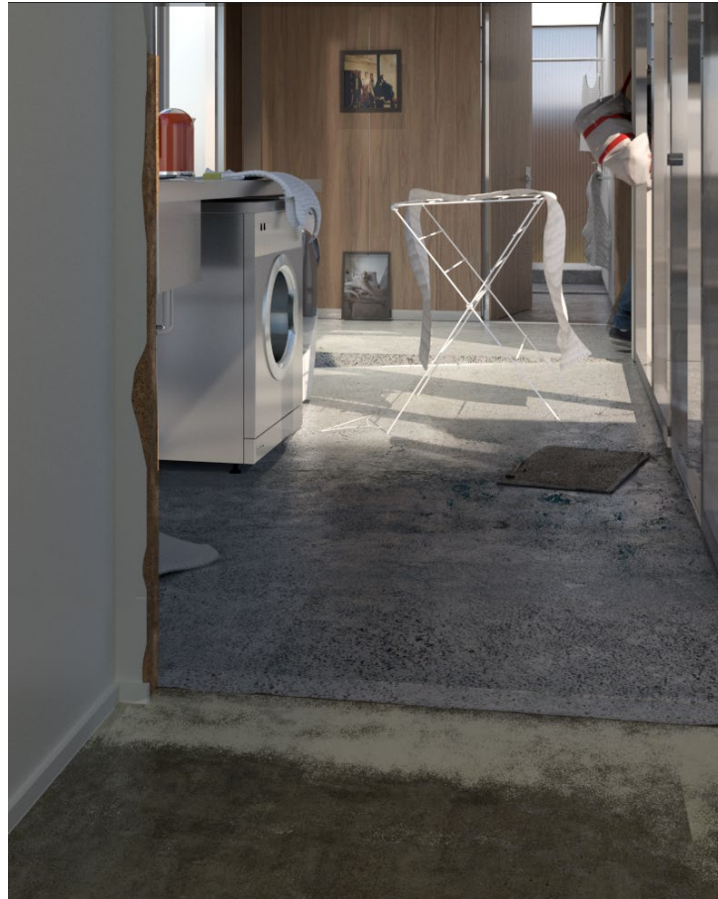


Figure 9. View towards proposed addition – water damage is revealed within the original slab

Throughout the site, work such as this is indebted to an understanding of the Grant House as a home, rather than as a historical object. Acting as a case study for how this trajectory might be used to bring an ensemble together, into the future, built additions and alterations serve to extend the narrative of the historical building, yet at all times question value judgements inherent in its preservation. In this case, spatial qualities, circulation patterns, and memories are preferenced over flat, visual reference, and, where they have emotional, and physical value, parts of latter additions are retained without historical hierarchy. It is a heritage practice which is inherently domestic in genesis, and aims to reconcile the built object to those intangible elements which transform a house into a home.



Figure. 10. Renovations, looking South toward the original bathroom, 1982

CONCLUSION

Any building is a palimpsest of alteration, and use. When it is opened up, either literally or conceptually, its entire history may be read, and, importantly, *re-read* within the confines of our vast, contemporary built paradigm. When my father built a new bathroom in 1982, he simply tiled over the external wall, and extended the existing slab. Rather than simply demolishing this entire project, to attempt to revert the house back to its original state, this legacy could instead be revealed, and celebrated – a range of colours, tiles, old wallpaper, and fittings – an ode to tastes which changed over half a decade, and the needs of a family which, like that of its architect, grew with its house. In taking this stance, the building may be used not only to broadcast an understanding of its original context, as per traditional heritage legislation, but also to understand its place within our own. In this process, the scope of heritage practice is recontextualised away from preservation, and towards the way the historical value of preservation might give way to the value of change.

This shift is the reconciliation at the heart of this work. If the stated goal of domestic heritage work can be restated as such, then the perceived ‘threat’ of heritage can be reconsidered – and an expanded, domesticated heritage used to bring a building’s history not only into the present, but comfortably into the future.

ACKNOWLEDGEMENTS

This paper is an extension of work conducted for the Master of Architecture at the University of Melbourne, Australia. It is dedicated to the memory of my Grandparents, who had the foresight to engage McIntyre, and to step outside of convention.

NOTES

- ¹ Andrew Taylor, "Stress and anxiety": homeowners claim heritage listing will reduce house prices," Sydney Morning Herald, published December 8, 2019, <https://www.smh.com.au/national/nsw/stress-and-anxiety-homeowners-claim-heritagelisting-will-reduce-house-prices-20191205-p53hat.html>;
- Jasper Lindell, "Owner tells tribunal heritage listing would devalue Seidler house," Canberra Times, published March 30, 2019, <https://www.canberratimes.com.au/story/6005243/owner-tells-tribunal-heritage-listing-would-devalue-seidler-house>
- ² See Philip Goad, "Optimism and Experiment," *Architecture Australia* 79, no.5 (1990): 34-55
- ³ Listing in this case is similar to a Grade 2 listing in the UK.
- ⁴ Heritage Council Victoria, *Grant House: H2392* (Melbourne: HCV, 2019), 10, https://heritagecouncil.vic.gov.au/wp-content/uploads/2019/08/FINAL_HERITAGE-COUNCIL-DETERMINATION-Grant-House-14-Pasadena-Avenue-Beaumaris-August-2019.pdf
- ⁵ Susan Coffey, Interview with Author, 18 August 2021;
- ⁶ Peter McIntyre, Interview with Author, August 6, 2021. Technological innovation in the post-war period moved at a pace beyond such considerations – cars were designed to be used for five years, plastics for far less. The house was not expected to last more than 20 years. See Nigel Whiteley, "Toward a Throw-Away Culture: Consumerism, 'Style Obsolescence' and Cultural Theory in the 1950s and 1960s," *Oxford Art Journal* 10, no. 2, (1987), 8.
- ⁷ Namely, criterion A – "Importance to the course, or pattern, of Victoria's cultural history," and criterion D – "Importance in demonstrating the principal characteristics of a class of cultural places and objects." See Heritage Council Victoria, *The Victorian Heritage Register Criteria and Threshold Guidelines* (Melbourne: HCV, 2019), https://heritagecouncil.vic.gov.au/wpcontent/uploads/2019/05/VHRCriteriaandThresholdsGuidelines_2019Final.pdf.
- ⁸ Philip Goad and Alan Pert share a similar sentiment in their experience with the 1964 Ernest Fooks House nearby in Caulfield North. See Philip Goad, Alan Pert and Paul Walker, "The Growing House and the Paradox of Preservation." in *Proceedings of the Society of Architectural Historians Australia and New Zealand: 37, What If? What Next? Speculations on History's Futures*, ed. Kate Hislop and Hannah Lewi (Perth: SAHANZ, 2021), 538-546.
- ⁹ Heritage Victoria, "Nominate a Place or Object," Department of Environment, Land, Water and Planning," last Updated July 29, 2021, <https://www.heritage.vic.gov.au/protecting-our-heritage/nominate-a-place-or-object>
- ¹⁰ McIntyre, interview.
- ¹¹ Karen McCartney, *Iconic: Modern Australian Houses 1950-2000* (Murdoch Books: Sydney, 2019), 50.
- ¹² Nigel Bertram, Lecture in *The Politics of Public Space, Volume Four*, ed. OFFICE and Tom Muratore (Melbourne: OFFICE, 2021), 57.
- ¹³ See Mary Featherstone and Rory Hyde, "And so it goes on," *Architecture Australia* 110, no. 4 (2021): 20.
- ¹⁴ Heritage Council of Victoria, *The Community's Perceptions of Heritage: Literature Review* (Melbourne: HCV, 2014), 5, <https://heritagecouncil.vic.gov.au/wp-content/uploads/2016/07/Community-Perceptions-of-Heritage.pdf>
- ¹⁵ ICOMOS Australia, *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance, 2013*, 7, <http://amagawa.org.au/wp-content/uploads/2014/12/The-Burra-Charter-2013.pdf>
- ¹⁶ Fred Kroh, "Structures," Fred Kroh Fotograf, accessed February 20, 2022, <https://fred.net.au/structures>
- ¹⁷ See Peter Raisbeck, "Lovell Chen," *Architecture Australia* 110, no. 2 (2021): 94-98
- ¹⁸ Peter Williams, "AIA 2021 Awards for 'Heritage' Discussion Panel," 29 September 2021, https://www.youtube.com/watch?v=oy_5C4KGGVc
- ¹⁹ Mark Wigley, "Introduction" in *Preservation is Overtaking Us* (Columbia: GSSAP Transcripts, 2016)
- ²⁰ The guidelines ask firstly "does the place/ object have a *clear association* with an *event* (phase, movement, way of life, etc) in Victoria's cultural history." Then, in step 2, regarding state-level significance, "Does this *association* allow the *event* to be *better understood*."
- ²¹ Indeed, this is the problem at the heart of this work – that the continuity of a domestic, contemporary life cannot be sustained within a Heritage building, and by extension within the legislation itself, as the rightfully nebulous subject is tied to a discrete event, which is itself seen as unalterable. The building itself is therefore unalterable, less its value be decreased.
- ²² HCV, *Grant House (H2392)*, 7. It is described as the "most intact surviving example of the eight similar bowstring truss houses" designed by McIntyre. However, given that the central volume was demolished, and rebuilt during

the 1980s by my father, such an objective statement is hard to quantify. The true significance, regarding a history of the house, lies in the unbroken domestic occupation of the house itself.

²³ HCV, *Grant House (H2392)*, 18. Interestingly, taking out the old gas heater is one of the only exemptions allowed in the current heritage overlay on the building – there is a permit exemption for “extraneous items such as air conditioners, pipe work, wiring, antennae, and aerials.”

²⁴ Peter & Dione McIntyre Associates to D.J. Thompson, November 2, 1959.

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PLANTATIONS IN SÃO TOMÉ AND PRÍNCIPE: SPATIAL LAYOUT AND INDUCED BEHAVIOURS

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INTRODUCTION

In the 16th century, Portugal established in São Tomé and Príncipe one of the most productive plantation economies in the tropics based on slave labour and sugar intensive monoculture. Later, from the mid-19th century to 1975, large plantations called Roças were developed to produce coffee and cocoa for highly profitable export production. As a result, at the beginning of the 20th century, São Tomé and Príncipe was the biggest exporter of cacao in the world. In these plantations, thousands of indentured workers were employed. As a result, roças embody the traces of merciless labour conditions¹ and a spatial organisation designed for the privilege of Europeans and their hegemony.²

Nowadays, roças serve several purposes, ranging from luxurious hotels to houses of large communities in squatters, and still, several roças are in ruin, being consumed by nature. The analysis of this heritage is relevant since these settlements can be future-directed legacies, which can contribute to a global cultural overhaul and sustainable development. A comprehensive overview of this context allows us to understand the past and the present, considering tangible and intangible values embodied by these heritage plantations. Critical and diachronic studies on the colonial and contemporary heritage are integrated by investigating the spatial layout of roça Agostinho Neto and roça Água Izé in their original design and as they are today. Roças were initially designed to be isolated and hierarchical³ to optimize the production process and the trade export. Their original spatial organisations aim at segregating some of their inhabitants, while their territorial location makes them isolated regions inside São Tomé Island. This study aims to identify how the physical environment of roças have influenced and still influences human experience and behaviour and support the thesis that these settlements were designed hierarchically. Sensory access, behavioural affordance, and sociality are discussed by integrating critical perspectives arising from on-site observations and social surveys collected in November 2021 and coupled with the space syntax analysis.⁴

ROÇAS IN SÃO TOMÉ AND PRÍNCIPE

Brief historical overview and original spatial organisation

Roça⁵ is a large-scale agro-industrial estate structured by a series of settlements, headquarters, and dependencies, designed to maximize the profit deriving from the crop production process.⁶ These settlements were multifunctional complex that included groups of houses, large agro-industrial constructions, and supporting facilities. This vast heritage (two hundred roças exist in the country) derives from European architectural and structural patterns adapted to the tropical environment. Distinct cultures and roles characterise each social group living in Roças across time.

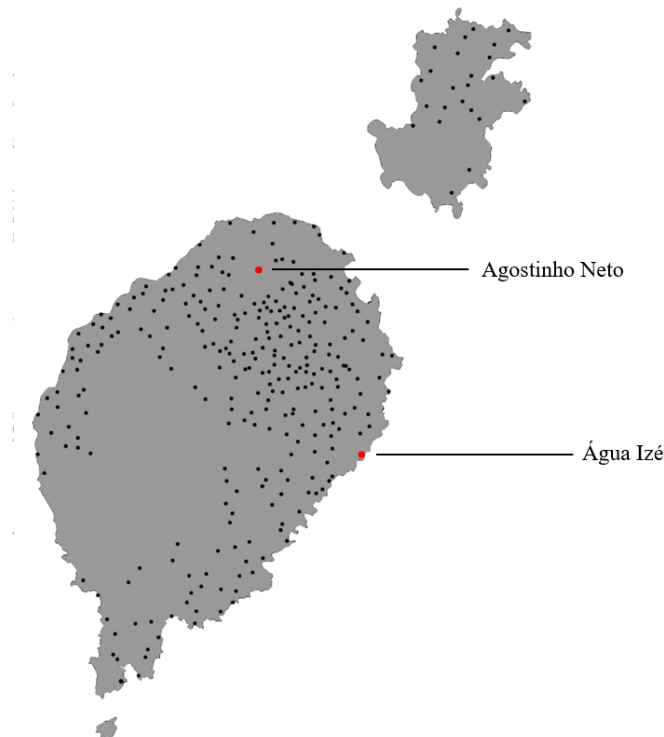


Figure 1. Location of roças in São Tomé and Príncipe

Although roças follow a similar spatial organisation, each has different dimensions, depending on the territorial context in which they are established and their role in the whole plantation system. In more detail, their spatial layout differs according to their use and connections between the headquarter and dependencies and their position next to the coastline (used as dock and port areas) or in the inland (mainly used to settle the plantation lands, house workers and the machinery close to the plantations). Although these differences exist, all roças follow a spatial organisation, where the same fundamental elements are present. There are usually five main functional areas: the administration area, the area where the workers lived, the area for the production facilities, the area for other facilities, and the open-air square - *terreiro*. The administration area generally includes a group of buildings, such as the house of the owner, the house of the administrator, and the house for the foremen and offices. The area lived by workers includes their houses, the *sanzalas*, and communal facilities such as washing and sanitary areas. The third area comprises all the buildings related to production, namely warehouses, dryers, greenhouses, workshops, carpentry, and metalwork workshops. The larger roças also include other equipment usually built after the beginning of the 20th century, such as hospitals, chapels, and schools. The *terreiro* was a central empty area in the settlement with a symbolic role since it was where workers were joined to be counted before and after the work in the plantations, or where the beans were dried.⁷ Roças were designed to be as much as possible self-sustainable.

The experience of the roça is largely characterised by the imposed and clear social hierarchy, manifested by its spatial structure, the architectural style used, and the construction systems adopted, related to the four areas referred to before. The spatial organisation of the roças required an adaptation to the existing territorial conditions, either in physical terms since several of them occupy sloping terrain, or in the formalisation of the social relationships that were established between low hierarchical workers (enslaved people and forced contracted⁸) and the other groups in the settlement, namely specific workers, usually coming from the city of São Tomé, and higher position workers as foreman and administrator, typically Portuguese.

Roça Agostinho Neto

Roça Agostinho Neto is situated in steep terrain in the north of the island, distancing 14 km from the city of São Tomé and 5 km from the coastline. This roça was the headquarters of an estate with more 14 dependencies, owned by the Sociedde Agrícola Valle Flôr, and it is considered the country's most representative roça.⁹

The original layout of Agostinho Neto was developed around four zones.¹⁰ the first including the hospital and the chapel, at the higher altitude and at one of the edges of the settlement; the second, on the opposite top of the settlement and lower more than 20 meters, with the house of the owner, administrator and foremen presenting a lower building density; the third zone occurs on both sides of the avenue and includes the sanzalas distributed along different platforms connected by staircases; the fourth locates in between the second and the third and consists of the offices of the company and other technical areas. Its layout is characterised by the central axis, with 470x80 meters, that crosses the entire settlement¹¹ (see Figure 3). In 1924 Agostinho Neto had 2,500 workers.

Nowadays, several new constructions are spread throughout this settlement: i) attached to the existing buildings, e.g., to the sanzalas; ii) not attached and within its original perimeter; iii) and outside of the original roça area (see Figure 2 and Figure 3). The area with the highest building density is the one surrounding the sanzalas; among these houses, several new types of houses and facilities were built. Due to the large size of this roça, the newly built solutions are very diverse. In the last ten years, a large number of new constructions has been built, distancing observations derived by the surveys carried out by Fernandes and Silva¹² to our off- and on-site analysis in 2021-2022 (Figure 3).



Figure 2. Present-day occupation in roça Agostinho Neto: in front of the owner's house (left) (photo by Rui Brito); sanzalas and their extensions (right) (photo by Sara Eloy)

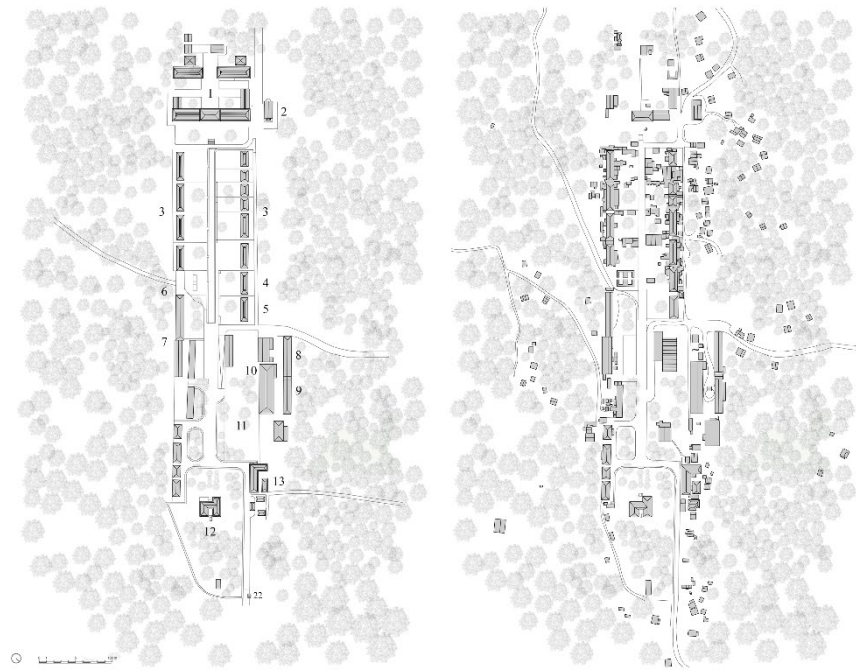


Figure 3. Roça Agostinho Neto: original layout (left); nowadays layout (right)
 1 - Hospital; 2 - Chapel; 3 - Sanzalas; 4 - School; 5 - Nursery; 6 - Washing area; 7 - Offices; 8 - Warehouses; 9 - Workshops; 10 - Drier; 11 - Terreiro; 12 - Owner's house; 13 - Foremen and European workers houses

Roça Água Izé

Roça Água Izé is distancing 17 km from the city of São Tomé, and its location, close to the coast, facilitates it to turn into one of the most profitable roças in the country.¹³ This roça was the headquarter of an estate with 14 more dependencies and owned by Companhia da Ilha do Príncipe. In 1908 this roça employed circa 2,500 workers.

The original layout was adjusted to the land's natural slope by implanting the buildings on three altimetric levels, parallel to the coast (northeast/southwest).¹⁴ According to Silva,¹⁵ this roça's design intended to establish hierarchy among those who lived and worked there. The housing sector of the roça on the southwest side of the roça is divided into two zones. The first zone, to the west and more inside the land, was for the sanzalas, which are located on different uneven platforms and are organised according to modular sets. The second zone in the south, closer to the sea and the main road, was the house of the administration and owner, surrounded by constructions that assure the privacy of the place.¹⁶ From this house, it was possible to look at all the roça, especially the terreiro and the sanzalas, to control the activities there. The production facilities are located in the northeast of the settlement. The symbolic radial-arranged hospital is located in the southwest in a steep area apart from the rest of the settlement.



Figure 4. Present-day occupation in roça Água Izé: sanzalas and recent extensions (left) (photo by Sara Eloy); the current use of the terreiro (right) (photo by Rui Brito).



Figure 5. Roça Água Izé – original layout (left), nowadays layout (right)

1 – Owner's house; 2 – Administration house; 3 – Foremen house; 4 – Offices; 5 – Old Hospital; 6 – New Hospital; 7 – Clinic staff house; 8 – Sanzalas; 9 – Warehouses; 10 – Workshops; 11 – Stable; 12 – Drier and factory; 13 - Terreiro

Also, in roça Água Izé nowadays, several new constructions are spread throughout this roça and in the same three situations: attached to the existing buildings, e.g., to the sanzalas; not attached but inside the original roça area; and outside of the original roça area (see Figure 4 and Figure 5). Because this roça is smaller than Agostinho Neto, the larger group of new constructions is outside the original layout. Figure 5 (right) shows many new blocks adjacent to the sanzalas, built east of the original settlement. Comparably to what is observed in Agostinho Neto, inhabitants have also constructed extensions to the existing buildings and have demarcated outdoor areas of influence. Nowadays, the hospitals are close to collapse, although they are still used as housing, and the industrial facilities in the northeast are almost abandoned or occasionally used¹⁷.

PATTERNS OF CURRENT OCCUPATION IDENTIFIED DURING OFF- AND ON-SITE SURVEYS

After the independence of São Tomé and Príncipe in 1975, roças became the property of the state. In the last decades, roças have shown extraordinary resilience in various solutions since these constructions turned into refurbished luxury hotels, museums, local businesses, or becoming squatted settlements. At the same time, few settlements are still used for cacao plantations. Other roças, endangered by neglect and shortage of funds, are still useless skeletons close to being lost in time. Yet, by becoming entangled with local cultural and economic structures, these plantations harbour the promise of a future-directed legacy meaningful to global culture and development. Especially in the roças that have become squats, several alterations were accomplished. The alterations are done in the spatial layout of roças following three types of action, according to Ana Fernandes.¹⁸ i) expansion of the habitable space; ii) construction of new houses next to the existing built-up areas; iii) demarcation of outdoor areas of influence.

In both roças, Agostinho Neto and Água Izé, all these three types of alterations took place, mainly around the sanzalas (types i, ii and iii) and outside the original perimeter of the roças (types ii and iii). Água Izé is nowadays lively, and, likewise Agostinho Neto, most of the community gathers around the original building blocks and much less around the original central areas since they lost their aggregator, yet controversial role.

The permanence of the use of terreiro as it was conceived (meeting un-built place) seems to be an option that the local communities are taking, almost as if now this place remains a symbol of the previous controversial times.

INFLUENCE OF SPATIAL LAYOUT ON THE EXPERIENCE AND BEHAVIOURS OF INHABITANTS

Space syntax and spatial patterns of roças

Architecture structures the space we live in and directly relates to social life.¹⁹ Buildings and the space between them allow people to move or force them to stop, encounter others, or be isolated. Space syntax was introduced by Bill Hillier, Julienne Hanson, and colleagues at The Bartlett, University College London in the late 1970s to early 1980s to enable an analytical analysis of the relations between space and society.

Since the 70s several studies using this theory have been performed on different types of built environments, from cities to villages, neighbourhoods, and buildings.²⁰

To understand how the spatial organization influences the behaviour, we first needed to identify a spatial pattern in the original roças and analyse if that pattern can support the thesis that these settlements were designed hierarchically. Additionally, we analysed the current layout of the two roças to identify how strong those patterns are and if they were altered with the recent new constructions. We calculated integration and connectivity measures using visibility graphical analysis (VGA).²¹ Integration usually indicates "how many people are likely to be in a space and is thought to correspond to rates of social encounter".²² At the same time, connectivity "measures the number of immediate neighbours that are directly connected to a space".²³ We observed that the limits of the original and current settlements differ in one case more than the other. Indeed, the settlement around Água Izé is much more extensive nowadays than originally, and this difference is not so pronounced in Agostinho Neto. So that the analysis would represent the settlement at the moment to be studied, we opted to analyse a different perimeter – original and present-day - of each roça.

Roça Agostinho Neto analysis

The analysis carried out by Silva²⁴ about the hierarchical design of Agostinho Neto can be supported by the space syntax analysis here presented.

Figure 6 (left) shows the integration analysis, and Figure 7 (left) shows the connectivity analysis of the original design. It is verifiable that the crossing between the avenue and the street that connect the houses of the owner, administrator, and foreman is the area with higher integration and connectivity. This means that this is the place in the settlement with a higher potential to be a destination for movement and with a high number of connections departing from and to it. In an opposite tendency, we can observe that the areas where workers live, sanzalas, have low integration and connectivity values. Likewise, the terreiro has a level of connectivity higher than the sanzalas and lower than the control area of the owner and administrator. This is because the terreiro needed to be easily accessible but not more than the spaces controlling it. Such results support the thesis of roça being closed within itself and hierarchical structure.²⁵

As mentioned before, new constructions were built within the perimeter and in the near surrounding areas of this roça. The boundaries of this roça remain unchanged since the new structures of this settlement did not spread much outside the original perimeter.

When comparing the original to the current layout, it is identifiable that the old dynamics are similar to the current ones. The most significant difference was the enlargement of the perimeter on the southwest of the settlement. By creating new fringes of the roça, the areas with a large potential for movement (the most integrated areas) are now the ones in the north of the roça, previously areas of plantation (Figure 6, right). This result does not say much about the living dynamics inside the old structure that remained almost the same. When analysing the connectivity of the settlement, we can observe that the same hierarchy is maintained nowadays even if a new extension exists in the southwest (Figure 7, right). A relevant modification was the addition of a building on one of the sides of the terreiro that negatively impacted the integration of such area (see Figure 6, right). This addition is uncommon in most of those roças analysed in literature²⁶ and as verified through our on-site survey.



Figure 6. VGA analysis – Integration of Roça Agostinho Neto: original layout (left) and present-day layout (right)

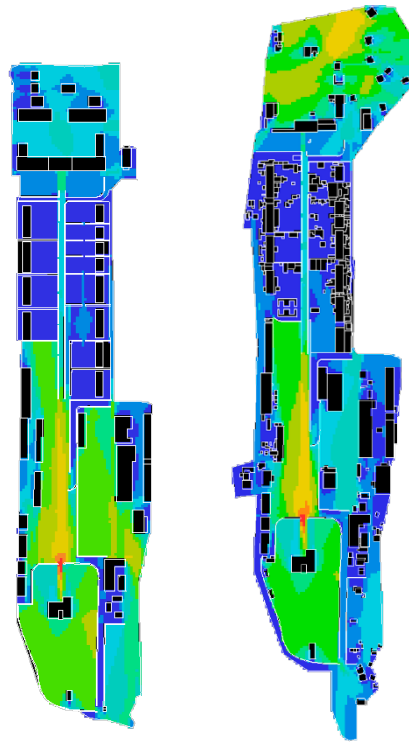


Figure 7. Integration VGA analysis – Connectivity of Roça Agostinho Neto: original layout (left) and present-day layout (right)

Roça Água Izé analysis

Similarly to the previous case study, the analysis carried out by Silva²⁷ about the hierarchical design of Água Izé can be supported by the space syntax analysis here presented. On the one hand, the study of the integration measure in the original design (Figure 8, left) shows that the area around the owner's house and the terreiro are the more integrated ones and the ones with higher connectivity. This means that these areas have a large potential to be a destination for human movement and that there are a high number of connections departing from and to them. On the other hand, the area around the sanzalas and close to the two hospitals present low levels of integration and connectivity and therefore less potential to attract movement or to be visited.

When comparing the original layout to the current one, it is identifiable that by enlarging the area of roça, most of the initial dynamics have changed. Indeed, by creating new fringes of the roça, the areas with a large potential for movement (the most integrated areas) are the ones northeast of the roça, previously serving as plantation land (Figure 8, right). Also, the densification of the buildings of sanzalas by constructing new houses adjacent to the existing ones reduced the connectivity there, increasing the sense of segregation in these areas (Figure 9, right).

As mentioned before, one interesting phenomenon observed in Água Izé (as in other roças) was that the original terreiro has been maintained, in most cases, as it was initially conceived, without any occupation by new other constructions or any alterations of its original spatial form. This permanence in the spatial layout is visible in Figures 8 and 9 (right), which show that this previously dominant place is still losing its importance as an aggregator of the roça.

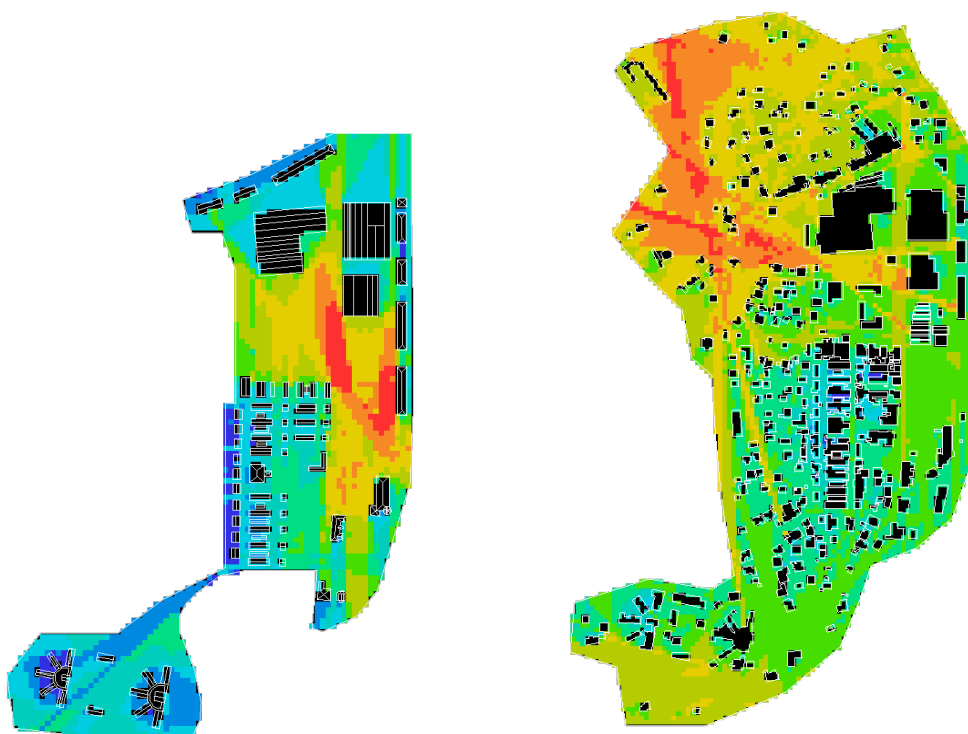


Figure 8. Roça Água Izé VGA analysis – Integration. Original layout (left), and present-day layout (right)

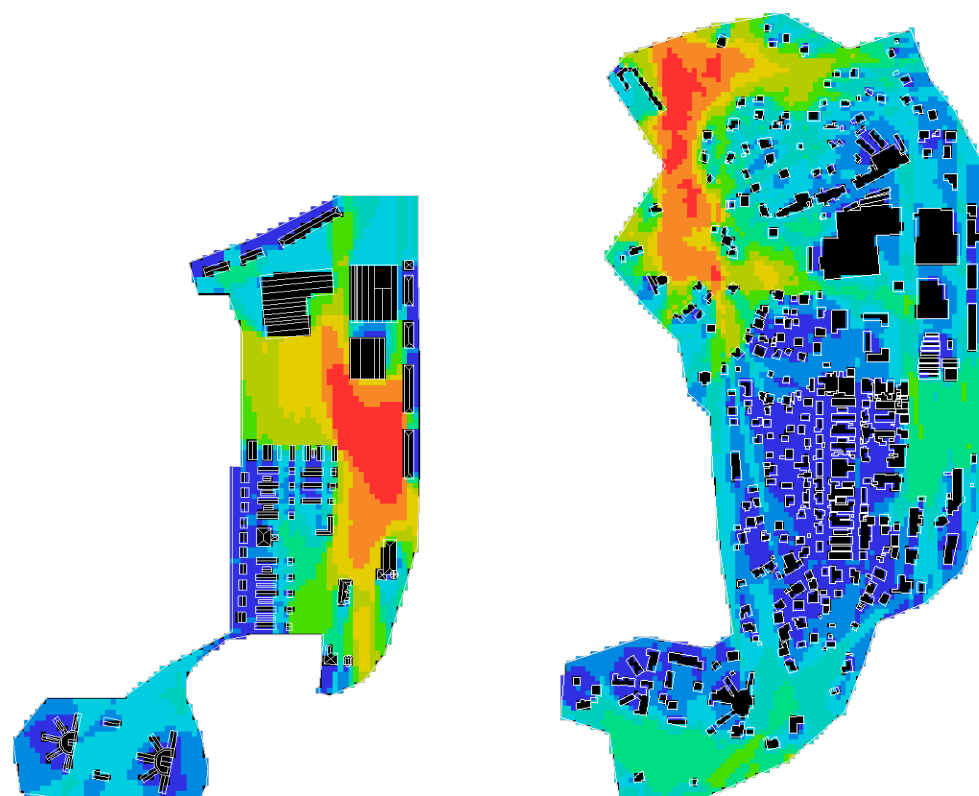


Figure 9. Roça Água Izé Integration VGA analysis – Connectivity. Original layout (left), and present-day layout (right)

CONCLUSION

This paper presents an exploratory study whose aims is to identify patterns of spatial layout in the roças of São Tomé and Príncipe, that can support the claim that these settlements were built following a hierarchical social structure.

An analysis of two representative roças was developed using space syntax method. Results show a tendency to prove the hypothesis that roças were designed hierarchically to strengthen social differences among the inhabitants of the roças. The areas dedicated to housing workers – sanzalas – present low levels of integration and connectivity, showing that those were places where social encounters were to be avoided and kept to minimal. On the contrary, the houses of the owner and administrator are positioned in areas that displays higher levels of integration and connectivity to increase the control over the entire space and its occupants. After almost 50 years of independence and some restructuring of these roças, the original patterns are maintained and, in some cases, the connectivity become worst. Results suggest that there is a pattern of imposed social life in the spatial organisation related to the topological configuration of the two analysed roças.

ACKNOWLEDGEMENTS

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¹ Natália Umbelina, *Travail Forcé Dans l'archipel de São Tomé et Príncipe: Ler Serçicaes. De l'abolition de l'esclavage à La Généralisation Des Travailleurs Sous Contract (1853-1903)* (L'Harmattan, 2019); Catherine Higgs, *Chocolate Islands. Cocoa, Slavery, and Colonial Africa* (Ohio University Press, 2012); William Gervase Clarence-Smith, "Labour Conditions in the Plantations of São Tomé and Príncipe, 1875 – 1914," *Slavery and Abolition* 14, no. 1 (1993): 149–67, <https://doi.org/10.1080/01440399308575088>.

² Hugo Machado da Silva, "Roça de São Tomé e Príncipe. Génese, Processo e Lógicas Espaciais" (Universidade do Porto, 2018); Augusto Nascimento, *Poderes e Quotidiano Nas Roças de S.Tomé e Príncipe de Finais de Oitocentos a Meados de Novecentos*. (Lisbon, 2002).

³ Emiliano Dantas, "A Imagem Enquanto Leitura e Escrita Do Mundo-O Levele e a Ferida Colonial" (ISCTE - Instituto Universitário de Lisboa, 2021); Silva, "Roça de São Tomé e Príncipe. Génese, Processo e Lógicas Espaciais."

⁴ Daniel R. Montello, "The Contribution of Space Syntax to a Comprehensive Theory of Environmental Psychology," in *6th International Space Syntax Symposium* (Istanbul, 2007), 1–12; Bill Hillier and Julienne Hanson, *The Social Logic of Space* (Cambridge: Cambridge University Press, 1984).

⁵ The term 'roça' means a place where weeds are cut, a clearing, and a place with crop plantation agriculture.

⁶ Silva, "Roça de São Tomé e Príncipe. Génese, Processo e Lógicas Espaciais."

⁷ Silva.

⁸ The labour system in roças of São Tomé and Príncipe was based on 'perpetually indentured' and "almost identical to slavery, which in law, was abolished in 1875. (...) There labourers were technically freed after purchase, but they were forced to acquiesce to long contracts which were 'automatically renewed' on expiry (...) they were brought to São Tomé and Príncipe against their will and were not repatriated. (...) The children of these labourers were born into 'perpetually indentured' (...)" William Gervase Clarence-Smith. "Labour Conditions in the Plantations of São Tomé and Príncipe, 1875 – 1914." *Slavery and Abolition* 14, no. 1 (1993): 149–67. <https://doi.org/10.1080/01440399308575088>.

⁹ Roça Agostinho Neto (named roça Rio de Ouro before São Tomé and Príncipe independence) was founded in 1865 and acquired in 1903 by José Luís Constantino Dias who performed substantial changes to the previous existing settlement. Silva. "Roça de São Tomé e Príncipe. Génese, Processo e Lógicas Espaciais."

¹⁰ Silva

¹¹ Silva

¹² Ana Silva Fernandes, "Entre Remediar e Solucionar. A Estruturação e a A participação Como Meios de Gestão Da Escassez e Ruptura Do Ciclo de Pobreza. São Tomé e Príncipe Como Laboratório." (Universidade do Porto, 2015); Silva, "Roça de São Tomé e Príncipe. Génese, Processo e Lógicas Espaciais."

¹³ Roça Água Izé was founded in 1854 by João Maria de Sousa Almeida, the 1st Baron of Água Izé (Silva 2018).

¹⁴ Silva, "Roça de São Tomé e Príncipe. Génese, Processo e Lógicas Espaciais."

¹⁵ Silva.

¹⁶ Silva.

¹⁷ In one of the original industrial buildings a new association FACA (Fábrica das Artes Ambiente Cidadania Activa / Fabric of the Arts, Ambient and Active Citizenship) was installed. This association is part of a large project created in 1995 by João Carlos Silva and Isaura Carvalho – Associação Roça Mundo – that by 2002 turned to be a foundation. Within this project several initiatives were created as CIAC (Centro Internacional de Arte e Cultura/ International Center of Art and Culture) in 1994, CACAU (Casa das Artes, Criação, Ambiente e Utopia/House of the Arts, Creation, Ambient and Utopia) in 1995 and the Bienal de Arte e Cultura de São Tomé e Príncipe, whose 1st edition was in 1995. FACA aims at recovering the roças and bring the population back from the urban peripheries to the roças, through the implementation of sustainable actions that promote economic and cultural development, such as art, crafts, ecotourism, or cultural tourism. Information available at http://arquipelagoscriativos.unidcom-iade.pt/?page_id=543

¹⁸ Fernandes, "Entre Remediar e Solucionar."

¹⁹ Hillier and Hanson, *The Social Logic of Space*.

²⁰ Work by Sam Griffiths show the opportunities that space syntax analysis bring to historical research on space and society. See Sam Griffiths "The Use of Space Syntax in Historical Research: Current Practice and Future Possibilities." (*Proceedings 8th International Space Syntax Symposium*, 8193:1-8193:26, 2012). At the scale of buildings interesting work by Bill Hillier and Tahar Bellal. See: Bill Hillier, et al. "Ideas Are in Things: An Application Of the Space Syntax Method to Discovering House Genotypes." *Environment and Planning B: Planning and Design* 14 (1987): 363–85; Tahar Bellal. "Understanding Home Cultures through Syntactic Analysis: The Case of Berber Housing." *Housing, Theory and Society* 21, no. 3 (2004): 111–27.

<https://doi.org/10.1080/14036090410000471>. In the scope of this study relevant references are Loureiro et al. (Vânia Raquel Teles Loureiro et al., "Configuration of Self-Organizing Informality: Socio-Spatial Dynamism in Favelas," (*Proceedings of the 11th Space Syntax Symposium*, 2017, 86.1-86.1).), Bellal (Bellal Understanding Home Cultures through Syntactic Analysis) and Griffiths (Griffiths "The Use of Space Syntax in Historical Research:).

²¹ Visibility Graph Analysis (VGA) "investigates the properties of a visibility graph derived from a spatial environment. The VGA can be applied to two levels, eye level for what people can see, and knee level for how people can move which is critical to understand spatial layouts." Turner, A., M. Doxa, D. O'Sullivan, and A. Penn. "From Isovists to Visibility Graphs: A Methodology for the Analysis of Architectural Space." *Environment and Planning B: Planning and Design* 28, no. 1 (2001): 103–21. <https://doi.org/10.1068/b2684>.

²² Kinda Al_Sayed et al., *Space Syntax Methodology* (Bartlett School of Architecture, UCL, 2014), 15, <https://doi.org/10.1017/CBO9781107415324.004>.

²³ Al_Sayed et al., 15.

²⁴ Silva "Roça de São Tomé e Príncipe. Gênese, Processo e Lógicas Espaciais."

²⁵ Silva.

²⁶ Silva.

²⁷ Silva.

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BRIDGES IN PUNE AND COLLECTIVE MEMORY

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INTRODUCTION

The old city of Pune is located in western India on the right bank of river Mutha. The process of urbanization of Pune is spanned over three centuries under different rules. Process of urbanization of Pune began during eighteenth century as it was selected for the residence of Peshwa¹ who was the executive head of Maratha state. In 1818, the Marathas were defeated by British. Later Pune was made a Monsoon capital of Bombay presidency.² British ruled Pune till 1947 when India got independence. The process of urbanization of Pune was naturally influenced by these political events.

River Mutha flows through the city in northeastern direction and meets river Mula on the North of the old city at the place called 'Sangam'. Thereafter the joint flow is known as 'Mula-Mutha' river and it flows eastwards. The cantonment of Pune is located near this river. During last three centuries, the city grew in terms of space, industries, trade and population which eventually led to the need of more means of communication and growth across the river. Thus the bridges which were built to fulfil the needs of process of urbanization got connected with the urban history of the city.

This paper focuses on the connection of these bridges with the collective memory of the people of Pune and Pune's urban culture. The bridges have been conferred the official names which in most cases differ from the names by which they are commonly known as i.e. their popular names.³ This paper works on the hypothesis whether the names given by people to the bridges which in most cases differ from the official names hold some significance with reference to city's past or geography. The second hypothesis is whether the people of Pune themselves chose to remember the significant events of the past by deciding when to accept the official name and when to not.

The paper will explore what is the meaning of popular names, their significance and why the official names could not become popular. It will check if the popular names have connection with Pune's urban past and have spatial and geographical significance.

RESEARCH METHODOLOGY

This research paper aims at finding the connection between the bridges and the collective memory. For this purpose, the six oldest bridges in Pune are taken into consideration. List of oldest bridges is prepared by referring the chronology given in the books and gazetteers.

Their official and popular names were searched and collected through the official websites, documents, local newspapers and conversations with local people. Then the significance of those names was examined and the correlation with collective memory was established.

The case of Dengale (Dagdi) bridge⁴ is not taken in this case study because there are two bridges on the same spot. While constructing the new bridge, older bridge (which was much shorter in height) was

kept intact. The new bridge was built just above it. Presence of both the bridges on the same spot may have disrupted its niche in the collective memory. Thus, the collective memory related to this bridge could not be studied properly.

Lakdi bridge

It was first built in 1761 by Nanasaheb Peshwa. It was a wooden bridge. It came to be known as 'Lakdi bridge'. Lakdi means wooden. However it got dismantled in the floods of 1840. A new masonry bridge was constructed on the same site in 1847. A footpath was added to the bridge in 1929 and it was broadened in 1952. The bridge connects south-western part of the old city with the western part of the city. It is a myth that the construction of this bridge was ordered by the Peshwa after defeat of Marathas at the third battle of Panipat so that the soldiers could enter the city through the back-end and would not have to face the agony of the people.

It was named as 'Shree Chhatrapati Sambhaji Bridge' in 1952. Sambhaji was a Maratha king and a son of Shivaji who founded the Maratha state.⁵ He is a historical personality very well-known in Pune. Despite of that the bridge is remembered by its original form.

Sangam bridge

The place of confluence of two rivers is called 'Sangam' in Marathi. The sangam (confluence) of Mula-Mutha rivers is located on the north of the old city. The place is itself known as Sangam only. During Peshwa period, British residence was located here. When British became the rulers, connecting cantonment of Poona with cantonment of Khadki and city of Bombay was very important. It was necessary to build a bridge across the river to complete the highway. Thus the bridge was built on Sangam in 1830. It was called 'Wellesley bridge'. It was a wooden bridge. It was replaced with masonry bridge in 1873.

The bridge is commonly known as a 'Sangam bridge'. This bridge connected the western Maharashtra with the cantonment.⁶ It paved its way through the un-urbanised and uninhabited area near the city.

Bundgarden bridge

In 1850, a bund was built on river to supply water to the cantonment. In 1867, a bridge was constructed near that bund which gave a direct entry to the cantonment from northern region. It was named 'Fitzgerald bridge'. It was named after the then Governor of Bombay (now Mumbai) Sir William Robert Vesey Fitzgerald.⁷ It was referred as 'Mula-Mutha bridge' in Marathi in the cornerstone of the bridge.

The area surrounding the bridge was an open ground. A garden was built within a year on it which came to be known as 'Bundgarden' as it was near the bund. Afterwards the bridge itself was commonly called as 'Bundgarden bridge'.

Two bigger bridges were constructed on both sides of the older bridge and the older bridge was made open as 'Art plaza' to facilitate artistes in the city.⁸ It has become a part of recreational activities in the city. However, each bridge of them is known as the Bundgarden bridge.

Nava bridge

The settlements across the river began in the late nineteenth century. In almost fifty year the areas like Model colony, Prabhat road developed as a white-collar planned settlement. Also many important educational institutes like Fergusson College were established in that area. Gradually the area was getting urbanized.

Subsequently the need for the new bridge was arisen. New bridge was built connecting Shaniwar Wada with the newly developing area of Bhamburda (Shivaji Nagar) in 1923. The bridge was inaugurated by

the then Governor of Bombay Presidency, Sir George Lyod. Thus in some official documents the bridge is referred as 'Lyod bridge' although it was officially named as 'Chhatrapati Shivaji Pul'. Though the people of Pune are quiet acquainted with and proud of the name 'Shivaji', the bridge has always been referred to as 'Nava Pul' i.e. the new bridge.

Sangam and Bundgarden bridge were never referred to as 'new bridge' probably because those were serving the imperial needs. Those bridges were not that helpful in the city life. Hence, after Lakdi bridge, Shivaji bridge was the first bridge which was actually useful for the city dwellers. Thus it was known as 'Nava Pul'.

Interestingly there are more than twenty bridges in Pune which were constructed after this bridge but none of them was called as a 'new bridge'. Thus even though it is amongst the oldest bridges in the city, it is still known as a new bridge. The bridge connects the headquarters of Pune Municipal Corporation with Shaniwar Wada.⁹ Not only the British name but also the name 'Shivaji' could not gain a mass base for this bridge.

Balgandharv bridge/ Omkareshwar bridge

It was built in post-independence era. It connected western peths (wards) of the old city with Shivaji Nagar. This bridge was constructed in 1976. It was named by Maharshi Vitthal Shinde who was a well-known social reformer in Maharashtra. But the bridge has never been known by that name. It is mostly called as 'Balgandharva Pul' and a few times as 'Omkareshwar bridge' by two iconic places situated on the two ends of the bridge.

Balgandharva is a theatre where many significant cultural activities of the city are carried out.¹⁰ Omkareshwar is a lord Shiva's temple which was built during Peshwa period (almost three-hundred years old).

Mhatre bridge

Like other bridges, Mhatre bridge also signifies the growth of the city. It was built in 1984 connecting Erandwane on the left bank of the river with Dattawadi on the other end. It indicated the growth in south-western part of the growing city.

In 1984, Ravindra Mhatre who was a second rank officer at Indian Embassy in London, was killed by terrorists. In his memory, the bridge was named after him. Mhatre bridge is the only bridge amongst the above cases which is known by its official name.

It is also the first bridge in Pune which neither has historical relevance in terms of city's history nor is located near core city or the cantonment. It was the indicator of Pune's growth beyond its traditional boundaries and development of new suburbs like Kothrud.

COLLECTIVE MEMORY

Collective memory is a collective conservation of the past. It refers to how groups remember the past. Collective memory can get manifested through the names, stories, folktales, etc. If studied with caution, it is becoming an important source of understanding history and the heritage of a place. Many of the times collective memory is expressed in oral ways. This is the most convenient or well-illustrated method to remember the past in many societies. It can also get manifested in the behavioural aspects of the society.

In this paper, collective memory is explained in relation with the urban past. Often it can be seen that the official names of places are different than what people call it. It can be applied to the names of roads and squares. But in case of Pune, it was applicable to the names of bridges. Being a riverine city, bridges have played important role in the growth of the city. That importance could be found in the names by

which people call them. This paper aims at elaborating the relationship between collective memory and the bridges in Pune.

INFERENCE

From the above facts it seems that the official names of the first five bridges have never gained the popular base. The names given by people are different than the official names. Popular names signify various things.

In case of Lakdi bridge, it signifies the original material form of the bridge which is related to the collective memory of the bridge. The bridge underwent several structural changes. It was also famous for prohibiting the entry of scooters on it. So it has always been relevant to the urban life. But still it is known by the structure which does not exist today! This name is a case of how the names are passed from one generation to another.

Linguistically, the word 'Lakdi' is Hindi. In Marathi the word for wooden is 'Laakadi'. Marathi is a local language of Pune. And still the Hindi name for a bridge is passed through the generations. A Hindi name suggests the medieval origin of the name. It is quite surprising that the people of Pune who are otherwise very conservative for Marathi culture have chosen to continue calling the important bridge by a Hindi name.

The name sangam for a bridge implies a geographical or a spatial significance. While a word sangam is known for joining of two streams, sangam bridge joined the Bombay port with the city of Pune. It symbolized the inclusion of peshwa's city of Poona in the British-ruled Bombay presidency. In other words, it signified the end of medieval age in Pune and arrival of imperialism. It should be noted that the first British residence was located near the Sangam itself.

In case of Bundgarden bridge, the nearest landmark was taken into consideration. The British name was a foreign name for the local people. Thus it seems like the nearest landmark which was becoming a centre of recreational activities for the upper strata of the society was chosen.

An alternate name for this bridge was 'Mula-Mutha bridge' which was very specific geographical name. This name might not have become popular because river Mula-Mutha was not a part of city-life. The bridge was not directly entering the city. It was outside the city. Also river Mutha was defining the boundary of the city. After sangam, the boundary of the city ended. So, this bridge and river Mula-Mutha both were not a part of the city-life. That might be the reason why this name could not become popular.

In case of Nava bridge, the term 'nava' for a bridge is directly related to the urban past of the city's development. It is amusing that a hundred-year-old bridge is still called as a 'new bridge'. The name denotes how people got connected and became used to this bridge. In terms of people and vehicles, it can be called as the most crowded bridge in Pune. There is a large junction of Pune Municipal Transport (city buses) at one end of the bridge from where connectivity is available to almost every part of the city.

In case of Balgandharva bridge, city-spaces and their utilization with reference to the city-life and culture have played the role in popular name of the bridge. Omkareshwar is architecturally aesthetic and well-maintained temple in Pune. It can be regarded as a symbol of Maratha culture and heritage. There are many old residents of the city who visit the temple daily. It also has a Samadhi of Chimaji Appa (Bajirao Peshwa's brother) ¹¹ in its premises. On the other hand, Balagandharva is a theatre with premises -which is full of cultural activities, exhibitions, plays etc. So it is also the iconic place on the other end of the bridge. Thus while rejecting the official name for the bridge, people chose to remember it by the nearest iconic places the bridge connects.

It proves that the popular names have had some historical, spatial or cultural significance. Sometimes the official names were difficult to pronounce in instance of 'Fitzgerald bridge'. Or in case of Wellesley,

it may not have been accepted by people because it was a foreign name. But in cases of Shivaji and Sambhaji, they were familiar names for the people and still they did not become popular names. So, the lack of familiarity with the names does not seem to be the reason for avoiding the official names. It seems like people chose to remember historical or spatial facts related to the bridge through the names. The only bridge that is known by its official name is Mhatre Bridge which is named so in memory of the Indian diplomat who was murdered by terrorists. It seems like Mhatre bridge is the only official name accepted by the people. Lack of significant landmark nearby the bridge may have contributed in this case. But as it can be seen its name itself is a memory of the tragic past. In this case, official name itself is related to the collective memory. That might be the reason why official name was accepted by the people and no other name was given to the bridge.

CONCLUSION

Importance of bridges in any riverine city is huge for they accelerate its growth. In case of Pune, it seems that their importance is not limited to this one factor. They have become part of the collective memory of the city in connection with the urban past and geography in form of their names.

The first hypothesis that the names given by people to the bridges hold some significance with reference to city's past or geography is true. As discussed above, all the popular names are relevant to the city life or the urban past. The popular names were not chosen randomly. They hold significance in terms of their relevance to the life of the people living in the city. The case studies discussed above support the hypothesis.

The second hypothesis was whether the people of Pune themselves chose to remember the significant events of the past by deciding when to accept the official name and when to not. It appears that, the people of Pune, at subconscious level, chose to remember their urban past and surrounding in a unique way. The official names appeared to be distant with respect to the city's culture and life. They indicated the cultural gap between official names and the urban social life. The irrelevance of the names with urban life might have prompted the people to grant new names to the bridges. These names were naturally more relevant to their experiences in urban life. Therefore, the popular names might have been chosen or selected at sub-conscious level of the mass and become popular gradually. While doing that, the people appear to be selective. The case of Mhatre bridge, where official name was accepted, supports this argument. Keeping the name of 'new bridge' intact for over a century shows that the people may have deliberately granted this name to that particular bridge and not to any other, new bridge built after that. It can be inferred from these facts that the process of naming the bridges was not too random. Some thought and perspective can be found in the names.

In historical cities like Pune, the roots of cultural and social past can be found in the things which at first might appear insignificant or irrelevant. It is not necessary that history is to be found in the written sources only. Oral history and collective memory can contribute in understanding the people's perception and method of conservation of their own past. As any other source of History, it also requires to be studied with proper methodology.

It can be concluded that the collective memory in case of Pune's urban history has uniquely been manifested through the popular names of the bridges.

NOTES

¹ Bajirao Peshwa decided to make Pune his residence in 1830. After that the fortunes of Pune changed and the process of urbanization got accelerated.

² This also had effect on the urbanization of Pune because Governor used to stay in Pune for four months of Monsoon.

³ Henceforth they will be referred as 'popular names'.

⁴ Dengale bridge connects the northern wards of the old city with Shivaji Nagar. New bridge was constructed in 1971.

⁵ Shivaji founded the Maratha state in seventeenth century. Sambhaji was his son. Both are the most famous kings in Maratha history.

⁶ Pune was in hinterland of the port of Bombay, which is one of the factors that accelerated the growth of the city.

⁷ Mishra Garima, "Pune: Bundgarden Bridge to turn into Art Plaza," The Indian Express, January 23, 2016, <https://indianexpress.com/article/cities/pune/pune-bundgarden-bridge-to-turn-into-art-plaza/>.

⁸ The old bridge is no longer used for vehicular traffic.

⁹ The headquarters of PMC was constructed later at that site.

¹⁰ Since Pune is known as a cultural capital of Maharashtra, the cultural centres in Pune such as Balgandhrava theatre have contributed significantly to the regional cultural changes.

¹¹ Chimaji Appa had led a mission/ battles against Portuguese which forced them to focus their activities more in Goaa than on the west coast of Maharashtra.

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SAFEGUARDING OF IRANIAN INTANGIBLE CULTURAL HERITAGE FROM IRANIAN PHOTOGRAPHERS' APERTURE

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INTRODUCTION

The photographic camera, which was launched in Iran about three years after its invention, observes and follows many directions in search of its mission. Sometimes it is a decorative item in the post of an aristocrat's house to show off, and sometimes it looks in the eyes of a girl in a mysterious search for the truth, and it calls out the terror and disgust of war and wants to show its truths. It doesn't take long that in the 1960s, traces of the foundation of artistic photography can be seen in Ahmed Ali's innovative views. By entering the Pahlavi period, and with the emergence of a form of ordered modernity, perhaps the Iranian society is somewhat familiar with the components of modernity and development, and it becomes a prelude to the Islamic revolution in which, it seems, the middle class gains a form of historical awareness. This is where the close connection between photography, which is known as a tool for showing and recording in modern society, is formed with the social body. By entering the 1980s, the photos, which were previously considered as decorative and advertising objects, are now used as a carrier for new concepts. The photographer wears the garment of commitment and tries to represent the suffering and inequality of the people of the land with his camera, a trend that was found in the works of people such as Kaveh and Hengameh Golestan, Bahman Jalali, Yahya Dehghanpour, and Maryam Zandi before the 1979 revolution, and perhaps an individual expression for artistic photography. Was. The story does not end here. Photography sees itself as part of a movement that tries to connect with the tangible and lived experience of people. Kasraian is simply one of the first, he has depicted this range for the first time with years of work and persistence. Our people have formed what they call art on the axis of their inner imagination and time, Kasraian's photographic behavior is not just an attempt to document customs and peoples, but a new narrative of the active imagination of the people of their land. Many seemingly simple and common artistic actions are hidden behind ideals imported from the history of art in other countries. The action and result of Kasraian's production was formed based on his inner need, not on the basis of attention to mere art, the reflection of this act was the collective unconscious acceptance of the intellectuals and people of this thoughtful and noble artist. Kasraian's photo books were another first phenomenon, in an expressive form that responded to a picture book. In the following article, we are trying to describe the flow of photography after the revolution of 1979 and tell how documentary photography finds its accuracy in the form of a tool for recording, preserving, and publishing tangible and intangible cultural works in the works of Nasrullah Kasraian and Reza Deghati

Body

"The age of photography is also the age of revolutions, conflicts, assassinations, and explosions; In a word, the era of impatience, the era of everything that ignores and denies anything that exalts and achieves", says Roland Barthes in *Camera Lucida*.

I flip through illustrated magazines such as *Zan Rouz*¹ or *Ferdowsi*.² Nothing but routine can be found in it. Regretfully, many photos remain stagnant and decorative in my eyes. But in the meantime, even those that have little existence in my eyes, most of them only have an all-pervading attraction or maybe informative. Without biting or shouting common pain.

In the fall of 1979, Majid Davami,³ the editor of *Zan Rooz* magazine, was wanted by Sadegh Khalkhali,⁴ and announcements were made to find him. Yes, there has been a revolution.

It is logical that revolutions are always accompanied by upheavals in society, and its waves sweep over everything, and the field of art and photography is not spared from it either. Photographs, which may have had a decorative and beautiful aspect before this, suddenly become a committed and mission-oriented activity, and photography is connected to the tangible and lived experience of people. Due to such events, Iranian photography was able to find a secret among heads and stand shoulder to shoulder with other arts. Of course, this does not mean that the works of photographers such as Kaveh Golestan⁵, Bahman Jalali,⁶ Yahya Dehghanpour,⁷ and Hengameh Golestan⁸ in the 1970s and earlier in the works of Ahmad Aali⁹ in the 1960s, who sought help from the camera to represent inequalities and truths and they tried to create an artistic language. In fact, they were just a marginal attitude at that time. The modern society, which we had previously seen the signs of in the constitutional revolution, after a period of modernization during Pahlavi's time,¹⁰ which according to some was authoritarian, has now found the opportunity to accept it in its heart and in a democratic way. Perhaps these developments are not similar to the second half of the 20th century when the developed industrial world turns everything, including nature, history, tribes, sufferings, sports, sex, and politics into a show. The tool used for this work is the camera. The ubiquitous presence of cameras convincingly indicates that it is the time to conceive interesting events, events that are worth photographing. That is, the photo is a kind of eye of modernity and like God is watching us. In the post-revolutionary period as well, accepting that modernity naturally and not by force destroys the social and cultural structure; more or less the same characteristics that the westerners had for photography can be extended here as well. That is, photography should be a platform for "show" whose tool is the camera.

The first steps of documentary photography were formed in the 1970s in protest against the abnormal social situation and discrimination and obvious class divisions. Bahman Jalali's photos of the Zoroastrian crypts, Kaveh Golestan's brilliant collection in Shahr Nou,¹¹ Hengameh Golestan's photos of women living on the outskirts of the city, Nasrallah Kasraian's photos of the deprived people, Mahshid Farahmand's¹² photos from workers, and Mahmoud Kalari's¹³ works are definitely among the precious treasures of Iranian documentary photography before the revolution. With the occurrence of revolution and war in the 1980s, the nascent trend of documentary photography intertwines itself with committed photography and manifests the issue of commitment in a form of social documentary photography. This form of committed photography appeared in the midst of the days of the revolution and later in the years of the war,¹⁴ in the form of photographing the struggles of the street people and the bravery of Iranian warriors. In his famous writing "Photographer's Eye", Sarkovsky says that the subject or the thing itself is one of the basic components of the formation of the language of photos, and this point occurs more often in the first way when we are faced with an event of the majesty of the revolution. With these interpretations, there is no mistake in considering the revolution and especially the war as a factor in opening the language of Iranian photography and making it move. In fact, the photographer assumed that his camera should follow the suffering and inequality of the people of his land, and through these efforts to depict the war, Iran's news photography is known in the world by people like Golestan,

Daghati, Yaghoubzadeh, etc. It seems that, in fact, this provides the basis for Iran's photography capacity, both in terms of communication with the world and from an economic point of view. Also, through these efforts, a view is formed that steps into the field of representing war tragedies and rejecting it in other layers, for example, in the city space. This topic can be found in the series "Abadan¹⁵ who is fighting" and "Khorramshahr¹⁶" in 1981 and 1982. When we leave the photographed moment and return to our lives, we do not notice this conflict, we take the responsibility for this break. The reality is that any reaction to that photographed moment will be considered inadequate. Those who are in the situation of being photographed, do not see that moment as we do, and the style and context of the reactions are completely different. It is not possible for someone to look thoughtfully at such a moment and be able to get rid of it. Don McCullin writes in a biting description below the photo: "I use my camera just like I use my toothbrush, it just does its job."

The flow of documentary photography went further and tried to "show" and "preserve" customs and culture. The leader of this trend is Nasrallah Kasraian, the father of ethnographic and anthropological photography in Iran. In the midst of war, in the time of shortages and hardships, in the absence of images Nasrallah Kasraian created a link between the urban society of Iran and its land, which four decades later, is still an inseparable part of our visual memory. For at least two generations, the love and pain of Iran have been intertwined with his pictures. Although at the beginning it is formed from seemingly political thought, but in the middle of life, the spiritual essence of the artist loses its strong origin without people, especially the people who have resisted the storms of anxiety and lived a turbulent history through the centuries.

Nasrallah Kasraian's first photo book titled "Our Land Iran" dates back to 1990. When he decided to publish photos of Iran, but very different from what had been published before. In this photo, he tried to mix tangible cultural and natural works with the beliefs, customs and traditions of that region and tried to record, display, and expand the intangible human heritage. The further manifestation of this claim can be seen in the photo book titled "Damavand" which was published in 1997, which is the result of his 110 trips to Damavand region. In this regard, he says: "Basically, I am a person who doesn't always think about it when I want to do something. I think until a certain point and then I act. I believe that going this way that I have thought about, will tell us how to go forward. I realized that the image that people have of Damavand is a picture of a postcard. The photos that were published of this peak until then were taken in daylight, in which the surrounding plain (which was green and full of flowers) was also visible. At that point, I decided to show Damavand in other conditions and from the eyes of people who lived around it. for example, at a time, especially when it is not so dark and not so bright, this is Damavand. I thought that way we could see a lot of people. This way I can expand the visual experience of the audience. Every time I travel to Damavand, I encounter a new life. So, when will this story end, never!" With the explanation he gives, it can be understood that he intends to expand the visual experience of his audience in the direction that local people see Damavand in these works. He wants to show the lived experience of the people who have lived with this peak for years and this peak is an inseparable part of their beliefs and customs in the form of photographs so that the audience's gaze is accompanied by the people who have lived next to this peak and in one moment Let us live there and let this moment be our lived experience of Damavand. Something that changes every moment.



Figure 1. A Picture from Damavand

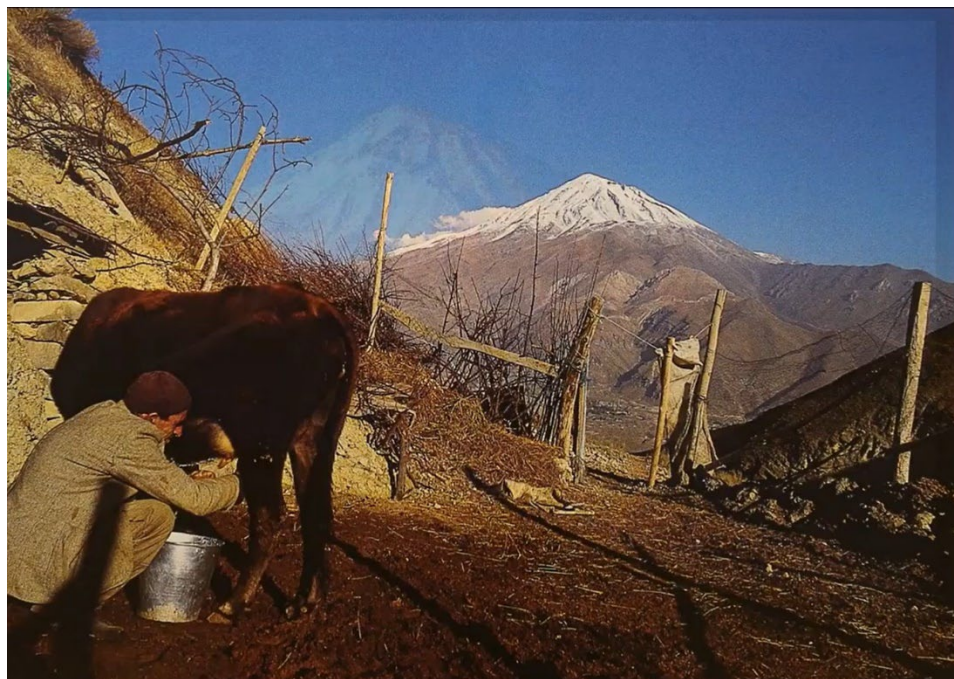


Figure 2. A Photo from Damavand – N. Kasraian

One of the photos that may be questionable in this photo book was Figure (3). He says about this photo: "One day, I went to the peak to photograph Damavand before sunrise, and the shepherd who saw me at that time asked why I was on the slopes of Damavand peak at this time of the morning, and I explained to him. He invited me to breakfast and I apologized to the shepherd for using the light of that hour for photography and I did not accept his invitation. When I returned, I saw that he had left some apples on the hood of the car for me, and I was really touched by so much sympathy and decided to do this. I will also publish the photo."



Figure 3. A Photo from Damavand– N. Kasraian

He directs his attention to "people and their works". In this regard, he says, "I used to photograph almost everything, that is, I didn't have such a specific plan and theme in my mind. Of course, I was not interested in taking pictures of things like flowers, insects, etc., but over time, I found my favorite subject and this was nothing but human beings; how they live. The most important factor that made my subjects more specific was my marriage to Zeba Arashi¹³, a graduate of Iranian calligraphy. We followed the work on different ethnic groups. From this point on, we had a definite plan to continue. We constantly traveled to different regions of Iran where ethnic groups lived and tried to photograph different aspects such as life, architecture, customs, and climatic conditions. "The result of these efforts and numerous trips was a collection of photographs such as the Kurds of Iran, the Turkmens of Iran, the nomads of Iran, Isfahan, Perspolis, North, South and Tehran."



Figure 4. A Photo from Kurdistan– N. Kasraian

At a time when the oppression of women was hardly tolerated, the images of Kurdish, Baluch, Gilak, Ler, Turk, Turkmen, Bakhtiari, Shahson and Qashqai women brought the smell of the wheat fields of Fars¹⁴ and the whispers of the forests of Zagros,¹⁵ Golestan¹⁶ and Azerbaijan¹⁷ to the cities. Since the dawn of Iran's history, this was the first time that real images of real Iranians were displayed. One of the lines that were clearly visible in these photos was the role of women and mothers and the respect and decency of the artist who saw the place of this part of the society well and showed it to others. Images of constant movement and effort, maternal presence, and the concept of home, which were all part of the song of life and an emphasis that we will not end.



Figure 5. A Photo from Balechustan – N. Kasraian



Figure 6. A Photo from Hormozgan – N. Kasraian

In his words, he could transfer external time to internal time with a photo. The outer time is the time of the universe, the rotation, and the sun, and the inner time is formed around the sun, the love of man,

and his fertile imagination. This piece of paper engraved with the chemistry and modernity of the modern world is the miracle of connecting external time to internal time. Our external time is rich with images of peaks and plains of our land and people who have migrated for thousands of years and colored their lives with songs and stories with carpets and rugs and with the loneliness of high mountains and vast sunsets.

Hasan Ghafari,¹⁸ a photographer in the field of ethnography, says: "In the last quarter of a century, life has seen many changes and mankind has grown very rapidly in acquiring sciences. In my opinion, on the one hand, digital technology has created a kind of social justice. and offers us many services, on the other hand, it has caused the loss of important parts of historical memories and many customs. Everything is changing. So I decided to use my camera with the aim of recording the spiritual heritage of the spaces that Their life is mixed with nature.

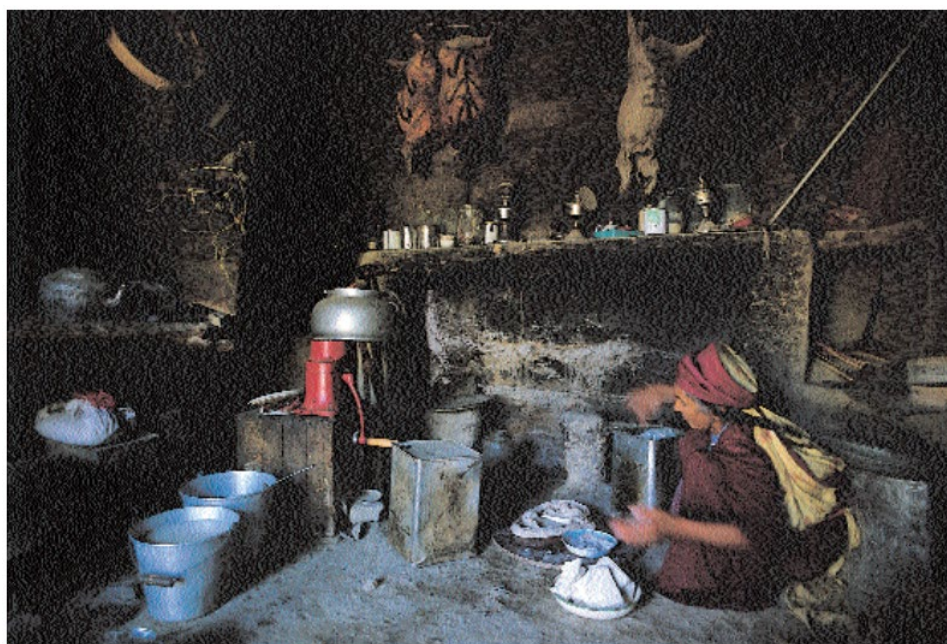


Figure 7. A Photo from Hormozgan – N. Kasraian

Another Epitome in documentary photography is Reza Deghati (1952 in Tabriz). He is a French-Iranian photojournalist of National Geographic, who is known in the world as Reza. He is one of the pioneers in the field of documentary photography and photojournalism, who goes beyond this. While he is a photojournalist, he tries to record and preserve the traditions and customs related to that region in the photos he often takes of war and unrest. Something that is perhaps very exemplary in this field. His photos from Afghanistan show the peak of the photographer's vision. His photos in this collection not only tell the pain and suffering of Afghans from years of war and injustice, but also some customs related to this region are visible in these photos. It is better to say that Reza likes to shout pain and suffering in the form of human customs. The photos published by Reza about Afghanistan in Time magazine, after which Reza received the World Press Photo Award in 1984. According to him, these photos are among the most serious photos about Afghanistan that were published in magazines such as Paris Match, Time and Stern.



Figure 8. A Photo from Afghanistan – R. Deghati



Figure 9. A Photo from Afghanistan – R. Deghati



Figure 10. A Photo from Afghanistan – R. Deghati

CONCLUSION

What came was a brief and analytical look at the evolution of photography after the 1979 revolution and it is a report of the evolutions that documentary photography experiences on its way. A path in which people like Nasrullah Kasraian and Reza are careful and don't look at tamed photography and see it as the voice of history and culture and in Kasraian's words "man and humanity" and it becomes a tool to preserve, record and Publication of cultural works of people. In the words of Roland Barthes "Mad or tame? Photography can be one or the other: tame if its realism remains relative, tempered by aesthetic or empirical habits; mad if this realism is absolute and, so to speak, original, obliging the loving and terrified consciousness to return to the very letter of Time: a strictly revulsive movement which reverses the course of the thing, and which I shall call, in conclusion, the photographic ecstasy. Such are the two ways of the Photograph."

"The choice is mine: to subject its spectacle to the civilized code of perfect illusions, or to confront in it the wakening of intractable reality"

NOTES

¹ Zan-e Rooz (Persian: زن روز, "Woman of Today") is a women's weekly Persian-language magazine published in Tehran, Iran.

² Ferdowsi is one of the most important and old Iranian publications. This magazine was one of the weekly magazines that also featured new poetry in the margin of their content

³ Majid Davami (born 1929 - died 2006) was a famous journalist and the founder of Zan Rooz magazine in Iran. Majid Davami was also famous for his controversial reports and interviews during the nationalization of the oil industry and the Mossadegh Court. Before Zanrooz, he was the editor of the weekly information magazine and then the intellectual magazine.

⁴ Mohammed Sadeq Givi Khalkhali (27 July 1926 – 26 November 2003) (Persian: صادق خلخالی) was an Iranian Shia cleric who is said to have "brought to his job as Chief Justice of the revolutionary courts

⁵ Kāveh Golestān Taghavi Shirazi (8 July 1950 – 2 April 2003), (Persian: کاوه گلستان) was an Iranian photojournalist and artist. In 1988 he took the first pictures of the aftermath of the Halabja chemical attack during the Iran–Iraq War.

⁶ Bahman Jalali (1944 – 15 January 2010) was an Iranian photographer who played a significant role in educating a new generation of Iranian photographers. He taught photography at several universities in Iran over a 30-year period.

⁷ Yahya Dehghanpour, an Iranian photographer, was born in 1940. His main interest is documentary photography. Dehghanpour studied Persian literature at Tehran University and studied photography at the San Francisco Art Institute. His works have been exhibited in numerous solo and group exhibitions.

⁸ Hengameh Golestan (born Hengameh Jalali 1952) is an Iranian photographer. She is considered a pioneer among Iranian women photographers.

In March 1979, when in the aftermath of the Iranian Revolution women in Iran began protesting the new government's rule ordering them to wear hijabs, she photographed the gatherings in the capital, in the process becoming one of few documentary photographers active in the country.

⁹ Ahmad Aali (Persian: احمد علی, born 1935) is an Iranian photographer and artist.

¹⁰ The Pahlavi dynasty (Persian: خاندان پهلوی) was the last Iranian royal dynasty, ruling for almost 54 years between 1925 and 1979. The dynasty was founded by a non-aristocratic Mazanderani soldier in modern times, who took on the name of the Pahlavi language spoken in the pre-Islamic Sasanian Empire in order to strengthen his nationalist credentials

¹¹ Shahr-e No was the red light district located in Gomrok town of Tehran, Iran. It employed about 1,500 women. After the Iranian revolution and the establishment of the Islamic regime under Ayatollah Khomeini, in 1980 the government demolished the red light district

¹² Iranian Photographer

¹³ Mahmoud Kalari (Persian: محمود کلاری; born in Tehran), is an Iranian cinematographer, screenwriter, film director and photographer, who has worked with number of renowned Iranian directors such as Abbas Kiarostami, Jafar Panahi, Asghar Farhadi and Mohsen Makhmalbaf.

¹⁴ The Iran–Iraq War[c] (Persian: جنگ ایران و عراق; Arabic: الحرب الإيرانية العراقية) was a protracted armed conflict between Iran and Iraq that began on 22 September 1980 with the Iraqi invasion of Iran. It lasted for almost eight years and ended on 20 August 1988.

¹⁵ Abadan (Persian: آبادان Ābādān, pronounced [ʔɒːbɒːˈdɒːn]) is a city and capital of Abadan County, Khuzestan Province, which is located in the southwest of Iran.

¹⁶ Khorramshahr (Persian: خرمشهر [xoræmˈʃæhr], also romanized as Khurramshahr, Arabic: المحمرة, romanized as Al-Muhammerah)[1][2] is a city and capital of Khorramshahr County, Khuzestan Province, Iran.

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MONTAGE AND DIALECTICAL HISTORY: THE ACCESSION DAY TILTS, WHITEHALL AND EMBODIED PARTICIPATION

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MONTAGE AND DIALECTICAL HISTORY

The meaning and use of montage in this discussion references the nineteenth-century French word which denotes ideas of assembly from prefabricated parts. This notion of plurality where new meanings are produced through juxtaposition and adjacency are explored through the sixteenth-century Accession Day Tilts. These jousting tournaments were a fundamental aspect of Queen Elizabeth I's Accession Day and celebrated in the tiltyard of Whitehall Palace. The experiences of the festivities were simultaneously informed by the ephemeral qualities of the proceedings and the prominence of the architecture of the Palace where material characteristics still exist. While the appearance of the building has completely changed, there are still similarities in the positioning of the former tiltyard and current Horse Guards Parade ground in relation to the spatial qualities of the architecture.

In this paper, montage as an interdisciplinary tool is used to explore the conception of three-dimensional spatial environments and especially participation dependent eidetic experiences conveyed through different modes. Additionally, the notion of an intellectual montage is employed to engage the users and encourage active participation in the dynamic process of constructing the work and/or experiences.¹ As the meanings of heritage are cumulative and fluid, this notion of dialectics foregrounds the role of the user and enables the understanding of the work to shift through different levels of engagement. Most importantly with each transformation, the shifts and gaps in knowledge are accommodated and the multiple facets of history, both tangible and intangible, are juxtaposed and exploited to resist fixed readings and meanings.²



Figure 1. Horse Guards Parade grounds flanked by the Horse Guards building



Figure 2. Outline of the current Horse Guards building drawn over part of Henry VIII's tiltyard

MONTAGE AND PERSPECTIVE OF MEANING

The notion of dialectical history, articulated as non-linear and conveyed through the techniques of montage, fragments and allegory begins with the English Reformation and the Royal Family as tantamount with the Church of England. This portrayal extended to the Queen's carefully constructed image as 'Supreme Governor'.³ Hence Accession Day was marked with copious celebrations and the imagery of the Tilts was designed to establish the 'political and theological position' of Protestant England.⁴ There are no surviving images and these festivities are largely depicted through poetry and literary references.⁵ Significantly, a piece of work hailed as a reflection of these significant celebrations is the Ditchley portrait, c. 1592.⁶ The use of didactic allegory in the building of Elizabethan mythology is evident in this larger-than-life-size painting which depicts the Queen standing on a globe with her feet on Oxfordshire, positioned as a figure between England and God.⁷ The celestial association is reinforced by the portrayal of her ability to control the weather through dispelling storm clouds and ushering in sunshine. This technique of arranging individual objects to create a picture is also referred to as perspective of meaning and/or Elizabethan vision. This was manifested through issues of conveyance and included the construction of visual symbols embedded with allegorical references as well as allusions to specific narratives.⁸ In 'The Allegory of the Tudor Succession', c. 1572, the people in this painting consist of both living and deceased members of the Tudor family as well as representations of mythical figures, thus enabling the painting to be read in various ways. For instance, the four Tudor monarchs depicted can be read individually with regards to their political roles in relation to the Tudor dynasty. Likewise the mythical figures of Peace, Plenty and Mars have been depicted with the necessary embellishments and attire to convincingly convey their symbolic roles. The use of Elizabethan allegory through the individual symbolic elements and the composition of the figures serve to reinforce specific aspects of the narrative depending on the assembling of different combinations. Hence the primary aim of the state portrait was not to portray the Queen as an individual but to 'invoke through her image the abstract principles of her rule'.⁹

Consequently, the Tilts were not only a means for the monarchy to articulate their position, but also enabled the public to experience the architectural space of the tiltyard on that one particular day a year at the height of the festivities.¹⁰ Likened to some aspects of montage, this ability to understand the intention and meaning of the work through reconciling the mental and visual gaps between specific elements enabled a deeper appreciation. This presentation technique also allowed the sixteenth-century audience to understand the implied meanings. However, the use of didactic allegory in these visual compositions and staged performances meant that despite the different readings afforded to the participant, the intended meanings were similar. Dialectical allegory in contrast facilitates the creation

of new, multiple and individual readings where meanings are solely reliant on the users' interpretations and required to complete the work.



Figure 3. *Ditchley Portrait*, c. 1592, attributed to Marcus Gheeraerts the Younger



Figure 4. *'Allegory of the Tudor Succession'*, c. 1572, attributed to Lucas de Heere

RECONSTRUCTING THE ACCESSION DAY TILTS

References to the idea of an annual feast in honour of Queen Elizabeth recur in Elizabethan literature. These literary allusions further suggest that the Tilts were a fundamental aspect of the aesthetic language during the late sixteenth-century. Works which allude to the Tilts include Edmund Spenser's epic *Faerie Queen* (1590–1), Sir Philip Sidney's novel *Arcadia* (1590–3), and Michael Drayton's *The Shepherds Garland* (1593). These literary examples, termed by Frances Yates as 'word pictures' to reflect the pageantry of the Tilts have served to establish the emphasis on enactment within a fictitious narrative focused on particular themes, and woven around a deity-like figure.

The most precise visualisation of these celebrations can somewhat be reconstructed through a reading of George Peele's blank verse 'Polyhymnia' (1590). Composed specifically for a tilt in that same year, it remains the most detailed and descriptive account. The event is introduced chronologically with the repeated depiction of the thirteen pairs of tilters, their names, staging, and costumes as they entered the tiltyard. Descriptions of the elaborate costumes, accompanying paraphernalia and methods of arrival by means of horses, corteges, and pageant cars denoted the roles assumed by the knights. The one portrait which is said to be a visual translation of Peele's verse to painting and has been hailed as a reflection of these significant celebrations pertaining to the description of 'great Empresse of the world' and 'Star of England's Globe', is the Ditchley portrait.¹¹ These written allusions are studied alongside existing pictorial documentation like the sketch of the tiltyard pavilion, drawings of jousting armour and score cards.

The privy and tiltyard galleries of Whitehall Palace were established from the onset between 1530 and 1532.¹² The earliest existing layout drawings depict the Palace in the seventeenth-century and a 1670 plan shows the tiltyard gallery as 80 feet long and 19 feet wide, consistent with an earlier elevation drawing by Inigo Jones in 1623. The open space in front of Jones's Banqueting House, 1619–22, is labelled 'part of the tiltyard' and this is where the south wing of the current Horse Guards building sits.¹³ Hence Henry VIII's tiltyard would have occupied part of the current Horse Guards Parade grounds, making this space one of the surviving areas of Whitehall Palace to have retained any ceremonial function.¹⁴ The first Horse Guards building was commissioned by King Charles II in 1663 and until this day, remains the ceremonial entrance of Buckingham Palace.¹⁵ The current building is dated 1750–60 and serves as the headquarters of the London District of the British Army and Household Calvary, and further houses the Household Calvary Museum.¹⁶ The Museum not only introduces the history of the Guards to the public, but also allows visitors to experience aspects of the original building, which were restored during the design of the gallery spaces. Features include the original cobbled floor and vaulted ceiling of the stables. More importantly, the integration of an aspect of history into the present context is apparent in one of the galleries that contain the Queen's Life Guard stables. Horses are still groomed for ceremonies in these original eighteenth-century stables and this activity can be glimpsed via a large glass partition in the Museum. The presence of the sentries at the entrance of the Horse Guards building further allude to the historical significance of this space and its association with royalty. The large open space through the archway and located alongside St James's Park is the Horse Guards Parade where the jousting tournaments occurred.

At present, the spatial and social practices of the Tilts are articulated through an asynchronous archive consisting of ephemeral aspects like theory and narrative, material history like the current Horse Guard Parade Ground and Museum, and most importantly the experiences of the users through historical records and current interactions. Hence, the appropriateness of montage as a tool that reconciles these archival fragments is demonstrated. New meanings of the Tilts are generated by different users through engagement with different combinations of these tangible and intangible material aspects and experiences. This inherent method of understanding history and expanding the collection of material to include different mediums, acquired through new working processes and practices will be extended to the present. In this instance, discussions concerning digital technology, virtual sensations and environments entail the construction and contributions of a sound archive.

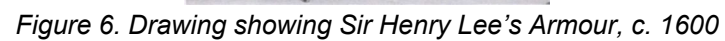


Figure 7. Jousting Cheque, or Score Card for the Accession Day Tilt, dated 17 November 1584

DIGITAL TECHNOLOGY AND AUDIO FRAGMENTS

Through the precise use of advancing technology, the sounds associated with Accession Day celebrations and the Tilts can be digitally recreated as intangible auratic additions. In this instance, the vividly described ‘ringing of bells, lighting of bonfires and firing of guns’ by courts and parishes, as well as the cheering crowds and theatrical performances by the knights in the tiltyard as described in detail by Lupold von Wedel in 1584 can be interpreted and constructed as sound bites to enhance eidetic experiences.¹⁷ As there are no authentic recordings of these events, the audio fragments will have to be constructed from the onset.

As the language of the literary and fine art references discussed were specific to the period, the inventiveness of the audio aspects is approached through combining the precision of current technology with scholarly research. Working structures that enable these fragments to exist as autonomous units of meaning, individually addressing issues like authorship and narrative are important. This will require academic and practical knowledge regarding the materiality of the architecture, in particular the tiltyard as well as historical musical instruments and apparatus associated with sound production. Digital expertise will serve to facilitate the translation and empirical calculations of these scientific sound studies into recordings. The methods by which the synthesis of the different components become audio fragments that accurately depict the different instances of the Tilts are inventive and original. These sound bites not only enhance and extend the existing asynchronous archive, but the availability of process work with incomplete slivers will encourage participants to assume the different roles of composer, performer and/or listener, thus contributing to the plethora of multiple interpretations and personal experiences. Significantly, the work demonstrates the relevance and relevant use of technology.

In this instance, digital technology is not afforded greater importance and/or approached as an all-encompassing tool that overshadows the contributions of other archival material. Neither is it simply an organisational mechanism, structured as a framework to insert information. It is important to highlight that while these audio fragments serve to augment reality, they are not meant to foster the reenactment of complete virtual reality environments.¹⁸ This is because the diminution of the gaps and/or intermediate spaces which are the ‘productive forces in the generation of meaning through active involvement of a critical audience’, has already been initiated by the seamless amalgamation of pictorial elements into virtual images by way of digital rendering practices.¹⁹ Hence, consistent to the notions of montage and dialectics, these sound fragments are unmediated and exist as independent entities that simultaneously emphasise the gaps in history.

[N]ow approached the day, when on November 17 the tournament was to be held... About twelve o'clock the queen and her ladies placed themselves at the windows in a long room of Weithol Whitehall palace, near Westminster, opposite the barrier lists where the tournament was to be held. From this room a broad staircase led downwards, and around the barrier stands were arranged by boards above the ground, so that everybody by paying 12d. would get a stand and see the play... Many thousand spectators, men, women and girls, got places, not to speak of those who were within the barrier and paid nothing. During the whole time of the tournament all those who wished to fight entered the list by pairs, the trumpets being blown at the time and other musical instruments. The combatants had their servants clad in different colours, they, however, did not enter the barrier, but arranged themselves on both sides. Some of the servants were disguised like savages, or like Irishmen, with their hair hanging down to the girdle like women, others had horses equipped like elephants, some carriages were drawn by men, others appeared to move by themselves; altogether the carriages were very odd in appearance. Some gentlemen had their horses with them and mounted in full armour directly from the carriage. There were some who showed very good horsemanship and were also in fine attire. The manner of the combat each had settled before entering the lists. The costs (of such pageantry) amounted to several thousand pounds each. When a gentleman with his servants approached the barrier, on horseback or in a carriage, he stopped at the foot of the staircase leading to the queen's room, while one of his servants in pompous attire of a special pattern mounted the steps and addressed the queen in well-composed verses or with a ludicrous speech, making her and her ladies laugh. When the speech was ended he in the name of his lord offered to the queen a costly present... Now always two by two rode against each other, breaking lances across the beam... The fete lasted until five o'clock in the afternoon...¹

Figure 8. The eye witness account by Lupold von Wedel in 1584 remains the only description of the proceedings at a tilt. The audio aspects are highlighted

THE PRACTICE OF ARCHIVAL RESEARCH, HERITAGE AND EMBODIED PARTICIPATION

Montage as a technique enables a non-hierarchical framework that approaches the multiple depictions of the Tilts through an asynchronous archive where the disjunctions between tactile experiences of a tangible site, literary and pictorial material, and intangible auratic additions are juxtaposed to conjure up meaningful and individual experiences through active user participation. The gaps are celebrated, and meanings shift as contingent on the work being completed by the embodied user.

The techniques of didactic allegory and allusion in the design and choreography of the Tilts were meant to allow active participation through composing different ways to understand the proceedings. Despite the similarity of the intended meanings, the work was appreciated on individual terms. This methodology extends to the present where personal readings of the Tilts are derived from different combinations of material available. As dialectical history advocates that the acquisition of knowledge is neither linear nor seamless, the ensuing experiences are not meant to be singular and continuous but fragmented and juxtaposed. Additionally, the framework for this non-hierarchical system is constructed through active sources with the critical intent to reflect participation and use. The nature of heritage is communicated through varying hybrid and interdisciplinary material that also employ didactic and dialectic allegories. The Tilts that occurred during Elizabethan England are presently devised to be experienced through these archival fragments which are acquired through different working processes and practices. The readings of the Tilts are transformed by the user and similarly, the resulting polyvalent experiences of overlaid histories transform the physical and digital archive of resources that enrich discussions concerning this particular aspect of English heritage. These conflicting discontinuous fragments that include archival material and the visual and tactile qualities provided by the permanence of the architecture enables half-a century of history to also be reflected in the tangible and intangible gaps, further facilitating the juxtaposition of intellectual stimuli.²⁰ The notion of an intellectual montage is thus created through the inherent complexity and layers of meanings, with the eidetic experiences celebrated on individual terms.

Significantly, the rejection of a dominant medium that dictates and/or generates a leading narrative creates new readings and meanings that function as critique, entertainment and/or education. These active resources operate as catalysts that facilitate the appreciation of history, but revisited in the present context. This ensures that the qualities of multiplicity, polyfocality and polyvalence through the multifaceted layering of experiences that occur at different moments in this space and as apparent in history, will always have relevance in the present.

Digital technology in this instance is not limited to sound and audio material but can be used to alter the workings of the existing archive and the manners in how different aspects are approached, used and presented, to demonstrate new dialectical ideas concerning participatory explorations. This current manner of engagement is very different to the intentions of the Elizabethan pageantry and Tilts, where the choreography was infused with particular themes to impress and remind the public who as loyal subjects, were expected to understand the meanings being alluded to. As public perception of, and loyalty to, the monarchy has changed over time, so have the meanings associated with the Tilts.²¹ Hence the term ‘perspective of meaning’ can be used to describe the ability to interpret, apply, and infer material regarding the Tilts. The practice of archival research and all material in this archive is distinct, fluid and non-hierarchical. This inventive way of engaging with architectural history would allow the past to be integrated in more accessible, precise, and nuanced manners. Most importantly, the archive transforms the readings of the Tilts associated with each aspect and similarly, the work and meanings produced transforms the archive.

NOTES

¹ Manfredo Tafuri, "The Dialectics of the Avant Garde," *Oppositions* 11: A Journal for Ideas and Criticism in Architecture, v.11, (1977): 78.

² The historiographical approach references the work of Walter Benjamin and especially *The Arcades Project* (1999). This post-humous publication is described as 'the blueprint for an unimaginably massive and Labyrinthine architecture, a dream city in effect'. The basic essence and characteristics of the Paris arcades are effectively captured in a working system that respected the differences of the events juxtaposed within the spaces. The principles of montage are evident in the arrangement of the six chapters of the book, which are designed to operate independently and enable 'the work to be remade anew' by each reader. Howard Eiland, translator's foreword to *The Arcades Project*, by Walter Benjamin (Cambridge, Mass. and London: Belknap Press of Harvard University Press, 1999), viii and Jonathan Hill, *Actions of Architecture* (London and New York: Routledge, 2003), 108.

³ Roy Houston, ed., *Queen Elizabeth II and the Royal Family* (London: Dorling Kindersley Ltd., 2015), 151. The current monarch Queen Elizabeth II's role in the Church of England is a direct consequence of Henry VIII's actions.

⁴ Frances Yates, "Elizabethan Chivalry; The Romance of the Accession Day Tilts," *Journal of the Warburg and Courtauld Institutes*, v. 20, no. 1/2, January – June, (1995): 7.

⁵ A suggested visual reference is the eight Valois Tapestries that depict ceremonial tilting at the French Court during the time of Catherine de Medicis. This body of mid-sixteenth-century textiles are attributed to cartoons by Lucas de Heere.

⁶ The Ditchley portrait measures 2413 x 1524 mm, is attributed to Marcus Gheeraerts the Younger and is currently displayed in the Tudor Gallery at the National Portrait Gallery, London, UK.

⁷ Susan Frye, *Elizabeth I: The Competition for Representation* (New York and Oxford: Oxford University Press, 1993), 114 and Yates, "Elizabethan Chivalry," 9.

⁸ This notion set the tone regarding the commissioning and production of the portraits and images of Queen Elizabeth throughout her reign. Hence the term 'lost sense of sight' alludes to the fact that the ability to see and understand works of art presented in this manner is no longer common practice. Constance Lau, "A contemporary reading of the Accession Day Tilts in relation to festival and the Elizabethan notion of 'lost sense of sight'," in *Architecture, Festival and the City*, ed. Jemma Brown et al. (London: Routledge, 2019), 40. Additional reference, Roy Strong, *Gloriana: The Portraits of Queen Elizabeth I* (London: Thames & Hudson, 1987).

⁹ Roy Strong, *Gloriana: The Portraits of Queen Elizabeth I* (London: Thames & Hudson, 1987), 36.

¹⁰ Lau, "A contemporary reading of the Accession Day Tilts," 39.

¹¹ David H. Horne, *The Life and Minor Works of George Peele*, v. 1 (New Haven, CT: Yale University Press, 1952), 232.

¹² Simon Thurley, *Whitehall Palace* (New Haven and London: Yale University Press in association with Historic Royal Palaces, 1999), 46.

¹³ The Banqueting House, which is located directly in front of the Horse Guards building, is currently used for state events. William III had this building converted into the Chapel Royal after the 1698 fire, a function it retained until the 1890s.

¹⁴ The Parade ground also currently accommodates the ceremonies *Beating the Retreat* and *Trooping the Colour*. The first event takes place in May and June when military music and parades are performed under floodlights. The latter is a pageant to commemorate Queen Elizabeth II's birthday and takes its name from the regimental colours on display. This ceremony is preceded by an official parade along the Mall with the reigning Queen and other members of the royal household riding on horseback or by royal coach to the Horse Guards.

¹⁵ After the fire of 1698, the Court moved to St James's Palace and this building became the official entrance. By 1745, it was in disrepair, deemed unsafe and demolished. The current Horse Guards building consists of three arches with the central arch surmounted by the clock tower. The inscriptions of 'SMF' and 'StMW' on the main arch denote the historic parish boundaries of the churches St Martin in the Fields and St Margarets.

¹⁶ Emily Barber, *London* (London and Somerset: Blue Guides Ltd., 2014), 152. The Horse Guards building has been frequently attributed to William Kent. However, this account states that it was by William Robinson and John Vardy, 'influenced by the designs of William Kent'.

¹⁷ Roy Strong, *The Tudor and Stuart Monarchy, volume II* (Woodbridge: Boydell Press, 1995), 129–30. 'Accession Day was celebrated on a national scale, and court and parishes across the whole country responded with prayers, ringing of bells, lighting of bonfires, firing of guns and feasting'. The original source is noted as 'City of London Repertories, xxii, fol. 2v; an entry concerning the payments involved occurs on fol. 8' and Roy Strong, *The Cult of Elizabeth: Elizabethan Portraiture and Pageantry* (London: Thames and Hudson, 1977), 134–5. The original source is noted as 'Journey through England and Scotland made by Lupold von Wedel in the years 1584 and 1585,

Transactions of the Royal Historical Society, new series IX, 1895, pp. 258–9; V. von Klarwill, *Queen Elizabeth and Some Foreigners*, London, 1928, pp. 330–2’.

¹⁸ These ideas that are deemed more appropriate to the arguments in this paper, are raised alongside current discussions and opportunities concerning the metaverse and offer an alternative method on how digital technology can be integrated and contribute to ongoing research regarding history, heritage and culture.

¹⁹ “Delirious New York, 40 Years Later,” Martino Stierli, accessed July 24, 2022.

<https://yalebooks.yale.edu/2018/09/25/delirious-new-york-40-years-later/>. Additional reference, Martino Stierli, *Montage and the Metropolis* (New Haven and London: Yale University Press, 2018).

²⁰ Tafuri, “The Dialectics of the Avant Garde,” 74. The original source is noted as, S.M. Eisenstein, “Metocli di Montaggio.” Film Fonn (New York, 1949. Italian translation in Fonna e fecnicci delfilm e lezioni di regia [Turin: Einaudi, 1964]. p. 75).

²¹ Lau, “A contemporary reading of the Accession Day Tilts,” 46.

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MATERIAL VERSUS IMMATERIAL DICHOTOMY: THE TERRITORIALIZATION OF INTANGIBLE HERITAGE AS URBAN ENTREPRENEURIALISM

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INTRODUCTION

Flamenco has its own and characteristic artistic expressions such as “duende flamenco”, an expression that is difficult to perceive, since duende is something to be felt, which touches the emotional. Poet Federico García Lorca states that *duende* is a power and not an action, it is a struggle and not a thought: “it is not a matter of faculty, but of a true style of life; that is, of very ancient culture, of creation in action”.¹ We can look at flamenco, an Andalusian cultural manifestation with gypsy roots, through duende and its intangibility. Vilém Flusser,² furthermore, states that there is no separation between material and intangible, which leads us to the connections that heritage studies establish between intangible and physical heritage. Our hypothesis seeks to understand manifestations of the intangible and its links with historical territories, using as an object of study resonances of flamenco about Triana, in Sevilla, southern Spain, considering that the material versus immaterial dichotomy reaches high complexity and goes beyond traditional layers of information. Sevilla has flamenco as one of its main tourist attractions and in Triana, consequently, one of the supposed most of its original destinations, thus being placed as a global commodity. In our assumptions, this neighbourhood is a place for the sale of “pure flamenco” shows in privatized spaces that use a distant echo of what this heritage really means. However, duende is missing there, and this void is also visible in the thematization of these spaces, which makes this kind of tourism an estrangement for the locals in their own city. As this is a tourist city that offers unique intangible values, as well as historical sites in constant preservation, the question that arises is: Is it possible to separate material and intangible?

THE CURRENT ANTHROPOLOGICAL CONCEPTION OF CULTURE

Regarding urban development, it is important to emphasize that its intangible dimension is complementary to its built part, and it is important to consider these dimensions inseparable. All material testimony has an intangible dimension, as well as the reverse: all immaterial testimony has a tactile dimension, revealing itself by materiality, by the hand of man who unveils his knowledge, by the space where the activities take place, by the nature, which is appropriates and modifies, by the objects it owns.

However, what is often present in the debate points to the Material versus Immaterial dichotomy, especially in the field of knowledge of Cultural Heritage. Vilém Flusser points out the need to discuss the distorted concept of immateriality for the correct understanding of an element in its entirety. According to him, the material is what fills forms. With the development of the sciences, the theoretical perspective entered a dialectical relationship with the sensorial perspective (observation - theory - experiment) which led to a materialism for which matter is reality. Flusser puts here the original opposition between matter and form where, for example, what can be seen is wood in the shape of a table. It is true that the wood is hard, one can trip over it, but the shape of the table is eternal. Thus, the shape of the table is real, and its content is only apparent. If form is understood as the opposite of matter, then one cannot speak of material design. If form is the how of matter and matter is the what of form, then drawing is one of the methods of shaping matter and making it appear as it appears and not otherwise. Design, like all cultural expressions, shows that matter does not appear if it is not informed and thus, once informed, it begins to manifest itself as a phenomenon. Therefore, if we pursue the material versus immaterial dichotomy, concerning the ceramic brick, for example, we have accumulated practices and knowledge that led the brick to become a brick. And what about the act of building the city? Going further, what if we think about the city not only from its material dimension, but also from its intangible dimension and the complementary relationship that these dimensions establish in the face of this same dichotomy?

We can understand the inseparability between the material and immaterial dimensions also when we analyse the city. With the intention of preserving the historical fabric, when turning to the exercise of categorization, would the urban development be harmed in its entirety? The ongoing debate around Cultural Heritage points to challenges regarding the preservation of Intangible Heritage, especially from the expansion of cultural consumer global markets. The profusion of symbolic-cultural goods and services in this context has provoked the homogenization and standardization of symbolic universes and identity codes,³ as well as the urban environment, especially regarding the city's entrepreneurial processes.

Intangible Heritage

So how to deal with the specific issues that make up the intangible? The field of the Cultural Heritage preservation presents this discussion in the face of different categories of heritage divided into Material Heritage and Intangible Heritage. It is possible to discuss whether in this area of knowledge there is a distorted concept of immateriality, starting with the consequences of categorization, the cognitive process of understanding the characteristics of objects by criteria of similarity or dissimilarity as an action intrinsic to the organization of knowledge records⁴. Therefore, the separation between two main categories, that of material heritage and that of intangible heritage, can lead to the distorted concept of immateriality by establishing a dialectical relationship between them. There is no brick without someone who makes it without considering the context in which it must be inserted. So, what to say about the city and its development?

Regarding Intangible Cultural Heritage, it is important to understand the criteria used in its patrimonialization process, which is directly related to the intangible city. One of them is the Collective aspect, which means that there are no safeguard actions aimed only at individuals. Another is generational transmission, which concerns the processes of transmission of knowledge, techniques, meanings, memories, and values associated with the cultural element, from the oldest to the youngest. And, finally, the dynamic conception of these cultural elements, which means incorporating into the traditional field of heritage the dimension of the present, of living cultural practices, of everyday life, of synchrony. The debate around a modern anthropological view of culture is recent, in which affective values and subjective links are considered for the classification of cultural elements, in contrast to

decades of preservation policies that privileged material elements.⁵ The Convention for the Safeguarding of Intangible Cultural Heritage⁶, promoted by UNESCO in 2003, strengthened a debate that was already taking place in this regard. It was clearly intended to fill a gap about preservation of cultural heritage, as intangible cultural expressions could not be safeguarded through the existing international legal instruments.

The division between two different categories of heritage, however, highlighted the dichotomy between material and immaterial, in addition to the emergence of other debates, such as the natural and the cultural. The current discussion on Cultural Heritage considers that all categories are part of a set in which their different meanings are articulated in a living and dynamic whole. In addition to the parts that make up the whole, when considering as intangible cultural heritage the practices, representations, expressions, knowledge and skills that communities, groups and, where appropriate, individuals recognize as an integral part of their cultural heritage, constantly recreated by communities and groups according to their environment, their interaction with nature and their history, that is, when considering the intangible dimension of heritage, the debate also started to consider the processes that are part of its construction.⁷

TERRITORIALIZATION OF AN INTANGIBLE ELEMENT

One can make a reading of culture through the material dimension that space incorporates, one of the ways of recognizing the formation of an identity being its manifestation in the territory. Rogerio Haesbaert⁸ puts with one of the points on the formation of identity, from the cultural point of view, the contrast necessary for the creation of the figure of the other defined also by a spatial limit, which can be read as a border, which separates who is from the other side and has another identity. This feature may have been built internally or be the result of the glance that the other has over that group, with the geographic space being a potential reference for the demarcation of these borders. In this case, for Haesbaert, it is evident that these differentiations are biased by materiality, despite the notion of territory starting from the political dimension in which power relations define the concept. It is important to emphasize that geography today incorporates the very symbolic dimension of power, a clear example being the classic definition of territory as a nation-state, in which the idea of national territory is created from a common identity for all who live in those countries' limits, an identity often created from an internal cultural homogeneity forged and constructed through hegemonic power.

If we think of other ways to capitalize on culture, we believe that, in the case of Flamenco in Seville, this heritage is being territorialized in the neighbourhood of Triana. The first signs of occupation date back to the twelfth century and today, the Muslim origin of the Triana suburb is true, based on the results of archaeological and geographical studies carried out there. It is important to emphasize the historical layers that this territory accumulates, as this helps to configure this landscape as an urban cultural landscape, that expresses traditions and values and forms a record of ongoing interactions between people and place. These interactions and the values they embody yield both tangible and intangible heritage.



Figure 1. View over Betis Street in Triana, Sevilla.

Along with being remembered for being the home of sailors and artisans, plus refuge for gypsies, Triana is considered the birthplace of Flamenco.⁹ Flamenco in Sevilla is mainly gypsy in its origin, and Triana is where flamenco artists lived for a long time, until they were expelled. They had been living there for perhaps four centuries in an example of coexistence and integration, but at the end of the fifties of the last century their expulsion was determined.¹⁰ Today, Triana is placed by tourist discourses as the birthplace of flamenco, but little is said about the processes of speculation that it faces, especially regarding the use of flamenco in particular, an intangible heritage, as its impetus. Triana is sold as an original Flamenco territory in the context of tourism in Andalucía and participates in a process of urban entrepreneurialism about the thematization of the landscape.

Urban entrepreneurialism

There are many examples of landscape thematization linked to touristification processes, and one of the aspects of this commodification concerns Urban Entrepreneurialism. Sevilla, elected creative city of music by UNESCO in 2006, has Flamenco as one of its main tourist attractions and in Triana, one of the supposed most of its authentic destinations, thus being placed as a global commodity. In our assumptions, this neighbourhood is a place for the sale of “pure Flamenco” shows in privatized spaces that use a distant echo of what this heritage really means. However, the *duende* is missing there, and this void is also visible in the thematization of these spaces, which makes this kind of tourism an estrangement for the locals in their own city.



Figure 2. Daily flamenco show poster of Tablado Pura Esencia (Pure Essence) located in Triana.



Figure 3. Show poster of "Pure Flamenco" in Triana.

The depiction of Flamenco as we see it today began at the end of the 19th century, when there was an attempt to emulate domestic environments in the presentations, since it is an art that emerged in family environments with clear respect for a tradition. As Flamenco was institutionalized as an Intangible Cultural Heritage, its vernacular character, linked to the domestic, intimate environment, was tarnished. What exists today is a representative discourse of a fiction about Flamenco that is intended to be global, homogeneous, without a context of origin, saleable in all respects.¹¹ Even so, words that refer to the sense of authenticity are used in tourist discourses, especially when linked to the Triana neighborhood, as can be seen in graphic pieces of dance shows and websites about guided tours.

In view of this panorama, this research considers the concept of Urbanization, coined by Francesc Muñoz¹² which concerns the banal urbanization of the territory, from the indistinct repetition of similar aspects in different places, causing different cities to establish similar references, characterizing the urban forms and functions of the contemporary city. Three simultaneous processes define the term Urbanization. One of them is the economic and functional specialization that reduces the diversity of activities, which nullifies the complexity of the urban fabric of relationships, resulting in the homogenization of the human landscape as well. Another process is the morphological segregation of urban space. The new mapping of functions creates islands of specialized functioning without interrelationships, separated by barriers and discontinuities, both physical and virtual, which make it difficult to find the diversity and complexity of urban space. The consequences of the two processes result in the third, which is the thematization of the city landscape, like the “Disneyfication” pointed out by David Harvey.¹³ In other words, the local uniqueness stems from the characteristics gathered as Cultural Heritage, which are architectural, urban and intangible characteristics. The aspect of homogeneity, in turn, concerns the character of synthesis of these same cultural elements that the interventions promote, reducing meanings to the possibility of consumption.

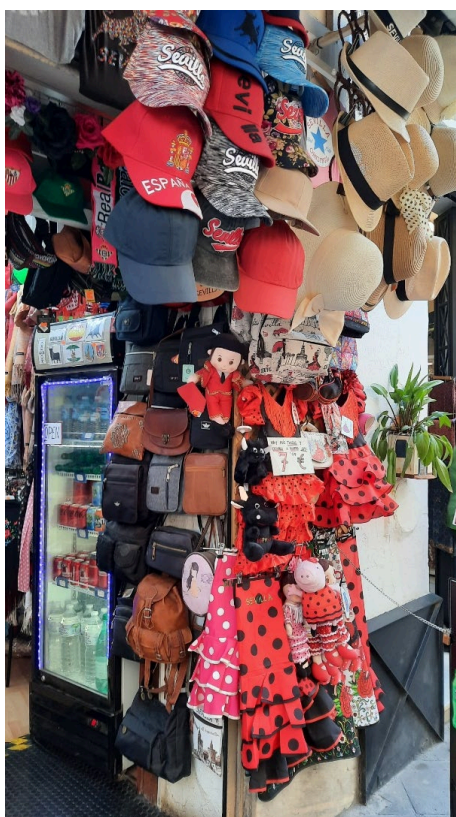


Figure 4. Sale of tourist products in stores in Seville with elements that refer to Flamenco

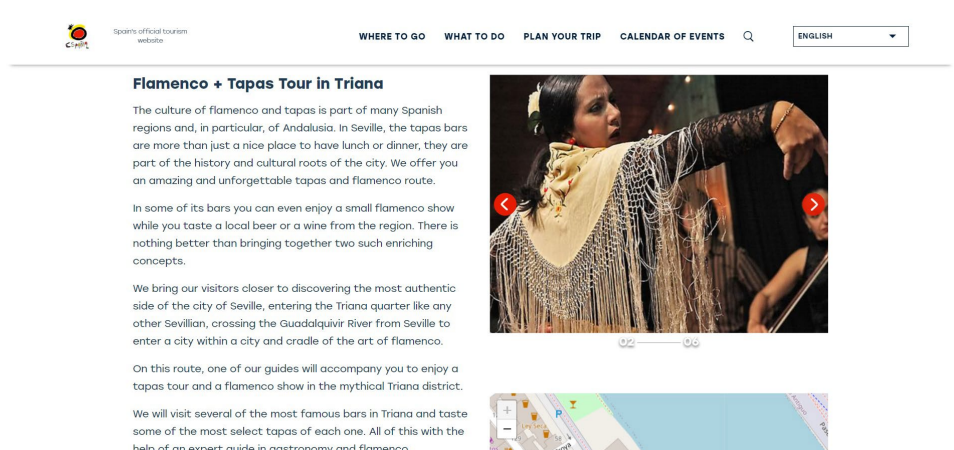


Figure 5. Spain's official tourism website, one of those who offer tour in Triana.

CONCLUSION

Finally, there is an ongoing process that builds a materialized version of intangible heritage which is territorialized as urban entrepreneurialism. There are many examples of landscape thematization linked to touristification processes, but what is being highlighted here is the intangible heritage as the main inducer of this process. This concerns the already much discussed culture as a commodity where there is a widespread belief that there is something special about cultural products and events, existing on some higher plane of human creativity and meaning than that located in the factories of mass production and consumption. Elements of intangible heritage, when institutionalized through preservation practices, are captured by the city's entrepreneurial processes by undergoing a simplification for quick consumption. This same process is verified in the territorialization of cultural elements in historical places, which contributes to a discourse that supports tourist practices.

As for the material versus immaterial dichotomy, what can be concluded is that preservation practices, by not considering a heritage element in its entirety, with the insistence on the division into categories that obey a dialectical logic based on the materiality of the elements, make it possible for the immaterialities are apprehended by mass cultural tourism. These intangible elements are often converted into attractions that in many cases do not match the original heritage context from which they were taken while weakens their preservation.

NOTES

¹ Federico García Lorca, *Juego y teoría del duende. Obras completas* (Madrid: Aguilar, Tomo III, 1986).

² Vilém Flusser, *O mundo codificado: por uma filosofia do design e da comunicação*, comp. Rafael Cardoso (São Paulo: Ubu Editora, 2017), 25-27.

³ It is interesting to observe the presence of discourses and practices already determined on the territory, especially regarding cultural tourism, which often has predetermined routes according to programmed and codified consumption. Manuel Delgado, *La No-Ciudad come ciudad absoluta, No Ciudad* (Sileno, 2003), 14-15.

⁴ The categories as instruments of analysis serve the understanding of the world and work if seen as part of a systemic work, which leads to an integrated understanding of the objects they contain. Two points can be highlighted here, one of them being the fact that the categorization process is based on the knowledge of the world of those who perform it and, finally, allows the reduction of complexity, organization, and representation of human knowledge. Mario Guido Barité, "Las categorías: Aportes para una revisión conceptual y metodológica," *Cadernos da F.F.C.*, no. 7 (1-2) (1998), 77-96.

⁵ Ulpiano Toledo Bezerra de Meneses, "O campo do patrimônio cultural: uma revisão de premissas" (paper presented at I Fórum Nacional do Patrimônio Cultural, Brasília, DF, 2009), 25-39.

⁶ The Convention listed as objectives the safeguarding of intangible cultural heritage; respect for the intangible cultural heritage of the communities, groups and individuals involved; raising awareness at local, national, and international levels of the importance of intangible cultural heritage and its reciprocal appreciation; besides international cooperation and assistance. UNESCO, Convention for the Safeguarding of the Intangible Cultural (Paris, 2003), <https://ich.unesco.org/doc/src/01852-EN.pdf>

⁷ Other concepts also faced an evolution in this sense, such as the cultural landscape, in which one tries to overcome other dichotomies, such as nature versus human intervention, in addition to the landscape as an accumulation of times. Rafael Winter Ribeiro, "Paisagem cultural urbana e paisagem histórica urbana: o Rio de Janeiro e os desafios recentes para a lista do patrimônio mundial," *Identidades: territorio, cultura, patrimonio*, no. 6 (2016).

⁸ Rogério Haesbaert, "Da desterritorialização à multiterritorialidade" (paper presented at X Encontro de Geógrafos da América Latina, São Paulo, Universidade de São Paulo, 2005).

⁹ It is important to point out that, just as the exact origin of Flamenco is not known, there is also no way to say for sure its place of birth. Sevilla disputes the title of birthplace of Flamenco with other cities in the south of Andalusia, such as Jerez da Frontera, which will build, as a result of an international competition, the City of Flamenco, consisting of a museum, school and research centre.

¹⁰ There are reports that there was a great expulsion of Roma from Triana in the 1950s to exile in ghettos and suburbs on the outskirts of Seville, having been taken to a neighborhood where, even today, impoverishment, social marginalization and cultural decay prevail. Andrea Kaiser Granada, "Triana: relato de un exilio forzoso," *GranadaHoy*, August 05, 2014. https://www.gradahoy.com/ocio/Triana-relato-exilio-forzoso_0_831817330.html

¹¹ Iván Perriáñez Bolaño. "Discursos y representaciones locales sobre la patrimonialización del flamenco en Andalucía, un proceso multinivel." *Revista de Antropología Social*, 28(1), 71-93, (2019). <https://doi.org/10.5209/RASO.63767>

¹² Francesc Muñoz, *Urbanización. Paisajes comunes, lugares globales*. (Barcelona: Gustavo Gili, 2008).

¹³ David Harvey, *A Produção Capitalista do Espaço*. (SP: Annablume, 2005), 217-237.

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BETWEEN PERMANENCE AND CHANGE – THE LIVING-MUSEUM OF *FÁBRICA DE CONSERVAS PINHAIS & Cia. Lda.* FROM MATOSINHOS (PORTUGAL)

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INTRODUCTION

In order to address the issue of the living-museum of the *Fábrica de Conservas Pinhais & Cia. Lda.*, we consider necessary the urban and historical framework that the factory occupies in the city of Matosinhos. Such a process allows us to understand the transformations holistically of the factory's image, identity and changes in its tangible/intangible attributes and the construction, management and orientation of the Living Museum.

From sand to urban land

The expansion and development of Matosinhos is attributed to the construction of the *Leixões* seaport (1895).¹ This port, initially designed to shelter navigation was adapted for commercial exploitation, due to the economic potential of the maritime market and the navigation problems of *Douro* river.² In what has become, today, the southern part of Matosinhos,³ there was an extensive sandy terrain⁴ and a hippodrome that ceased its activity in 1883.⁵



Figure 1 – «Planta da parte da Villa de Mattozinhos compreendida entre a praia de banhos e o forte do Queijo», c.1896, Eng. Licínio Guimarães

The economic attractiveness of the *Leixões* seaport and the characteristic of the unbuilt space, encouraged the urban expansion and growth of Matosinhos to south,⁶ giving rise to the first small industries in the late nineteenth century, including small salting warehouses and, later, larger industries such as *Armazém da Real Vinícola* (1898). The author Guilherme Vaz, states that the factories and warehouses helped define the design of the streets.⁷ The existence of a community with an enormous fishing tradition, the lack of a large canning center in the north of Portugal and the proximity to *Leixões* seaport are identified as factors that explain the considerable and growing number of salting warehouses and canning factories that have developed in the area.⁸



Figure 2 – Cartão de Visita da Real Vinícola, com vista para o alçado sul do armazém e da rua D. João I, (c.1900)

The *Pinhais* factory

In 1920, António Rodrigues Pinto Pinhal⁹ founded one salting warehouse (still present today in Avenida Serpa Pinto) whose commercial success lead him, in 1923, to build the *Fábrica de Conservas Pinhais*, adopting a new conservation process.¹⁰ The design and architectural project for the factory was commissioned to the architect Joaquim Neves.



Figure 3 – Vista exterior da Fábrica de Conservas Pinhais & Cª Lda.(1939)

The choice of the site for the *Pinhais* factory may have been influenced by the vacant land in the southern area of Matosinhos and the existence of other canneries to the north, such as *Paramos L^a* (1918) and *Boa Nova* (1920). After the construction of the *Pinhais* factory, we identified the building of the *Padrão* (1927); *Joana D'Arc* (c.1931-32) and *Vasco da Gama* (1939) factories, to the north, *Marques Gomes* (1928); *Marques Neves* (1940) and *Júdice Fialho* (c.1940-45) factories, on the south. The *Pinhais* factory was thus inserted in an industrial area that was developed between 1918 and 1945. Of considerable size, the main facade of the factory (facing Avenida Menéres), is composed of an extensive longitudinal body, broken by two vertical bodies, standing out from the architectural forms of the urban surroundings. As for the plant, with eight buildings, the distribution was designed according to the operational logistics of a canning factory, containing spaces for administration, canning, sardine heading, ovens, and equipment sanitation, guaranteeing the traditional production of canned food. It seems to us that there was a strong intention by the architect Joaquim Neves to reinforce the architectural plasticity on the main façade, as a way to demonstrate the power, strength and status of the new factory.¹¹

Due of its commercial success, in 1927 the plant machinery was improved and renewed, and, in 1945, with the end of World War II, the facilities were again expanded, reaching the current organization.¹² Between 1921 and 1945, the factory created several canned food brands¹³ that conquered the national and international markets due to the quality of the process in the preparation of the canned food, especially *Nuri* and *Pinhais*.¹⁴



Figure 4 – Project for the enlargement and remodeling of *Fábrica de Conservas Pinhais & C^a Lda.* - Cross sections, elevations and plant The black line represents the shape of the factory when it was built in 1923, and the red line the project for its expansion in 1945



Figure 5 – Canning sardines, interior view of the *Pinhais* factory (c.1939)

Due to a huge financial crisis, the lack of sardines, the instability in the canning sector and high production costs, from the 1950s to the 1990s, part of the canning factories in Matosinhos gradually closed down, became ruined or were demolished in order to build large buildings in response to new demographic needs and urban planning.¹⁵ Between 1990 and 2010, for example, the architecture of old factories was appropriated for new purposes, as in the case of *Dias, Araújo & Comp. Lda.* adapted for a shopping center,¹⁶ or the old *Real Vinícola*, now *Casa da Arquitetura*, a cultural space dedicated for architecture. The *Pinhais* factory, despite economic difficulties, being surrounded by cannery ruins, and the different pressures of urban expansion policies, has maintained its activity uninterruptedly, becoming a living symbol of the city's industrial memory.

The living-museum

In 2007, by initiative of the Matosinhos City Hall, a proposal was made to create a "living-museum" inside the *Pinhais* factory.¹⁷ The measure was justified by the symbolism and historical importance of the factory for the city and by the progressive loss of the industrial memory of Matosinhos. The "living-museum" idea, consists of a museum space, integrated in one of the internal side parts of the factory, with the principle of exploring the factory history for cultural and touristic purposes. Although with a favorable opinion, the idea remained suspended, because between 2008 and 2009, the *Pinhais* factory presented financial problems, resulting from the crisis in the canning sector in Portugal due to competition from the canneries located in Morocco.¹⁸

During 2013/14, when the new Municipal Master Plan was being defined (made official in 2019), the Matosinhos Sul area is considered the part with the greatest expression of industrial memory still existing in the city due to the large amount of deactivated factories. Moreover, the area where the *Pinhais* factory is located was integrated in the "Urban Mesh and Axis" plan in the "Architectural Heritage Safeguard Areas"¹⁹ section, reinforcing the municipality's intentions to preserve the place.

In 2016, the Austrian company *Glatz*, bought the *Pinhais* factory. The link between the *Pinhais* factory and the *Glatz company*²⁰ was strengthened throughout the 20th century with the marketing of the *Nuri* brand, the main brand of canned sardines in sauces sold in the Austrian market. The risk of ending the supply of the *Nuri* brand can be understood as one of the various factors that justified the acquisition.

In 2020, in the celebration of the centennial of the *Pinhais* factory, the municipality and the *Glatz company*, appropriating the idea from 2007, considered that were met all the conditions for the creation of the "living-museum".

We identified that the growing historical interest in the factory and its heritage value to the city were reinforced by the cultural actions of the Matosinhos City Hall. Justifying this, we point out the publications referring to the theme – *Testemunhos da História, para um retrato de Matosinhos Contemporâneo* (2006) and *Memória da Indústria Conserveira de Matosinhos, Leça da Palmeira e Perafita* (2008); as well as in the preparation of exhibitions - *Urbevoluções* (2018); *Sons do Património* (2019) and *As económicas do Mar, a Indústria Conserveira* (2021). We believe that these cultural measures have fostered the recognition of the historical value and identity by the community to the industrial heritage of Matosinhos, as well as the justification for its maintenance and safeguarding. An example of this, is the active voice from the community during the public discussion of the *Municipal Master Plan* for the *Matosinhos Sul* area, identifying the intention to protect the architectures of the old ruined factories, adapting them to new purposes and to ensure the continuity of the *Pinhais* factory.²¹ Recently, we have also verified an intention, by the stakeholders, to invest in new buildings in the city, using the spaces of the old canneries in ruins, keeping the architectural forms, as in the case of the *Prado*²² factory, in 2021. The action is in line with some examples of urban interventions applied in Manchester in the adaptation of old industrial spaces into housing places.²³

The designation "living-museum", in the context of industrial heritage, is susceptible of different readings. It can appear as a cultural process developed based on historical recreations, in a certain space

and period of time, around or inside a factory. We present the case of Black Country Living Museum, which, emerging as a local cultural measure of industrial museums, they represent different ways of living and working during the industrial revolution.²⁴ The idea has expanded, making Black Country a destination for an audience interested in reliving a staged approach to the era.²⁵



Figure 6 – Frame from the Visit Black Country Living Museum promotional video

We understand that the designation "living-museum", applied to *Pinhais* factory, fits the definition that Paul Smith attributes in 2017 to industrial heritage. According to the author, the designation "living-museum" is defined by the action of creating a museum in an active factory, being an appealing process for its simplicity and satisfactory at a cultural and tourist level,²⁶ giving examples of this application in the *Usine D'aiguilles et D'épingles* (Saint-Sulpice-sur-Risle). This is a creative way to preserve the Genius Loci and the industrial memory, capable of turning the factories into a new cultural symbol in the place where they are located, reinforcing their value of authenticity.²⁷ We can also frame the designation "living-museum" in the approach exposed by Guilherme d'Oliveira Martins, according to the principle of understanding cultural heritage as a living reality.²⁸ Such a concept allows us to delve into new questions that are not limited to the historical narrative of the factory, such as its importance for the city²⁹ or signaling the transformations of the place in the diachrony.³⁰

The "living-museum" of the *Pinhais* factory has been given the name *Conservas Pinhais Factory Tour*. The investment, in 2020, was "over two million euros, with community funding of over 900 thousand euros",³¹ since besides the integration of the museum in the factory, cleaning works and adaptation of the architecture, in some spaces, for people with reduced mobility were carried out. At the same time that minor changes were being made to integrate the museum, on April 7, 2021, *Pinhais* was classified as an *Imóvel de Interesse Municipal* (Municipal Interest Property), granting a legal status of protection to its tangible and intangible attributes without conditioning its industrial activity. The factory museum has a reception room, an audiovisual room and a room for educational/recreational activities. The program offered, aims to convey the tangible and intangible values of the factory and industrial heritage of Matosinhos, allowing the active participation of the visiting public in workshops and cultural sessions, strengthening the local heritage education, being important principles for a mediation space.³³



Figure 7 – Pinhais Plant in the execution of works and maintenance for the integration of the living - museum



Figure 8 – Entrance to the plant's living museum



Figure 9 – Exhibition Hall of the Living Factory Museum

There is also the possibility for the public to move around the various areas of the factory, so that they can observe the different phases of canning production.³⁴ As happens in Portugal with the *Vista Alegre* (Ílhavo) and *Viarco* (São João da Madeira) factories, the "living-museum" of the *Pinhais* factory, taking advantage of tourist activity, explores its image,³⁵ canned brands and historical relationship with the town and community, promoting its interest at a national and international level,³⁶ attracting new stakeholders.³⁷ In October 2021, the *Conservas Pinhais Factory Tour* officially opened to the public.

CONCLUSION

Already counting a considerable number of visitors and having recently received the *Tripadvisor Travelers' Choice Award* (2022), the living museum of the factory has become a mandatory stop for tourism in Matosinhos. The conjugation between heritage safeguarding, branding and continuity of the industrial activity, demonstrate, not an organic idea on the organization between museum-factory, but a fluid construction that respects its history and the city, bringing new economic assets and allowing the integration of the different communities that visit the living-museum to the industrial reality of Matosinhos. Thus, the *Pinhais* cannery is today a tangible symbol of the permanence and resistance of the local industrial memory and its intangible dimensions.

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- ³ Guilherme Vaz, *Companhia Vinícola Portuguesa: Continuidade e Mudança em Matosinhos Sul*, (Porto, Universidade Lusófona do Porto, Maio de 2020), 65-74.
- ⁴ The place had several designations according to local authors, listing: Areal do Prado, Areal do Senhor do Prado, Areal do Espinheiro or Areal do Senhor do Padrão.
- ⁵ The Oporto Hippodrome, belonging to the Oporto Jockey Club, was built in 1875.
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- ⁷ Vaz, *Companhia Vinícola Portuguesa: Continuidade e Mudança em Matosinhos Sul*, 65-69.
- ⁸ Josué Tato, *Memória da Indústria Conserveira de Matosinhos, Leça da Palmeira e Perafita – 1899-2007* (Matosinhos, Câmara Municipal de Matosinhos, 2008), 230.
- ⁹ Born in Espinho (Portugal) on March 1st 1882, he moved to Matosinhos in 1910, at Rua Teixeira de Melo (now Rua Heróis de França), nº483, in a two-story house, whose lower floor was a fish salting warehouse. It was integrated in the *Sociedade de Pesca A Pescadora* on August 28. After the construction of the *Salazones* salting warehouse (1920), he founds and builds the *Pinhais* factory, delivering the factory project to the architect Joaquim Neves.
- ¹⁰ Josué Tato, *Memória da Indústria Conserveira de Matosinhos, Leça da Palmeira e Perafita – 1899-2007* (Matosinhos, Câmara Municipal de Matosinhos, 2008), 150-153.
- ¹¹ The design of the main façade of *Pinhais* may have influenced other factories that appeared later, as in the case of the *Joana D'Arc* cannery (c.1931-32).
- ¹² Jorge Amorim, *António Pinhal Júnior* (Matosinhos, Câmara Municipal de Matosinhos. 2004), 34.
- ¹³ We list some of the trademarks registered by the *Pinhais* factory: Anteo; Amourette; Buzon; Cibeles; Cisne; Cometa; Edusa; Hebe; Hio; Les Ailes; Mabuti; Marinheiro; Mascato; Matapan; Matusa; Nuri; P; Pescador; Pinhais; Rios; Sailor; Semper Idem; Yo and 10.
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TOWARDS A HOLISTIC DIGITAL RECORD SYSTEM OF A HERITAGE BUILDING IN JEDDAH HISTORICAL CITY, SAUDI ARABIA

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INTRODUCTION

Cultural heritage is the legacy of tangible artifacts and intangible features of a group or society that are transferred from past generations, maintained in the present, and granted for future generations to benefit from their advantages.¹ tangible heritage includes buildings, historical places, monuments, and artifacts,² while intangible heritage focuses on traditional festivals, ways of life, customs, traditional crafts, etc.³ In recent years, there is widespread interest in digitizing heritage information for preservation in various countries around the world. Even though the rapid development that the Kingdom of Saudi Arabia (KSA) is currently witnessing in the urban field, many heritage buildings suffer from a lack of attention and conservation.⁴ Therefore, there is a growing need to record heritage buildings using the latest technologies and approaches for preservation, documentation, and dissemination.

Documentation is one of the primary methods to provide meaning, understanding, definition, and recognition of cultural heritage values.⁵ In the past, traditional survey techniques methods were used for recording heritage buildings such as tape measures, pencil and paper for field notes, plumb bobs, and simple cameras.⁶ With the development of technology, new digital metric survey techniques have entered into the tools used to record structures such as laser scanners, digital photogrammetry, GPS units, and total stations technique.⁷ The new techniques can contribute to obtaining accurate records and acquiring a better understanding of heritage buildings.

Digital documentation assists to disseminate heritage data digitally in several ways. The significance of digital dissemination of cultural heritage is represented in:

- Its consideration as a social necessity to improve society's knowledge of the cultural heritage's importance
- Its capability to help to understand the danger that the antiquities are exposed
- Its ability to raise awareness about the care that must be provided.⁸ Enriching the scientific content in open digital sources
- It makes the data accessible to all demographics, which enables them to access it in the way that suits them.

There are various application methods of digital dissemination in the field of cultural heritage. These methods can be divided into computer-based applications,⁹ cloud-based applications,¹⁰ and web-based applications.¹¹

Heritage Building Information Modelling (HBIM) is a novel methodology that assists in documenting heritage buildings.¹² It can be utilized to create, preserve, document, and manage full engineering drawings and information of heritage buildings for a better understanding of the present condition of restoration, informing schedules, changes, renovations, conservation policies, and planning.¹³

As for Geographical information systems (GISs) are computer-assisted systems for capturing, storing, retrieving, analyzing, and displaying spatial data and can be used for heritage preservation.¹⁴ Historical Geographic Information Systems (HGIS) is the creation and use of a relational database of geographic historical information in a Geographic Information System (GIS).

This paper presents a research approach for creating a holistic heritage digital record system that integrates information about the tangible and intangible aspects of Shafei Mosque, a heritage building in Saudi Arabia. The purpose of this paper is to establish a framework to improve the recording process of the Shafei Mosque heritage building's tangible elements and intangible attributes to conserve and promote them locally and internationally in a digital format. This framework will help in seeking to achieve the direction of the vision of the Kingdom of Saudi Arabia's 2030 third-level goals assigned to the quality-of-life program in the culture and heritage sector.¹⁵ Such a framework relies upon the intense digitalization of the Shafei Mosque as part of a holistic digital platform for voluntary public records. This platform will include tangible and intangible data of the Shafei Mosque for digital documentation, digital reconstruction, and digital dissemination. Such a framework and platform are supported by novel fieldwork techniques such as digital photogrammetry and laser scanning in combination with intangible attributes acquired from archival records and documents from governmental, academic, and local parties. This framework for the future will ensure a flexible repetition of documentation and conservation of a unique data environment to be accessible digitally whenever, wherever, and whatever is needed.

Jeddah is a city in Saudi Arabia, where in 2014, UNESCO listed several buildings located in its historic district in the list of world cultural-historic buildings. Jeddah is a city of historical, economic, and commercial value. As it includes in its ancient area considerable concentrations of residential buildings, popular markets, mosques, and educational schools.¹⁶ However, many of these buildings suffer from a lack of attention and conservation.¹⁷ Therefore, there is a desperate need for documentation of heritage buildings for future management.

Some papers discussed the significance of digital documentation of Jeddah heritage buildings. Research to date has documented the Roshans, a Hijazi wooden window, by integrating image-based modeling and CAD modeling.¹⁸ However, the interior of the Roshan has not been documented due to limited and unsuitable technical tools used for capturing data in narrow corridors and areas under the wooden windows due to lighting conditions. Therefore, there is a need to integrate image-based and range-based techniques to overcome these limitations.

Another study by Baik stated that Jeddah Heritage Building Modelling can help in the decision-making process in heritage preservation.¹⁹ However, the role of HBIM can be enhanced by offering unlimited access to the historic site's information by using a cloud-based, web-based, and free open-sources content management system to get a better understanding and visualization experience.

In this paper, integration between many methods for recording heritage building information is needed to overcome the limitation of each method and to obtain better and more accurate records. A research approach for creating a holistic heritage digital record system that integrates information about the tangible and intangible aspects of a heritage building in Saudi Arabia will be presented. Another integration will be conducted between HBIM and HGIS to develop heritage buildings information dissemination by offering unlimited access of the historic information by using cloud-based GIS for analytics and visualization experience.

METHODOLOGY

The main goal is to create a digital record system that integrates information about the tangible (physical: dimensions, materials) and intangible (cultural: methods, skills, history) aspects of heritage buildings in Saudi Arabia, the final output will illustrate a framework for developing the recording process of heritage buildings. To use the created framework for the proposed holistic digital record, it will be required to nourish the models in digital platforms and to collect essential information from various resources which will be useful for documentation and dissemination. The integration of tangible and intangible information will help to contribute to improving the recording process to obtain precise records and obtain a deep understanding of heritage buildings. Therefore, the work started by collecting data from documentary research as secondary data and fieldwork as primary data to acquire rich, trusted, and precise information about heritage buildings' elements for the generation of a holistic digital record for digital dissemination through digital platforms as which will help for future management and decision-making (Figure 1).

In this paper, the selection of a suitable heritage building to establish a holistic digital record will be based upon four evaluation criteria identified from surveying the literature which are: significant values, unique structure, accessibility of the site, and availability of data. Also, after surveying the literature, data will be captured on-site by the most appropriate recording methods to capture information about historic buildings which are digital photogrammetry and laser scanner.

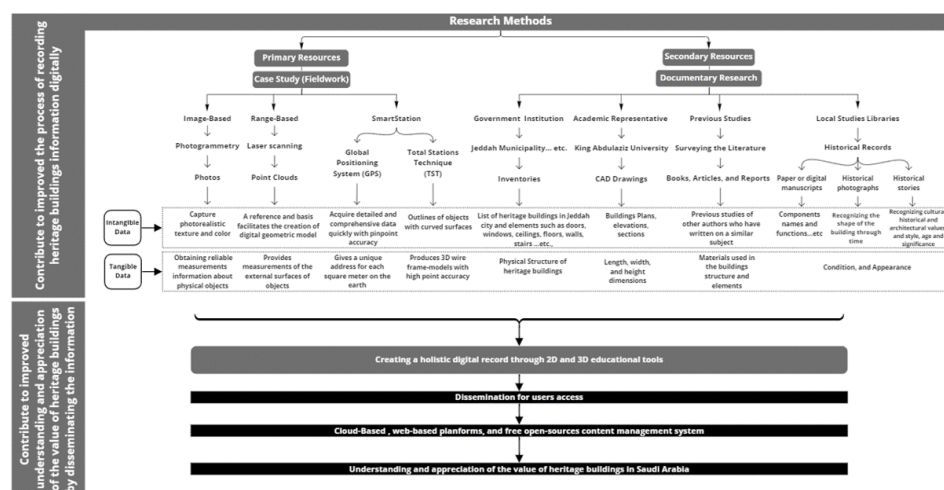


Figure 1. Methodology workflow

DATA ACQUISITIONS, PROCESSING, AND GENERATION OF A 3D MODEL

Based on evaluation criteria identified from surveying the literature Shafei mosque's minaret is selected to be the case study to fulfill the goal of this paper. The documentary research data is obtained from inventories from government institutions, CAD drawings from academic sources, surveying the literature, and Historical records from local studies. The fieldwork data is acquired by Close Range Photogrammetry (CRP) is represented in smartphone digital cameras and digital camera devices, Terrestrial Laser Scanning (TLS), Global Positioning System (GPS), and Total station technique (TST), in order to acquire detailed, reliable, and an accurate 3D point cloud of the Shafei mosque's minaret. The 3D points cloud was created by combining:

1. Videos, transferred into sequential photos in Adobe Premiere Pro Software
2. Archived images, both captured by two different digital camera devices
3. Points cloud extracted from laser scanners in Agisoft Metashape Pro software PhotoScan

The integration of the 3D points cloud from different tools is conducted in CloudCompare software to avoid the limitation of each tool to acquire a complete 3D model of the mosque based on a planned workflow (Figure 2). The integration of obtained tangible and intangible data with the created 3D model of a heritage building for digital documentation and dissemination purposes is discussed later in this paper.

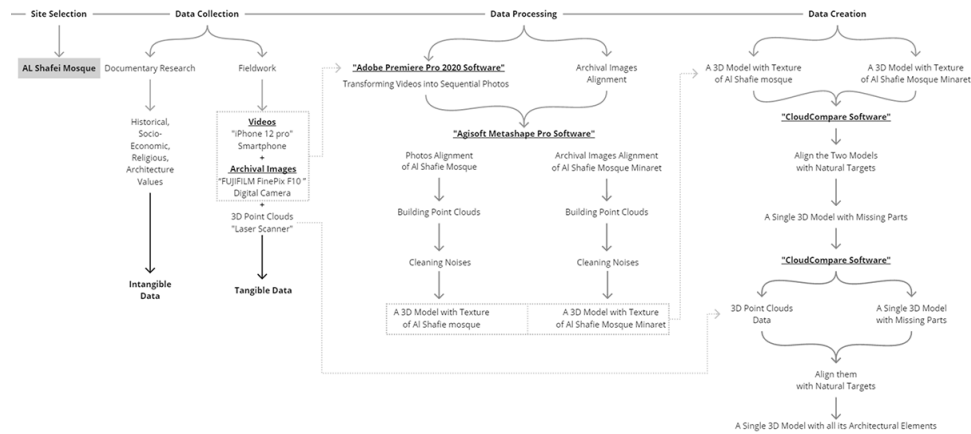


Figure 2. A Diagram Explanation of The General Workflow of Al Shafei Mosque

DIGITAL DOCUMENTATION OF HERITAGE BUILDINGS THROUGH BIM

In this paper, to create the 3D model of the Shafei mosque's minaret, it is required to identify and classify its architectural elements to get a detailed generic 3D model. For instance, the proposed mosque's minaret consists of three octagonal floors, a round cap surmounted by a crescent, two balconies surrounded by a wooden fence based on gradual rows of plain muqarnas beautifully shaped, "kandiliya" windows, and small doors.²⁰

The use of BIM approach is conducted to create a 3D model of the Shafei mosque's minaret using Autodesk Revit software, which can help in extracting geometric characteristics such as plans, sections, elevations, etc. from the 3D model, in addition to non-geometric characteristics such as descriptions from a particular time about the minaret present condition; which can be used as a reference for decision making about future work, such as research, investigation and/or conservation work (Figure 3).

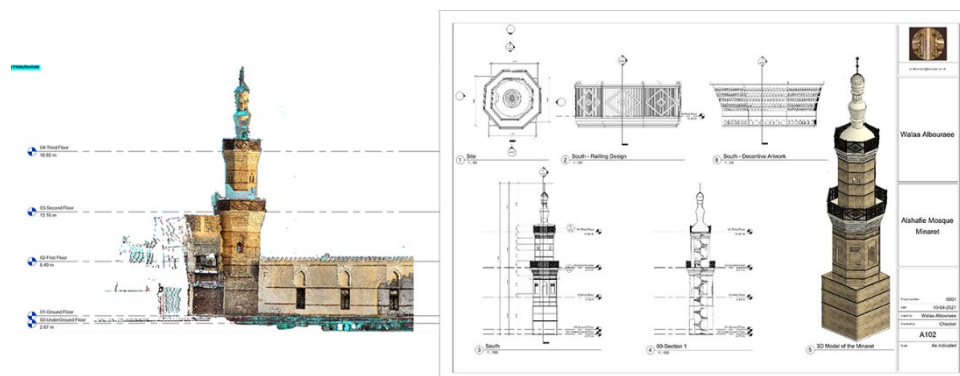


Figure 3. In the Right: A 3D Point Cloud Model of Shafei Mosque's Minaret; in the Left: A Generic 3D Model of Al Shafei Mosque's Minaret with its Architectural Drawings.

It is known that there are many digital libraries of architectural elements of various styles, however, these digital libraries only describe the physical aspects of the elements and neglect to explain the

heritage characteristics such as the history, experiences, and culture of its citizens, and do not show any spatial data for the building. Thus, there is a need to integrate the Historic Building Information Model (HBIM) and Geographic Information System (GIS) to obtain a comprehensive digital record that includes both tangible and intangible information in order to disseminate information for better understanding and appreciation of heritage buildings.

DIGITAL DISSEMINATION OF HERITAGE BUILDINGS DIGITAL DOCUMENTS THROUGH HBIM AND GIS INTEGRATION

The author of this research adopted cloud-based apps and web-based apps as digital dissemination strategies in free platforms with low-cost tools for:

- Sharing tangible and intangible cultural heritage data
- Spreading awareness and appreciation of the significance of data preserved digitally
- Allowing access to reach a larger audience of the community to increase public participation to improve digital records of the Shafei mosque's minaret. To do so, the integration of Heritage Building Information Modeling (BIM) with Geographical Information Systems (GIS) is needed.

Accordingly, in this paper, the integration of the BIM and GIS approach of the Shafei mosque's minaret to create a holistic digital recording system is conducted. Documented data are inserted in a map using a variety of layers. The Shafei mosque layers are created and precisely located on the map via the ArcGIS site (Figure 4).

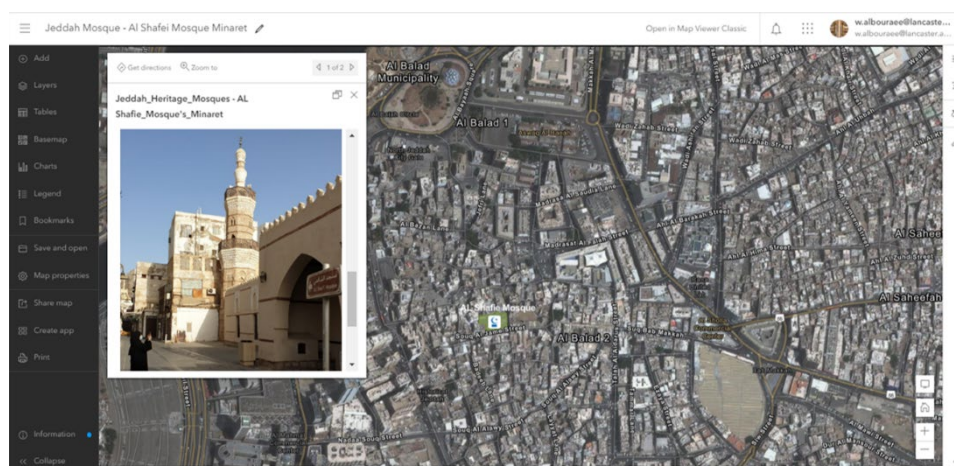


Figure 4. ArcGIS Layers of the Shafei Mosque's Minaret in a Map

Tangible and intangible information is then added as pop-ups, including text, images, and hyperlinks (Figure 5). This type of comprehensive approach allows for a better understanding of the building for future management and decision-making.

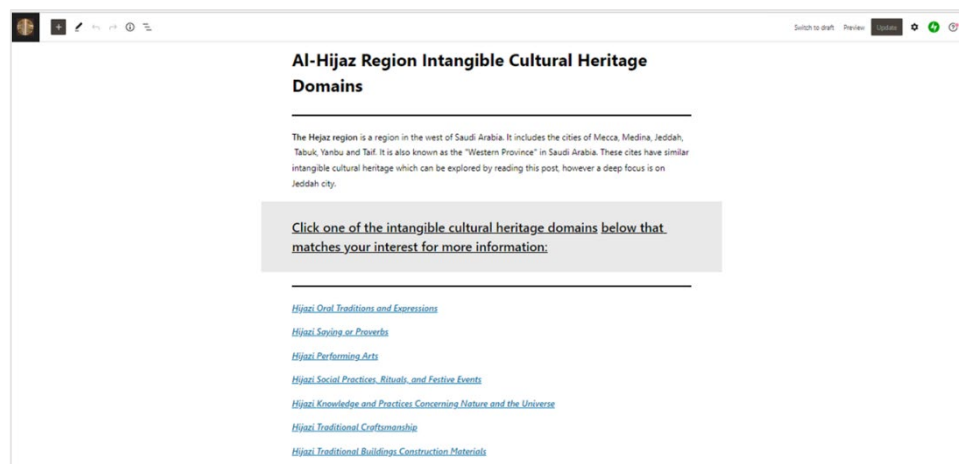


Figure 5. Hijazi Region Intangible Cultural Heritage Domains

ArcGIS StoryMaps is also used to create a story map of Al-Shafei mosque in Jeddah. The story of the mosque is entered, the building location, pictures, and information are added, and the story map is published to be available to the public for better understanding and appreciation of its heritage aspects, where it is presented in a unified digital record to provide access to all tangible and intangible information for Al-Shafei mosque. After publishing the story map of the mosque, a URL link for the building map is obtained. The story website can be also browsed through the smartphone apps on the record's website (Figure 6).



Figure 6. Story Map of the Shafei Mosque in Jeddah, Saudi Arabia

EXPERIMENTAL RESULTS

To create a comprehensive digital record system of heritage buildings by integrating their intangible and tangible heritage information there is a need to create a framework to improve the recording process for conservation and promotion locally and internationally in digital format. Based on the literature review, previous studies, methodologies, implementations, data acquisition, and data processing of a

selected case study in heritage building recording, a framework for creating a holistic digital record of a heritage building is drawn (Figure 7).

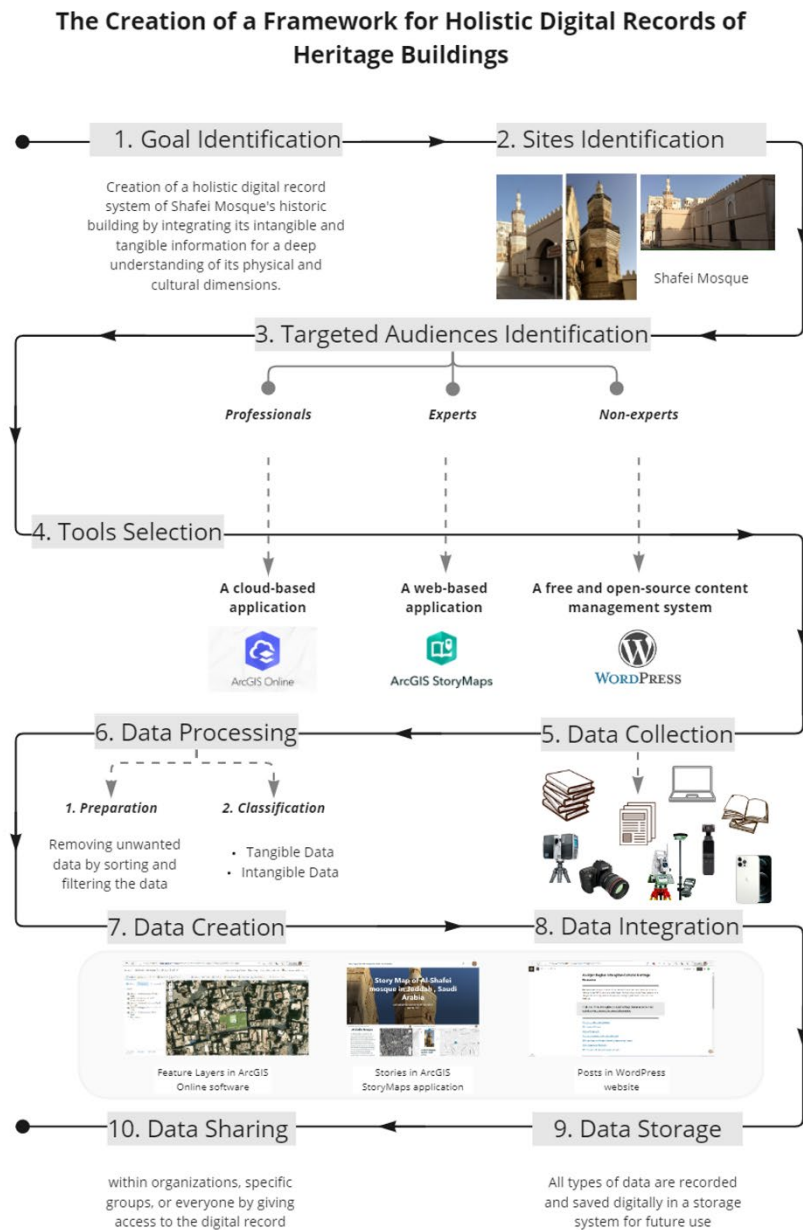


Figure 7. A Framework for Holistic Digital Record System of Heritage Buildings

The proposed framework stages started with the aim of creating a holistic digital record of a heritage building by integrating tangible and intangible information for a deep understanding of the physical and cultural dimensions of the building. A heritage building can be selected based on its historical, architectural, aesthetic, economic, cultural, and social values...etc. The identification of the targeted audience, who can benefit from this digital record, is divided into:

1. Professionals, such as architects, designers, archivists, archaeologists, and restorers
2. Experts, such as researchers, academics, and historians
3. Non-experts such as anyone interested in cultural heritage.

Then, tools need to be selected, that suit each targeted audience based on use availability, easy to access, free of charge, and low-cost tools including ArcGIS Online software, ArcGIS StoryMaps, and WordPress to create the holistic digital record of the Shafei mosque.

Then, data obtained from various sources should be collected such as documentary research from governmental institutions, academic representatives, previous studies, local libraries ...etc., and from data generated in varied formats based on the fieldwork stage whether visual or audible data including texts, images, videos, and hyperlinks...etc. As for data processing stage can be started with data preparation for cleaning the undesirable information by means of sorting and filtering, and then classifying the data into tangible and intangible data.

The holistic digital record of the heritage building can be created by integrating tangible and intangible data in diverse shapes on various platforms. The heritage building can be created as a feature layer in ArcGIS Online Software and its accurate location can be specified on the map. Then, its tangible and intangible data can be inserted as pop-ups, including texts, images, and hyperlinks for a better understanding of the building for future management and decision-making by professional users. Also, a story of a building can be created in the ArcGIS StoryMaps application to present a story map that provides access to all tangible and intangible information of the building to better understand and appreciate the heritage aspects within an integrated digital record of the building by expert users. A website can be generated by WordPress website, to allow information publication and dissemination to be accessible for better understanding and exploring the hidden heritage by non-expert users. Then, data can be stored digitally in each platform storage system for further utilization including dissemination among organizations, particular groups, or whoever needs it by providing access to the digital record for allowing voluntary public users to continue developing the created holistic digital record of historical buildings in term of remaining them updated for sustainable purposes.

CONCLUSION

The growing interest in digitizing tangible and intangible information about heritage buildings is a great opportunity for digital preservation, documentation, and dissemination. Using the latest technologies and approaches can play a significant role in digital documentation. However, each method used in heritage buildings for recording tangible and intangible data has its advantages and disadvantages. So, integration between several methods for recording heritage building information is recommended to overcome the restrictions of each method and to acquire better and more accurate records, as well as georeferenced and realistic 3D models. As seen by the Shafei mosque example, it would be useful to ensure that heritage buildings with large areas are thoroughly surveyed and studied to consider their future use either by the government or the researchers due to their significant values based on UNESCO regulations. It is also recommended to improve the use of the Historic Building Information Model (HBIM) by generating open access and interactive experience of the historical site's information by utilizing cloud-based, web-based, and free open-source contents management system to acquire better analytics and visualization experience.

Due to the lack of digital elements of Jeddah heritage buildings. It is valuable that such a digital library of architectural elements be created for the heritage buildings of Jeddah to be used for future works. It is also discovered that the digital record can be the first step toward a City Information Model. The Lancaster City Information Model (LCIM) project is an example that proves this ambition. The LCIM is an open-source web application that illustrates the 3D (LOD2) geospatial model of Lancaster City, Morecambe, Lancaster University, and Heysham.²¹ This project can be scalable by adding more tangible and intangible data including historical, cultural, social, economic, architectural, aesthetic, artisanry, religious, and environmental values of the landmark buildings and places. So, based on that, to develop this research it is recommended to build a Jeddah Historic City Information Model and,

eventually, even a Saudi Arabia Countrywide Information Model as an open web application that includes 3D geospatial models and their tangible and intangible aspects as a reference that assists for future investment before responding to changes, renovations, and repairs which will ensure avoiding any negative impact during the work. It is also can be scalable by allowing the participation of volunteer community members who can play an important role in the digital recording, where they can update and publish their recorded geographic information of a city by adding more variety of information which can help to observe the changes that occurred over time to the heritage buildings.

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RECONSTRUCTION OF ANCIENT SETTLEMENT OF AKROTIRI, THIRA IN 1613 BC IN THE CONTEXT OF AN INTEGRATED VIRTUAL REALITY SERIOUS GAME

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INTRODUCTION

In the recent past times, there has been a rapid increase in technology and in particular technological forms that were not widespread in previous times, such as virtual and augmented reality. One can notice, that the above-mentioned technologies are used in many areas of everyday life and more importantly, in cultural heritage. Virtual reality (VR) in particular is used both for entertainment, gaming, and for educational purposes through serious games¹ and virtual tours.

With the use of VR technology, we can simulate virtual museums, galleries, or cultural spaces without the need for the user visiting the physical place of the museum. Such a simulation is depicted in figure 1. Also, this is more fun and engaging for the users because they could follow a different path, interact with objects that are not accessible in the real world and play minigames which would not be possible throughout the visit in a physical attraction. A whole new world of endless potential lies ahead of us, in terms of the VR technology. The cultural heritage in many cases is no longer tangible and the objects or monuments are altered.

Within the scope of the project ActiVatoR,² which reconstructed some major events in Ancient Greek history, the collaboration of the Centre for Research and Technology Hellas (CERTH) and Noesis Science Center & Technology Museum resulted in the reconstruction of the settlement of Akrotiri in Thira. The final result is a VR serious game, which depicts the Akrotiri settlement during the Bronze Age of Greece and specifically in 1613 BC. This was the year of the famous Thira volcano eruption, which devastated the Akrotiri settlement alongside the Minoan Civilisation in Crete. The representation of the settlement focuses on the buildings of this era, the people's clothing, their everyday activities and finally the tools and household goods of that particular age. In order to achieve historical accuracy and realism, the development team followed a research approach conducted by the project partners, based on data provided by previous research works on this matter. In this paper we present a serious game that aims to immerse the player and deliver the original atmosphere in Akrotiri, a few moments before the volcanic eruption occurred, alongside with the event of the actual eruption. Our work focused specifically on reproducing to the user the true emotions of being in such a place and the way the people of that era dealt with such a horrific event. This paper describes the methodological approach that we followed in order to represent as accurately as possible the various cultural assets that are depicted in

the VR scene. It also provides preliminary evaluation results with respect to real players' immersion and usability.



Figure 2. An example of a typical virtual museum.³

THE RECONSTRUCTION PROCESS

The main challenge in any VR/serious game application, which aim at achieving the best possible historical accuracy and realism is the proper reconstruction of assets and displayable objects. This challenge gets even bigger when it comes to reconstructing the whole buildings, areas, monuments and cities. Luckily for us, there are high-end devices and technological equipment, we can use for a more realistic depiction of the place or a monument that will be reconstructed. The reconstruction can be done in various ways, more often, with the use of laser scanners, drones and also cameras including that of a smartphone. The more accurate the tools that will be used for the photos, the more similar to the real object, the three-dimensional model to be reproduced will be. With the process of reconstruction, damaged monuments or altered ones can be represented or built, in three-dimensional form, which in combination with VR gives the experience of a realistic depiction of monuments.

The reconstruction process follows three major steps described in the following sections. The first one is the historical research that we conducted in order to represent the Akrotiri Settlement with maximum historical accuracy. The second one is the 3D reconstruction procedure of several assets that will be later used in the development of the VR application. Finally, the last step is to assemble all the previously recreated assets and create the scene in a virtual space.

Historical Research

Before the so-called Minoan Eruption, the Akrotiri Settlement was part of a thriving civilisation, the Minoan Civilisation. It was one of the greatest ports of the Aegean Sea in the prehistoric era and reached its peak in the mid and later Bronze Age.⁴ The size of the settlement is about 200 acres, which is considered one of the large-scale settlements of the era. It had a very advanced and clean architectural structure and drainage system, elements that highlight the existence of a rich and wealthy town. Sadly, this settlement was devastated due to a great earthquake and the volcanic eruption that followed which happened sometime around 1650 B.C. This eruption was called later the Minoan Eruption, as it also led to the destruction of the Minoan Civilisation. The Akrotiri came to light when the professor Spyridon Marinatos began excavating the place in 1967.⁵ He chose to dig in the Akrotiri hoping to find evidence, in order to verify his old theory stating that the Minoan Eruption destroyed the Minoan Civilisation. Figure 2 shows the Akrotiri settlement as it is found and displayed at the site of the city.



Figure 3. The excavation site on the town of Akrotiri, Thira

In order to properly depict the story of Akrotiri, one should search the findings of the excavations and analyse them. Hopefully, many of the findings were preserved almost intact, revealing a variety of previously unknown aspects of this advanced civilisation. Buildings is definitely one of the most interesting findings and most of them were built out of fine, well compacted clay with rooftops made of hay. They were up to three floors in height and had windows and some of them, staircases. A great sample of a typical house is the so-called West House.⁶ It was named in such way because of its position on the settlement and features luxurious decorations on the interior. The decorations include wall paintings on the first floor, a common sample of wealth in prehistoric era, and a miniature frieze. There is also a room in this house which was used as a workshop featuring windows and more than 400 loom weights that has been found there.

The Akrotiri was a wealthy centre of trade back then, as shown by the great variety of amphorae found in many houses. Those amphorae depicted mostly ships, harbour and fishing activities on the outside, and were used as vessels for storing grain, liquids and metals.⁷ They were made out of clay, wood, stone and in some cases metal. Those findings were similar to vessels and amphorae found in Crete and other Mediterranean coastal settlements; thus, we can safely assume that people of Akrotiri mostly occupied with trading. Another finding which strongly supports this hypothesis, is a tablet with more than 200 textiles written in Linear A language. The tablet is assumed that belonged to a merchant and contains a list of items that the merchant ordered.

As mentioned before, the people of Akrotiri were relatively rich people occupied in trading, but there were also fishermen and potters. The presence of workshops in the settlement states the need for goods and supplies by the inhabitants. Those workshops manufactured mostly amphorae, clay pots, vases and hydrias, but there were some that manufactured metal objects and mostly jewels. The women of Akrotiri were among the well-dressed women of the era. They had long beautiful dresses and lots of jewellery such as earrings, rings and bracelets as shown in the many murals and amphorae.⁸

The settlement is located in the south-western of the Thera Island formerly known as Santorini nowadays. Someday around 1650 B.C. a great volcanic eruption following an earthquake with magnitude of seven, destroyed the settlement. People tried to leave the island taking with them as many

of their belongings as they could as the volcanic fumes and tephra covered the skies. The Minoan Eruption had just occurred covering the entire settlement in lava and tephra. That layer of volcanic material though, preserved the settlement as it was back then, leaving almost intact many findings that show us the life of those people. The eruption was so great that several remains of it found in trees in North America and eventually destroyed the entire Minoan Civilisation.

The 3D Reconstruction phase

Three-dimensional reconstruction is used quite often to more accurately capture objects and areas from the real world to the virtual world. It is used in many cases for applications of cultural interest, architectural purposes, and even serious games. The reason that this technique is quite useful, is because of the ability to recreate objects and places that have been destroyed or altered, in virtual form, only by using images. For the purposes of the ActiVatoR project, it was necessary to reconstruct the entire settlement of Akrotiri, from the houses and alleys to the ships and merchandise located in the port. This technique made us able to capture, with the greatest possible accuracy, the space where one of the largest volcanic eruptions in European history took place, in order for the user to gain maximum immersion and VR experience.

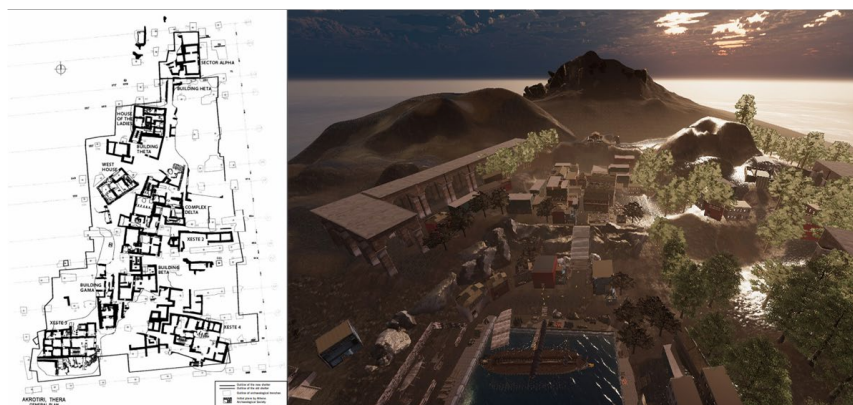


Figure 4. The plan of the city in the left side of the image and our design in the VR space on the left side of the image

First of all, the project represents the ancient Akrotiri settlement structure of 1650 BC in a realistic manner as shown in the figure 3. The alleys and roads were created based on the left side of the figure 3, which shows how the area was spatially shaped. On the right side of figure 3 the Akrotiri in VR space is depicted. To achieve that result, it was necessary to use some appropriate tools and techniques. First of all, to reconstruct the buildings, we had to use images of the area and houses of that era as references, and create new 3D graphic models, with the use of software tools such as Cinema 4D and Blender. Taking into account the historical research and the findings in Akrotiri from the houses of that time and area, the modelling process began in Cinema 4D tool. All materials,⁹ were designed and represented in this software from scratch. Initially, the purpose of the project was to find ready-made and third-party 3D assets that would fit the time and era. In this process though, we decided that it would be better to recreate our own assets because the already existing ones did not fit appropriately in the era of reference. Moreover, the third-party available assets could not accurately capture the objects to be represented. In

particular, for the houses, we made a representation of them, based on the information that existed, in terms of their physical characteristics, i.e., the height, the colours that existed at that time and the decorations they had. Wooden doors and windows were later positioned above the recreated models. A great sample of our work regarding house recreation is shown in figure 4.



Figure 5. A typical house in Akrotiri settlement

Except from the houses, the reconstruction of the settlement included pots, vases and amphorae that the people owned and used at that time, as well as the clothing of the inhabitants. According to historical reports, 3D amphorae of the time were constructed, in order to make user experience as realistic and immersive as possible. Such an amphorae is shown in figure 5. The same holds for the clothing which, also based on historical references, they were reconstructed so that they resembled as much as possible the clothes of the time. This mainly concerns the colours, the design and the length of the clothing. A fine sample of the women clothing of the era is depicted in figure 6. We also captured the physics of the clothing with great accuracy, so it can be presented in a VR environment. The clothes were designed in Cinema 4D and animated in the Blender software.



Figure 6. An amphorae of the Minoan Civilization

Finally, it is worth noting the reconstruction that took place on the ships of the era, as the Akrotiri settlement was mainly a trade station. First of all, three-dimensional models of the ships that existed at the time and more specifically the triremes were created. For the reconstruction of the ships, we used a technique called photogrammetry. The produced 3D model of that technique was very large in terms of polygon presence. To reduce the number of polygons of that ship, a technique called polygon reduction¹⁰ was used. Figure 7 depicts the ship after the polygon reduction procedure.

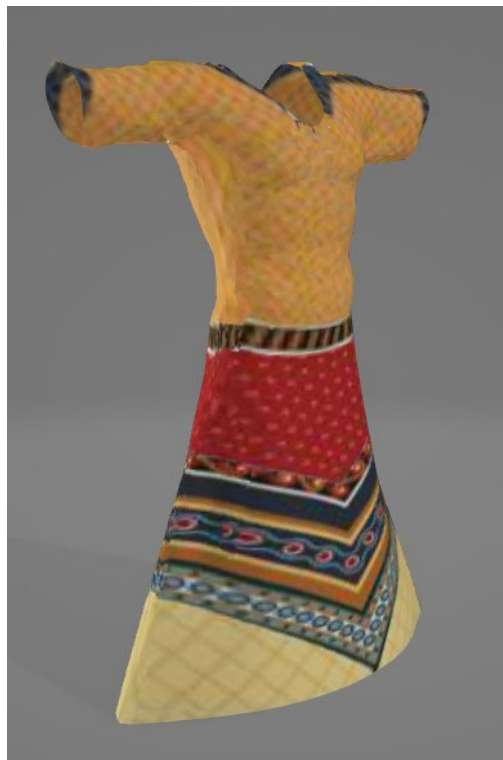


Figure 7. The reconstructed dress that women of Minoan Civilization used to wear



Figure 8. The reconstructed ship after the polygon reduction procedure

Akrotiri in VR

As mentioned in the Introduction section, this paper describes the reconstruction of Akrotiri Settlement in a VR space. The reconstructed assets represented in VR comprise a serious game for educational purposes. The Akrotiri settlement representation is one of the three interactive scenarios of the project ActiVatoR which is called “The first civilisation of Europe” and referred to the Minoan Civilisation based in Crete. The other scenarios are the Siege of Rhodes and the Antikythera Mechanism. The aim of this game is to educate the users through an immersive experience, about the life and customs of a people lived back on the days of prehistoric Thira Island. To construct and develop such a game we needed a game development platform and a VR headset. To this end, we used Unity3D and HTC Vive, respectively.

The player starts his/her journey in an alley placed on the northern edge of the settlement, as shown in figure 8. In front of them there is the avatar of a potter crafting an amphora. The player can move in any direction on the settlement and discover the life of the people there. All the way down the main path the player can view men and women of the era doing a lot of activities, such as fishing, pottery, doing construction works, and caring their babies. All the people are dressed according to the historical research we conducted and use pathfinding algorithms, in order to move in across the roads and alleys of the city. As the player moves down the main alley, they cross a big stairway leading to the port of the settlement. In the port there is the big ship which mentioned above and also several storage buildings. Furthermore, there are animals and people working at the docks there. When the player stands in the port, they get a task of getting into the amphorae storage room. The moment the player enters the storage room is the moment that the earthquake strikes and shortly after, the great volcano eruption is represented. Finally, after the big eruption, the player has to board on the ship and try to leave the island, watching the fumes and volcanic ashes darkening the sky. While the player explores the Akrotiri settlement small earthquakes occurring and their motion is represented by the motion platform simulator on which the VR serious games is installed. The large earthquake occurs, when the player enters the warehouse and produces a very powerful and intense movement.

The whole ActiVatoR project was tested by users of various age groups. The tests were based on six major axis including graphics, usability, sound quality, refresh rate, motion sickness and simulator

response. Most of the users found the project satisfyingly interesting and specifically the Akrotiri scenario. Many of the comments were talking about how thrilled they were by the big earthquake in this scenario and how it managed to deliver them the horrifying feeling of a volcanic eruption. There was also a very positive feedback on the graphics and the depiction of the Akrotiri in the VR space.

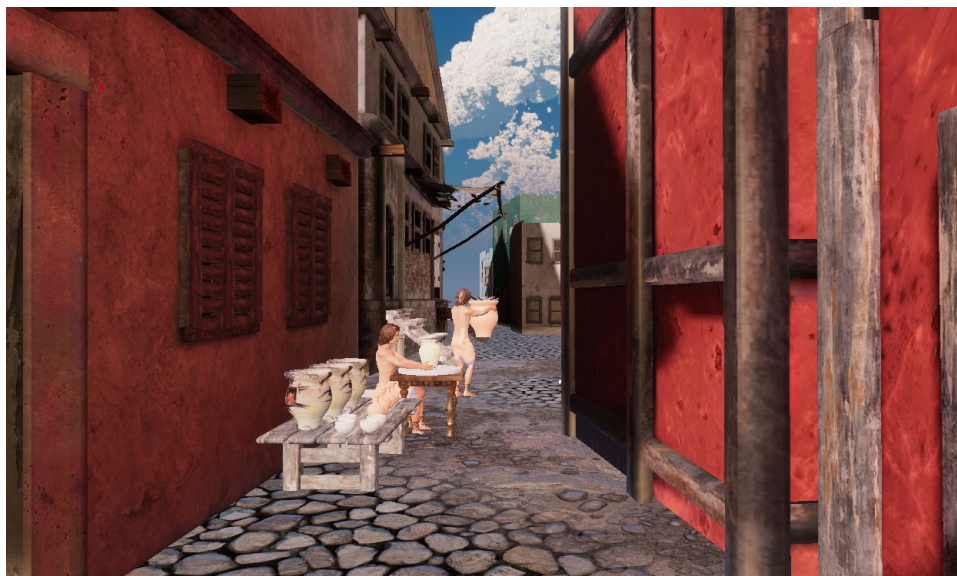


Figure 9. The starting point of the player in the VR environment of the game

CONCLUSION

This paper presented the process of reconstruction of Akrotiri settlement in Thira. We described the reconstruction process in general and presented the historical research, on which the whole reconstruction was based. The reconstruction process is a difficult task when it comes to the representation of historical places. We needed to be as accurate as possible, hence we conducted a thorough historical research in order to represent the details of the various digital objects as accurately as possible. The modeling process was also very important as we needed to represent specific details about the assets to be depicted. Thanks to the photogrammetry technology we were able to achieve maximum detail as we digitized the findings and assets. Finally, the development of the VR application was also a challenging task. It demanded thorough knowledge of software development and specifically game development. Furthermore, it required intense optimization in order to avoid motion sickness issues due to low framerate of the visual rendering. From our experience we realized that all this significant development effort was worthwhile, as we managed to achieve a realistic and immersive user experience, while achieving the educational objectives originally set regarding the acquisition of new knowledge about the historical context of the first European civilization, Akrotiri in Thira. Also, we noticed that the users were excited to live the experience of the volcano eruption, which resulted in the destruction of the Thira civilisation. This is an important outcome as it motivates users, especially youngsters to come across historical knowledge, through VR gaming experience. Our future work includes the development of more educational scenarios based on additional historical events.

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NOTES

¹ A serious game or applied game is a game designed for a primary purpose other than pure entertainment. The "serious" adjective is generally prepended to refer to video games used by industries like defense, education, scientific exploration, health care, emergency management, city planning, engineering, politics and art. Serious games are a subgenre of serious storytelling, where storytelling is applied "outside the context of entertainment, where the narration progresses as a sequence of patterns impressive in quality ... and is part of a thoughtful progress". The idea shares aspects with simulation generally, including flight simulation and medical simulation, but explicitly emphasizes the added pedagogical value of fun and competition.

(https://en.wikipedia.org/wiki/Serious_game)

² The project website for more information. (<https://activator-edk.gr/>)

³ The image is found on the web and coming from

(https://www.researchgate.net/publication/314522860_Inline_Co-Evolution_between_Users_and_Information_Presentation_for_Data_Exploration/figures?lo=1)

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THE ARCHAEOLOGICAL SIMULATION: BLENDING TIMES AND TIME TRAVEL THROUGH METAVERSE?

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INTRODUCTION

In 1992, Neal Stephenson published the science fiction novel "Snow Crash." The author wrote about the Metaverse, a collective virtual shared space accessed through virtual reality terminals. With Archaeological Simulation, users can live in such Metaverse, experience the simulation all together and export their thoughts directly to the archaeological debate. It is clear that the next step in the creation of these Metaverses will be the merging of 3D GIS and game platforms, making simulations more and more realistic over time. As digital social networks, these will have the potential for promoting effective innovation scenarios in the areas of archaeological research and cyberarchaeology. The following article suggests that creativity in the development of 3D interpretations allows researchers to explore an interstitial space where different times blend. The text presents the theoretical bases for the ongoing Archaeological Simulation project and some theoretical queries that can be responded by cyberarchaeology and its multidisciplinary research. It is then suggested that these technologies should be used, not only by researchers to simulate time traveling and (re)think about their contemporary world, but also by museums for the public experience as well.

ARCHAEOLOGY AND METAVERSE

During the first decade of 2000, roughly a million people turned to 'Second Life' to experience the 3D alternative reality. This included some archaeologists who sought the opportunity to expand their post-processual studies.¹ In short, users could interact with each other and create new versions of human societies on that platform. The term 'virtual reality' first originated during the Cold War,² but it was after the turn of the century that a new philosophical current roused: are you living in a computer simulation? Just as computer algorithms project hypotheses and surveys based on information collected in different databases, virtual simulations of the past are not *a priori* right or wrong representations, but rather emergent interpretations of the enactive process.³ The basic principle of past simulations is that perception and knowledge of virtual environments are governed by the same ecological approach as Gibson's for visual perception. Cybernetic simulation allows action possibilities offered by the submerged environment itself (affordances⁴) and, there, the relationships/perceptions between the researcher(s) and the simulated environment enhance the interpretation process. The virtual ontology⁵ of archaeological information, or the cybernetics of archaeology, refers to all the interconnected relationships that the datum produces, the transmission code and its transmissibility. The ability to

transmit knowledge and its interpretation depends on a complexity of several factors such as technology, format, accuracy, induction-deduction, communication, context, ontologies, among others. Are we aware of how much data can be produced and disseminated in this age? And how fast is this process?

We can define the Archaeological Simulation as a collective virtual shared space that, in practice, can be accessed by archaeologists and the general public all along in community.⁶ This means we can refer to it as a Metaverse.⁷ The significance of virtual reality research projects amid Covid-19 pandemic has gained increased visibility as big tech companies like Facebook (now Meta) and Microsoft started investing in new Metaverse-like platforms. This project, however, started in 2013: essentially, to study the proto-history of northern Portugal, an archaeological site was chosen to make its 3D reconstruction on a game platform called Torque3D.⁸ The site that was used for this experience was Romariz, a proto-historical settlement from northern Portugal. To the date of its abandonment, around the 1st century A.D., It had typically autochthonous architectures, as well as typically Roman ones. This archaeological site is located in the surroundings of Romariz Village, in Aveiro district. These proto-historical settlements in northern Portugal were relatively small, located at the top of hills with a low or average height. Not far from rivers and fields for hunting-gathering activities, the interior spaces of these settlements were composed with circular or elliptical shape architectures. It seems clear that these communities remained in isolation until the approach of the Roman civilization, with the exception of rare contacts between these and those communities of the southwest Iberia. The proto-historical settlement of Romariz appears to have been built around 900 B.C. with perishable materials. However, previews archaeological interventions did not seek to understand its ancient record properly. For example, it's not yet certain when stone was used to replace previous building materials - the available data, despite being so scarce, seem to indicate that this transition took place between 300 and 200 B.C.



Figure 1. The researcher joining the Archaeological Simulation as an avatar

By the time Nick Bostrom first published his simulation argument in 2003, Richard Bartle also stated that virtual worlds would be experienced through virtual reality interfaces so powerful that the virtual would be indistinguishable from the real. Ten years later, (re)constructing the proto-historical settlement of Romariz was seen as an opportunity to grip the avatar from that parallel virtual universe and explore the past as it could have been. These avatars are tokens that represents us and we will assign meanings to the world we interact with through it - something from the symbolic. Like a performance-art, those pixels on the screen are just like an audience, and we associate meaning to our role-play within the simulation: the archaeological presence becomes real to the actor.⁹ I argue that the virtuality of

simulated pasts and our interaction with them belongs to a universe that urgently needs to be explored. Virtual reality may represent an important archaeological ecosystem that is capable of hosting knowledge and communication processes from the real to the virtual world and vice versa, forming the simulation process. To better understand this process, we can think of the puppets' metaphor from Deleuze and Guattari: according to the authors, the puppet strings are linked, not to the supposed will of the artist who handles the puppets, but to a multiplicity of nerve fibres that form another puppet in another dimension, connected to the first. That is, dependent and independent factors are correlated in the puppet dynamics - the dependent factors are the hands of the human actors and the independent factors are the multiplicity of string movements that can be generated unpredictably by the mutual interactions of the strings themselves. To the authors, this process is a rhizome.¹⁰ And this map is open and connectable in all its dimensions - it is detachable, reversible, susceptible to constant modifications. That being said, 3D information can be considered the core of the knowledge process, providing the opportunity to make a performance-art, with dialogue and responses, between those who interact in the simulation, between the researcher and that virtual ecosystem.¹¹

VIRTUAL TIME TRAVELING

In the 1990s, image production was essential in the process of building a new world order¹² and, consequently, the appreciation and analysis of virtual archaeological models as well. Today, more than the apparatus of 3D models, what matters to cyberarchaeology¹³ is simulation, interaction and performance. That is, we can say that we no longer reconstruct the past solely and exclusively on the basis of technology. Instead, we perform the digital past. This cyberarchaeology focuses on the human factor and interaction, including the compromise between digital interactions in the form of avatars in a parallel reality that simulates the reality of the past.¹⁴ According to Maurizio Forte, the layer that separates cyberspace from reality is disappearing, involving a total hybridization of technological devices and visual content (augmented reality, holograms, among others). The transformation of researchers into actors/avatars makes the role of virtual environments more geared towards collecting affordance data, different narratives and digital performance, leaving the semiotics of 3D models in the dark.¹⁵

This project came to attest that the next step in the creation of Metaverses will be the merging of 3D GIS and game platforms, making simulations more and more realistic over time. As digital social networks, these will have the potential for promoting effective innovation scenarios in the areas of archaeological research and cyberarchaeology specifically. In 1992, Neal Stephenson published his science fiction novel *Snow Crash*. In his book, the author writes about the Metaverse. That 'collective virtual shared space' would be accessed through virtual reality terminals. In 'Romariz 3D', users can live that Metaverse, experience the simulation all together and export their thoughts directly to the archaeological debate. For example, while wandering among the forests of Romariz' landscape, the human monumentality is perceived to stand out from the nature. The avatar catches a glimpse of wonder of the ancient world.

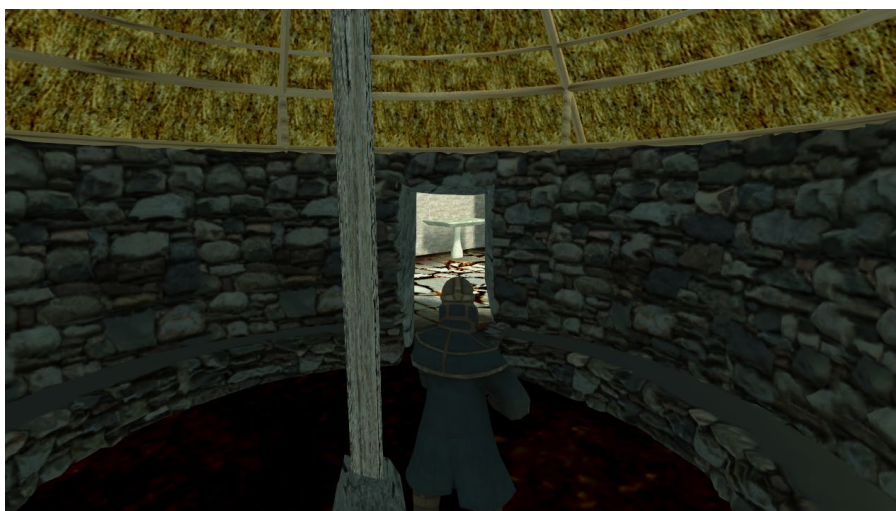


Figure 2. The researcher observing and experience the ancient Romariz settlement

I argue that these new technologies in the museum's space favours the reduction of institutional authority which will, in turn, result in an increase of knowledge in popular culture, as also with the recognition of multiple meanings and lore. This means that the scope of culture would significantly grow and expand. More importantly, the use of the Archaeological Simulation in museums automatically adapts the information and knowledge resources to new generations. This project fulfils the paradigm that visitors in museums should develop scientific skills through interactive experimental activities. Most importantly, this experience helps the public understand some of the scientific data by the visual sense; it opens a window to help people understand a little more about their own contemporary world and ancient history. Archaeological Simulation presented itself as an opportunity to explore the proto-historical landscape as it could have been in that past. It's an exercise of the imagination: not being able to know, for sure, how the architectures of Romariz settlement would have been like, the archaeologist's speculation based on architectural theory was applied. On this game platform, we can simulate the urban paths and routes of Romariz. We walk through ruins that are (re)constructed in a simulated past.

Nick Bostrom suggested that, unless we are now living in a simulation, our descendants will almost certainly never run an ancestor-simulation. The simulation hypothesis is a proposal regarding the nature of existence which posits that all of existence is an artificial simulation, such as a computer simulation. According to Bostrom, in the future, it will be possible to simulate all the actions of all the neurons in the brain, and simulate the sensory input to that brain with enough accuracy to convince the simulation that it is a real person. It seems clear that our descendants will certainly keep on working with the computer simulations that we are creating today. I then suggest that these new technologies should be used by researchers in humanities to simulate time traveling and (re)think about their role as archaeologists, specifically. Above all, it should be seen as an experience and an opportunity for researchers to embrace their own performances in a virtual past while grappling an avatar and explore terms such as archaeological precognition,¹⁶ archaeological psychometry,¹⁷ archaeological synaesthesia¹⁸ or even transmogrification,¹⁹ for this technology can be a tool to help us ponder about the next technological phase towards transhumanism.²⁰

Andrew Reinhard wrote that "what used to be the sole province of printed fiction, which offered a univocal entry point to imagined spaces, we now have fully realized, interactive, digital built environments to help us create our own stories within the context of these new, virtual worlds".²¹ According to Baudrillard, hyper-reality is the condition of the simulacrum, which can be confused with reality and, in some cases, replace it.²² I suggest that through the incorporation of archaeologists into

digital avatars, these will adapt their cognitive perceptions to the cyberworld of the past. They will feel the simulated ancient world as figures immersed in cyberspace. Hyper-reality here shares the concept of simulation - it is not a copy of reality, but a conceivable reality.²³ In virtual reality, archaeology does not authenticate virtual models. In virtual reality, archaeologists will study and validate their methodological work, transparently sharing all the data and information they collect during their research. The *modus operandi* and development during the (re)construction²⁴ of Romariz archaeological site in a game platform is an example of this open methodology and critic.²⁵ For example, on the platform used for this virtual simulation, the concept of reality was distorted by the quest to make that virtual world as real as possible. The researcher, on that game platform, performs his performance, simulating life from an avatar in a reality that is not his own. The researcher is no longer conscious in his dimension and refines his cognitive senses in that other, virtual one. The researcher applied his Archaeological Foveal Study²⁶ and pondered on ancient societies through architecture and urbanism.²⁷

CONCLUSION

Mullen and Davidenko recently suggested that time passes faster during immersion in virtual reality. Based on the observation and questionnaire of participants involved in their investigation, the psychologists came to classify this phenomenon as 'Time Compression Effect'. In this form of time paradox,²⁸ we time-travel ourselves to a simulation of the past. The outcome psychometry from our scientific contact with (re)constructed sites should then be used to query our archaeological readings and achieve new answers for certain scientific paradigms in social sciences that cannot be tested otherwise. To think of our perception between contemporary time and the Archaeological Simulation is a desired process for this transmogrification, especially if we do it collectively, using the power of the transdisciplinary hive-mind.²⁹ I argue that human beings are very well capable of breaking through their processual barriers and think of their world and their position in the cosmos with the help of philosophy and contemporary art. In archaeology, for example, positivist thinking was discredited and the structures of metanarratives exposed by the post-processualist theory. The postmodern program would come to be demarcated by the deconstruction of the Cartesian methodology or the myth of metanarratives capable of compiling all of history on a single 'hard drive'. If archaeology does not reinvent itself and adapt to the 21st century, it will become part of the archaeological record. Perhaps, as the interpretation of a work of art implies invisibility and interpretability will imply invisuality,³⁰ in archaeology, archaeologists are challenged by the unmistakable temporal dynamics and they plunge into their own political narratives. It seems that proto-history of northern Portugal meets all the requirements to become an international case study for cyberarchaeologists. How many 'proto-histories' can then be transmitted to the general public? How can archaeologists deconstruct the narratives of political power from within the established historical-cultural paradigm?

This project is in constant mutation and transformation, resulting in different narratologies, embracing new methodologies and theory, helping us researchers to understand our contemporary world. Michael Shanks wrote that "notions of the archaeological, sociological, and geographical imagination all imply creative understanding of life today, of possibilities of change, innovation, of the roles of individual perception, practice and agency".³¹ If archaeology studies non-state societies, rejections of authority by the people of the past and also uses its criticism to point out the accumulation of power by elites and institutions today,³² Lewis Bork and Matthew Sanger argued that the discipline should take advantage of the anarchist theory. According to the authors, applied anarchism will itself question the basic concept that 'simplicity' is the starting point of any society and that only 'complexity' can be achieved. The current scientific paradigm for proto-history of northern Portugal, however, is based on historical-culturalism and romanticism. That narrative is used by political institutions to publicize their 'spectacular archaeological heritage' and feed the tourism economy. The archaeological sites then

become 'institutionalized' and the local communities left aside from new archaeological practices and knowledge of the 21st century. Romariz' proto-historical site is an example of this - nothing else matters but the 'spectacular' archaeological metanarrative that has already been created in the 19th and 20th centuries. It is estimated that there are still more than 50% of the site underneath the surface. New LiDAR technologies could provide important information about unexcavated areas, giving us the possibility to expand this Archaeological Simulation.



Figure 3. The researcher searching for other proto-historical settlements nearby Romariz site

According to Giannachi, Kaye and Shanks, "'presence' not only invites consideration of individual experience, perception and consciousness, but also directs attention outside the self into the social and the spatial, toward the enactment of 'co-presence' as well as perceptions and habitations of place".³³ I argue that archaeologists should (re)construct, simulate and perform the past, using these new technologies as a tool to generate new narratives for science and the general public. As far as the authenticity of the digital (re)constructed past is concerned, we must consider that, as there is no way to validate models, this validation must be done by analysing all the digital hermeneutics,³⁴ from data collection to the interpretation made of the sites. In order to increase the knowledge sharing and to foster the debate on the archaeological reality, this entire process, moreover, should be carried out in community that collaborates and interacts in the simulated past.³⁵ Because working theory in archaeology involves creativity, knowing how to listen and tune in,³⁶ without prophesying purposes and meanings. At a time when contemporary philosophy and quantum physics queries the notions of reality in our universe,³⁷ the archaeological theory appear to us as a beacon to guide our research through a chaotic palimpsest of realities.³⁸

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NOTES

¹ Colleen Morgan, (Re)Building Çatalhöyük: changing virtual reality in archaeology, *Archaeologies* 5 (Journal of the World Archaeological Congress, 2009): 468-487; Rodney Harrison, Excavating Second Life: Cyber-Archaeologies, Heritage and Virtual Communities, *Journal of Material Culture* (2009): 14, 1, 75–106; Maurizio Forte and Gregorij Kurillo, Cyber-archaeology and metaverse collaborative systems. *Metaverse Creativity* (2010): 1, 1, 7-19.

² "VPL Research Jaron Lanier", Virtual Reality Society, accessed July 05, 2022,

<https://www.vrs.org.uk/virtual-reality-profiles/vpl-research.html>

³ Francisco Verela, Eleanor Rosch and Evan Thompson. *The Embodied Mind: Cognitive Science and Human Experience* (1991). Cambridge: The MIT Press. The Enactive Process proposes that the functioning of the mind and that of a computer are analogous, and indicates the study of computational processing as a model to explain cognition. Thus, cognition is understood as information processing. In this model, information arrives at the organism through exposure to stimuli (input), and returns to the environment through behavioral responses (output), based on basic processing rules.

⁴ Igor Marini, Enando Neto and Leticia Perani. *As mecânicas do divertimento: uma análise de affordances em games de simulação de parques de diversão*. *Metamorfose - Arte, Ciência e Tecnologia* (2017). Affordances is what a user can do with an object based on the user's capabilities. In essence, an action possibility in the relation between user and an object. It's been used in digital studies and gaming development.

⁵ The virtual ontology of archaeological information, or the cybernetics of archaeology, refers to all the interconnective relationships which the datum produces, the code of transmission, and its transmutability.

⁶ Inspired by the philosophical theory Ancestors Simulation, the Archaeological Simulation simulates the archaeological past in the metaverse by the 3D (re)construction of archaeological sites. It seeks to explore the archaeological imagination and the way in which the contemporary archaeologist interprets the scientific record of archaeology through his experience in the Simulation.

⁷ Metaverse is a network of 3D virtual worlds focused on social connection.

⁸ "Archaeological Simulation", accessed July 05, 2022, www.archaeologicalsimulation.com

⁹ Gabriella Giannachi, Nick Kaye and Michael Shanks, *Archaeologies of Presence – Art, Performance and the Persistence of Being*, (Oxfordshire: Routledge, 2012); Pedro da Silva, *Arqueologia e Simulação: contributo para um debate sobre a realidade*, *Antrope*, (Tomar: IPT - Centro de Documentação e Arquivo, 2021): 13, 239-251.

¹⁰ Rhizome is a philosophical concept that was developed by Gilles Deleuze and Félix Guattari in their *Capitalism and Schizophrenia* (1972–1980) project. It is used to describe theory and research that allows for multiple, non-hierarchical entry and exit points in data representation and interpretation.

¹¹ Pedro da Silva. *Ensaio sobre a (Re)Construção Arqueológica como Performance*. *Al-Madan Online* (2020): Tomo 1, 23, 114-118.

¹² Carlos Gaspar. *O Pós-Guerra Fria*, (Lisboa: Tinta da China, 2016).

¹³ Cyberarchaeology represents a research path of simulation and communication, whose ecological-cybernetic relations organism-environment and informative-communicative feedback constitute the core. Archaeology is entirely part of the contemporary society and it is the gateway to the ancient world; it cannot represent the ancient world. The cyber process creates affordances and through them we are able to generate virtual worlds by interactions and inter-connections.

¹⁴ The Archaeological Reality is a set of scientific data obtained by archaeological prospecting and excavation techniques, including the study and dating of the entire archaeological record.

¹⁵ Pedro da Silva, *A Informática e Multimédia Aplicadas à Investigação Arqueológica – A reconstrução 3D do castro de Romariz e a sua aplicação numa plataforma de jogo*, Master's Dissertation, (Porto: FLUP, 2013).

¹⁶ While in the archaeological simulation, precognition is like a psychic ability to see events in the future that is contemporary in the real world.

¹⁷ Archaeological Psychometry is a process whereby facts or impressions about simulated ancient societies or other simulated archaeological things are received through contact with the (re)constructed past.

¹⁸ Synaesthesia is the relationship of different sensory planes: for example, sight with touch. The term is used to describe a figure of speech and a series of phenomena brought about by a neurological condition that can be simulated.

¹⁹ By accessing the archaeological simulation, a process to change into a different form, virtual substance or state, occurs.

²⁰ Post-Humanism is a concept originating in the fields of science fiction, futurology, contemporary art, and philosophy that means a person or entity that exists in a state beyond being human.

- ²¹ Andrew Reinhard. *Archaeogaming – An introduction to archaeology in and of video games*, (New York: Berghahn Books, 2018): 5
- ²² Hyperreality, in semiotics and postmodernism, is an inability of consciousness to distinguish reality from a simulation of reality, especially in technologically advanced postmodern societies.
- ²³ Ryszard Wolny. *Hyperreality and Simulacrum: Jean Baudrillard and European Postmodernism*. *European Journal of Interdisciplinary Studies* (2017): Vol 3, Issue 3, 75-79.
- ²⁴ Archaeological (Re)Construction is a co-evolving subject in the human evolution generated by cyber-interaction between worlds. The past cannot be reconstructed but simulated while being constructed in the present.
- ²⁵ Reflexivity is critical activity of systematic construction of a conscious thought. In 2017, Romariz 3D project achieved new developments with the support of three main local institutions: the Town Hall of Santa Maria da Feira (Aveiro), the local Museum of Lóios Convent and the Cultural Association 'Voltado a Poente'. Unfortunately, new scientific studies on the site became precarious due to the lack of financing and political interest. Romariz site has been 'institutionalized' and the local communities left aside from new archaeological practices and knowledge.
- ²⁶ The fovea is a depression in the inner retinal surface of the human eye, about 1.5 mm wide, the photoreceptor layer of which is entirely cones and which is specialized for maximum visual acuity. The methodology of "Archaeological Foveal Study" was first theorized and applied in 2012/2013 during the (re)construction of Romariz site. It helped researchers to interpret the social logic that governs the spatial planning of archaeological sites: Circulation Analysis, Isolation Analysis and Visibility Analysis.
- ²⁷ Pedro da Silva, *A Modelação 3D do Castro de Romariz: Resultados da Aplicação do Modelo de Estudo 'Foveal'*, *Atas do IX Encontro Nacional de Estudantes de História* (Porto: FLUP, 2014): 31-46
- ²⁸ Temporal Paradox is an apparent contradiction, or logical contradiction associated with the idea of time and time travel.
- ²⁹ Hive-Mind is a collective consciousness, analogous to the behaviour of social insects, in which a group of people become aware of their commonality and think and act as a community, sharing their knowledge, thoughts, and resources.
- ³⁰ Carlos Vidal, *As Quatro Invisibilidades*, (Lisboa: Edições do Saguão, 2021)
- ³¹ Michael Shanks, *The Archaeological Imagination* (Routledge, 2016), 17
- ³² Rui Gomes Coelho. *O Arqueólogo Cordial – A Junta Nacional da Educação e o enquadramento institucional da arqueologia portuguesa durante o Estado Novo (1936-1974)*. (Lisboa: Imprensa de Ciências Sociais UL, 2018).
- ³³ Gabriella Giannachi, Nick Kaye and Michael Shanks, *Archaeologies of Presence – Art, Performance and the Persistence of Being*, (Oxfordshire: Routledge, 2012): 1
- ³⁴ Digital Hermeneutics is to investigate the relation between the human interpretation process and web application supporting that interpretation process
- ³⁵ Nicolò Dell'Unto and Maurizio Forte. *Embodied Communities, Second Life and Cyber Archaeology, Heritage in the Digital Era*. (Lund University: Multi-Science Publishing, 2010): 181-194.
- ³⁶ Bjørnar Julius Olsen and Christopher Witmore. *When Defense is not Enough: On Things, Archaeological Theory, and the Politics of Misrepresentation*, *Forum Kirische Archäologie* (2021): 10, 67-88
- ³⁷ String theory is an attempt to unite the two pillars of 20th century physics - quantum mechanics and Albert Einstein's theory of relativity. To quantum mechanics, multiverse is a group of multiple universes. Together, these universes comprise everything that exists - the entirety of space, time, matter, energy, information, and the physical laws and constants that describe them. The different universes within the multiverse are called "parallel universes", "other universes", "alternate universes", or "many worlds".
- ³⁸ While immersed in the metaverse, there are multiple reality layers (virtual and non-virtual) that overlaps in the human mind.

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ARCHIVAL CHALLENGES IN EMERGING FORMS OF DIGITAL ARCHITECTURAL CONTENT

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INTRODUCTION

The discipline of Architecture is increasingly becoming immersed with advanced digital production methods; most recently, this has led to many new digital outputs, processes, and tools used to assist architectural design. Due to the proliferation and commercialization of these digital technologies, issues concerning the archival practices of digital content have become evident. While many institutions have adopted internal archival methods, there is no standardized approach to archiving the increasing amount of new digital content produced in the architectural disciplines. Currently, discussions primarily focus on computer-aided design (CAD) and Building Information Modelling (BIM) preservation with minimal guidance available for archiving emerging forms of digital architectural content. However, as digital creation increases and becomes more prevalent, one can argue that preserving this content is crucial to the discipline as many of these works will later become significant artefacts in the history and culture of architectural design. In response, this research seeks to explore the current and future challenges of archiving digital architectural works in academic settings by extrapolating information from four case studies, each varying in form and complexity. The research then offers findings from these case studies and provides frameworks to aid file management and archival processes. To conclude, the work briefly examines noted challenges in the emerging field of archiving new forms of digital architecture.

INQUIRY

Architectural work outside of standard building design is becoming increasingly complex, often implementing a mixed use of software and technologies to work toward a final output. As we move further into born-digital design processes such as 3D scanning, mixed reality, and other forms of digital fabrication, we must consider how to manage and archive these projects. In response, sample selections of digital work are analyzed for archival characteristics through four technology-oriented case studies at the University of Manitoba. Each study examines a digital design that uses emerging technologies in its design process and outputs.

Methods of Inquiry

The foundation for this inquiry uses a framework derived from the International Organization for Standardization's eight-phase methodology for implementing record management (ISO 15489-2:2001) (Figure 1).¹ Following a preliminary investigation and an initial analysis of the institution's activities, each case study is systematically reviewed for its file management requirements, as noted in Stage C.

For this study, the analysis focuses on three key factors: Production Tools, Design Process, and Final Output (Table 1). Furthermore, an expanded investigation of each case study's preservation characteristics assesses the archival relevancy, reproducibility, interoperability, potential legacy data risks, typical output formats, and size, which will assist in identifying strategies for file management and, subsequently, archival procedures (Table 2 and Table 3).

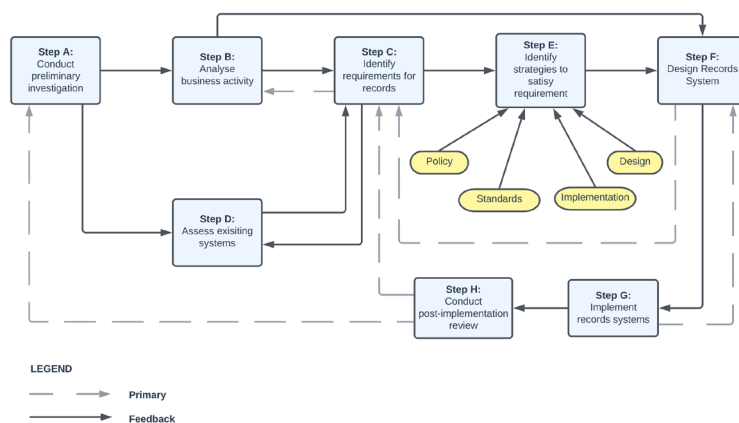


Figure 1. ISO/TR 15489-2:2001(E) Design and implementation of a records system

CASE STUDIES

Grotesques

Grotesques is a digitally oriented project led by Jon Watts (MLArch) at the University of Manitoba's Fabrication Laboratory (FABLab) that responded to a fabrication request from the Manitoba Museum. In this study, the Manitoba Museum wanted to recreate historic decorative figures known as grotesques.² These figures were previously salvaged from the façade of the now demolished Winnipeg Tribune Building in Manitoba, Canada.³ In response, an initial 3D scan of the original figures was conducted, and the results were iteratively manipulated in various software to produce 3D printed scaled replicas (Figure 2). The replicas were then exhibited in an immersive exhibition at the Manitoba Museum titled *Winnipeg 1920 Cityscape*.⁴

Creating the grotesques required a multifaceted digital approach to ensure the accuracy of the final output. First, 3D scanned content was imported into Rhinoceros 3D (Rhino) and patched to fix any inherent errors produced during scanning (Figure 2). Next, Meshlabs software was used to subdivide meshes, and digital sculpting software Zbrush was used to smooth, blend, and resculpt areas that appeared jagged. Rhino was again used to produce a façade attachment detail, allowing the replica to respond to in-situ installation. Finally, the work is exported to a .STL file and physically printed on a large-scale 3D printer. This case study emphasized that many iterations and various software outputs are used to create the resulting .STL file for the final 3D printing purposes.

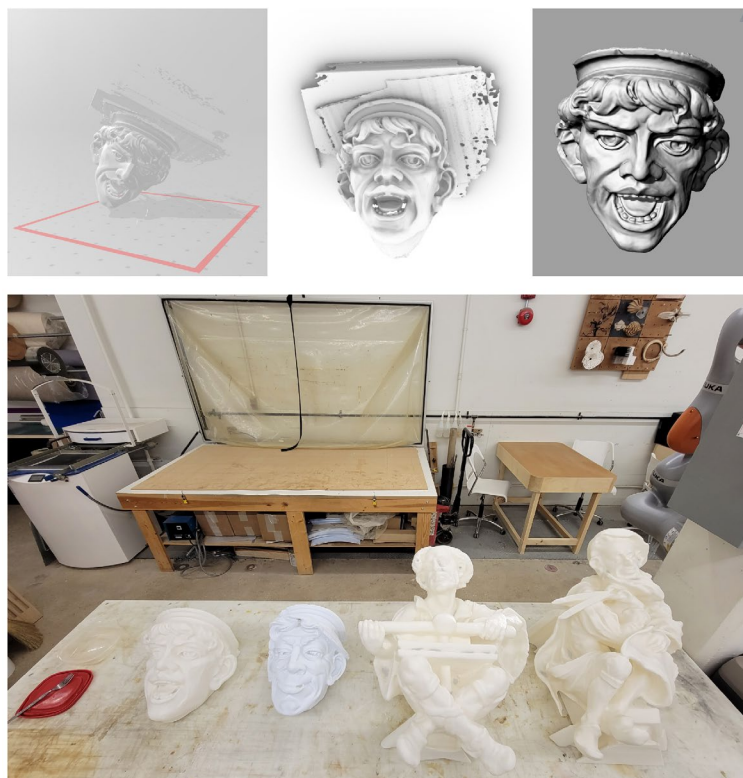


Figure 2. Iterative process work of grotesque design and 3D printed scaled replicas

Interior Environment Mobile 3D Scan

The second case study examines the process of 3D scanning interior spaces in the John A. Russell Building and Centre for Architectural Structures & Technology at the University of Manitoba. The data and information extrapolated using the 3D scanner varied from analysis of interior spatial characteristics and 3D objects to point clouds and interior photographs, resulting in an editable 3D scan.

The initial scan is captured using a handheld device that is walked throughout the selected interior spaces; as the device traverses through each area, it records the various 3D scan data to the internal drive on the mobile scanner. Once completed, the recorded data can be transferred via USB flash drive and stored directly on a PC. In this specific study, file sizes often varied based on the complexity of the scanned space, with some scans reaching up to eight gigabytes. 3D point cloud processing software CloudCompare was later used to access the output .PLY data for additional analysis and visualization (Figure 3).

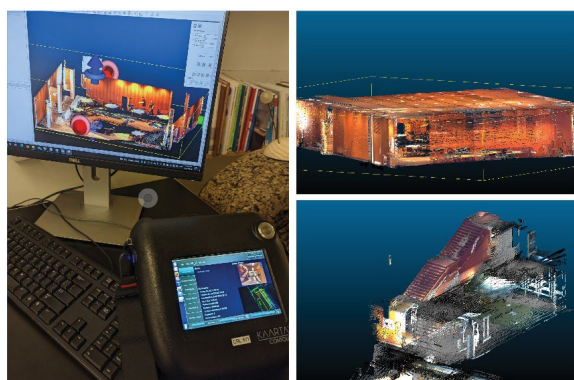


Figure 3. KAARTA CONTOUR mobile 3D scanner and CloudCompare visualization

Pinawa Dam Aerial Drone 3D Survey

The third case study analyzes landscape architecture thesis work by Jon Watts, conducted at the University of Manitoba in conjunction with the FABLab. This study utilized data from a 3D scanned survey of a decommissioned dam in Pinawa, Manitoba. The initial intent was to use this site as the foundation of a design concept. However, the project shifted focus to detailed documentation, modelling, and analysis of the site; rather than proposing built designs. The case study also resulted in scaled physical models using 3D printing and CNC routing.⁵

Initially, the site was 3D scanned using an aerial DJI Inspire 1 Pro Drone to produce high-resolution aerial photos and photogrammetry data (Figure 4). Next, the data was imported into photogrammetry software to translate the images into point clouds for 3D representation. The point cloud data is then imported into MeshLabs processing software for additional modifications. Finally, Rhino is used for further edits, such as topographic layer division. The resultant work in the Rhino document is a 3D visual representation of the drone imagery and point cloud data that can later be used as a reference for 3D modelling or other proposed design work at the Pinawa Dam (Figure 4).

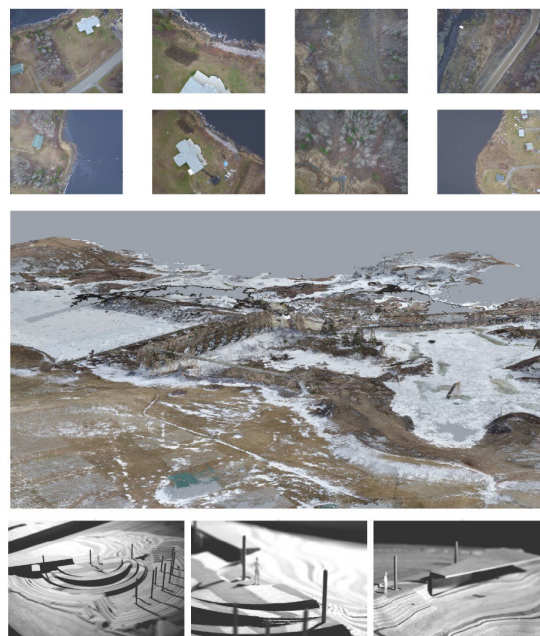


Figure 4. Selection of drone photography, 3D drone scan visualized in Rhino, and physical model

HoloLens Mixed Reality – Interior Design Visualization

Current research from the University of Manitoba's Virtual Reality Laboratory explores the capabilities of using mixed reality headsets such as Microsoft HoloLens to visualize and communicate design concepts in varying scales, from design details and furniture to an entire room and building visualizations (Figure 5). For this to occur, several different software must communicate to transfer the 3D visualizations to the HoloLens wirelessly. The 3D objects and spaces are then overlaid into the physical environment, allowing one to interact and manipulate designs in real-time.

Based on the generation of HoloLens device, to create an augmented reality experience, there are various software options, including 3D Viewer (beta), Unreal Engine, Unity, Revit, Microsoft Visual Studio, 3DS Max, and other emerging tools. Unfortunately, file output type varies based on the generation of HoloLens, software, and workflow used, making archiving many aspects of the mixed reality experience complex at this time. In addition, unlike the other case studies, reproducibility, interoperability, and inherent legacy data risks are challenging for archival purposes (Table 2).

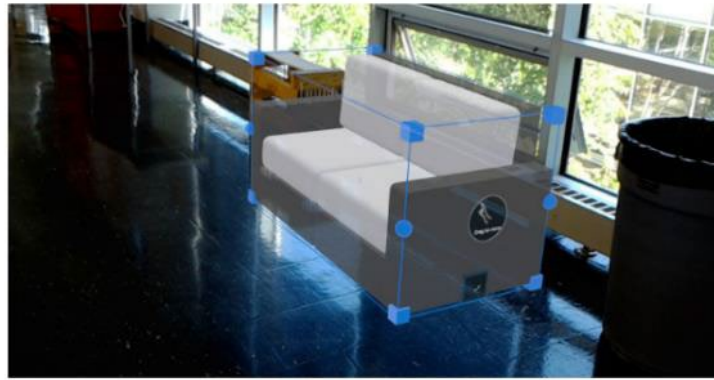


Figure 5. Microsoft HoloLens (Gen 1) mixed reality furniture visualization

Archival Analysis

	Production Tools	Design Process	Final Outcome
Grotesques	White Light 3D Scanner, VX Elements, Rhino, MeshLabs, Zbrush, 3D Printer	3D scanning, mesh editing, digital smoothing/blending, custom design details	.STL file to be printed on a large-scale 3D printer
Interior Environment Mobile 3D Scan	KAARTA CONTOUR mobile 3D scanner, USB flash drive, CloudCompare	3D scanning, file transfer, content import, software-based edits	.PLY file that can be imported into various software
Pinawa Dam Aerial Drone 3D Survey	DJI Inspire 1 Pro Drone, PIX4D, MeshLabs, Rhino, CNC Router, 3D Printer	Drone photography, photogrammetry software modifications, mesh editing and layering, fabrication	A multitude of 3D files such as .P4B and .3DM, as well as physical models
HoloLens Mixed Reality - Interior Design Visualization	HoloLens (Gen 1 and Gen 2), 3D Viewer (beta), Revit, 3DS Max, Unity, Unreal Engine, Microsoft Visual Studio	Export existing architecture work to 3D format, import and modify using selected 3D software, connect 3D experience wirelessly to HoloLens	A multitude of 3D files, including .fbx and proprietary and interdependent file structures

Table 1. Archival requirements analysis

	Archival Relevancy	Reproducibility	Interoperability	Legacy data risks
Grotesques	Yes, historical artefact. Used for public exhibition	Output work is easily reproduced	.STL output has high interoperability	Minimal
Interior Environment Mobile 3D Scan	Yes, documentation of an existing site	Output work is easily reproduced	.PLY output has fair interoperability	Minimal
Pinawa Dam Aerial Drone 3D Survey	Yes, documentation of an existing site	Output work is easily reproduced	.3DM output has low interoperability	Minimal
HoloLens Mixed Reality - Interior Design Visualization	Varies. Much of the work is used as a conceptual design tool	Difficult to reproduce	The use of various formats and software causes poor interoperability	Yes, work uses proprietary software

Table 2. Preservation characteristics analysis

FINDINGS

Through analysis of these case studies, a variety of findings became evident. First, due to the technological complexity of the projects analyzed, each case study did not follow a standardized archiving approach. Instead, the creator determined each project's file management and archival process. The work produced in these case studies resulted in many iterative files, including conceptual and sketch work, often making the content difficult to categorize or manage later (Figure 6). Additionally, archiving this work becomes increasingly challenging when creator turnover is frequent, such as students and staff in academic settings.

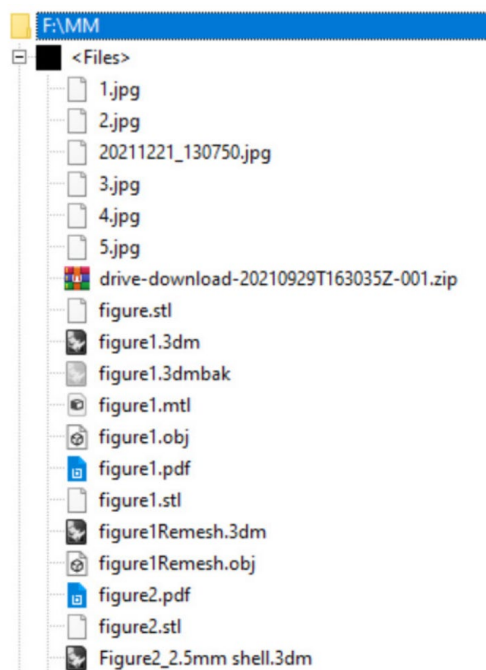


Figure 6. Grotesques, root folder file management structure

File types noted in all case studies vary based on each project but typically fall into generalized classifications of design work (e.g., 3D Files, Images, CAD, PDF). However, in most cases, the final iteration of the work had been output to an open-source or standard file format to ensure additional archival accuracy. In addition, project file sizes varied in both file amount and disk space (Table 3). Therefore, in some instances, all iterations and files of produced work may not require archiving.

	Project size and file quantity	Common Output Types
Grotesques	3.6 GB (113 files)	.STL, .3DM, .OBJ, .JPG
Interior Environment Mobile 3D Scan	8.1 GB (943 files)	.PLY, .PNG, .JPG
Pinawa Dam Aerial Drone 3D Survey	29.5 GB (3,065 files)	.P4B, .JPG, .TIF, .PLY, .TXT
HoloLens Mixed Reality - Interior Design Visualization	3.5 GB (3,678 files)	.EXE, .STL, .FBX, .SLN

Table 3. Case study file analysis

Response

Expanding on the information provided from Stage C's requirement analysis, Stage E of ISO 15489-2:2001 undertakes the identification of strategies to implement.⁶ However, it should be emphasized that the methodology for approaching file management and archiving may vary slightly with each project due to the scope, intended retention, legal implications, and stakeholder goals.⁷ Therefore, one must consider these factors for each individual project before undertaking the initial file management and archival process.

Basic archival standards must first be met to ensure discipline-specific approaches can be advantageous. An initial classification scheme and standard hierarchal folder structure in conjunction with compliant file naming conventions will increase the likelihood of success in accessing and archiving files.⁸ Each case study's design process exhibited a multitude of file types, iterations and modifications throughout the work. This showed the need for a phased and hierarchal approach to archiving the work successfully. This is particularly important in architectural disciplines as designers often retain previous digital works for reference or backup purposes.⁹ Additionally, this iterative work can often assist in understanding the evolution of a project.¹⁰ Therefore, implementing existing industry-standard terms with phased naming could help create an approachable file management and archival system.

In response to this, a phased five-folder system with sub-directories is proposed. This system consists firstly of a root folder with the dated project name (e.g., 20220323-Sample_Project_1). Then, each root folder consists of five sequentially numbered phased sub-directories: preliminary files, working files, completed files, documentation files, and other files (Figure 7).

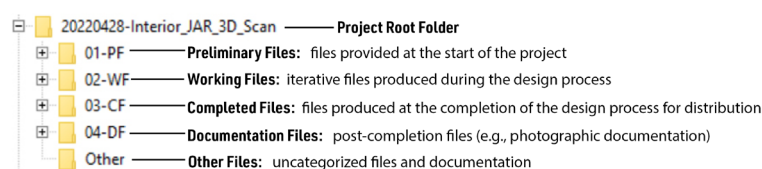


Figure 7. Phased five-folder system with sub-directories

Expanding on the proposed phased five-folder system, we can provide additional standardized subdirectories for each phased folder based on our findings during stage C of ISO 15489-2:2001, as outlined in Table 3. A short file naming convention with truncated industry standard terms is provided,

which derives from the typical file types.¹¹ This nested subdirectory structure consists of 3D, CAD, IMG, OTHER, and PDF (Figure 8).

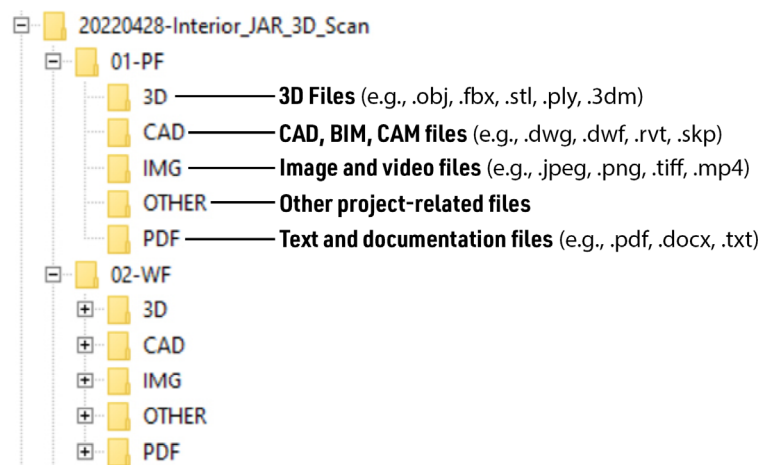


Figure 8. Standardized subdirectories

Folder and file naming should be consistently applied throughout the project.¹² File names should ideally be less than 25 characters and avoid using special characters.¹³ Do not use spaces; instead, provide filenames with mixing delimiters consisting of hyphens and underscores for readability and cross-OS compliance (Figure 9).¹⁴ All files should be dated and follow a standardized approach; ISO 8601 without delimiters is suggested when implementing dates (e.g., YYYYMMDD).¹⁵ For archival purposes, the file name should briefly describe the contained work.¹⁶ Use ordinal version numbering (e.g., v01, v02, v03, etc.) for significant file changes. For directories with a large number of files, use 01 or 001 for leading growth based on the anticipated file amount (Figure 10). Files can be batch renamed using software to reduce manual file renaming. It should be noted that files should be appropriately named when initially exporting from software, as exported work may have dependencies and required subdirectories (e.g., CAD XREFs, 3D Scans) and renaming, modifying, or moving these files will be detrimental to the project's archival integrity and functionality.¹⁷

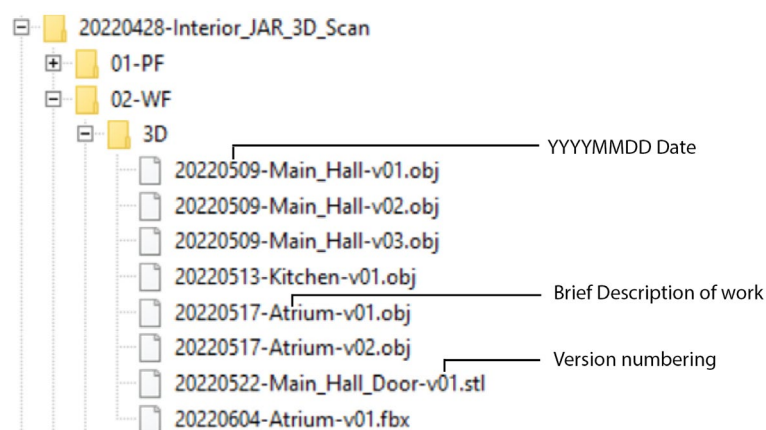


Figure 9. File naming convention

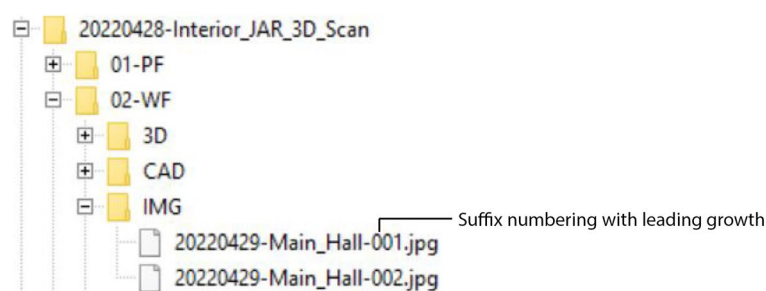


Figure 10. Large file number naming convention

Information on how the project's creators produced and used the data and the subsequent outcomes should be provided in a text file in the core directory. The contained information may vary based on project type but could consist of "file names, file formats and software used, title, author, date, funder, copyright holder, description, keywords, observation unit, kind of data, type of data and language".¹⁸

It is recommended to provide cyclic redundancy checks (CRCs) to ensure the fixity of digitally stored files. This will confirm that files are unchanged over time and have not been modified or corrupted. CRCs such as SHA-1 and MD5 would be suitable in this instance.¹⁹ If data compression is necessary due to lack of digital storage or economic reasons, ensure compressed files are not cross-referenced with any other data and ensure CRCs are produced that match the compressed archive. It should be noted that compressed files are more prone to data loss and corruption.²⁰

Challenges

During the analysis of these case studies, it became evident that there are many challenges related to file management and archival processes. Some of which are not exclusive to the field of architectural design. However, these must be briefly addressed to understand better the hurdles we currently face.

Determining a project's archival relevancy will often hinge on "a number of factors, including institutional mission, cultural preferences, economic practicality, and risk management policies".²¹ In some instances, we must also accommodate for existing automation and record-keeping systems that may already exist.²² This can cause additional challenges when working with emerging forms of digital content. Exporting proprietary file formats for archival storage should also be avoided to reduce file access issues at a later date.²³ Issues surrounding this topic will become increasingly important as legacy software access will become challenging in the future with the recent adoption of online authentication protocols and other forms of software DRM.²⁴

The cost involved with archiving can vary based on the intended outcomes. For example, local disk space or cloud storage may be used to preserve the work.²⁵ However, both have embedded continual costs concerning maintenance and backup protocols that must be analyzed before undertaking archival processes.²⁶ Additionally, there may be a cost or fee when archiving work using online digital repositories. For example, the preservation of digital antiquity work using The Digital Archaeological Record (tDAR) has structured fees for archiving work based on factors such as file size, number of files, and complexity of the item".²⁷ Therefore, the cost can become important when determining the work's archival location and contents. Consideration of the retention period of the archive is crucial as well, as this can vary from months to years to decades. The intended length of archival storage will have implications regarding file export types and continual costs that one must consider.²⁸

Legal aspects of archiving work are also essential to consider, with aspects of ownership, intellectual property, and limitation periods being important.²⁹ Additionally, to reduce potential conflicts of interest, all stakeholders involved in the work should reach a clear consensus on the intended archived materials and archival process prior to commencing the work.³⁰

CONCLUSION

Methods of file management and archiving have changed drastically in the past decades, and we will continue to see an increase in digitally driven design methods in architectural design processes. This is evident from the abundance of new file types and software used throughout the case studies. A structured file management system that responds to the unique nature of digital architectural work can assist in creating a standardized approach to these challenges. Unfortunately, there is no singular solution for archiving these new forms of content due to the varied work the design discipline undertakes. Achieving greater success in archiving will require flexibility and adaptability to move forward successfully. Nevertheless, the case studies and findings discussed will provide context to larger discussions on this topic as the proliferation of new design methodologies will continue to intertwine with our daily workflows. Additional advocacy from academic institutions can ensure that much of this digital work is not lost or inaccessible, as it may have academic, historical or cultural significance. However, for this to occur, education on how to accommodate the preservation of digital design content needs to become prominent. With this in mind, we must address these issues related to archival practice to ensure the preservation of these new forms of emerging digital designs.

NOTES

- ¹ International Organization for Standardization, *ISO/TR 15489-2:2001(E) Information and documentation — Records management — Part 2: Guidelines* (Switzerland: ISO, 2001), 3.
- ² “The Winnipeg Tribune ‘Gargoyles,’” The Manitoba Museum, accessed June 10, 2021, <https://manitobamuseum.ca/archives/3862>.
- ³ Glen Olsen, “Hit by Wrecker’s Ball,” Winnipeg Free Press, November 26 1983. <https://access-newspaperarchive-com.uml.idm.oclc.org/ca/manitoba/winnipeg/winnipeg-free-press/1983/11-26/page-12/>.
- ⁴ “Making the Old New Again, but Still Old! The Winnipeg 1920 Cityscape,” The Manitoba Museum, accessed June 17, 2022, <https://manitobamuseum.ca/archives/47925>.
- ⁵ “Parametric Landscapes,” Jonathan Daniel Watts, accessed June 19th 2021, <https://mspace.lib.umanitoba.ca/xmlui/handle/1993/32565>.
- ⁶ Abderrazak Mkadmi, *Archives in the Digital Age* (New Jersey: Wiley-Blackwell, 2021), 23.
- ⁷ Mkadmi, 46.
- ⁸ Mkadmi, 48.
- ⁹ Ann R.E. Armstrong, “Architectural Archives/Archiving Architecture: The Digital ERA,” *Art Documentation: Journal of the Art Libraries Society of North America* 25, no. 2 (October 2006): 12–17, doi: 10.1086/adx.25.2.27949434.
- ¹⁰ William Mitchell, “Architectural Archives in the Digital Era,” ed. Nicholas Olsberg, *The American Archivist* 59, no. 2 (April 1, 1996): 200–204, doi: 10.17723/aarc.59.2.506h724783065016.
- ¹¹ Mkadmi, *Archives*, 4.
- ¹² Edward M Corrado and Heather Moulaison Sandy, *Digital Preservation for Libraries, Archives, and Museums: Second Edition* (Maryland: Roman and Littlefield, 2017), 248.
- ¹³ Kristin Briney, *Data Management for Researchers: Organize, maintain and share your data for research success* (Exeter: Pelagic Publishing, 2015), 75.
- ¹⁴ Susan Hinck, “Improve Efficiency with Use of Standardized File Naming Conventions,” *Nursing economic* 39, no. 1 (2021): 43–44.
- ¹⁵ Mkadmi, *Archives*, 4.
- ¹⁶ Luciana Duranti, Terry Eastwood, and Heather MacNeil, *Preservation of the Integrity of Electronic Records* (Dordrecht: Springer Netherlands, 2002), <https://doi.org/10.1007/978-94-015-9892-7>.
- ¹⁷ Annet Dekker, *Sustainable Archiving of Born-Digital Cultural Content* (Rotterdam: Virtueel Platform, 2010), 17.
- ¹⁸ Corrado, *Digital Preservation*, 248.
- ¹⁹ Trevor Owens, *The Theory and Craft of Digital Preservation* (Baltimore, Johns Hopkins University Press, 2018), 109.
- ²⁰ Corrado, *Digital Preservation*, 197.
- ²¹ Michèle Valerie Cloonan, *Preserving Our Heritage : Perspectives from Antiquity to the Digital Age* (Chicago: Neal-Schuman, 2015), 447.
- ²² Cloonan, 437.
- ²³ Kathy Perrin and Duncan Brown, *A Standard and Guide to Best Practice For Archaeological Archiving in Europe EAC Guidelines 1* (Belgium: E.A.C., 2014), 38.
- ²⁴ Annet Dekker, *Sustainable Archiving*, 18.
- ²⁵ Corrado, *Digital Preservation*, 147.
- ²⁶ Ann R.E. Armstrong, *Architectural Archives*, 14.
- ²⁷ “Pricing Digital Preservation Fees,” tDAR The Digital Archaeological Record, accessed July 3rd, 2022 <https://core.tdar.org/cart/add>.
- ²⁸ Kristine Fallon, “Defining and Encoding Architectural Information for Digital Archives” (paper presented at Hybrid Architectural Archives: Creating, Managing and Using Digital Archives, Rotterdam, Netherlands, November 8 – 10, 2009).
- ²⁹ Mkadmi, *Archives*, 49.
- ³⁰ Michèle Valerie Cloonan, *Preserving*, 446.

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DIGITAL PRACTICES FOR GENERATING INTERACTION: EXHIBITS AND MUSEUMS AS PHYGITAL ENVIRONMENTS.

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INTRODUCTION

Over the last two decades, two trends have profoundly changed the conception and design of events aimed at enhancing cultural heritage, both around temporary and permanent exhibitions: the organization of the content offered and, hence, of the exhibition tools, on the concept of *narration* and the experimentation of *digital experience modes*.

These two new horizons, wildly where they coexist in an integrated way, are increasingly aimed at constructing “phygital”, blended, and cross-reality (XR) experiences. These are experiences based on the interaction between the physical environment (and thus its analog communicative structure) and the digital environment (consisting of virtual enhancements of the experiential form of the visit). These interactions occur thanks to technologies that create hybrid and innovative communicative and interactive levels.

This paper focuses on the intersection of these new paradigms that prefer experiential interaction guided by storytelling design to purely technological interaction, i.e., based on instrumental implementation only. Therefore, the cultural heritage enhancement project is investigated here by implementing augmented and enabling digital experiences according to a holistic and *human-centered vision*. This vision generates new exhibition scenarios, where the technological upgrade acts as a means of consolidating and expanding the narrative capability of the exhibition space. It activates, in fact, new perceptive experiences (whether related to material or immaterial content), configured through the physical and active involvement of the visitor, who acts, therefore, as a sort of *relational trigger*.

TANGIBLE INTERACTIONS

While, on the one hand, in the field of cultural heritage dissemination, there are many operational declinations of innovative blended and cross-reality technologies (XR), such as virtual reality (VR), augmented reality (AR), and virtual worlds (VWs), that involve the use of 3D models/simulations across physical, virtual, and immersive platforms, the applications that refer to the concept of Tangible Interactions are fascinating. These generally include “user interfaces and approaches to an interaction that emphasize the tangibility and materiality of the interface, the physical embodiment of data, whole-body interaction, and the embedding of the interface and user interaction in real spaces and contexts.”¹ Because of their nature, they are better integrated into a broader narrative structure aimed at generating situations of connection and direct involvement of visitors with the collections on display and their conceptual, physical, and contextual contents. These experiences, therefore, enhance the relationship

between the visitor, the exhibition content, and its multiple meanings and determine authentic, innovative approaches to realize unprecedented modalities for developing knowledge. This also happens with the construction of the consolidation of its memory, accessible and shared at whatever level – individual or collective – such experience is addressed.

THE EXHIBITION DESIGN AS A NARRATIVE-BASED TRANSITIVE PROCESS

The exhibition design gives a completed and accessible form to curatorial ideas whose purpose is to display knowledge and evoke the contents of these ideas – whether explicit (the collection) or implicit (its contents and meanings) – in the space of memory, ideas and representations. The exhibition design, therefore, carries out a transitive process that makes accessible the logical connections that define the possible relationships between the exhibited collection, its intrinsic value, and its extensive meaning: two parameters that Stephen Greenblatt calls *wonder* and *resonance*.²

An exhibition system today, therefore, does not end its task in merely “putting something on display”, finding its best technical solutions in the traditional syntax of exhibition equipment (like panels, showcases, pedestals). Instead, it develops itself as the configuration of a complex system that generates *shared and sharable culture*. We can affirm that any object removed from its original environment and relocated in an exhibition system is undergoing an inevitable act of delocalization. In that case, it is the exhibition super-structure that, in welcoming it and integrating it into a broader scenario, provides it the interpretative tools and relocates it “in space and time”, synchronizing it with the interweaving of possible narratives that it emanates.

Therefore, the conceptual principles of the exhibition design have shifted from a mainly architectural sphere towards a synergic system of several cultural areas, between narration, communication, performance, interactivity, and digital supports. This shifting happens in the sign of a *user-centered design* approach, which looks at the role of the visitor, its privileged user, as an active and participatory component of the exhibition structure, as pointed up by Atelier Brückner.

Giving content form raises the question of what content is. Content means the narrative of an exhibition: source, storytelling, plot, and message. Content refers to objects, which are staged, but also to intangible, abstract, information that is to be conveyed. Storytelling is a narrative and communication technique that transports knowledge and can involve the visitor actively, interactively, or reactively in a story. In this way, the content is experienced with all senses and the story being told is the focus of attention.³

Storytelling is a human act that is as spontaneous as necessary, which stands at the beginning of any interpersonal relationship and constitutes the necessary basis for progress. It is an action that requires reciprocity between the *emitter* – the storyteller – and the *receiver* – the listener. This principle of reciprocity stands at the basis of narrative staging. It implies the fulfillment of a relational necessity where what is shown emanates communicative capacity for its audience, gaining its *willingness to listen*. As Boris Groys states, the exhibition “is not an object, but an event”⁴ and “should be understood not as a pure act of presentation, but as the presentation of presenting, as the unveiling of one’s framing strategy.”⁵ Groys points out that the exhibition:

di-shows the technology of presentation, the apparatus and structure of framing, and how our gaze is determined, oriented, and manipulated by technology. When we visit an exhibition, we not only look at the images and objects on display but also reflect on the spatial and temporal relationships between them.⁶

In this scenario, exhibition practice is involved in a process of renegotiation of its design. This process furthers the centrality of the object to convey, alongside and with it, contents, messages, and considerations. All of them support – but perhaps, it would be better to say: reinforce, develop, vitalize – its values by resolving of its communicability, comprehensibility, and collocation in a broader

framework of human relations. In these terms, evaluating and understanding the place of the numerous forms of digital mediation available today is fundamental. Through digital technologies, the visitor acquires a *performative* knowledge of the exhibition site determined by sequences of gestures, actions, interactions, and attitudes. However, this knowledge is conceptually based on the absence of physicality, the unlimited availability of memory, the preponderant extension of visual-formal perception, and the replacement of everyday spatial and sensorial reality with a pre-equipped meaning alter ego. These conditions can easily lead to a dissolution of those relational connections that constitute a participatory perception in a cultural experience, resulting in disorienting and self-referential conditions, where the visitor is no longer called upon to participate in the creation of meaning but rather in its passive assimilation. A sort of paradoxical short circuit where active presence generates levels of understanding only passively accessible). As Byung-Chul Han states, the digital generates a vision that nullifies the pathos of distance “digital communication, in general, reduces distances; the reduction of spatial distances relates to the erosion of mental distances.”⁷ Moreover, he argues, the trend of digital culture is additive because it is based on collective and transparent writing, where information is produced without intermediation and is therefore devoid of temporal and existential extension, resulting in a considerable loss of meaning of the narrative.

THE *PHYGITAL* SCENARIO

The topic of intermediation brings into play the ability of the digital apparatus to generate a natural and physical interaction with the visitor, where the latter acts as the trigger of the very process of modulation and assimilation of the contents of the whole exhibition apparatus. An experiential interaction, strongly *object-based* and *gesture-based*, can engage the visitor in a more “friendly”, comprehensible, and operationally way. This process is the consequence of the elaboration and subsequent representation of gestural and operational patterns already established in the linguistic habits of everyday life. It is interesting to point out how the New Zealand psychologist and neuroscientist Michael Corballis argued that human language developed mainly from manual gestures, thanks to the *mirror system*⁸. It is a mechanism through which man developed the *mimesis*, i.e., the ability to intentionally reproduce actions and events from the outside world, even in the absence of natural objects with which to interact: a mechanism, not surprisingly, widely used in *phygital* environments).

The visitor, therefore, accesses the digital enhancement, reaching higher and layered levels of the exhibition narrative, which also gives materiality to the immaterial contents through spontaneous and usual attitudes. So, fruition models are central to theoretical scenarios and operational outcomes. Already in 2009, about the fruition models, Davide Spallazzo, Alessandra Spagnoli, and Raffaella Trocchianesi provided a classification organized around paradigmatic modes:

incremental - “the quantity and quality of the content proposed to the visitor [increase exponentially] in accordance with his particular readiness for involvement and immersion”⁹,

selective - “the user, as an active reader, freely makes his own reading paths within the *museum-exhibition metatext*”¹⁰ and

participatory - “the visitor (...) is guided to design his own cultural experience both from the point of view of content and of the *structure* or image of the cultural institution itself.”¹¹

Today these experiences, based on the interaction of physical (analog) and virtual (digital) environments, are called *phygital*. The intersection of these new paradigms fosters story-driven experiential interaction and the humanization of technology as a mediation of the experience with physical, cognitive, or virtual space. These experiments generate augmented and enabling digital experiences according to a vision that defines new relationships between people/users and innovative scenarios of the nature of the exhibition space, considered in the broadest spectrum of hybridization: *physical/figurative/virtual*.

SOME PARADIGMATIC CASE STUDIES

Cma Gallery One: the interpretative phygital environment

Launched between 2012 and 2013, *Gallery One*, installed at the Cleveland Museum of Art¹² (media design and development by Local Projects; exhibit design by Gallagher and Associates), marked a milestone in using what has been defined as interpretive technology. It is an articulated and extended system of reinterpreting museum collections through highly immersive technological implementations. Strategically arranged in the museum space so that it can be crossed at different times during the visit, Gallery One's innovative blend of art and technology invites visitors to connect actively with the art on view through exploration and creativity. Designed for visitors of all ages, both novice and seasoned, the technology interfaces inspire visitors to see art with greater depth and understanding, sparking experiences across the spectrum from close looking to active making and sharing.¹³

Although, in this case, the user interface still consists of multi-touch interactive screens, it is the typology of exploration, based on the union of the principles of entertainment and education, that, by a ludic language, allows visitors to access different levels of narrative through bodily and sensory involvement. For example, the visitor's body, mapped by a motion sensor, is called upon to imitate the poses of the sculptures ("*Strike a Pose*"), or her/his facial expressions can be compared, thanks to facial recognition software, with those of the portraits in the collection ("*Make a Face*"). These experiences humanize the relationship between the artwork and the user, predisposing the latter to greater confidence and making exploring the more complex cultural content more fluid and natural.

Gallery One is conceived and approached as an interactive space that seeks to connect art and ideas, and forge connections between art and people (...) The Gallery One space brings art and ideas together to facilitate inquiry and discourse among visitors. Information is delivered in ways that feel like experiences rather than didactic lessons, allowing visitors to drive their own encounters with works of art and share their experiences with each other.¹⁴

Greenwood Rising: the immersive phygital environment

The creation of *phygital* exhibition environments, conceived through transitive processes based on storytelling, also makes it possible to generate immersive experiences. In this case, it is declined the idea of active immersive, based on the relationship between the visitor and the surrounding environment reinterpreted by digital enhancement. The result, then, is spaces that are not purely contemplative, like it happens in the full immersive exhibitions, where the only language offered is the visual one, within whose logic everything happens.¹⁵ By *phygital* immersive concept, the coexistence between the narrative contents, the objects, and their digital enhancement positively persists.

Local Project, a design studio based in New York (U.S.A.), also media design and developer of *Gallery One*, is the author and media designer of the exhibit *Greenwood Rising*¹⁶, a memorial devoted to the misunderstood Oklahoma 1921 Tulsa racial massacre. It concerns the history of the dramatic destruction by a group of white residents of over 35 blocks of Greenwood's prosperous African American neighborhood, where over 300 people died.

In the Memorial, the interweaving of past and present is experienced by visitors moving between objects, films, layered images, and environments reconstructed and enhanced by digital. In this way, visitors can understand the urban and social development of the neighborhood ("*Greenwood Spirit*"), but above all, get to know the people and their lives. Where else could this best happen than in a period barbershop ("*Life in Greenwood. Period Barbershop Recreation*")? Here, in an immersive environment, holographic barbers talk about the hopes and values of the community with their visitors/customers, according to the most classic and human attitude of oral transmission of history. Lastly, the digital set design of the "*1921 Tulsa Race Massacre*" creates a profound emotional impact and senses engagement by immersing visitors in a landscape of destruction, where you relive the drama, minute by minute, but also listening to audio stories coming from interviews with survivors. Visitors end their journey by

making a personal commitment to racial reconciliation: a commitment that is entrusted to an LED brick that is added to the community wall of past commitments in the “*Journey to Reconciliation: Commitment Space*”.

Museo Laboratorio della Mente: The human gesture phygital environment

Operating for over forty years, *Studio Azzurro*, an Italian multidisciplinary artistic research laboratory, has created video environments, sensitive environments, and museum itineraries. In all these projects, the presence of digital technology is fundamental. Often it is explicit (technical devices are visible, in a logic of conceptual and operational integration with analog and traditional exhibition apparatuses), but, above all, “humanized” through the centrality of everyday gestures, used as an immediate and spontaneous means of access to the digital contents themselves.

The *Museo Laboratorio della Mente*,¹⁷ which opened in 2000 in Rome, is a cognitive and sensorial journey into the world of mental discomfort. Here, for example, in the section “*Houses of the Body*” two installations require the visitor’s body to assume specific postures that act both as an access code to information and as a sensory and physical identification with mental pathologies symptomatic attitudes. The “*Table*” installation will only emit short audio narratives due to the positioning of the elbows of the visitor, who will also have to put his hands over his ears.

“This posture generates an inverse perception, whereby other visitors are led to interpret this figure holding his head in his hands (...) as if he were one of those patients who, clasping his hands to his ears, tries to stop the oppression of sounds and voices pervading his head.”¹⁸

CONCLUSION

The three types of *phygital* exhibition environments introduced here are, of course, not exhaustive. For example, Sandro Debono¹⁹ proposes five possible scenarios of a more generic nature in search of an overview of the possible combinations that the contamination of physical and digital can assume within the *phygital* museum experience. The case studies illustrated here are, however, paradigmatic of a scenario that is still in full evolution. Not only because of the continuous progress of digital technologies (a fact that, moreover, implies the problem of the rapid obsolescence of technological solutions) but rather because of the constant revision of the communication and display strategies connected to them. A sort of paradoxical game of mirrors in which the time of availability of information is now zero but also entails its almost immediate consumption, just as the amount of accessibility to information is virtually infinite. In contrast, the human capacity to absorb and metabolize it remains limited.

The most important aspect of the experimentation of *phygital* environments in the context of exhibitions and museums lies in the potential of proposing hybrid experiences, strongly oriented to generate, stimulate and make available immersive scenarios. Here the interaction between the visitor and the digital tool is carried out in a spontaneous, not mediated, and therefore more easily assimilated manner. In this sense, the integration of digital enhancement within an overall narrative construction, which defines and coordinates the whole process of confrontation and recognition between the visitor and the offered contents, is fundamental. The intersection between narrative structure, personal physical, experiential capacity, and the enhancement in terms of content and communication brought about by digital practices overcomes that “transparency” that Byung-Chul Han defines as “the essence of information, indeed, (...) the gait of the digital medium.”²⁰

NOTES

¹ Eva Hornecker, "The Glossary of Human Computer Interaction," *Interaction Design Foundation*, Tangible Interaction, Chapter 45, accessed June 30, 2022, <https://www.interaction-design.org/literature/book/the-glossary-of-human-computer-interaction/tangible-interaction>.

² «By "resonance" I mean the power of the object displayed to reach out beyond its formal boundaries to a larger world, to evoke in the viewer the complex, dynamic cultural forces from which it has emerged and for which-as metaphor or, more simply, as metonymy-it may be taken by a viewer to stand. By "wonder" I mean the power of the object displayed to stop the viewer in his tracks, to convey an arresting sense of uniqueness, to evoke exalted attention».

Stephen Greenblatt, "Resonance and Wonder," *Bulletin of the American Academy of Arts and Sciences* 43, no. 4 (January 1990): 11-34, accessed June 30, 2022, <https://www.jstor.org/stable/3824277>

³ Atelier Bruckner, *Scénography 2. Staging the Space*, (Basel, CH: Birkäuser, 2018), 193.

⁴ Boris Groys, *In the flow. L'arte nell'epoca della sua riproducibilità digitale*, (Milano, IT: Postmedia, 2018), 176

⁵ Groys, *In the flow*, 170

⁶ Groys, *In the flow*, 170-171

⁷ Byung-Chul Han, *Nello sciame. Visoni del digitale*, (Milano, IT: Nottetempo, 2015), 12

⁸ See Michael Corballis, *Dalla mano alla bocca*, (Milano, IT: Raffaello Cortina, 2011)

⁹ Spallazzo Davide, Alessandra Spagnoli and Raffaella Trocchianesi, "Il museo come organismo sensibile. Tecnologie, linguaggi, fruizione verso una trasformazione design-oriented," in *Un nuovo "made in Italy" per lo sviluppo del Paese. ICT per la valorizzazione dei beni e delle attività culturali*, ed. AICA2009 (Roma, Università La Sapienza Roma, IT: 2009), paragraph: 3.1., accessed June 30, 2022, https://www.researchgate.net/publication/278031499_Il_museo_come_organismo_sensibile_Tecnologie_linguaggi_fruizione_verso_una_trasformazione_design-oriented

¹⁰ Spallazzo, Spagnoli and Trocchianesi, "Il museo come organismo sensibile", paragraph: 3.2.

¹¹ Spallazzo, Spagnoli and Trocchianesi, "Il museo come organismo sensibile", paragraph: 3.3.

¹² See *Gallery One*, accessed June 30, 2022, <https://www.youtube.com/watch?v=qWJqd6lyJ-E>

¹³ Jane Alexander, Jack Barton, and Caroline Goesser, Transforming the Art Museum Experience: Gallery One. in *Museums and the Web 2013*, eds. N. Proctor and R. Cherry (Silver Spring, MD: Museums and the Web, 2013), paragraph "Introduction", accessed June 30, 2022, <https://mw2013.museumsandtheweb.com/paper/transforming-the-art-museum-experience-gallery-one-2/>

¹⁴ Alexander, Barton, and Goesser, Transforming the Art Museum Experience, paragraph "Responding to audience research"

¹⁵ See "Between the Discursive and the Immersive", *Stedelijk Studies Issue #4* (Spring 2016); in particular, Mark Wigley, "Discursive versus Immersive: The Museum is the Massage", *Stedelijk Studies Journal* 4 (2016). DOI: 10.54533/StedStud.vol004.art02

¹⁶ See <https://www.greenwoodrising.org/> and <https://localprojects.com/work/museums-attractions/greenwood-rising/>

¹⁷ See <https://www.museodellamente.it/> and <https://www.studioazzurro.com/opere/museo-laboratorio-della-mente/>

¹⁸ UOS centro Studi e Ricerche ASL Roma and Studio Azzurro, *Museo Laboratorio della Mente*, (Cinisello Balsamo, IT: Silvana, 2010), 30

¹⁹ Sandro Debono, "Phygital ... What's That? Introducing the Phygital Museum Scale", *The Humanist Museum*, accessed July 24, 2022, <https://medium.com/the-neo-humanist-museum/phygital-whats-that-7d2c701c1662>
According to Debono, the five current scenarios are "Physical with a token of digital", "Physical with digital as an extension", "Digital as a pointer to physical", "Parallel and cross-existence of physical" and "Digital and digital with a token of physical".

²⁰ Byung-Chul Han, *Nello sciame*, 56

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LA PROMENADE ARCHITECTURALE: LE CORBUSIER, HADRIAN'S VILLA AND THE DIGITAL WORLD

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INTRODUCTION

Le Corbusier's *Vers une Architecture*, one of the foundational publications of modern architecture, was first published in 1923. It famously begins with a chapter on the "Engineer's Aesthetic." Less noticed, perhaps, is that a later chapter entitled "Architecture" deals with the history of architecture and its lessons. The title page of the first part of that chapter, entitled "The Lesson of Rome," is graced by the plan of Hadrian's Villa. In this section Corbusier goes on to say that at the villa, the Romans "really planned. It is the first example of Western planning on the grand scale." And to experience this, one has to take a "walk in Hadrian's Villa."¹

Le Corbusier wrote often about the role of architecture in guiding human movement.² He was clear about the need for view axes as the necessary motivating factor in the experience of a place. He believed that the most fundamental aspect in the act of arrangement that lies at the heart of planning "is based on axes... the line of direction leading to an end... A bird's eye view as given by a plan on a drawing board is not how axes are seen; they are seen from the ground, the beholder standing up and looking in front of him."³ These axes are at the basis of the notion of the "promenade architecturale" that was a constant concern of the architect.⁴

Despite the great difference in architectural expression and scale and the tremendous gap in time, Corbusier saw these principles in the plan of Hadrian's Villa, which, this paper claims, following Corbusier, was based on human movement as an organizing principle in its design. He visited and sketched Hadrian's Villa as a young man in 1911 on his "Journey to the East," and used that experience in the development of the architectural theory behind his work.⁵ On one hand, Le Corbusier's experience was of ruins. On the other, it is now possible to see how a complex such as Hadrian's Villa as originally designed adhered to those principles which so excited the young architect. One can now digitally recreate a sequence of images which would be encountered on a walk in Hadrian's Villa that a contemporary visitor might have taken, at the core of which are the views that the young Corbusier sketched.

A WALK IN HADRIAN'S VILLA

Hadrian's Villa is a large complex with a labyrinth like plan that has not ceased to fascinate since its rediscovery in the Renaissance. But 500 years of continued excavation and scholarly analysis have yet to explain some of the most basic facts about the place. At the center of the plan of the villa is a pool called the Canopus. (Figure 1, below left) The following images are taken along the route outlined here, a walk through a relatively small, but crucial part of the villa. Our walk will follow the path a diplomatic

visitor might have taken, who had come to the villa on an embassy to plead a case before the emperor, who is ensconced here, in Tivoli, instead of in the palace on the Palatine in Rome. The Canopus axis connects the Central Vestibule Complex to the north, assumed to be the entry point for visitors to the villa, with the Serapeum to the south, a major dining pavilion with extensive fountains, a monumental “nymphaeum.” Within the villa, this is the longest straight axis, but we shall see that it extends to the landscape beyond, grounding the villa within the greater landscape.



Figure 1. Above, Central Vestibule Complex entry façade; below left, partial plan of Hadrian's Villa; below right, current state of the ruins

Entry façade of the Central Vestibule Complex

In the forecourt to the Central Vestibule, the visitor approaches the formal entry into the villa. (Figure 1, above) Proceeding up the slope, the pavement makes an abrupt turn in front of the monumental set of steps, allowing those who have arrived mounted or in a chariot or wagon to disembark. Little remains of this façade except the niches and fountains to each side and the monumental scale of the foundation for the central stair. (Figure 1, below right).



Figure 2. Above, courtyard of the Central Vestibule Complex; below left, view of the ruins; below right, remains of a curved corner pier

Courtyard of the Central Vestibule Complex

Up the monumental stairs and through the entry gateway one finds oneself in a courtyard large enough but of a decidedly more domestic scale. (Figure 2, above, below left) A small reception room terminates the axis on the south. This room occupies the place of the “tablinum” in a traditional Roman home, on one side of the atrium opposite the entry. This physical relationship to our visitor forcibly invokes the symbolism of the “paterfamilias,” who sat in the tablinum to receive his clients. That Hadrian should be by extension the paterfamilias of the empire was both a factual result of being emperor and an aspiration on the part of Hadrian to be the benevolent father of the Roman world in emulation of Augustus and others. Not that Hadrian himself would be in this reception room to receive a visitor of whatever rank. That would come later. But the message was clear. The architecture speaks to reinforce this message of the authority of ancient traditions.⁶



Figure 3. Above, aerial view of the Central Vestibule Complex, looking south; below left, view of the ruins of the forecourt of the Central Vestibule Complex; below right, aerial view of the ruins

Aerial view of the Central Vestibule Complex

The plan of the Central Vestibule Complex has its awkward moments according to some scholars,⁷ but if there are compromises there is also a marvelous interplay of building and landform, as the axes which organize the architecture extend out into the landscape – or vice versa. (Figure 3, above) The reconstruction shows architectonic topiaries to the north and south, emphasizing axes. Terraced landscape edges to the west still exist amongst the ruins. (Figure 3, below left and right) To the east of the Central Vestibule Complex are the Large and Small Baths. Projecting from the courtyard to the east is an enclosure with a small temple identified as a “lararium.”



Figure 4. Above, the great hall of the Central Vestibule Complex, looking south; below left, view of the ruins from the south; below right, a sketch of the section through the Canopus by Le Corbusier

The great hall of the Central Vestibule Complex

The Canopus axis is so-called because the large canal that extends south from the Central Vestibule Complex is reasonably identified with the Canopus referred to in the description of the villa found in an ancient biographical sketch of Hadrian, an evocation of the canal between Alexandria and Canopus in Egypt.⁸ There were temples to Serapis at both ends of that canal, the one in Alexandria being the most renowned, with extensive extent ruins.⁹ The so-called Serapeum at the southern end of the Canopus beyond occupies a pre-existing hollow in the landscape with the land rising on three sides. This is clearly seen in the sketch by Corbusier. (Figure 4, below right)

At the center of this axis lies the great hall of the Central Vestibule Complex. (Figure 4, above, below left) This is the first of three similarly scaled large rooms encountered by a visitor traversing the villa, seemingly designed to accommodate the maximum sized crowd that would have assembled for an audience with the emperor.¹⁰



Figure 5. Above, view looking south from the great hall along the Canopus axis to the Academy on the hill beyond; below left, the view of the arches at the north end of the Canopus with the ruins of the Serapeum beyond; below right, a wall painting from Pompeii of a maritime villa

View along the Canopus axis to the Academy beyond

Though large trees now frame the three sides of the Canopus, at the time of construction the plantings could not have been so large. As such there can be little appreciation now how the Academy, the name given to the complex beyond on the hill, would form an architectonic, though picturesque, back drop to what is currently an overwhelmingly bucolic view. (Figure 5, below left, above)

A view is picturesque of course because it is picture-like. The tradition of Roman landscape painting emphasized picturesque architectural fragments within a natural setting, frequently seen through a painted architectural framework, imagined landscapes which actual villas may then have attempted to replicate.¹¹ A wall painting from Pompeii of a maritime villa, now in Naples, shows a similar scene. In naïve perspective, parallel colonnades alongside a central rectangular pool lead to a portico, with picturesque pavilions visible in the landscape beyond, the very model for the situation at the Canopus of Hadrian's Villa. (Figure 5, below right)



Figure 6. Above, the Serapeum; below left, the ruins of the Serapeum with an 18th century columbarium atop the ruins of the Academy visible through the trees beyond; below right, a sketch by Le Corbusier, before the Canopus was excavated

Serapeum

The Serapeum would probably not have acquired its name if it were not at the southern end of the Canopus, whose name seems so plausible. (Figure 6, above, below left) There is little evidence in the ruins of things Egyptian, though there is at least one nearby precedent for a Serapeum with a similar plan.¹² Corbusier saw the Serapeum before the excavations of the 20th century. His sketches emphasize the basic forms within the landscape and in particular the lighting effects, in this case of the top lighting of the curved end of the axial extension leading back from the half dome, that leads one eyes deep into the hillside. (Figure 6, below right)

The Serapeum is one of the highly unique architectural masterpieces at the villa that is surmounted by a segmented dome, reminiscent of a gourd.¹³ It is not a temple, but is a nymphaeum/dining hall with a permanent dining couch, on which diners would recline during the meal. This was called a “stibadium” when curved as here.¹⁴ The water which fills the Canopus canal rained down at the end of the axial extension of the structure back into the hillside, a miniature gorge. It then poured forth from the curved fountain behind the stibadium, which was also fed from the niches on both sides, both those with and without statues. The diners, reclining on pillows, would presumably have been able to pick their food from floating trays in the channel in front of the stibadium.¹⁵

There is no sculpture that can be definitely shown to come from the Serapeum that would give clues about its intended meanings.¹⁶ But there may still be a reason, in addition to the form of its plan, to believe that Hadrian could have conceived this structure as a Serapeum.



Figure 7. Above, the view to the north from behind the stibadium in the Serapeum; below left, Le Corbusier's sketch of the same view in 1911; below right, the view in 2010

Looking north from the Serapeum

In Hadrian's day, the Alexandrian Serapeum seems to have housed the famous library of Alexandria and its home institution, the Mouseion, or Museum. Hadrian is said to have debated the scholars there and appointed new members, which allowed them to be "among those who had free meals in the Museum." In Hadrian's day this appears to have been the most well known aspect of the Museum, which was referred to as "a dining table in Egypt, to which are invited the most distinguished men from all over the world."¹⁷ Thus it is entirely logical that Hadrian, proud of his learning and obsessed with the older civilizations of both Greece and Egypt, might name the preeminent dining hall at the villa, placed on a canal named the Canopus, a Serapeum, a symbol of the union of the Hellenistic world and the traditions of Egypt.¹⁸

In Corbusier's sketch looking north from the Serapeum what is extremely evident is that the Canopus axis is centered on a distant hill to the north, seen through a screen of trees, surely an extremely important aspect of the layout of the villa if we are talking about "view axes" as central to the concept of the architectural promenade. (Figure 7, below left) Yet in antiquity, the great hall of the Central Vestibule Complex would have blocked the view. (Figure 7, above) Which creates a conundrum. If the longest axis at the villa was oriented to a distant landscape feature, and this had any meaning, why would it have been hidden? What secret is this? For most of the subsequent century since Corbusier's visit a large tree has blocked this view, thus giving us the same experience as occurred in antiquity. (Figure 7, below right)



Figure 8. Above, aerial view of the Serapeum and the Apsidal Pavilion at the south end of the Canopus axis; below left, aerial view of the ruins; below right, view from the south of the ruins of the switchback stair on the east side of the Serapeum

Aerial view of the Serapeum and context

The Serapeum imitates no other known building. (Figure 8, above, below left) Underneath the references to Greece and Egypt lies a Roman vaulted concrete structure of Baroque complexity. Amongst subsidiary rooms for pleasure and service there are stairs on both sides. The stair on the east, on our left, is a very compact and modern seeming two story switchback stair that leads to the area above and behind the Serapeum, ultimately leading to the Apsidal Pavilion at the very end of the Canopus axis which then leads to the formal gardens further to the east. (Figure 7, below right)

As one walks south past the Serapeum towards the Apsidal Pavilion, a slight detour takes one up the slope to a vantage point behind the Serapeum, where there is a distant view to the north over the rooftop water channels. It is only from this spot above that this alignment of the Canopus is both acknowledged in the plan and visible to the visitor.



Figure 9. Above, view from behind the Serapeum looking north; below, the same view of the ruins today

View from behind the Serapeum to the Monti Cornicolani beyond

As we saw in the sketch of Corbusier, the Canopus axis projects beyond the confines of the villa and aligns with a distant hill. (Figure 9, above and below) The hill in question is surmounted by a village known today as Sant' Angelo Romano. This hill is actually the northernmost peak of a group of hills known as the Monti Cornicolani. The Monti Conicolani are so-called because they are believed to be the site of ancient Corniculum, the home of Servius Tullius, the fourth king of Rome. Hadrian constantly sought antecedents for his actions. Here is evidence of yet another model.¹⁹

The view would have been apparent from the Academy complex above, particularly from the tower which terminates the Canopus axis, but the Academy as a whole has a different alignment. The fact that this prime organizational alignment is not visible from structures whose orientation is fixed by this alignment will strike the modern viewer as strange.

That the relationship to the hill is eventually revealed in an out of the way spot might suggest that there was a reason to obscure the view for the uninitiated. Though Servius Tullius is known as one of the best of the seven kings, his ascension to the throne was problematic. Tanaquil, the queen of the deceased previous king, withheld notice of his death until securing the ascension of her protégé. This was similar to the promotion of Hadrian by Plotina, the wife of Trajan, and hence could be seen as acknowledging the presumed subterfuge that led to Hadrian's becoming emperor. Verification of an open secret, perhaps.²⁰



Figure 10. Above, the Apsidal Pavilion; below, aerial view of the Academy

Apsidal Pavilion

Continuing to head south, the visitor would arrive in front of the smaller apsidal structure terminating the Canopus valley. (Figure 10, above) The gates shown in the reconstruction emphasize the security aspect of this gateway structure, which controls the movement of visitors from an area relatively open to their free movement to more restricted areas of the villa. The plan of the smaller building mimics that of the larger, suggesting that its dome, which is entirely destroyed, could have been similar as well.

Once inside, turning twice to the left would take the visitor up a stair and into the formal gardens, into an area of the villa where only the emperor, his entourage, and his invited guests could go. The lucky invitee would have the opportunity to accompany Hadrian for a walk in the park, a hunt, or other such relaxing, yet “networking,” activity.

Figure 10, below, shows a proposed reconstruction of the Academy, with the structures that are visible above the Serapeum. The Apsidal Pavilion is on the far left, with the formal gardens visible above.

CONCLUSION

This digital reconstruction of a small but significant portion of Hadrian's Villa has demonstrated the power of view axes to organize and to give meaning to a plan. The “promenade architecturale” is not simply a device that offers the delight of architectural form, but one which enriches our experience and gives meaning to that experience.²¹ Corbusier's experience of the villa of the emperor Hadrian as a young man was one of the decisive experiences of his “Journey to the East.” It was here that he first encountered the dance of the “vie quotidienne,” in which our daily routes, or rituals, acquire and then transmit meanings that contain essential truths about our lives. The enlightened architect can fashion the environment according to these truths. In the case of a public monument like the villa of an emperor, this movement from “one evocative cultural statement to another” constitutes a representation of the

state in a “a concentrated array of appropriate themes and symbols.”²² And it is now the power of digital imagery that allows us to both to reconstruct what was and to propose anew meaningful passages through the designed environment as a virtual mirror of the lived world.

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NOTES

¹ Le Corbusier, *Towards a New Architecture*, trans. Frederick Etchells (New York, Toronto, London, Sydney: Holt, Rinehart and Winston, 1974), 145-146. First published as *Vers une Architecture* in 1923.

² "Architecture is experienced as one roams about in it and walks through it..." he told students. Le Corbusier, *Le Corbusier talks with Students from the Schools of Architecture*, trans. Pierre Chase (New York: Princeton Architectural Press, 1961), 32. First published as *Entretien avec les étudiants des écoles d'architecture* in 1943.

³ Le Corbusier, *Towards a New Architecture*, 173.

⁴ He did not coin the term "promenade architecturale" until later, in the 2nd volume of his *Œuvre Complète*. Discussing the architectural promenade at the center of his most seminal work, the Villa Savoye, Le Corbusier invoked the example of "Arab architecture" as an example of architecture experienced by walking about. Le Corbusier and Pierre Jeanneret, *Œuvre Complète Volume 2, 1929-1934* (Zürich: Les Editions d'Architecture, 1995), 24, first published 1936. Yet scholars agree that the idea is clearly present in embryo in *Vers une Architecture*. "In tracing the *promenade architecturale* back to the publication *Vers Une Architecture* (*Towards a New Architecture*), most studies refer specifically to Le Corbusier's use of Auguste Choisy's diagram of the Acropolis." Jacques Laubscher, "Tracing the origin of the term *promenade architecturale* as used in *Vers une architecture*," *South African Journal of Art History* 30: 4 (2015): 103-21.

⁵ Rome and its surroundings were the last new stops on his "Journey to the East," his seven month long journey as a twenty four year old man in 1911. Le Corbusier, *Journey to the East*, trans. Ivan Zaknic (Cambridge: MIT Press, 1987). This journey was life altering, and interestingly, for one of the creators of modern architecture, the Acropolis, Pompeii and Hadrian's Villa made a tremendous impression on the young architect. All are represented extensively in *Vers une Architecture*.

⁶ And just as the atrium would contain an altar dedicated to the household gods, a "lararium," so a small temple within a walled enclosure to the right of the image is known by that name.

⁷ According to William MacDonald, the Central Vestibule Complex "was less a building than a chain of courts and passages... the plan is something of a makeshift... maybe the building was extended more or less ad hoc." William MacDonald and John Pinto, *Hadrian's Villa and Its Legacy* (New Haven and London: Yale University Press, 1995), 69-70.

⁸ "His villa at Tivoli was marvelously constructed, and he actually gave to parts of it the names of provinces and places of the greatest renown, calling them, for instance, the Lyceum, the Academia, the Prytaneum, Canopus, the Poecile, and Tempe. And in order not to omit anything, he even made a Hades." *Scriptores Historiae Augustae, Hadrian*, 26.5, trans. David Magie, London: William Heinemann, Ltd. And New York: Harvard University Press, 1922-1932). This is the only descriptive passage of the villa to survive from antiquity.

⁹ Serapis was a syncretic Graeco-Egyptian deity of the Hellenistic era, when the Ptolemaic kings ruled Egypt, combining the attributes of Osiris and the bull god Apis. During the Roman Empire Serapis often replaced Osiris as the consort of Isis in temples outside Egypt. "Serapis," Wikipedia, accessed July 30, 2022, <https://en.wikipedia.org/wiki/Serapis>.

¹⁰ By present day standards a room of such a size could contain 750 people, standing room only. The height of the ceiling shown here is based on a 1:1 proportion, the minimum one tends to find in ancient Roman buildings. The double column motif that articulates the walls of the great hall of the Central Vestibule Complex is based on the reconstruction by Walter L. Reichardt, which neatly resolves the spacing of the openings on the side walls. William L. Reichardt, "The Vestibule Group at Hadrian's Villa," *Memoirs of the American Academy in Rome* XI (1933): 127-132.

¹¹ Pliny the Younger compared his Tuscan villa with a painted one. Of the views within his villa he wrote, "You would imagine, that not a real, but some painted landscape lay before you, drawn with the most exquisite beauty and exactness." Pliny the Younger, *Letters*, 5.6.13, trans. William Melmoth and Frederick C.T. Bosanquet (Delhi: Lector House, 2019).

¹² The villa structure, which has a hemicycle plan, is unlikely to replicate the famous Serapeum in Canopus, whose plan is unknown, or the one in Alexandria, which was rectilinear, typical for Serapeums across the empire. There is one local precedent for a curved plan Serapeum. There was an earlier temple to Serapis along with Isis in the Campus Martius, known from fragments of the Severan marble map of Rome. The villa Serapeum shares its basic plan form with the apsidal building of the Campus Martius plan. Two other examples of apsidal forms in temples of Isis and Serapis are illustrated in Anna Maria Reggiani, "Adriano e l'Egitto: Alle origine dell'Egittomania a Villa Adriana," in *Suggerioni egizie a Villa Adriana*, ed. Benedetta Adembri and Zaccaria Mari (Electa: Milano, 2006), 60-61. These are a 1st century example in Italy near Turin, and, less convincingly, a Hellenistic addition to the approach to the Serapeum at Saqqara.

There are three complexes with a hemicycle plan at the villa. All were associated at one time or another with finds of Egyptianizing sculpture and all could be associated with Serapis or his consort Isis. Besides the Serapeum there is the recently discovered Antinoeion, the possible tomb of Antinous, the favorite of Hadrian who drowned in the Nile (like Osiris), and there is the so-called Temple of Venus. Zaccaria Mari and Sergio Sgalambro, "The Antinoeion of Hadrian's Villa: Interpretation and Architectural Reconstruction," in *American Journal of Archaeology* 111 (2007): 83-104. The Temple of Venus is a Doric tholos that is framed by a curving portico, where a statue of Venus was discovered. This might be an Iseum, as Isis was sometimes identified with Aphrodite (Venus). It is adjacent to the so-called Palestra, where some of the Egyptian sculpture from the villa was found. Serena Ensoli, "Per un cosidetto Iseo nella villa di Adriano a Tivoli: il Padiglione-Ninfeo "di Venere Cnidia," in *Villa Adriana. Paesaggio antico e ambienti moderno: elementi di novità e ricerche in corso*, ed. Anna Maria Reggiani (Milan: Electa, 2002), 94-112.

¹³ In his short biography of Hadrian, Dio relates a story for the purpose of explaining Hadrian's dislike of Apollodorus, the leading architect under Trajan. Dio, *Dio's Roman History*, 69.4, trans. Earnest Cary and Herbert B. Foster (London: William Heinemann, Ltd. and New York: Harvard University Press, 1914-1927). This anecdote has Hadrian engaged in the actual production of an architectural drawing, an unusual activity, perhaps, for a future head of state. When Hadrian interrupted a consultation of Apollodorus with Trajan, Apollodorus snapped, "Be off, and draw your gourds." One is immediately reminded of the pumpkin shaped segments of the domes of Hadrianic buildings such as the Serapeum, a dome type unprecedented in earlier architecture (and of tremendous interest to the Baroque architects who later studied the ruins of the Villa for inspiration). According to William MacDonald, Frank Brown was the first to make this suggestion. William MacDonald, *The Architecture of the Roman Empire, Volume 1* (New Haven and London: Yale University Press, 1982), 135, Note 45.

¹⁴ The more common "triclinium" refers to a rectangular three-sided dining couch, or three couches placed at right angles to each other, and by extension, the place in which the couch or couches may be found. Vitruvius refers to a dining room as an "oecus," the Greek term for an all-purpose room, frequently with internal columns. Vitruvius, *The Ten Books on Architecture*, 6.3.8, trans. Morris H. Morgan (New York: Dover Publications, 1960). "Cenatio" or "cenaculum" is another, earlier term, meaning, simply, an eating place, and referred typically to upper floor rooms. Jean-Pierre Adam, *Roman Building: Materials and Techniques*, trans. Anthony Mathews (London: B.T. Batsford, Ltd., 1994), 308. Even the word "tablinum" came eventually to be used for a dining hall. William MacDonald and John Pinto, *Hadrian's Villa*, 102.

¹⁵ There is an elevated platform in a pool within the axial extension to the rear, covered by an arched bridge-like element, which could have been a secure but highly visible location for the emperor's couch during a banquet. Eugenia Salza Prina Ricotti made this suggestion in her publication of 1987. Eugenia Salza Prina Ricotti, "The Importance of Water in Roman Garden Triclinia," in *Ancient Roman Villa Gardens*, ed. Elisabeth B. MacDougall (Washington, D.C.: Dumbarton Oaks, 1987), 174-181. She subsequently backed away from it somewhat in 2001. Eugenia Salza Prina Ricotti, *Il Sogno di un Imperatore* (Rome: "L'Erma" di Bretschneider, 2001), 250-257. There she examines the history of the construction of the miniature gorge at the back of the Serapeum. The covered platform appears to have been added after the initial construction, but the only door providing access was cut through in a still later, third phase. Many have seen the platform as a potential location for sculpture. One suggestion is that it contained a Polyphemus group following the actual grotto of Tiberius at Sperlonga, where such a group was known to exist. Bernard Andrae and Alan Ortega, "Nuove Ricerche a Villa Adriana," in *Atti della Pontificia Accademia Romana di Archeologia, Rendiconti* 62 (Rome: Tipografia Vaticana, 1992), 90-96 and Bernard Andrae, "Il Gruppo di Polifemo di Villa Adriana," in *Adriano. Architettura e Progetto* (Milan: Electa, 2000), 77-80. Rejecting the idea of the platform as a location for sculpture, Eugenia Salza Prina Ricotti suggested that the originally inaccessible platform constituted a triclinium for the gods. She hypothesized that the platform was suggested to Hadrian by his visit to Alexandria and was added after his return. The doorway could have been added under Hadrian or in a post-Hadrianic phase, allowing the platform to then function as a triclinium for human diners. On the other hand, the sequence of construction changes could have been very fast. As Eugenia Salza Prina Ricotti admits, it is impossible in this case to know whether the changes were made a day or a century after the initial construction.

Other factors suggest that the changes were intended from the very beginning or close to it. The door unceremoniously cut through the fountain at the east side of the opening to the gorge (which may have been cut though at a date later than the initial construction as well) leads to a back room with access to a single seat latrine and to the covered platform. This functions both for the emperor's convenience and for his ability to come down and mingle with his guests if he so desired. Because of the violence done to the symmetry of the structure by the door, it seems less plausible to have been there simply for access to a latrine. Ann Kuttner assumes that the purpose of the door was to allow access for visitors to experience the "melodramatic pleasure" of entering "behind the waterfall... to join a river god at his source cavern." Ann Kuttner, "Delight and Danger in the Roman Water Garden: Sperlonga and Tivoli," in *Landscape Design and the Experience of Motion*, ed. Michel Conan (Washington, D.C.: Dumbarton Oaks, 2003), 137.

If Hadrian had originally ordered the Serapeum constructed prior to his departure from Rome in 128, thinking that he would recline with his guests, when he returned in 132 or 134, saddened by the death of his favorite, Antinous, and slowly withdrawing from the world, he could have ordered changes that would have enabled him to eat separately and securely.

¹⁶ At the Gregorian Egyptian Museum in the Vatican is a room with sculpture from the villa that is called the “Reconstruction of the Serapeum of the Canopus of Hadrian’s Villa, Tivoli.” Though there is no longer agreement about the original location of the sculpture on display there, here the head of Isis from the Vatican is still shown as the source behind the waterfall in the axial extension (though it was found by Pirro Ligorio in the Renaissance near the so-called Palestra). One can see these sculptures on the Vatican Museum’s website. “Room III. Reconstruction of the Serapeum of the Canopus of Hadrian’s Villa, Tivoli,” Gregorian Egyptian Museum, accessed July 27, 2022, <https://www.museivaticani.va/content/museivaticani/en/collezioni/musei/museo-gregoriano-egizio/sala-iii--ricostruzione-del-serapeo-del-canopo-di-villa-adriana.html>. Though there is currently disagreement about the location of the Egyptianizing sculpture in the Vatican, there need not have been only one location at the villa to mix aspects of Greek and Egyptian decoration. Three possible locations at the villa were discussed above in Note 12, and so the Serapeum is shown here with just such a mix. Much sculpture was removed from the villa in late antiquity, and the find spot of a sculpture need not be its original location without additional corroborating information.

¹⁷ The Library of Alexandria was part of the leading intellectual institution of the ancient world, the Mouseion (aka, the Museum). A so-called “daughter” library was located in the Serapeum of Alexandria. In 48 B.C.E. Julius Caesar appears to have inadvertently destroyed the main library while setting fire to the ships in the harbor, but the Museum continued in existence. The Alexandrian Serapeum could have housed the Museum in addition to the library, for it was known to have classrooms and resident scholars. Philostratus, in his life of Dionysius of Miletus, whom Hadrian nominated along with Polemo, referred to the Mouseion as “a dining-table in Egypt, to which are invited the most distinguished men from all over the world.” Philostratus, *Lives of the Sophists*, 1.22.3, trans. Wilmer C. Wright (London: William Heinemann, Ltd. and New York: Harvard University Press, 1921).

¹⁸ Most attempts to explain the meaning of the Serapeum and Canopus – and there are many – are variations on this theme of the unification of the Egyptian and Hellenistic worlds. There have been many interpretations over the years, listed in Joachim Raeder, *Die Statuarische Ausstattung der Villa Hadriana bei Tivoli* (Frankfurt am Main and Bern: Peter Lang, 1983), 299-314. See also William MacDonald and John Pinto, *Hadrian’s Villa*, 141-143. In Jean-Claude Grenier, ‘La décoration statuaire du “Serapeum” du “Canope” de la Villa Adriana,’ in *Mémoires de l’école française de Rome, antiquité* 101 (Palais Farnese, Rome: École Française de Rome, 1989), 925-1019, there is a proposal of an intriguing Egyptianizing theme for the Canopus/Serapeum based on restoring sculpture to the area which was found elsewhere, including statues of Antinous, none of which were found at the site. In this interpretation, the Serapeum represents the upper and lower Nile and its delta, and the Canopus canal becomes the Mediterranean, around which is placed the villa, Hadrian’s recreation of the Roman world according to the *Scriptores Historiae Augustae*. Bernard Andrae and Alan Ortega, “Nuove Ricerche,” 79-97, accepted his results with suggestions of their own. See the discussion of their ideas in Eugenia Salza Prina Ricotti, *Il Sogno*, 254-255. The authors repeated their ideas in Jean-Claude Grenier, ‘Il “Serapeo” e il “Canopo”: Un “Egitto” Monumentale e un “Mediterraneo,”’ in *Adriano. Architettura e Progetto* (Milan: Electa, 2000), 73-75, and Bernard Andrae, ‘Il Gruppo di Polifemo,’ 77-80. These were the most recent attempts to justify the Egyptian reference of the Canopus as the memorial to Antinous, who drowned in the Nile. Now that the Antinous memorial has been identified in the forecourt of the Central Vestibule Complex, the Canopus and Serapeum can be seen in the context of conventional villa themes. A more recent interpretation is that of Ann Kuttner, “Delight and Danger,” 103-156, in which she extends the Mediterranean interpretation in ingenious ways, without undue reference to Egypt.

¹⁹ The other two peaks, seen to the right of Sant’Angelo Romano, are occupied today by the town of Montecelio. Though there is general consensus that it is Montecelio that can be identified with Corniculum, at least one author has argued that Sant’Angelo Romano is the more likely site. Augustus J.C. Hare and St. Clair Baddeley, *Days near Rome*, 5th edition (London: Kegan Paul, Trench, Trübner and Company, 1907), 121. Originally published by Hare in 1875. Corniculum was a Sabine town conquered by Tarquin the Elder. See “To Nomentum and beyond: S. Angelo Romano and Montecelio,” *Rome in the Footsteps of an XVIIIth Century Traveller*, accessed 30 July, 2022, <https://www.romeartlover.it/Mentana2.html>.

²⁰ Our knowledge of the subterfuge of Tanaquil is primarily due to Livy, *History of Rome in Fourteen Volumes, Volume 1, Books 1 and II*, 1.41, trans. Benjamin O. Foster (Cambridge, MA: Harvard University Press and London: William Heinemann, Ltd., 1967).

²¹ Andre Wegenscky, the *chef d’atelier* of Corbusier’s studio in later years, wrote of Corbusier that, “as soon as he draws an architectural form in space, he imparts to it an element of meaning.” Quoted in the introduction to Le Corbusier, *Le poème de l’angle droit* (Paris: Foundation Le Corbusier, 1989), no page number.²¹

²² William MacDonald and John Pinto, *Hadrian’s Villa*, 204.

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AN APP TO MAKE VISIBLE THE CINEMATOGRAPHIC ECOSYSTEM OF VALLADOLID, SPAIN.

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INTRODUCTION

Who hasn't ever toured a treasure map? Even, many will have drawn it, incorporating data, information, references of the territory, keys, in short, to follow a route. Every treasure map was drawn by someone whose intention was to transfer the route to someone else to reach the final treasure through an informational procedure that today we would call geolocation.

We are currently developing a computer application for mobile (App), which will be operational in July 2022, so that, in individual or group visits, you can practice screen tourism, using geolocation systems, and discover the Cinematographic Ecosystem of our city, Valladolid, where cinemas, many already disappeared, and films shot there interweave a history of material and immaterial culture powerful linked to the cinema.

We have produced the necessary information for this (texts, plans, maps, renders, infographics, edits, story-telling, image retrieval, movies fragments) to feed the database, which we have called FilmcityDB, which will support the App, which we have called CineMAPP. The user experience of the possible routes of this ecosystem will allow access and enjoy the cinematographic history of the city of the last century and face some reflections on cinema, media, and new technologies, such as the relationships between the physical and the virtual, the understanding of time and the dialogue between past and present, the immaterial culture and the new technologies and the reactivation of the past through new practices from the cinema and the digital technology.¹

THE COMPRESSION OF TIME AND NEW TECHNOLOGIES

We can discover several treasures with the use of CineMAPP, the city of Valladolid, its cinemas, its film locations, and we can make different tours along its interactive, physical and virtual map, and we will understand that the tours will not only be in space but, and perhaps most significantly, in time, making visible places and buildings that may not exist today or are not presented to us as they were in their day or were represented in their respective shootings. Through the new communication and multimedia technologies and with the use of this WebApp we can compress time at our convenience: "I am always surprised that my contemporaries, who believe they have conquered and transformed space, ignore that the distance of centuries can be reduced at our whim".²

The city is a palimpsest whose many accumulated layers are not always easily legible. Diving into the traces that can facilitate its complex history is an objective of this project. These cinematic traces are more than just remnants of a cultural past, because, in many cases, they have a strong link to the city's urban development. They emerged with its urban evolution, disappeared for different reasons (fires,

obsolescence, urban transformations, etc.), and, in a certain way, left their mark on the city.) and, in a certain way, left discontinuities in the sentimental history of its citizens whose absence we will be able to restore in their memory through CineMAPP to recompose the idea of "unity of time" of which Zambrano speaks when she refers to the idea of "unity of time" to the need of "... linking of the relativity of the past and the future ... living the present as a fragment of a temporal current: perceiving its movement ".³ We will be able to visualize the Colegio de San Gregorio in Valladolid in a fragment of the film Mr. Arkadin (Orson Welles, 1955) with the transformation suffered in its filming and, simultaneously, see its current state or visualize the disappeared Cinema Pradera through augmented reality while we are right in front of its location next to the Campo Grande, in an exercise of maximum temporal compression called simultaneity, which supposes "the possibility for two or more events to enter into a single and instantaneous perception ".⁴ We have reflected elsewhere on the idea of the depth of time in this game of transparencies, overlapping, and temporal simultaneities and its use in some memorable architectural projects of modernity⁵, but it is undoubtedly the Cinema, with its particular use of locations, their transformation, and representation, the art that has best deployed the creative and formative potential of the compression of time. CineMAPP wants to pay a fitting tribute to Cinema and its most recent developments in the moving image.



Figure 1. The CineMAPP WebApp from GIRAC.

Figure 2. GIRAC members. From left to right: Sara Pérez-Barreiro, Eusebio Alonso-García, Rubén Vega-Balbás, Daniel Villalobos- Alonso, Iván Rincón-Borrego.

The reactivation of the past. New practices from cinema and architecture

Our research group has been developing for years several studies about the crossed relations between architecture and cinema, exploiting the combination of the tools that both disciplines, architecture and cinema, currently offer us for the analysis of contemporary visual culture. This is why the coexistence of both disciplines in academic research centres is becoming more and more frequent, through the Centres of Architecture and Visual Arts or similar in the Centres of the Schools and Departments of

Architecture, as they are more comprehensive entities of interests and use of research tools that until a few decades ago were considered separate.

The cinema and the moving image, in general, constitute a spatial experience that today extends to *digital production*. The relationship between the physical and the digital is increasingly present in the design of architecture and public space and in the everyday practice of the city. The city is configured as a space of relationships and the new media satisfy unprecedented information needs that enhance the social interaction of urban space. The new technological development has created its own terminology. The *media city* is a formal product and a conceptual finding that refers to and delimits, in a differentiated way, a precise urban form specific to our contemporaneity. The new digital culture has spread to the different human scales, the personal area of perception, the private space of the home, the collective space of public buildings and the urban landscape of the city.⁶ In recent decades, the most recent advanced architecture is picking up the results of these investigations. Specialized critics have warned of the risks of a use of technology that oscillates between mere spectacle or responsible use, a new didactic and social phenomenology,⁷ but have also analysed the social opportunities it brings.



Figure 3. GIRAC: shooting of an edit for the WebApp at the Broadway Cinema in Valladolid, July 2020. Daniel Villalobos, below in the front row, in the role of José Pradera, contemplates on screen an image by Jacobo Romero of the Cinema Pradera in Valladolid, 1932.

The real and the virtual: fiction and reality on the same plane.

Two films exemplify this issue well. There is a scene in the film *Things to come* (Menzies, 1936) where the grandfather shows the girl urban images of the past on a TV screen, prior to her post-war and post-pandemic situation. There is a moment in *Cinema Paradiso* (Tornatore, 1988) where Alfredo directs the camera projection into outer space, where the people who have just been expelled from the cinema are, and continues projecting the film onto a façade of the square. A neighbour comes out of a window to silence the screams in the square; his real image overlaps and intersects with the fictional image of the film. Reality and filmic fiction are superimposed on the unusual screen of the neighbouring façade. Alfredo has taken cinema to the street and has given back to his fellow citizens the space of weekly meeting and collective dream. It is an example of crossed relations and overlapping appropriations between cinema and architecture, fiction and reality, image and public space.

Both scenes intertwine some themes that we see as opportunities for research and transfer through specific technological developments: social education, collective memory, cultural visibilization, interdisciplinary visual culture, the image as informational support, development of visual culture as social knowledge, significance of the social history of a place.⁸ At the same time, between these two scenes, a curious paradox arises that is offered to us as an opportunity for technological development for our social environment: the scene that is more distant in time, that of the film from the 1930s, which tells us of a post-apocalyptic future, indicates one of the ways for the development of new technological

supports to teach and *make visible urban routes and places linked to their use as locations*, both exterior and interior, in film production, in particular, and audiovisual production, in general, carried out in our city.

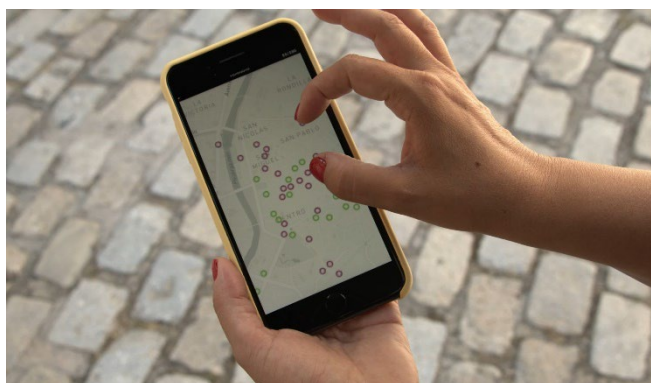
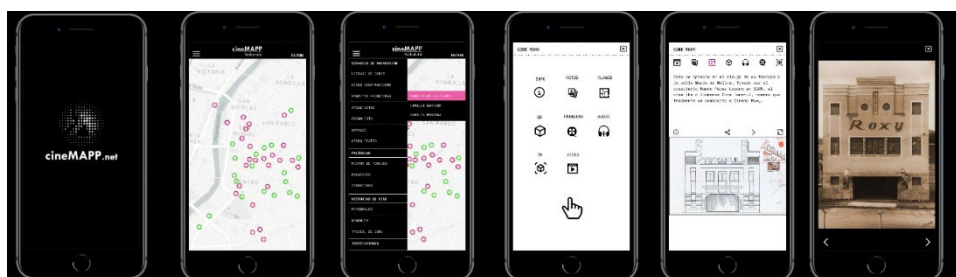


Figure 4. CineMAPP. A journey through the cinematographic treasure map of Valladolid.

METHODOLOGY, TECHNOLOGY, MANAGEMENT, TRANSFER AND EXPERTISE

The research project "*Ecosistema Cinematográfico de la Ciudad y Transferencia con Nuevas Tecnologías*" ("*Cinematographic Ecosystem of the City and Transfer with New Technologies*") is materialized in the design and implementation of two products. On the one hand, the WebApp Cinemapp, limited to the geographical area of Valladolid and on the other hand, the graphic database FilmcityDB, which brings together not only the information that feeds the WebApp, but also numerous data capable of articulating cross-sectional and specialized research, beyond the aforementioned geographical area.



Figures 5 and 6. CineMAPP, two images from the Frontpage.

Methodology

The research project is based on the project resolution methodology: needs analysis, response study, content preparation, and design of virtual and physical information support through specific technological development. This methodology is guided by a general objective, stated in the title of the project (OG - *City Cinematographic Ecosystem and Transfer with New Technologies*), which in turn is divided into three specific objectives: (OE1 - *Development of contents*; OE2 - *Transfer of contents and technological development*; OE3 - *The city as an extensive and daily Medialab*).

The OE1 - *Development of contents* allows us to carry out a study of both films and architectural sites for projection and filming. This archaeological work on the evolution of film culture allows us to analyze how architectural themes, the city, the landscape, urban spaces, lifestyles and social customs have been treated through film and audiovisual production in each era. The recognition of the current landscapes in the city of Valladolid that appear in the films and their transformation consolidates the

identity of the place in the personal and collective memory of its citizens; the contrast that results when comparing the images referred to in different periods reinforces the temporal dimension of its city and its neighbourhoods in the citizens' conscience.

The OE2 - Content transfer and technological development is a priority objective of the project. It consists of transferring to society the results of the research carried out for the reasons stated above. The acquired awareness of one's own history and culture, in this case, linked to cinematography, has local implications, in particular, and on contemporary visual culture, in a broader sense. The objective also serves as a promotion in the audiovisual sector, in general, and not only cinema; enhancing the attractiveness of the city for the audiovisual industry; empowering the neighbourhoods and the city and identifying its urban fragments in some examples of cinematic history; and, finally, building a visual and cinematographic ecosystem that pushes and encourages the city towards the physical and conceptual structuring of an extensive *Medialab*. This necessarily requires the combination of theoretical and research support and the development of advanced technologies that contribute to its dissemination and social transfer, which are embodied in Cinemapp and FilmcityDB.

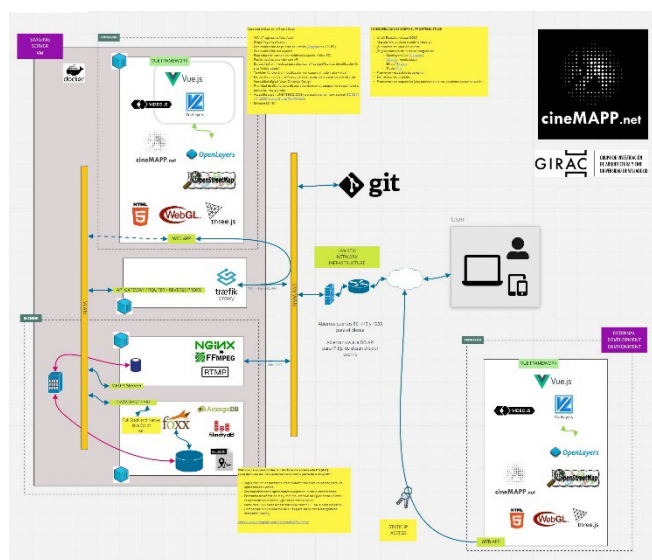


Figure 7. CineMAPP. Technological structure of the application.

Technology, data management and transfer

From a technological point of view, the design and implementation of both FilmcityDB and Cinemapp require the cataloging, production, and indexing of a large amount of digital data for their proper functioning. The general objectives of the project define, *per se*, that the construction of a "Cinematographic Ecosystem of the City" implies the collection of data that will serve to produce the elements and the code that articulates the WebApp. We refer to data on the films shot in the city, directors, actors, production..., to data related to its scenarios, to the screening venues, names of buildings, architects, year of construction, etc... Therefore, most of the data with which the research project works are reference data, derived and/or compiled in various formats (Graphics: jpeg, pdf, png, tiff, dwg, stl/ Texts: docx, pdf, txt/ Video: mp4, h264/ Audio: flac, mpeg-4). Much of this data has been obtained and produced by the research work carried out by GIRAC in recent years and its collaboration with the *Municipal Historical Archive of Valladolid*. The data serves as a working baseline, not only for the WebApp, but also to produce scientific publications to disseminate the results.

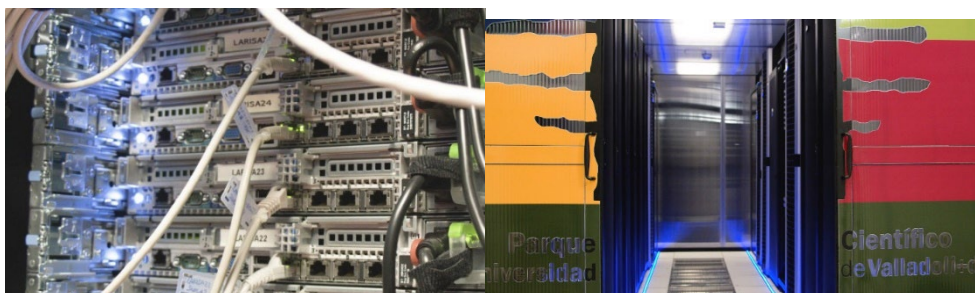
The data are organized using an open source, multi-model graphical database provided by the ArangoDB technology. The files are structured in terms of project, ID, figure and file names. The

naming system used is the appropriate to the semantic version control scheme (<ExampleURL>). The same idea is applied to datasets.

Multimedia, simultaneous and extrapolated experience

The moving image and the new audiovisual technologies offer in contemporary architectural practice and in other disciplines new conceptions of public and private space, a line of research in which the present project is installed. Considering the technical paradigms that Anthony Townsend establishes as attributes of media architecture⁹: "*visualization*", based on the number and proliferation of screens in the urban environment; "*communications*", based on wireless networks that change the way in which the user relates to the built environment; "*positioning*", referring to mobile technologies and their infinite possibilities in this sense; and "*documentation*", which would speak of the computer mapping of the city through geographic information systems (GIS), all these aspects are at the basis of the project *Cinematographic Ecosystem of the City and Transfer with New Technologies*. To respond to them, the proposed WebApp can be consulted in two modes. On the one hand, an interactive mode, we could say, in which the user follows his own route through the screen of his mobile device, as he walks through the city and the application returns *inputs* from its geolocation. And on the other hand, a ubiquitous mode, from any device connected to the Internet, although without accessing the content offered by geolocation, such as augmented reality.

The social, economic, and environmental impact sought by this project, intimately linked to the city of Valladolid, does not hide, however, the possibility that its approach and technology will be progressively exported to other locations. It is a fundamental and foundational criterion of GIRAC itself, as reflected in the declaration of its lines of research, that its reflections and theoretical research be involved in social reality.¹⁰



Figures 8 and 9. Headquarters of the FilmCityDB database in the server of the Science Park of the University of Valladolid.

GIRAC. Culture, tourism, industry, and cinema

In 2019 Valladolid was distinguished by UNESCO with the "Creative City of Cinema" distinction. This is the recognition of great work carried out by different organizations in the city. One of the most important is, without a doubt, the Valladolid Film Commission ([Valladolid Film Commission | Portal Web del Ayuntamiento de Valladolid](#)). GIRAC began its collaboration with this public technical office in 2017. One of the main activities of the Film Commission is to search for potential film locations. Our knowledge of the city, as well as the needs that a project of this type requires, allows us to identify emblematic, historical, contemporary, and modern locations that will capture the viewer from the screen.

GIRAC looks for suitable locations, manages the permits with the owners of the property, and makes a file where the most important data is collected: planimetric and photographic documentation, bibliography. In this way, those who are interested in filming in Valladolid can see an extensive catalog

of possible filming locations on the Film Office's website. Periodically, GIRAC, with the collaboration of students, looks for new locations to complete the offer to production companies. GIRAC has been extending the relationship between architecture and cinema through teaching practices and research during the last decades, serving as a stimulus for the realization of its own artistic practices and audiovisual installations for different events, collaborating in some of them with the International Film Week SEMINCI.¹¹

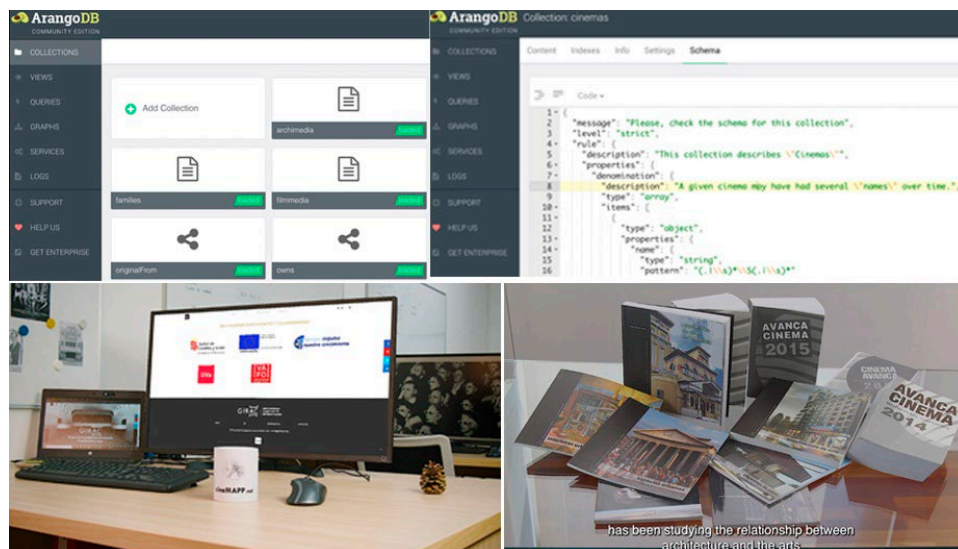


Figure 10. Arango programming system (a-b). CineMAPP: GIRAC and collaborating and participating entities and institutions (c). GIRACPublications (d).

CONCLUSION. VISIBILIZING THE ECOSYSTEM: FROM THE TANGIBLE TO THE INTANGIBLE

Throughout its history, the city of Valladolid has had more than 70 buildings for cinemas, theaters, multiplexes, cinemas associated with schools.¹² Many of these buildings have been destroyed, modified, and no longer have the cinematographic use for which they were designed. Citizens have many memories associated with these places. Walking around the city without these emblematic spaces does not mean that we have forgotten them, but rather that we remember them with nostalgia for those movie afternoons.

One of the main objectives of the WebApp we are developing is the possibility of restoring the presence of those lost properties. Through the use of Augmented Reality (AR) we allow the user to recreate those places. From the cell phone, the user can see and understand how the urban environment was defined by the presence of that neighbourhood cinema. A fundamental element in city life and leisure. In this way what no longer exists becomes present in a clear way allowing the user to enjoy that lost architecture.

The appropriate transfer of this knowledge will bring added value to the city in social, cultural, and economic terms. The city and its neighbourhoods will reinforce their image from the knowledge of its history, in this case, linked to the cinema. The transfer of this information, through the app as an innovative and specific task, will serve as the main support for film tourism in this ecosystem.

NOTES

¹ This work has its origin in the Research Project funded by FEDER and Junta de Castilla y León (Regional Government of Castilla y León), "Cinematographic Ecosystem of the City and Transfer with New Technologies". GIRAC 2020-2023, Ref. VA234P20, whose principal researcher is Eusebio Alonso-García. Previously, GIRAC developed another Research Project funded by FEDER and Junta de Castilla y León (Regional Government of Castilla y León), "Audio-visual Landscapes in the Media City". GIRAC 2018-2020, Ref. VA127G18, whose principal researcher was Daniel Villalobos-Alonso.

² Marguerite Yourcenar, *Memorias de Adriano* (Barcelona: Edhasa, 1982 (1951)), 248.

³ María Zambrano, *Los sueños y el tiempo* (Madrid: Siruela, 1992), 85.

⁴ Henri Bergson, *Durée et simultanéité* (Paris: Quadrige, 1992 (1922)) 43.

⁵ Eusebio Alonso-García, "Giuseppe Samonà. Concurso de la Cámara de Diputados. La profundidad del tiempo". *ZARCH* 14 (2020): 70-85.

⁶ In the fifties and sixties, architects and scenographers such as Josep Svoboda or Charels and Ray Eames experimented with projects and installations multi.screens, whose performances from some universal exhibitions are a fundamental reference: Josef Svoboda, *Laterna Magika. In the Secret of the Theatrical Space*, trans. Jarka Burian (New York: Applause Theatre & Cinema Books, 1993); Beatriz Colomina, "Enclosed by Images: The Eameses' Multimedia Architecture," *Grey Room* 2 (2001): 7-29; María Nieto Sanchez, "Beyond the Screen. Dynamic, Multiple and Transformable Spaces." In *Avanca Cinema. International Conference 2016*, ed. Antonio Costa and Rita Capucho, (Avanca, Portugal: Edições Cine-Clube AVANCA, 2016), 1099-1107. In the nineties, the digital started to develop an increasing influence which was reinforced by the works of different authors and the creation of the Medialabs: Nicholas Negroponte, Nicholas, *Being digital* (New York: Vintage Books, 1995); Eusebio Alonso-García, Sara Pérez-Barreiro, Iván Rincón-Borrego, Daniel Villalobos-Alonso, Daniel; José M^a Jové Sandoval, "Mediatic Unbracullum. Architecture, Cinema and Multimedia Systems", in *Watch This Space: Exploring Cinematic Intersections Between the Body, Architecture and the City*, eds. Howard Griffin and Maciej Stasiowski. (Intellect Books, 2022); Iván Rincon-Borrego, Sara Perez-Barreiro, Eusebio Alonso-Garcia, Daniel Villalobos-Alonso, Jose M. Jove-Sandoval, Silvia Cebrian-Renedo, "The image as matter and material. Advanced architectures and audiovisual experimentation from the inclusive view of Herbert Bayer", *Arte, Individuo y Sociedad* 34, 1, (2022): 335-350. <https://dx.doi.org/10.5209/aris.74210>; Ivan Rincon-Borrego, Eusebio Alonso-Garcia, Sara Perez-Barreiro, Daniel Villalobos-Alonso, "Screen architectures in the information age. Notes on media walls and new paradigms", *Estoa*. 11, 21 (2022):127-140.. <https://doi.org/10.18537/est.v011.n021.a11>

⁷ Umberto Eco, 1965. *Apocalípticos e integrados* (Barcelona: Lumen, 1965).

⁸ Eusebio Alonso-García, "Windows in Cinema, Art and Architecture," *Avanca Cinema, International Conference*, 2017 (2017): 359-369.

⁹ Anthony Townsend, "Digitally mediated urban space: New lessons for design," *PRAXIS: Journal of Writing + Building*, 6, 102 (2004): 100

¹⁰ WEB del GIRAC: <http://girarquitecturaycine.uva.es/>

¹¹ Sara Pérez-Barreiro, Iván Rincón-Borrego, Eusebio Alonso-García. Daniel Villalobos-Alonso, "A Dios pongo por testigo que la forma sigue a la función. Aprendizaje de la arquitectura a través del cine", in *La ciudad en el cine. Recorridos, encuadres, secuencias y montajes*, ed. Antonio Pizza, (Madrid: Ediciones Asimétricas, 2022): 224-239.

¹² Daniel Villalobos-Alonso, *Arquitectura de cines en Valladolid* (Valladolid: GIRAC and Universidad de Valladolid, 2020).

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SEARCH FOR ARCHE: STANISŁAW WYSPIAŃSKI IN THE DIGITAL ERA

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INTRODUCTION

Although more than a century has passed since Stanisław Wyspiański's death, his work still shapes the collective Polish imaginary.¹ The reason is not only the presence of his writings in the school curriculum² but primarily the sharpness of his vision. Symbolic figures populating his plays, such as *The Wedding* (Polish: *Wesele*) or *Liberation* (Polish: *Wyzwolenie*), still represent the main lines of ideological divisions in the debate regarding the place of Polish political traditions in the era of modern state-building. In other words, in common perception, Wyspiański remains an artist-philosopher of politics, a figure characteristic of the Polish artistic life of the nineteenth and early twentieth century.

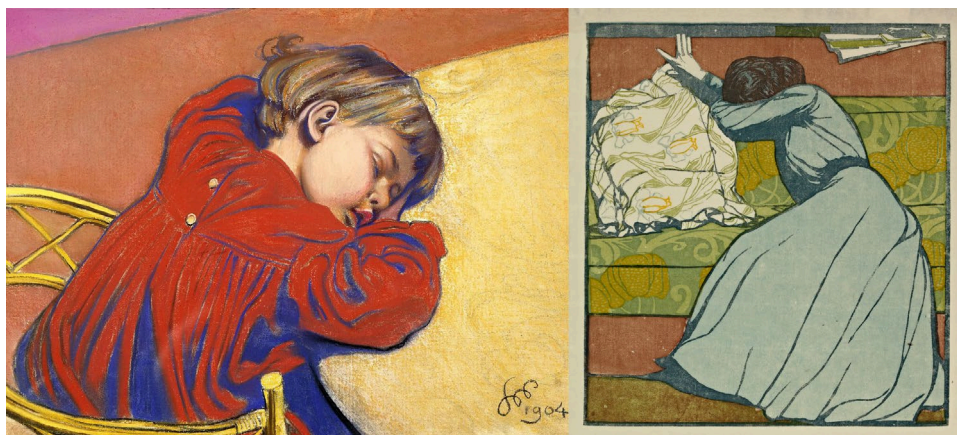


Figure 1. Stanisław Wyspiański, "Sleeping Staś", 1904, pastel on paper, 47 x 62 cm (left); Max Kurzweil, "Pillow", 1903, woodcut, 28.6 x 25.9 cm (right)

Moreover, Wyspiański was a visual artist considered one of the great revivers of graphics as well as pioneers of modern interior and furniture design in Galicia. Today, thanks to the possibilities of digital reproduction techniques, they are available at one's fingertips. And his appealing paintings, especially pastel portraits of children (fig. 1, left), can be seen almost everywhere in Poland.

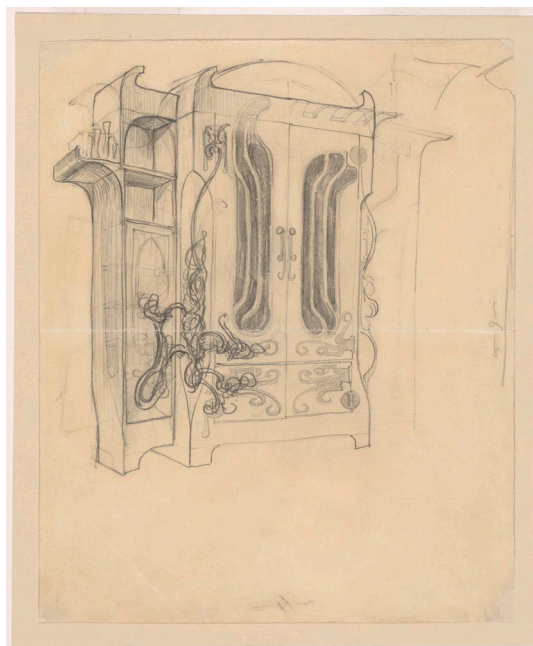


Figure 2. Stanisław Wyspiański, "An Art Nouveau cabinet design sketch"

However, as it turned out, this omnipresence and visual abundance do not prevent trivialisation. On the contrary, focusing on political matters narrowed the complexity of Wyspiański's literary works as well as his paintings and designs. An example may be the question of his place on the artistic map of Central Europe around 1900. For many years, as it seems, Polish scholars diminished the significance of German-language literature and art for Wyspiański for political reasons.³ Not to mention his vivid interest in Czech intellectual life remains unexamined.⁴ As a result, Wyspiański's oeuvre seems to be 'autotelic' and concentrated on the Polish independence issues.

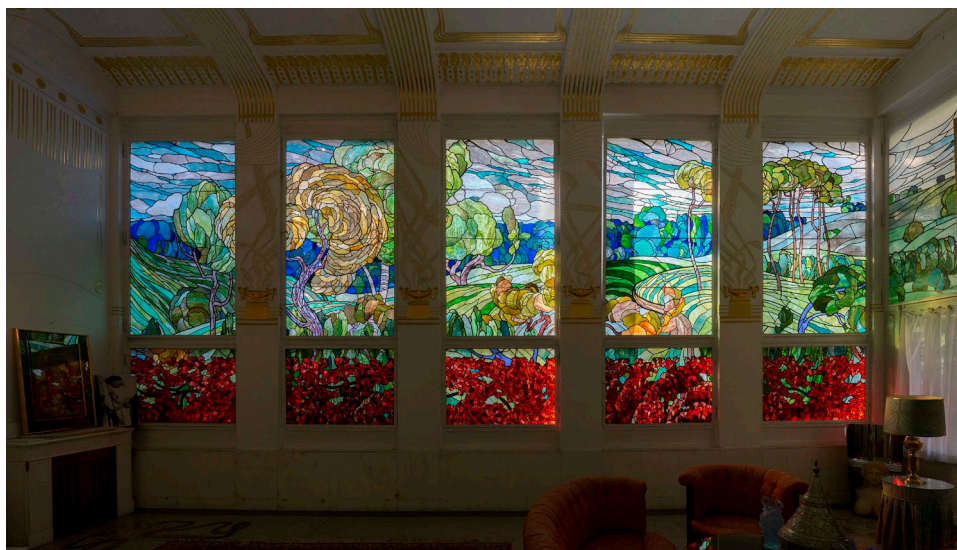


Figure 3. Adolf Böhm, "Autumn Landscape in the Vienna Woods", Stained glass for Villa Wagner I, 1899

On the other hand, Wyspiański's works have been entangled in the net of stylistic concepts developed by art historians of the last century. His paintings, furniture and interior designs are usually described as examples of local (i.e. 'Polish') variants of Art Nouveau (Polish: secesja). Leaving aside the problematic validity of this term in describing Wyspiański's paintings, it becomes even vaguer when

speaking of his design pieces. What kind of Art Nouveau does one speak about, the Franco-Belgian floral and curvilinear or the Austro-German rigid and geometrical one? Although Wyspiański has designed objects in the former, evoking the unpredictability of 'Nature' (fig. 2), most preserved works indicate affiliation with the latter turning into Modernism and foreshadowing Art Deco. The same taste for austere ornamentation, cubical shapes, and the appreciation of decorative qualities of the material itself link Wyspiański to Jugendstil⁵ or Vienesse Modernism (German: Wiener Moderne).⁶ It is even more evident if one considers him an Art Deco pioneer.⁷

WYSPIAŃSKI SEEN UP CLOSE AND SEEN FROM A DISTANCE

Curiously enough, these parallels have been noticed by earlier scholars and art critics, such as Stanisław Lack, Wincenty Trojanowski, Elżbieta Skierkowska, and Helena Blum,⁸ but regarded as standing in stark opposition to the art of the so-called 'oppressors.' Yet, notably, most of these remarks come from the first half-century after Wyspiański's death. Furthermore, the closer to the political breakthrough of 1989, the less noticeable they are. In addition, the role of Paris comes to the fore, overshadowing Vienna and other artistic centres of the monarchy.⁹ Even though Vienna's role in shaping modernity has been praised in the capital of France since the 1986 exhibition *Vienna 1880-1938. The Joyful Apocalypse* (French: *Vienne 1880-1938: L'Apocalypse Joyeuse*) held in Centre Pompidou and curated by Jean Clair.¹⁰



Figure 4. Stanisław Wyspiański, "Apollo (Copernicus Apollo)", 1904

Nevertheless, in the last decades, scholars such as Urszula Kozakowska-Zaucha, Agata Wójcik, and Dorota Kudelska are steadily changing this view.¹¹ Their researches show that Wyspiański was deeply immersed in the Central European, or to be more precise, Viennese, art scene. However, no single study deals with this subject, which is even more surprising in the era of European integration. To some extent, such a comparative approach was undertaken by Elizabeth Clegg and Akos Moravansky, creating simultaneous histories of Central European art. However, it does not fully reflect the dualistic

monarchy's complex political and cultural identities. It seems that divisions formed after 1918 and 1945 still determine scholarly research, making it impossible to see how important the common imperial past is and what we can learn from it. However, it is not only a historical matter of bringing forward forgotten context. This re-writing of the history of Wyspiański's work may help to re-interpret Polish tradition in the post-communist reality. It may show a way out of the binary opposition between the East, identified with political oppression and ambiguous 'integration' within the Eastern Bloc and West, simultaneously being a source of identity and the object of aspiration. In other words, it can incentivise the search for a new, more inclusive identity that exists in continuity with other political and artistic traditions. It does not mean eliminating differences but reconciling them within a larger (political and artistic) whole.



Figure 5. Koloman Moser, *Design for the angel window for the Otto Wagner Church (Kirche am Steinhof)*, 1905, *gauche on paper*, 436.5 x 144 cm

DIGITAL TOOLS AND THE OBJECT IN CONTEXT

One may ask, what is the place of digital tools in this process? Can new technologies overcome ideological disadvantages? It will be more apparent in the example of Wyspiański's use of *archaisation*. What can be understood by this term? In short, decontextualising and rescaling historical motifs or patterns to evoke supra-historical associations in paintings or design works.

To some extent, it is a tendency related to the pursuit of the 'primitive,' a phenomenon present in French or German art at the beginning of the twentieth century. However, in Wyspiański's case and the Central-European art of the first two decades of the last century, it was not looking outward but inward. Hutsul or Highlander (Polish: Górale) crafts could be 'exotic' but not 'foreign.' For the imperial government, it would be an element of the ethnic mosaic. For national activists, it would be intact by the time and external influences model for the revival of national art. Finally, it would be a source of more spontaneous and straightforward seeing for modern artists.¹² Nevertheless, with all the differences, folk art will be an essential point of reference in building modern identities.

Existing platforms provide knowledge on this subject, but it is dispersed. For example, although video hosting services like Youtube contain lectures and videos explaining the complexities and nuances of Austro-Hungarian artistic life, it requires a specialistic background to know what to look for. Similarly, open-access libraries, such as Heidelberg University Library, containing art magazines from the time in question only provide access to some modernist journals. Moreover, they do not link to other internet resources. For instance, Wyspiański, one of the founding members of the Vienna Secession (German: Wiener Secession), was also a keen reader of its press organ – "Ver Sacrum". The magazine was printed in a limited edition and available only for subscribers interested in artistic matters. It also lasted only five years, so not many copies are available. Fortunately, all issues are scanned in high resolution and are available on the mentioned Heidelberg University Library website. Things look different in the case of "Hohe Warte", a monthly edited by Joseph August Lux, a promoter of early modernist architecture, and assisted by Viennese architects such as Josef Hoffmann and Otto Wagner. Wyspiański was a subscriber of this journal. In its pages, he probably got acquainted with the modernist interest in rustic architecture as a source for the healthier, 'closer-to-nature' modern architecture. Sadly, none of the issues is digitalised.

Museums' virtual collections are generally well-developed. Photos are taken in high resolution with high colour accuracy. Apart from typical problems like scale accuracy or lack of interaction with an object, one may think there are no more considerable problems. However, surprisingly, the objects in question do not function in the broader context. At best, they are presented in reference to other works in the particular collection. Although they are sometimes compared to objects in art centres such as Paris or London and less often in Vienna, they are usually shown only in local contexts. It is especially evident in the case of Polish museums focusing on purchasing mainly works of Polish artists. This policy can only partially explain by filling the Second World War losses. The main reason seems to be the resistance to seeing Polish art from a broader perspective. For example, Wyspiański's furniture for the Żeleński apartment from the collection of the National Museum in Kraków functions only in the context of the artist's design works. However, the set can be seen as an example of the reception of Viennese Modernism. It can also be considered as an illustration of a broader tendency present in Central Europe around 1900, namely, the return to the Biedermeier period as a reaction to the Art and Crafts movement.¹³

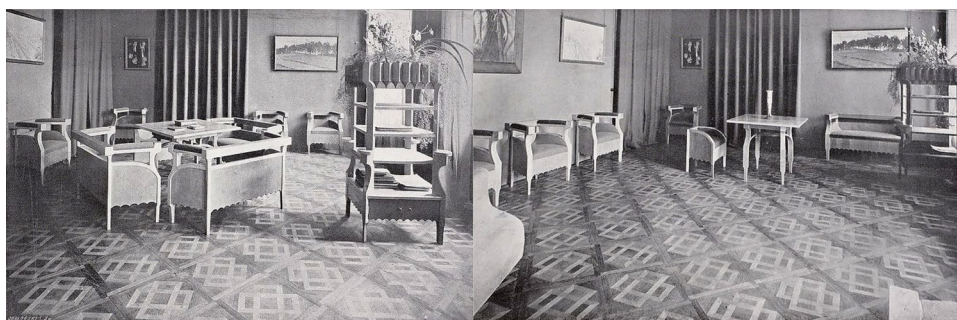


Figure 6. Stanisław Wyspiański, Żeleńskis' apartment, 1904

Another area for improvement is the availability of literary sources. Wyspiański was a recognisable figure on the Viennese art scene. His great admirer was Berta Zuckermandl, an influential art critic, in whose salon the idea of creating the Viennese Secession was born. Artur Roessler, later known as a promoter of Egon Schiele, also praised Polish artist works.¹⁴ Moreover, Ludwig Hevesi, in an article on the revival of modern painting in Austria, mentions Wyspiański as a representative of a new 'folkloristic tendency' in the monarchy: "The Poles have already great traditions and a patriotically historic art in the great paintings of Jan Matejko (1838-1893), and Artur Grottger (1837-1867). But modern times have even here wrought great changes, and the national temperament now seeks expression rather in in the highly-coloured and 'ethnographische' style".¹⁵ He was not the only one. William Ritter, a significant European art critic, described Wyspiański's late works presented at the 1908 Hagenbund exhibition as "robust and barbaric" (Italian: "robuste e barbare") as well as conducted in a "Japanese and Slavic style".¹⁶ Regrettably, only the latter texts are available online, but none are translated into Polish or English.

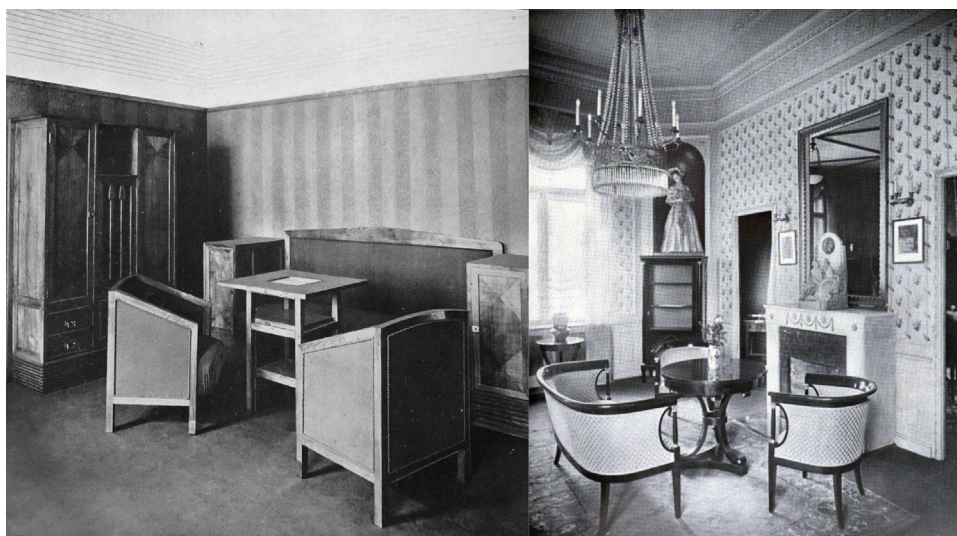


Figure 7. Otto Prutscher, *Gentleman's room in a Vienna apartment, 1902* (left); *A room in Biedermeier style* (right)

NEW MEDIA FOR (RE)NEW(EWED) CONTEXTS

The solution can be the development of international digital platforms providing information for scholarly and non-scholarly audiences.¹⁷ For example, it could be a net of museum websites providing reciprocal links to other collections or, in Wyspiański's case, one place being at the same time a research institution website. Furthermore, it could collect not only photographs of his works with detailed descriptions but also source materials, lectures, books and articles. Moreover, the possibilities of contemporary photography, 3D modelling and VR may help juxtapose the works of Wyspiański and Viennese Modernists to find common ideas and sources of inspiration. The virtual models of furniture showing scale, materials, facture, structure and ornamentation would open up new fields of analysis in Art History. The richness of sources collected in all significant Central European museums (e.g. National Museum in Kraków and Warszawa, MAK - Museum für angewandte Kunst, Leopold Museum, Theater Museum, Národní galerie v Praze) available online would immensely deepen the comparative studies.¹⁸

Access to the digital collection would show to what extent Wyspiański and other Central European artists, especially Viennese Modernists, were looking for sources of inspiration in similar places. It would also help to classify them. The reach collection of the Carpathian folk art (e.g. Hutsul), archaic

Greece, the Byzantine art 'discovered' by the art historians like Alois Riegl would become more accessible to researchers. The biographical notes and objects containing hyperlinks to entries working similarly to Wikipedia would present the significance of a given source. For instance, Wyspiański was nothing different to his contemporaries in fascination with Middle Ages, Renaissance, Japan and the so-called 'Orient'. The same tendencies can be noticed in the designs of Koloman Moser, Josef Hoffmann or Emilie Flöge. The hyperlinked image or 3D object could redirect from one object to another.

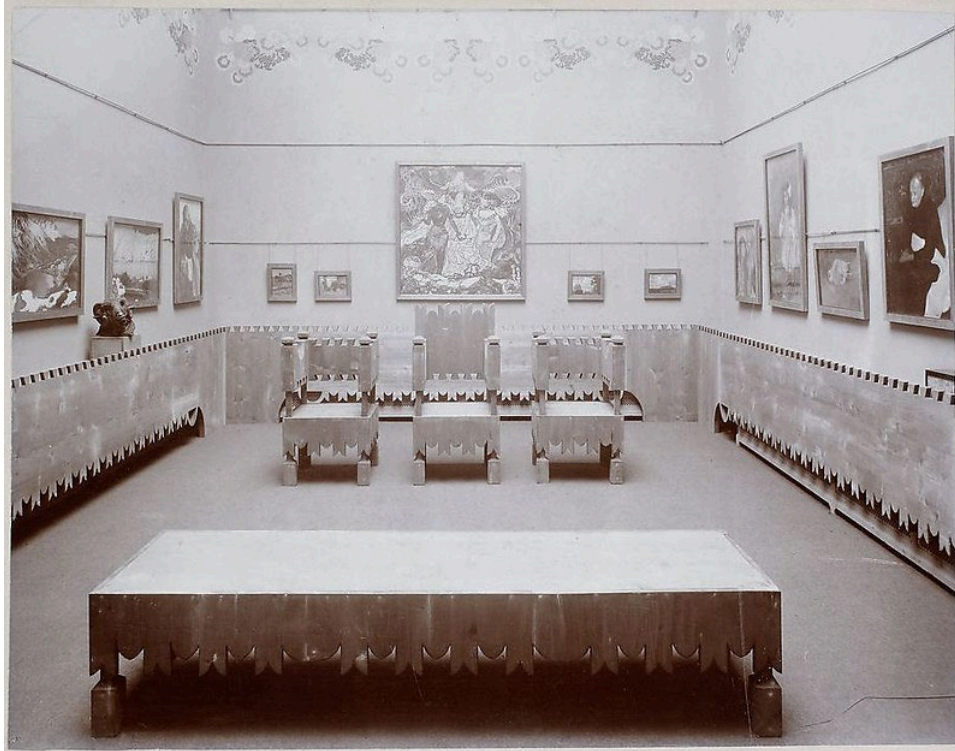


Figure 8. Stanisław Wyspiański, "Bolesławów day-room", 1904

The significance of these tools does not merely limit to recalling resemblances but also may reshape the image of centre-periphery relations within the Austro-Hungarian monarchy by showing its dynamics, fluctuations and amplitude. Moreover, building such a platform not assigned to one institution but functioning in the regional framework could allow researchers to show how individual political identities (local and imperial) interacted with each other in the artistic domain. This repository of Wyspiański's work in the Central-European context would show how the imperial heritage enriched *peripheral* art by providing artistic stimuli from the *centre* and how the *peripheries* stimulated the *centre*. Furthermore, it would lead to re-interpret dominant national independence narratives, as can be seen in the case of Wyspiański's *Bolesław the Bold* (Polish: *Bolesław Śmiały*) play and the *Bolesławów day-room* (Polish: *Świetlica Bolesławowska*). Both tackle the issue of power legitimisation through art, sources of sovereignty and national identity but, at the same time, reflect the shift in the Central-European Jugendstil towards geometricity.

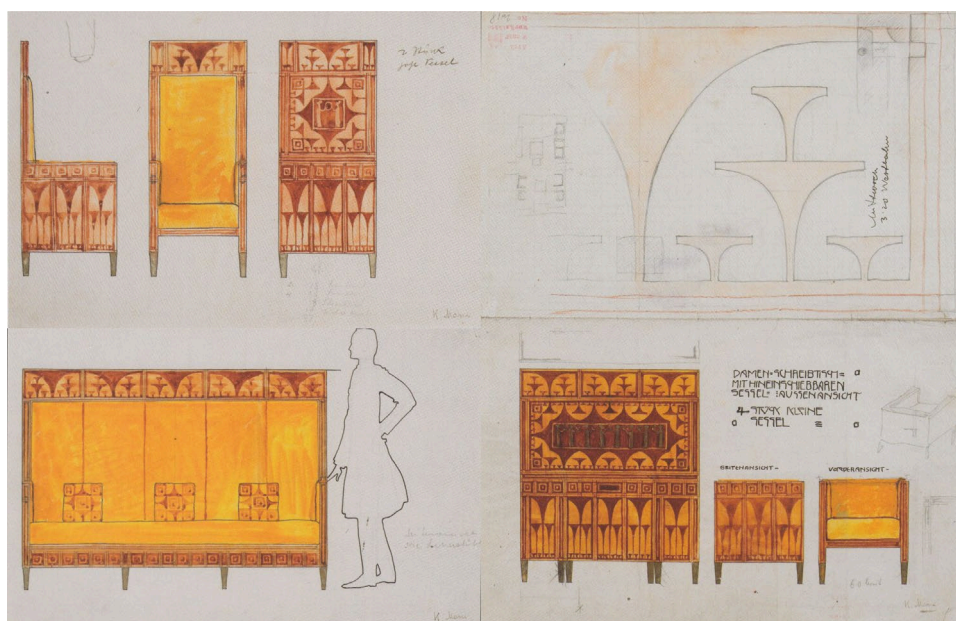


Figure 9. Koloman Moser, *Design Sketches for the Eisler-Terramare apartment, 1903*

On the other hand, *Bolesławów day-room*, stemming from the historicist interest in the past, anticipated modernist aesthetics of purity. However, Wyspiański considered this artistic renewal from the perspective of the regeneration myth. In this vein, he was a continuator of Romanticism and a forerunner of Central European Modernism. Therefore, new digital tools, including VR, would allow examining visual materials from different points of view and create a platform for international cooperation.

CONCLUSION

In 2018, Vienna celebrated the Year of Modernism. On this occasion, Seite Zwei, a creative bureau, designed a multimedia platform with films, images, texts and 3D models. They advertised the project with the slogan: "Be ahead of your time."¹⁹

However, to be someone's time in the context of Viennese Modernism could be something more – reconfiguring the place of Habsburg heritage within Central Europe by the broadest possible inclusion. Naturally, it would not happen without institutional cooperation on a state level. Nevertheless, restoring the memory of the importance of imperial Vienna in the works of one of the most prominent Polish artists may be the first step. It could be an example for other projects and make it easier to build new platforms for future heritage and memory projects in the region.

Finally, new technologies could be a handy tool for (Art) Historians and historical policy creators, who can transcend the limits of particular narratives and build more open and inclusive versions of their stories. Ultimately, accepting fundamental differences in understanding the most recent history does not mean renouncing one's identity.

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NOTES

¹Stanisław Wyspiański was born on 15 January 1869 and died on 28 November 1907 in Kraków, then a fortified border town in Western Galicia, Austria-Hungary. He was the son of Franciszek Wyspiański, a sculptor and photographer, and a nephew of Bronisław Wyspiański, a photographer, both living and working in Habsburg Galicia. Significantly, Franciszek was a friend of Jan Matejko – the most prominent figure in the Polish artistic life of the second half of the nineteenth century – a painter called by Ludwig Hevesi, an influential Viennese art critic from the turn of the nineteenth and twentieth centuries, one of the three great M's of Austro-Hungarian art besides Hans Makart and Mihály Munkácsy. In later years, Stanisław became the pupil of Matejko, and, despite the later stylistic differences, the "old master's" work will always remain a point of reference for the artist.

Cf.: Ludwig Hevesi, "Feuilleton. Michael Munkácsy," *Pester Lloyd*, 4 May, 1900, <https://anno.onb.ac.at/cgi-content/anno?aid=pel&datum=19000504&seite=2&zoom=33&query=%22dreißig%20großen%20M.%22&ref=anno-search>

² Reading Wyspiański's symbolistic drama *The Wedding* (Polish: *Wesele*), addressing the Polish identity issues under the Habsburg rule is part of compulsory secondary education in Poland. Moreover, thanks to the vividness of metaphor, acute wit, as well as the attractiveness of rhythmicity and versification, some sentences and phrases from the play have entered the colloquial language. Undoubtedly, the most frequently quoted are the words of Chochół, the central symbolic figure, saying: 'You oaf! You had the Golden Horn!' (Polish: 'Miałeś, chamie, złoty róg') expressing regret for lost opportunities.

³ Although the history of Wyspiański's reception is still a to-do-task, it seems that the main reason why the Central-European context was marginalised for decades is the troublesome history of Polish-German, Polish-Austrian and Polish-Czech relationships in the last two centuries. Even now, the positive role of the 'Partitioning Powers' (Prussia, Austria and Russia), as they are called in Poland, and the Lands of the Bohemian Crown remains a delicate issue. Many consider it a form of questioning the uniqueness of the Polish identity. The other reason is a living memory of World War II, resulting in Soviet domination over Eastern Europe. However, the central role of Paris in Wyspiański's stylistic development remains unproblematic, primarily due to a long tradition of Polish voluntary or involuntary presence in France. A relatively new research approach is a question of the significance of British art for Wyspiański. Albeit, research on the mediating role of Vienna in acquiring new artistic tendencies from France and Great Britain by Wyspiański is neglected. In recent times, this tendency has been amplified by re-reading the local history through the lenses of postcolonialism, strengthening older narratives.

⁴ A separate issue is Wyspiański's connection to the Czech art around 1900. From artist's letters and his 1904 and 1905 *Diaries* (Polish: *Raporty*), one can notice that he stayed in touch with representatives of Czech culture. And, a closer look on artist's library shows that he was got some of his inspirations from Czech literature on art. Wyspiański's connection to the Czech culture can be seen as a part of the phenomenon of mutual cultural exchange in the Krakow-Prague-Vienna triangle.

⁵ Another, albeit not evident at first glance, aspect of this phenomenon is the anticipation of Austrian Expressionism by Wyspiański. It is especially striking if one compares his pastel portraits with Egon Schiele's gouaches. It seems that the stylistic resemblance is not merely accidental but has common roots in Symbolism and Japonisme as well as in the interest of Middle Ages, folk and so-called 'primitive' art. Moreover, one can find a parallel in the social background. Both artists were born and raised on the *peripheries* of the Empire (Kraków and Krumau) and searched for their style in relation to the *centre*, i.e. Vienna. Wyspiański was one of the founding members of The Vienna Secession (German: Wiener Secession) and exhibited his works in the association's exhibition spaces several times. Moreover, his design works reveal knowledge of the newest tendencies present at the time in the imperial capital.

It is not clear if Schiele knew his works. However, he might have known his 1890s pastels from "Ver Sacrum", a press organ of The Vienna Secession or seen Wyspiański's proto-expressionistic works at the 1908 exhibition of The Society of Polish Artists "Sztuka" (Polish: Towarzystwo Artystów Polskich "Sztuka") in Hagenbund. Certainly, Schiele was as familiar with the changes occurring in the Viennese art scene as Wyspiański, and both searched likewise for new means of expression. As a result, their works evolve from the elegance of the late Jugendstil towards sharpness and discordance. However, it took a more constrained and 'realistic' way than in the case of German Expressionists.

More on this subject:

Michał Strachowski, "Wyspiański – Schiele. Dwa Oblicza Wiedeńskiego Ekspresjonizmu?", in *Dyskursy (nie)oczywistości. Zagadnienia pewności, niekwestionowalności oraz bezsporności w nauce, sztuce i kulturze*, ed. Zielińska Agnieszka and Krzysztof Jaskółka (Poznań: Wydawnictwo Rys, 2022), 299-331.

⁶ At a closer look, Wyspiański's interior and furniture designs bear a strong likeness to the works of Alfred Roller (1864-1935), Koloman Moser (1868-1918), Josef Hoffmann (1870-1956) or even Adolf Loos (1870-1933).

However, one may ask: to what extent was the Polish artist acquainted with Viennese Modernism? Wyspiański has undoubtedly seen their works in The Vienna Secession catalogues and advertisements in "Ver Sacrum". He also subscribed to "Hohe Warte", an illustrated fortnightly edited by Joseph August Lux, promoting new tendencies in architecture and design. Recent research also shows that Wyspiański's stained glass for The Church of St. Francis of Assisi in Kraków, especially *God the Father* (1897-1904) and for the Medical Society Building (1904), resemble Adolf Böhm's (1861-1927) stained glass for Villa Wagner I conducted in the Tiffany's glass style (1899). They also anticipate Koloman Moser's designs for Otto Wagner's Kirche am Steinhof (built 1903-1907). Certainly, Wyspiański had to know Böhm's design from "Ver Sacrum", but it is not sure if he has seen Wagner's House.

More on this subject: Strachowski, "Secesjonista. Stanisław Wyspiański jako projektant wnętrz i mebli," In *W Wiedniu, Paryżu i Monachium... Artyści poza granicami (XIX i XX w.)*, ed. Dorota Kudelska and Zdzisław Kudelski, (Lublin: Towarzystwo Naukowe Katolickiego Uniwersytetu Lubelskiego, 2020), 25-36.

One may notice more similitudes in the field of graphic design, notably in comparison with Josef Maria Auchentaller's vignettes and illustrations. The author is currently preparing a manuscript dealing with this subject.

⁷ Unfortunately, Polish (and following them, foreign) scholars ignored or diminished the importance of this parallel between Wyspiański and Viennese Modernists' shift towards Art Deco, usually considering these tendencies separately.

Cf.: Anna Sieradzka, "Stanisław Wyspiański jako prekursor stylu Art Déco w polskim rzemiośle artystycznym," in *Rzemiosło artystyczne. Materiały Sesji Oddziału Warszawskiego Stowarzyszenia Historyków Sztuki*, ed. Ryszard Bobrow, (Warszawa: Stowarzyszenie Historyków Sztuki, 1996) 131-143; Anna Sieradzka, *Art Deco w Europie i w Polsce*, (Warszawa: Wydawnictwa Szkolne i Pedagogiczne, 1996); Anna Sieradzka, "Początek Działalności 'Wiener Werkstätte' i Narodziny Stylu Art Déco w Wiedniu w Latach 1903-1907," *Ikonothea. Prace Instytutu Historii Sztuki Uniwersytetu Warszawskiego* XIII (1998): 189-202; Anna Sieradzka, "Początki Awangardy w Meblarstwie Polskim Lat 1904-1914," in *Studia z architektury nowoczesnej. Architektura i wnętrza 1905-1923* (Toruń: Wydawnictwo Uniwersytetu Mikołaja Kopernika, 2007), 131-143.

⁸ Stanisław Lack, "Wystawa Jubileuszowa," *Krytyka* 4 (1902): 340-349; Stanisław Lack, "O Malarskich Dziełach Wyspiańskiego," *Krytyka* 6 (1904): 162-176; Wincenty Trojanowski, *Wyspiański: Artysta, Człowiek, Życie* (Warszawa: Księgarnia F. Hoesicka, 1927), 210; Elżbieta Skierkowska, *Plastyka Stanisława Wyspiańskiego Na Tle Ówczesnych Kierunków Artystycznych* (Wrocław: Ossolineum, 1958), 19; Helena Blum, "Wstęp," in *Stanisław Wyspiański, 1869-1907; Wystawa Jubileuszowa 1907-57, Grudzień 1957-Listopad 1958*, ed. Helena Blum and Leon Płoszewski, (Kraków: Muzeum Narodowe, 1958), 22; Helena Blum, *Stanisław Wyspiański* (Auriga: Warszawa, 1969), 38.

⁹ Curiously enough, all scholars emphasise the role of Paris in life and work of Wyspiański, there is only one comprehensive study on this subject – an article of Agata Wójcik dealing with the short period of artist's education at the Académie Colarossie.

Agata Wójcik, "Stanisław Wyspiański Paryskiej Académie Colarossi," *Krzysztofory. Zeszyty Naukowe Muzeum Historycznego Miasta Krakowa* 25 (2007): 141-148.

¹⁰ Cf. Jean Clair, *Vienna 1880-1938: L'Apocalypse Joyeuse* (Paris: Centre Georges Pompidou, 1986).

¹¹ Cf. Stefania Krzysztofowicz-Kozakowska and Piotr Mizia, "'Sztuka', 'Wiener Secession', 'Mánes'. The Central European Art Triangle"; Dorota Kudelska, 'Ein unterschätzter Ort von oft unerwünschten Malern. Die polnische Kunst im Hagenbund', in *Hagenbund - Ein europäisches Netzwerk der Moderne (1900 bis 1938)*, ed. Haradl Krejci and Agnes Husslein-Arco, (Wien: Hirmer, 2015) 307-317; Kudelska, "Między Secesją a Hagenbundem – artyści polscy w Wiedniu 1898-1914", *Pamiętnik Sztuk Pięknych / Fine Arts Diary* 10 (2015): 191-198; Kozakowska-Zaucha, "No, Pierwsza Porządna Wystawa' Nowa Przestrzeń Dla Sztuki – Raumkunst i Salony Sztuki", *Pamiętnik Sztuk Pięknych/Fine Arts Diary* 10 (2015): 85-90; Agata Wójcik, "Towarzystwo Polska Sztuka Stosowana – Warsztaty Wiedeńskie. Powiązania Ideowe i Stylowe. The Society for Polish Applied Art versus the Vienna Workshops – an Attempt at Comparison. Stylistic Analogies in Furniture and Interior Design" *Rocznik Historii Sztuki* XLIV (2019), 125-138.

¹² Unfortunately, the significance of folk art for Viennese Modernism still requires full recognition. Usually, the current literature considers it in the light of female art, but this phenomenon is a broader tendency within Viennese Modernism.

More on this subject: Kathrin Pallestrang, *Die Textilmustersammlung Emile Flöge Im Österreichischen Museum Für Volkskunde* (Wien: Österreichisches Museum für Volkskunde, 2012); Megan Brandow-Faller, "An Artist in Every Child—A Child in Every Artist," *West 86th: A Journal of Decorative Arts, Design History, and Material Culture* 20 (2013), 195-225; Megan Brandow-Faller, "Child's Play?," *The Journal of Decorative and Propaganda Arts* 27 (2015), 148-171; Megan Brandow-Faller, "Folk Art on Parade," *Austrian Studies* 25 (2017), 98-117; Alys X. George, *The Naked Truth* (Chicago: Chicago University Press, 2020); Christoph Thun-Hohenstein et al., *Die Frauen der Wiener Werkstätte*, (Basel – Wien: Birkhäuser, 2020), Brandow-Faller, *The Female Secession* (University Park: The Pennsylvania State University Press, 2020).

- ¹³ Alicja Kiljańska, "W poszukiwaniu tożsamości. Wybrane polskie wnętrza i meble z lat 1892-1914," in *Polskie style narodowe 1890-1918*, ed. Andrzej Szczerski, (Kraków: Muzeum Narodowe, 2021), 63
- ¹⁴ Günther Wytrzens, "Wiedeń w Życiu i Twórczości Wyspiańskiego," *Pamiętnik Literacki* 64 (1973): 131-146; Roman Taborski, *Wśród Wiedeńskich Poloników*, (Kraków – Wrocław: Wydawnictwo Literackie, 1983), 150-163; Roman Taborski, *Polacy w Wiedniu*, (Wrocław: Ossolineum, 1992), 121-122 and 136-137; Anna Baranowa, "Krytycy wiedeńscy o "Sztuce" – Ludwig Hevesi, Hermann Bahr, Berta Zuckerkandl," in *Stulecie Artystów Polskich "Sztuka"*, ed. Anna Baranowa, (Kraków: Universitas, 2001), 65-77; Roman Taborski, *Pożegnanie Wiednia* (Warszawa: Wydział Polonistyki. Uniwersytet Warszawski, 2003), 59-71.
- ¹⁵ Ludwig Hevesi, "Modern Painting in Austria," in *The Art Revival in Austria* (London – Paris – New York, 1906), XI.
- ¹⁶ William Ritter, "L'arte polacca d'oggi," *Emporium* 161 (1908): 334.
- ¹⁷ Besides providing visual tools, contemporary digital technologies provide access to the written sources not available for the scholars not only fifty or thirty years ago, but also for the researches from the beginning of the twenty-first century.
- ¹⁸ We also have access to design sketches, which is especially important in searching for common sources of interest and development of style.
- ¹⁹ "Vienesse Modernism – 2018," Seite Zwei, accessed 20 November, 2022 <https://moderne.wien.info/en/about>

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A TEMPORAL PERSPECTIVE IN PÓVOA DE VARZIM: ENVIRONMENTAL CONDITIONS, LANDSCAPE AND HUMAN SPACE DEVELOPMENT

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INTRODUCTION

Póvoa de Varzim has been occupied for thousands of years. The marks of this settlement are still visible in many areas of this county. Its initial name, *Villa Euracini*, is evidence of the Roman presence in this territory.

Over time, its landscape has been shaped, and these changes are visible mainly from the 14th century onwards. The 16th century marks the beginning of a more effective occupation of the territory. The end of this century decisively marks the expansion of the village to the west and the occupation of new areas.

From the 1860s onwards, it became a famous seaside resort, visited by many people to spend a few days of leisure and fun. The passage from this location to the seaside village brought with it the stamp of progress, this because, especially in the area close to the beach, buildings appeared that, were, at the time, a novelty in Póvoa de Varzim.

It was necessary to wait for the last quarter of the 20th century to see that the harmonious growth carried out until then gave way to an irrational expansion with high costs for the natural landscape. However, from the mid-1990s onwards, an attempt was made to reverse the situation of this poor urban planning, with structuring documents being prepared that allowed the regulation of spatial planning in the urban perimeter of Póvoa de Varzim.

GEOGRAPHIC CONTEXTUALIZATION AND OTHER DATA

Póvoa de Varzim's county is located in Portugal northwest, very close to the most important cities in this region (Porto, Braga, Guimarães and Viana do Castelo). The current population of Póvoa de Varzim is around thirty thousand inhabitants, which in the summer months increases a lot.

The town is divided in three neighbourhoods, which are also parishes areas: Paróquia de Nossa Senhora da Conceição/Matriz, Paróquia da Lapa/Bairro Sul and Paróquia de São José de Ribamar). The oldest, Paróquia de Nossa Senhora da Conceição/Matriz, it was founded in the 15th century. The other two neighbourhoods appeared in the 18th and 19th centuries. The town is surrounded by the Atlantic Ocean and up to the north it is close to the Spain border, Galicia.

URBAN DEVELOPMENT

The territory has been occupied since prehistoric times, and the funeral monuments located in some villages and places of the county are from that period.¹ Over the centuries, changes have taken place in its landscape. However, until the mid-twentieth century this village maintained its typical buildings, then, happened the replacement of rural-urban coexistence for the verticalization of urban space.

Primitive Occupation

Before the Roman occupation, the population was settled in the highest points of the county, mainly in Cividade de Terroso, an elevated area from where one can observe the entire surrounding area, but we also find other fortified buildings in other parts of the county (Laundos, Navais and Argivai).²

The territory where the town of Póvoa de Varzim is located today, has a population since Roman times, evidenced by the archaeological remains (roman *villae*) in Alto Martim Vaz,³ Junqueira Street, Vila Velha e Giesteira.⁴

Effective territory occupation

The first document historical references about medieval *villa Euracini* are from nine hundred and fifty-three. As it has been proved the population from this region was small and they were concentrated Vila Velha zone.⁵

After the Cristian Reconquest,⁶ the population started to grow. In 13th century, this territory was separated in two parts, almost geometrically the same size, separated by a metric water line. The city had many waterways, today, not visible. The names of some streets (Ponte Street or Boído Street) are evidences from that past. *Varazim de Susão* and *Varazim de Jusão*.⁷ The chapel da Mata, built in the middle age,⁸ was chosen for the parish church.⁹

Although the region's port had an economic important hole during that time, it was only around XV century that it was possible to notice a new landscape configuration in Póvoa de Varzim's urban area. The 16th century was historically very important because, during this period occurred a significant occupation of this territory. There was a square next to a nowadays Matriz church, and in that place, it was located Madre de Deus chapel and the council chamber.¹⁰

During the end of 16th century, the village started to expand through the occident, and the old village was linked to the new one only by a passage.¹¹ The fishing port was protected by a small fort built during the XV century.¹²

17th and 18th Centuries

The 17th century saw the consolidation of the Madre de Deus area as the centre of local life, the emergence of new streets, new buildings in other areas of the village and the population increase.¹³ Alongside the development of the upper part of the village, a small cluster of fishermen's houses began to appear in the Junqueira area.¹⁴ Throughout the 17th century, Póvoa de Varzim had three inhabited areas: the civic and political centre in Madre Deus, the countryside of Vila Velha and the fisherman cluster in Junqueira zone.¹⁵

In the second half of the 18th century, the coastal area, in a nowadays Bairro Sul, was urbanized, and the streets were exactly the same as they are nowadays. Parallels and perpendiculars to the coast There were small single-story houses, arranged neatly along the streets. There were huge backyards in those houses and due to this structure, the fishing population could have easy access to the seaside and the sea.¹⁶

Throughout the eighteenth century and until the mid-nineteenth century, the landscaping started to take form, as new buildings started to be constructed: the new Council Chamber, churches, manor houses, cemeteries, the hospital, squares and a new fort.¹⁷

Early 19th

It is worthwhile to note that during the first decades in 19th century, a big wall was constructed. This structure separated the beach of Ribeira and the public place of Areosa.¹⁸ This path was used as a public access separating the port area from the seashore. It's important to reveal that this structure separated the social classes. On one side of the sea there were the fisherman families that used the space for working, and on the other side tourists that went to the beach for leisure. In 19th century, this village definitely grew to the coastal area.¹⁹ Póvoa do Varzim's beach started to call tourists attention and some structures were created at the beach as tourism emerged specially at the seaside. During 1850s, several factors contributed to the village development: the improvement of the rail roads, connecting Póvoa do Varzim with other towns and villages also the construction of a horse path that linked the village to Vila do Conde, the construction of a railway to Porto city and later, another railway was constructed to Vila Nova de Famalicão. Hotels, cafes, thalassotherapy bathhouses, on the streets close to the beach, and restaurants were built and most of these buildings changed completely the village landscape, as it was composed mostly of modest fishermen's houses. In the bathing season, the reality was very different of the other months of the year.²⁰



Figure 1. Thalassotherapy, by Museu Municipal de Etnografia e História da Póvoa de Varzim

The village expanded up to the North and some places used by fishermen for their activity, such as public place of Areosa, had its structure changed as it were built a church, a school and a fountain.²¹ On the east side, buildings with one or more stories were constructed. Since then, Largo do Passeio Alegre, as it is known, has undergone several reconstructions. In just over a century almost everything has changed: for example, the beautiful houses with two floors gave way to unsightly buildings with several floors. Also, the garden disappeared. Only Cego do Maio monument, Grande Hotel and Casino remain constructions from the first half of the 20th century.

Due to those expansions, it was necessary to construct new streets, as well as, the improvement of the existing ones facilitating mobility. Thus, the buildings used for accommodation were highlighted in the landscape. The construction of Mouzinho de Albuquerque avenue contemplated these two objectives, being an important road axis between the upper part of the village and the beach area.²²

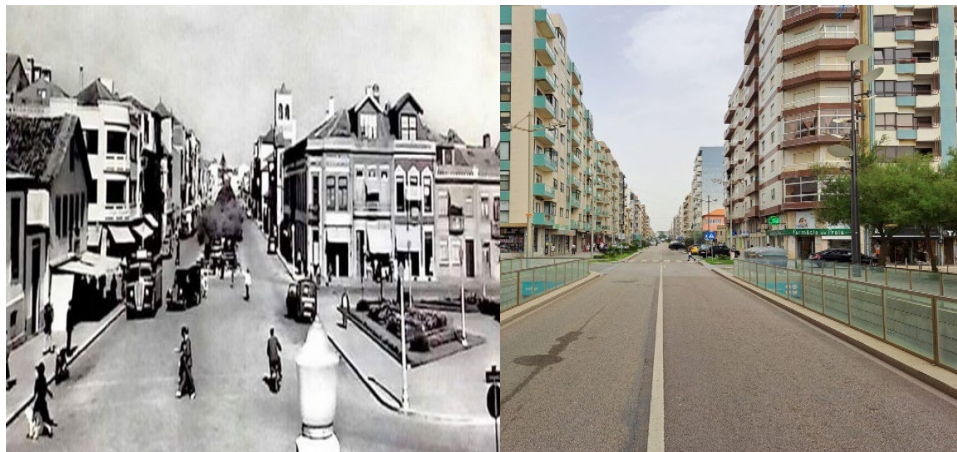


Figure 2. Mouzinho de Albuquerque avenue (1.º half of 20th century and in 2002), by Museu Municipal de Etnografia e História da Póvoa de Varzim and Author

Late 19th century and the first half of the 20th century

Nonetheless between the end of the 19th century and the middle of the 20th century, the expanded just a little. Despite of this, small urban centers were built all over the village. The publication, in 1871, of the Municipal Conduct Regulation sought to discipline the way of construction or reconstruction any building.²³ It should be noted that Banhos Street and Mouzinho de Albuquerque avenue underwent a considerable urban development during this period.

At that time, it was provided a useful city improvement plan, a paper project, drawn up in 1920 by Ezequiel Campos, supported by the plan drawn up in 1901,²⁴ which favored the construction of road axes between the city's neighborhoods and the surroundings.²⁵ However, at a national level, these plans did not have the desired repercussion, once, due to financial problems it wasn't possible to put the whole project into practice.²⁶

Between the 1920s and 40s, two emblematic cafés were built on the beach (Guarda-Sol and Diana Bar). These buildings still remain there, but while the first one maintains its function, the second was turned into a Public Library, in 2002. By understanding this rampant urban growth, it is important to mention that during the 50s the village population started to be concerned over the losses of their old landscape structure.²⁷ Also, during this time it was built Carvalhido Square, a structure that even nowadays reveals a mischaracterization of the landscape.

As noted, during the passage of time, the area began to be more urbanized, towards the north, houses were built throughout its entire length. The houses were framed in the environment and architecture of the latest period.²⁸ They did not go beyond three floors, exposed in the General Urbanization Plan, and often were separated by the backyards from the houses on the parallel street.²⁹

Mainly after the 1960s, in the north area of Póvoa de Varzim, apartment, with several floors, were built, and changing the characteristics of the existing urban harmony. Today there is only one two-story house, but it is quite impossible to notice it, once the large buildings were built all over the places.



Figure 3. Banhos avenue (2.º half of 60s and in 2022), by Museu Municipal de Etnografia e História da Póvoa de Varzim and Author



Figure 4. The only one two-story in Banhos avenue (2022), by Author

The same process happened in other streets of this area. They had tiny passages and were occupied with the fishermen houses but, as they were located next to the sea, started to be sought after by tourists. Nonetheless it's possible to find some of the old architecture houses. Throughout the 20th century, administrative buildings, schools and recreational structures were built in Póvoa de Varzim, which greatly contributed to its development and growth. The most important places in Póvoa de Varzim (Praça do Almada), the current civic center underwent profound changes over time, due to the functions performed. It is important to affirm on the other hand that tried to keep the same architecture pattern of the existing buildings.

The analysis of the Urbanization Master Plan, from 1947,³⁰ allows us to verify that great part of what was recommended, inspired by what was described in the Carta de Atenas, will only be implemented later,³¹ and is visible in three situations: fisherman neighborhood, Vasco da Gama avenue and Alberto Sampaio neighborhood.³²

The second half of 20th century until nowadays

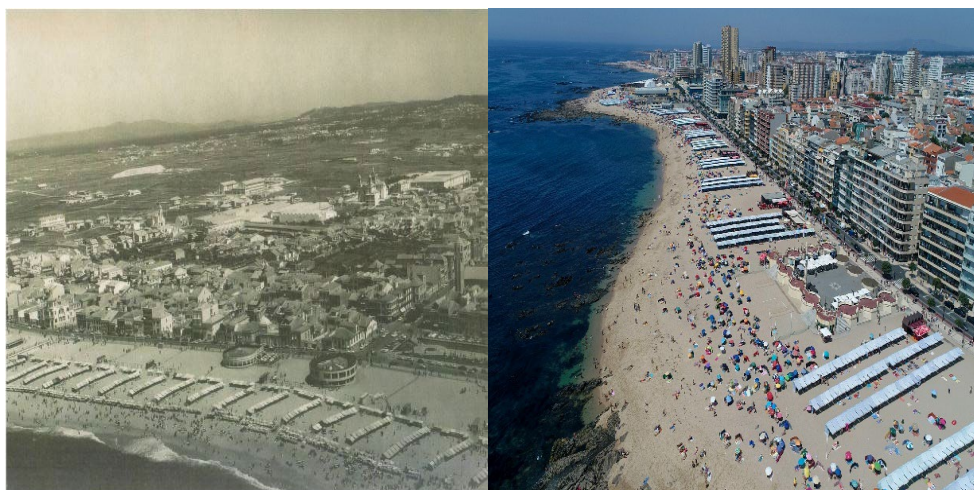
It is quite difficult explain about the urbanistic management between e 70s, and during part of the 90s. Then, almost the entire town had a rampant urban growth. The real estate speculation and the ineffectiveness of the municipal council, mainly the management of urban space, caused this situation.

It's known that during that time there were many places occupied by agricultural fields and vacant lots, which were replaced by houses, many of them vertical, which de-characterized Póvoa de Varzim. A landscape where rural and urban coexist side by side, turned into one in which the rural had practically no place.³³ Related to this situation, is the degradation of the coastline throughout the county, which in certain situations caused irreversible damage of the landscape.

The town northern area was the most affected, Vasco da Gama avenue, built vertically, and Banhos avenue, where houses and mansions were also replaced by this type of vertical construction.³⁴ A long time ago, before all these changes, it was possible to go to the top of the churches and some buildings, and enjoy the town sightseen to its fullest.

During the 90s, the urban chaos got under control after the publication of some documents (Coastal Planning, Municipal Master Plan,³⁵ Urbanization Plan³⁶ and Detail Plan), that allowed the town council the regulation of spatial planning in the urban perimeter of Póvoa de Varzim.

This urban intervention program has reached interesting levels of efficiency in the restructuring of urban spaces, mainly with regard to the quality of public space, with the construction of some recreational facilities (playgrounds, bike paths and rest areas).³⁷



*Figure 5. Póvoa de Varzim (1960's/1970's) and 2022,
by Biblioteca Municipal Rocha Peixoto and Jamespvz*

FINAL CONSIDERATIONS

Heritage is something that is bequeathed to us in order to preserve it for offering it to future generations, in the same state of conservation in which it was handed over to us. However, in the not too distant past, this very important premise that allows us to understand our past was not respected. For this reason, documents, both internationally and in countries, have been published over the years whose objective is to safeguard and enhance cultural heritage.

Unfortunately, this happened in the last three decades of the 20th century. What allowed the urban chaos in Póvoa de Varzim? Several questions can be raised in order to have this answer: How was it possible for this to happen? Who were responsible? What has been done to reverse the situation? Was it really done? The answers are in this text.

In the neighbouring city, Vila do Conde, the opposite happened. It was possible to reconcile the past with the present. The appreciation of its historic buildings has always been placed above other interests, which is why urban harmony, despite some mistakes, continues to be a reality in that seaside resort.

In Póvoa de Varzim, if there is a willingness, much of this urbanism, especially from the 19th century, can still be safeguarded. The academic works demonstrate that this town is an interesting case study. Politicians, heritage safeguard associations and citizens must contribute to this aim, but what was done wrong in the last decades of the 20th century will remain forever as urbanistic scars of Póvoa de Varzim. In the case of Póvoa de Varzim, unfortunately, the time does not go back. Today, only through images, we can have the idea of the charm and beauty of this seaside resort. That beautiful village no longer exists. So, what we can do to have memories of Póvoa de Varzim from that time?

An interpretative centre, focusing on the time and in the space of Póvoa de Varzim's county, with a playful and educational purpose, spread across the territory, having, among other, as communication resources, photography and videos or movies, from then and now, certainly will be an important cultural/heritage spot.

Póvoa de Varzim, birthplace of the famous writer, Eça de Queiroz, was, during the 19th and 20th centuries, frequented by other important people of portuguese culture, who described that village as a pleasant seaside resort to spend their summer vacations. That time no longer exists, but as we said in this text, much can still be done.

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NOTES

- ¹ Manuel Amorim, *A Póvoa Antiga. Estudos sobre a Póvoa de Varzim séculos X-XVI* (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 2003), 20-21.
- ² José M. F. Gomes and Deolinda M. V. Carneiro, *Cidade de Terroso* (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1999), 87-90.
- ³ To understand this subject, an article presents the results of this archaeological research, see: José Fortes, "Restos de uma vila Lusitano-Romana", in *Boletim Cultural da Póvoa de Varzim*, Vol. VIII, ed. Flávio Gonçalves (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1969), 313-341.
- ⁴ Amorim, *A Póvoa Antiga*, 29-30.
- ⁵ Amorim, *A Póvoa Antiga*, 38-39.
- ⁶ The Reconquista Cristã (Christian Reconquest) is a period in the history of the Iberian Peninsula, spanning approximately 770 years, between 710's until 1492 (the fall of Emirate of Granada).
- ⁷ Amorim, *A Póvoa Antiga*, 45.
- ⁸ In the 13th century. Wrongly, in the oral presentation, we refer to its foundation in the 16th century.
- ⁹ Manuel Amorim, "A importância da Capela da Mata na expansão da Póvoa", *Notícias da Póvoa de Varzim*, n.º 139, ano III (Setembro 13, 1985): 6.
- ¹⁰ Amorim, *A Póvoa Antiga*, 108; Sandra Araújo Amorim, *Vencer o mar, ganhar a terra: construção e ordenamento dos espaços na Póvoa pesqueira e pré-balnear* (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 2004), p. 45.
- ¹¹ Amorim, *Vencer o mar*, 49.
- ¹² João Baptista de Lima, *Monografia da Póvoa de Varzim* (Póvoa de Varzim: Tipografia Camões Editora, 1939), 28-29.
- ¹³ Agostinho Araújo, "O desenvolvimento urbano da Póvoa de Varzim na segunda metade do século XVIII", in *Boletim Cultural da Póvoa de Varzim*, vol. XVII, n.º 2, ed. Flávio Gonçalves (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1978), 270-274; Amorim, *Vencer o mar*, 56.
- ¹⁴ Araújo, "O desenvolvimento urbano", 18-20; Amorim, *Vencer o mar*, 58.
- ¹⁵ Amorim, *Vencer o mar*, 63.
- ¹⁶ Amorim, *Vencer o mar*, 178-179.
- ¹⁷ Amorim, *Vencer o mar*, 235-264, 325-333.
- ¹⁸ Amorim, *Vencer o mar*, 323.
- ¹⁹ João F. Figueira, "Desenhar a cidade alargada. O litoral da Póvoa de Varzim: uma história interpretativa e operativa", in *Boletim Cultural da Póvoa de Varzim*, vol. XXVIII, n.º 2, ed. Manuel Amorim (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1991), 410.
- ²⁰ Manuel Amorim, Camilo e Sena Freitas, "Uma amizade que a Póvoa viu nascer", in *Boletim Cultural da Póvoa de Varzim*, vol. XXVIII, n.º 2, ed. Manuel Amorim (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1991), 297.
- ²¹ Jorge Barbosa, *Toponímia da Póvoa de Varzim*, vol. III (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1975), 164 and 170.
- ²² Barbosa, *Toponímia*, vol. III, 112 and 118.
- ²³ Gustavo Duarte Vasconcelos, *Contributos para o estudo do urbanismo e dos equipamentos da Póvoa balnear (1871-1930)*, dissertação de mestrado em História da Arte Portuguesa (Porto: Faculdade de Letras da Universidade do Porto, 2017), 19, <https://repositorio-aberto.up.pt/handle/10216/108780>.
- ²⁴ Mário Gonçalves Fernandes, *Urbanismo morfologia Urbana no Norte de Portugal (Viana do Castelo, Póvoa de Varzim, Guimarães, Vila Real, Chaves e Bragança) 1852/1926*, vol. I, tese de doutoramento em Geografia (Porto: Faculdade de Letras da Universidade do Porto, 2002), 111 and 225, <https://repositorio-aberto.up.pt/handle/10216/18027>.
- ²⁵ Margarida Souza Lobo, *Planos de urbanização: a época de Duarte Pacheco*, 2.^a ed. (Porto: Faculdade de Arquitetura do Porto, 1995), 31-33.
- ²⁶ Sérgio Barroso, "O ordenamento à escala municipal", in *Geografia de Portugal: Planeamento e Ordenamento do Território*, Vol. 4, ed. Carlos Alberto Medeiros, (Lisboa: Círculo de Leitores, 2005), 307.
- ²⁷ Alexandre Cardoso, *Litoral Poveiro abordagem ecológica* (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 2021), 114.
- ²⁸ The mayor of Póvoa de Varzim wanted the bathing beach area to be similar to areas on the Spanish, French and Italian coasts. However, such a project was never carried out.
- ²⁹ Jorge BARBOSA, *Toponímia da Póvoa de Varzim*, vol. I (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1970), 121 and 124.

- ³⁰ Câmara Municipal da Póvoa de Varzim, *Plano Geral de Urbanização* (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1944-1946).
- ³¹ Nelson Silva Machado, *Turismo e Urbanismo: uma relação (des)conhecida na Póvoa de Varzim*, dissertação de Mestrado em Património e Turismo Cultural (Braga: Universidade do Minho, 2012), 72-103, <http://repositorium.sdum.uminho.pt/handle/1822/23360>.
- ³² Sara Sucena and José Carlos Proença Santos, "A influência da Carta de Atenas na Póvoa de Varzim, três fragmentos urbanos, três casos de estudo", in, *A Obra Nasce* – revista de arquitectura da Universidade Fernando Pessoa, nº 3, ed. Álvaro Monteiro (Porto: Fundação Ensino e Cultura Fernando Pessoa, 2006), 28-39.
- ³³ Cardoso, *Litoral*, 124-169.
- ³⁴ Guimarães, Egidio A, Póvoa de Varzim – Ano 2000, in *Boletim Cultural da Póvoa de Varzim*, Vol. XXIII, 2, ed. Flávio Gonçalves (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1984), 290-293.
- ³⁵ Câmara Municipal da Póvoa de Varzim, Plano Diretor Municipal da Póvoa de Varzim (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 1995/2015), <https://www.cm-pvarzim.pt/municipio/urbanismo/plano-diretor-municipal-da-povoa-de-varzim-pdmpv/aviso2157-2015-pdmpv-pdf/>.
- ³⁶ Câmara Municipal da Póvoa de Varzim, Plano de Urbanização (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 2006/2019), <https://www.cm-pvarzim.pt/municipio/urbanismo/pupv/>.
- ³⁷ António Leite Ramalho, *Retratos Urbanos* (Póvoa de Varzim: Câmara Municipal da Póvoa de Varzim, 2004), 58.

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SYMBOL OF PESSIMISM OR A WISE PROPHET? A CONTEMPORARY READING OF VELHO DO RESTELO AS A KEY CHARACTER IN CAMÕES' EPIC NOVEL *OS LUSÍADAS*.

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INTRODUCTION

The present research enquires on the multiple representations and interpretations of Velho do Restelo, a figure with key meaning in *Os Lusíadas* by Luís Vaz de Camões, who expressed a critical opinion about Vasco da Gama's expedition to discover the way to India, glorified in Portugal in the 15th century. It begins with an analysis of various literary perspectives and visual representations throughout the times, and subsequently focuses on a proposal to reconsider its symbolic resonance and representation. As a methodological base, the Jungian concept of archetypes and Campbell's idea of the monomyth are explored to identify the archetype Camões' character may embody.

The following article then proposes that Velho do Restelo, a seemingly minor character of the most famous Portuguese epic, in a time when we are looking at history differently, can be recognized in light of the decolonization movement. Since decolonizing is about creating spaces for multiple perspectives and showing different contexts, we believe that Velho do Restelo can be the transmitter of a counter-narrative to the glorification of the Portuguese marital expeditions.

Velho do Restelo

In 1572 Luís Vaz de Camões, Portuguese poet of great historical importance,¹ published the epic novel *Os Lusíadas*, considered to be one of the greatest poems of the Renaissance. Its central action is the discovery of the sea route to India by the team led by Vasco da Gama seventy-five years before. The predominating objective of Camões' verses is to praise the homeland and its History, and, above all, Portuguese people, for the overseas conquests at the time of the sixteenth-century navigations. His masterpiece can be seen as the poet's attempt to revive national pride.² In the comparisons he makes between Portugal and the largest empires of the ancient world, such as Rome, or that of Alexander the Great, Portugal always appears more favourably.

In Canto IV, when Vasco da Gama describes the departure of the ships from the shores of Lisbon, among the crowds cheering and praising their national heroes appears who Camões called "an old man of venerable appearance."³ He has become popularly known as Velho do Restelo – getting his name from the place where he gave his famous speech – Restelo beach.⁴

In the first strophe (94) Camões describes the figure and character of the Velho do Restelo, presenting him as a man "with knowledge only gained from experience." In strophes 95-97, through the mouth of

this character, Camões condemns the concepts of glory, fame and honour, which in reality are just euphemisms for greed and vanity, causes of countless physical and moral evils, and expresses general censure of human ambition. Next, in strophe 97, the Old Man asks himself to what disastrous consequences will this blind ambition lead the Portuguese Kingdom, and then shows a prophetic vision of the evils that the Portuguese could suffer (strophe 98). The final two stanzas of Canto IV are still an invective against wild ambition, whose origin is seen in the fire of Prometheus, symbol of all human passions.⁵

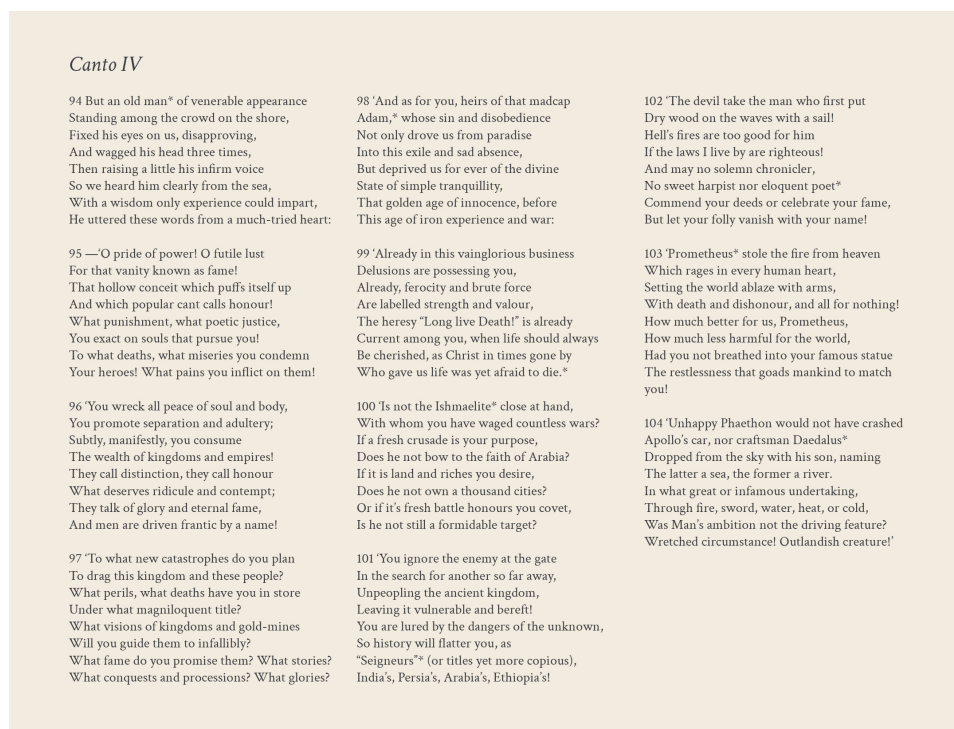


Figure 1. Words of Velho de Restelo in translation to English by Landeg White. (Image created by the authors. Source of text: *The Lusíads*, Oxford World's Classics, New York: Oxford University Press Inc., 1997.)

His words, portraying a position contrary to the Portuguese maritime endeavour, are in clear disharmony with the message of the whole epic. The ongoing debate of this paper is on what was the author's intention behind including this contradiction, as well as a discussion about the character's nature.

Symbol of pessimism or a wise prophet?

There those who see Velho do Restelo in pejorative light, such as Herick Silva, who in *Monitor de Literatura* states that this character symbolises pessimistic and conservative people who had no confidence in the likely success of the Portuguese discoveries.⁶ Cristina Moura Rebelo reinforces that opinion, and adds that despite being an eloquent person, he signifies "conservatism, ill will, a lack of adventurous spirit and a contemptuous attitude towards original ideas."⁷

However, there exists a great number of authors who see the character from a positive perspective. João Morgado recognizes that "we always treated Velho do Restelo badly, but maybe he was right."⁸ Tatiani Aparecida Serbai et al. place emphasis on the deep symbolic meaning of the mysterious senior and its high eloquence, calling him one of the most important characters of the whole epic.⁹ Sheyla Farias states that he can be compared to the chorus in Greek tragedy, which embodies the voice of wisdom.¹⁰ Various Portuguese poets of great importance also expressed their support of the Velho do Restelo's vision. His speech is taken up by Fernando Pessoa in "Mensagem,"¹¹ where he expresses criticism of

expansion due to Lusitanian losses and suffering. In “Poemas Possíveis”¹² José Saramago references voice of Velho do Restelo when he mentions the space race and the Vietnam War, criticizing the devaluation of the essence of life due to search of power and fame,¹³ and in “Memorial do Convento”¹⁴ he establishes the relationship with the episode of *Os Lusíadas* through the criticism of the construction of the Convent of Mafra, in which men abandoned their wives and children to work towards progress, this way echoing Velho do Restelo’s censure of authorities who are willing to take human lives in order to satisfy their vanity and selfish ends.¹⁵

Despite the many voices who support Velho do Restelo’s bravery to stand up against the expeditions,¹⁶ his character nowadays still functions in popular phraseology as a symbol of pessimism. Ana Salgado, in “Outros quinhentos,” writes: “[Oh man, you already seem like an Old Man from Restelo!] Yes, this is an expression used when we want to convey that someone is resistant to any change.”¹⁷ Pedro Braga confirms it: “He represents, or symbolises, the herald of pessimism, like Cassandra in the Hellenic tradition.”¹⁸

Iconography

After getting acquainted with Velho do Restelo’s literary meaning, we researched his presence in public iconography. While there exist extensive studies¹⁹ of the iconography of Luís Vaz de Camões, as well as of the illustrations of his great poem,²⁰ a gap was observed when it comes to studies of the iconography of his polemical figure.

A brief recognition of his graphic depictions was made, which we divided into twentieth-century paintings (Figure 2) and contemporary illustrations (Figure 3). It was observed that even the recent representations (Figure 3) still follow the same pattern with repeated characteristics – long white beard, a cane in his hand, and often an angry facial expression.



Figure 2. Velho do Restelo in twentieth-century paintings.



Figure 3. Velho do Restelo in contemporary illustrations.

Important to take into consideration is the small number of found representations, which indicates an apparent marginal status in the interpretation of the epic. However, what we posit is that this relatively secondary in the narrative figure actually is not marginal, but has a discreet, codified key role. Moreover, we state that this small number of gathered images further emphasises the need for his new visual representation.

Searching for the polysemy of Velho do Restelo

In 1939, on the side of River Tejo in Lisbon, on the location from where the ships departed to explore India, the *Padrão dos Descobrimentos* – *Monument of the Discoveries* was conceived, a work of architect Cottinelli Telmo and sculptor Leopoldo de Almeida. It intends to celebrate the Portuguese *Age of Discovery* (or *Age of Exploration*) during the fifteenth and sixteenth centuries.²¹



Figure 4. Padrão dos Descobrimentos (*Monument of the Discoveries*.) (Photo from: <https://padraodosdescobrimentos.pt/padrao-dos-descobrimentos/>, accessed June 13, 2022, edited by the authors.)

On August 8, 2021, the monument was covered with a 20-metre-long graffiti intervention on one of the sides (Figure 5), with words written in English: “Blindly sailing for monney [sic], humanity is drowning in a scarllet [sic] sea lia [sic].”²²



Figure 5. Graffiti on Padrão dos Descobrimentos, 2021. (Photo by António Cotrim/Lusa, accessed June 13, 2022, <https://www.publico.pt/2021/08/08/local/noticia/padrao-descobrimentos-vandalizado-mensagem-ingles-1973480>.)

Despite the very limited presence of Velho do Restelo in contemporary iconography, events like this²³ show that he might be better understood today than in the times of Camões. This kind of incident might be regarded as a symptom of fundamental shifts in contemporary narratives and historical interpretations, as we will observe next.

Decolonization

We are observing the growth of *decolonization* phenomenon. The term initially used to describe the process the colonies went through to free themselves from colonial supremacy, is defined today by International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) as a much broader process: “a philosophical, moral, social, spiritual and also activist call that points to the fact that we are still subject to the ideology of colonialism.”²⁴

There are many remnants of colonial times around us, such as street names, objects in museums taken from their legitimate owners, and – statues – that glorify people many times responsible for massacres and genocides. Lisbon’s heritage landscape is strongly marked with symbols that still carry colonial message,²⁵ with the Padrão dos Descobrimentos being the most visible example.

In past years, a growing number of cultural institutions, such as museums, are taking on the challenge of trying to decolonize their institutions. ICCROM states that to decolonize we need to ask the right questions, such as “How do we contribute to a renewal of the canon with stories and reference frames that have been systematically erased from it?” and places an emphasis on the need to change the focus and alter the perspective of presenting heritage.²⁶

We observe a range of emerging counter-narratives and revisitations of cultural heritage sites, with renewed contexts and perspectives. Notwithstanding its original imperial message, the Monument of

the Discoveries' interior has been a place where the initiatives that tackle the Portuguese colonial past started taking place. Cristiano Gianolla et al.²⁷ mention most recent initiatives, that include:

- the exhibition *Racism and Citizenship*, curated by Francisco Bethencourt in 2017,²⁸ which examines how the concept of subversive and inclusive citizenship frames the relationship between racism and its resistance;²⁹
- *Atlântico Vermelho (Red Atlantic)*, a project conceived in 2017 by the artist Rosana Paulino, that presents a set of works on fabric (Figure 6) that challenge traditional notions of history and hierarchy of artistic genres, revealing “the reverberate marks of an unresolved past;”³⁰
- *Contar Áfricas! (Talking about the Africas)*, described by the curators as “a scientific-museological exercise developed in 2018,”³¹ narrates the pluralism of relations between Portugal and Africa, showing a diverse and multiple facets of the continent.



Figure 6. No title, Print on fabric, drypoint and sewing. Part of the project *Red Atlantic* by Rosana Paulino, 2016. (Image from: *Red Atlantic, Superfície*, accessed June 30, 2022, <https://galeriasuperficie.com.br/en/exposicoes/rosana-paulino-atlantico-vermelho/>.)

African and Afro-descendant communities and organizations are also showing a greater engagement in recent initiatives questioning established narratives of the Portuguese empire.³² Beatriz Gomes Dias, former Djass³³ president, marks that: “The existing monuments that occupy public space are all centred on celebrating the discoveries and reifying myths of national identity,” expressing the need for this to be disputed. She then proposes a solution: “[...] the way to do this would be to present a counter-narrative that could oppose, that could dispute, this hegemonic national narrative,” and that it could be done “through a monument erected in the public space where we could tell our stories, or tell the reverse side of this glorified history.”³⁴ Dias places hopes onto the future project that is to be constructed in Lisbon – *Plantation – Prosperity and Nightmare* (Figure 7) by Angolan artist Kiluanji Kia Henda, a memorial to the millions of African people enslaved by Portugal throughout its history.³⁵ Dias believes it can serve as an example of counter-narratives, as well as a needed space for debate focused on showing the often unheard perspective of Africans and Afro-descendants.



Figure 7. Plantation, project by Angolan artist Kiluanji Kia Henda. (Image from: “Memorial De Homenagem Às Pessoas Escravizadas – Lisboa.” accessed June 13, 2022, <https://www.memorialescravatura.com/english.>)

Proposal for a Monument

A kind of counter-narrative that the following article proposes consists of recognizing Velho do Restelo in a time when we are looking at history differently, in the light of decolonization. Since decolonizing is about creating spaces for multiple perspectives and showing different contexts, we believe that Velho do Restelo can be the transmitter of the opposite narrative to the glorification of the Portuguese marital expeditions.

Based on the above, we propose that Velho do Restelo’s updated meaning can be expressed in new visual representations, in order to increase his presence in the iconography, and to update this literary character’s symbolism in people’s imaginary and consciousness. To ensure that the figure speaks nowadays to a wide range of people, including younger generations, this research proposes the development of aesthetics that transmit a spirit of contemporaneity.

As a medium of implementation for Velho do Restelo’s proposed representation, we have chosen Augmented Reality (AR) technology. Taking into consideration that today, many times when history is being questioned, an observed response is vandalization or taking statues down, the future project’s goal is to instead of destroying an object that is an expression of the past, stuck between being a symbol of national pride and from the other hand an outdated object needed to be updated, add another layer of reality by introducing a new, AR digital statue.

Among other reasons for choosing AR was the fact that through this technology digital creators can express their point of view without the need to undergo the procedures of installing a physical sculpture, which placement requires following a set of guidelines in the logistics and administrative process, and needs to take into consideration factors such as budget, finding a source of funding, and maintenance. Without the need of physical interaction with the existing monument, the Velho de Restelo digital monument is planned to be added in contraposition to the Padrão dos Descobrimentos, this way showing another perspective and narrative to the historical events, thus contributing to expressing the fuller picture. We believe that this Velho do Restelo sculpture can serve as a starting point for an open dialogue with all members of society.

Wise Old Man Archetype

To support our hypothesis, as part of a preparatory methodology for attributing to Velho do Restelo renewed meaning and resonance – as an embodiment of people who don't regard the discoveries as glorious events, we reach out to Jung's concept of the archetype.



Figure 8. Representation of an archetype structure. Diagram created by the authors, based on the work of Carl Jung.

Jung stated that “the concept of the archetype [...] indicates the existence of definite forms in the psyche which seem to be present always and everywhere.”³⁶ Based on the described archetypes, we hypothesise that Velho do Restelo can be regarded as an Old Wise Man, who is an embodiment of wisdom, knowledge, meaning, reflection, insight, intuition, honesty, truth, protecting power of destiny.³⁷ He appears diverse cultures around the world behind many forms and names, for example as philosopher, mentor, teacher, guru, hermit, wizard.

Campbell further stated that all mythic narratives are variations of a one, single, great story: the Monomyth.³⁸ *Os Lusíadas* fits into the Monomyth framework, Vasco da Gama being a hero who departs with Portuguese sailors for the journey, faces a crisis, and ultimately returns victorious. In literature, the wise old man often takes the form of a mentor, who appears in the beginning of *the hero's journey*,³⁹ and offers advice and guidance to the hero.

Christopher Vogler notes that sometimes mentors can take on a function of a personification of protagonist's conscience, reminding him of a moral code; however, as in this case, he may rebel against the elder's warning,⁴⁰ which later came with the dark consequences.⁴¹

Taking the above into account, we posit that Velho do Restelo can be regarded as a Wise Old Man, providing the means to elevate his figure from a symbol of pessimism to a symbol of wisdom and moral advice, a prophetic visionary.

CONCLUSION

This research demonstrates that it is possible to reread the meaning of the figure of Velho do Restelo, who, although coming across as a character of minor importance in the Luís Vaz de Camões epic novel *Os Lusíadas*, can be seen as having a key role. His opposite view of the glorified fifteenth-century

expedition for discovery of India adds a counter-narrative to the historical narrative, thus opening up a broader range of viewpoints about the discoveries.

Based upon Jung's concept of archetype, recognizing him as an embodiment of the Wise Old Man adds a ground for establishing his symbolism as an embodiment of wisdom and a voice of conscience.

Apart from rereading its semantical dimension, the article proposed an update of Velho do Restelo's image in contemporary aesthetics, in order to renew his presence in cultural iconography. The article is a part of a preparatory work for a future project, which consists of creation of an three-dimensional Augmented Reality representation of the character, placed by digital application as an addition to *the Padrão dos Descobrimentos* in Lisbon. Future work also includes finding ways of deepening the possibilities of engagement of young generation and their possibility of expressing their opinion.

The proposed approach could help in contextualising the portrayal of the historical events described in *Os Lusíadas*, while positioning the book as still relevant, encouraging deeper insights. The addition of digital technology might work as a trigger for interest among younger demographics, fostering an interest in cultural heritage.

On a broader perspective, it is possible that the creation of AR *counter-sculptures* in times when a range of matters in history and past attitudes are being questioned, can add missing narratives and serve as a stimulus for an ongoing dialogue.

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FROM ANCIENT TO META ARTEFACTS: EXPLORATIVE PARTICIPATORY MUSEUM EXPERIENCE

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INTRODUCTION

The emerging technologies are bringing us an incredible opportunity to craft new experiences for the audience, make content more accessible, start new conversations about archival, education, and audience engagement and bring new perspectives on collections. Most notable museums from around the world are working assiduously to digitalize the artefacts currently housed in museums by building databases with online collections. Many museums use 3D scanning methods to capture and store the subject's shape. It is common for museums to share their scanned collections on their official websites or blogs while exploring the existing technologies alongside artists, designers, and creators. London's science museum¹ is selling 3D prints and offering virtual tours of laser-scanned galleries, the Smithsonian² is scanning for archival purposes, and the Met³ is going even further by creating conversations and engaging with its audience during workshops. The Google cultural institute⁴ has been building a database of 3D scans in collaboration with cultural institutions from all around the world since 2014 under the initiative "Scan The World," where a single object generates a large number of interactions and that means there is something about this practice that raises the general interest. Furthermore, the digitized artefacts are accessible to everyone, to be downloaded, edited, merged, or even physicalized using additive manufacturing, which can be seen as distributing the knowledge about the ancient artefacts across the (digital) tools, the environment (virtual vs. physical), and the people, that over time leads to new understandings and practices. This is a significant moment when new practices are emerging by bridging the traditional, the old, and the known with the new digital concepts that redefine museums' role as cultural institutions.

The traditional role of the museum is to provide consistent and high-quality content for visitors to consume; that is how a good experience is maintained⁵. In contrast, nowadays, the focus is to achieve a greater level of visitor control and new methods of audience engagement by employing digitalized experiences, which is a great and refreshing novelty when these experiences are well thought out. The International Council of Museums⁶ defines a museum as "a non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for education, study and enjoyment."

To stay faithful to what a museum as an institution should represent, we have been working on creating an experience that explores the potential of inexpensive digital scanning while engaging museum visitors with on-site collections. Our focus was achieving high-quality visitor engagement and evoking

curiosity and interest to the extent where learning and inspiration occur, all together with enjoyment. This project unites participatory design and design anthropology⁷ through technological exploration. While the scanning processes were costly a few years back, they have become very accessible, mainly because of the advancements in photogrammetry software. Anyone can 3D scan an object with a smartphone, within seconds, and generate their 3D objects. These can be stored as data, archived, duplicated, 3D printed, distributed, and shared online, viewed on a screen or in an immersive environment, like a virtual reality headset or a stereoscopic display. That opens up plenty of possibilities for experimenting with 3D scans.

PARTICIPATORY MUSEUM EXPERIENCE

For our research purposes, we chose to exhibit Greek and Roman art sculptures in the concept museum and offer an interactive experience for the visitors called the Participatory Museum by personalising a sculpture from the collection. We scanned visitors' bodies and translated them into digital artefacts, extracted their faces from the 3D models, and attached them to a 3D model of an ancient sculpture. For this purpose, several workflows were studied and explored to achieve the fastest and best-looking outcome while creating the experience. New insights emerged by bridging the tangible and the intangible digital artefacts that led to the creation of meta-artefacts.

The museum installation was located at the University of Southern Denmark, campus Kolding, 5th floor. Plenty of visitors participated in the explorative participatory museum experience and kept coming back to see the tangible participatory exhibition (Figure 1).

This project encompasses the parcels B1, B2 and B3 (Figure 1). The workflow can be summarised in 4 phases: using photogrammetry for generating 3D models from the visitors in the museum that participate in parcel B1-a (Figure 1), post-processing and merging the 3D models in the dark studio labelled as B1-b (Figure 1), and finally, creating the participatory exhibitions B2 and B3 (Figure 1), one intangible exhibition using VR concepts (available within half an hour) and another tangible using 3D printing technology (time-consuming & available within few days, yet the reason why visitors came back).

To conduct our explorative research, we needed a framework that would ease the coordination between the people (4 design researchers, 20+ volunteers/participants) and the objects (artefacts and digital tools) in this non-traditional approach to creating a museum experience. In situations that surpass the traditional approaches or when designing new work practices and technology, distributed cognition⁸ has been suggested by scientists as a practical, theoretical framework for organizing the work performed in terms of the division of labour between people and artefacts.⁹ Therefore, regarding the project requirements, we developed a distributed cognition map based on the theory of distributed cognition that was utilized as an aid tool in: (1) organizing the environment where the research was conducted, (2) keeping track of the visitor's pathways and interactions with the artefacts, and (3) simplify the interlaced workflows. The distributed cognition map showed very efficient in mapping the visitor's pathways which enabled gathering data for evaluation and future improvement of the participatory museum experience.

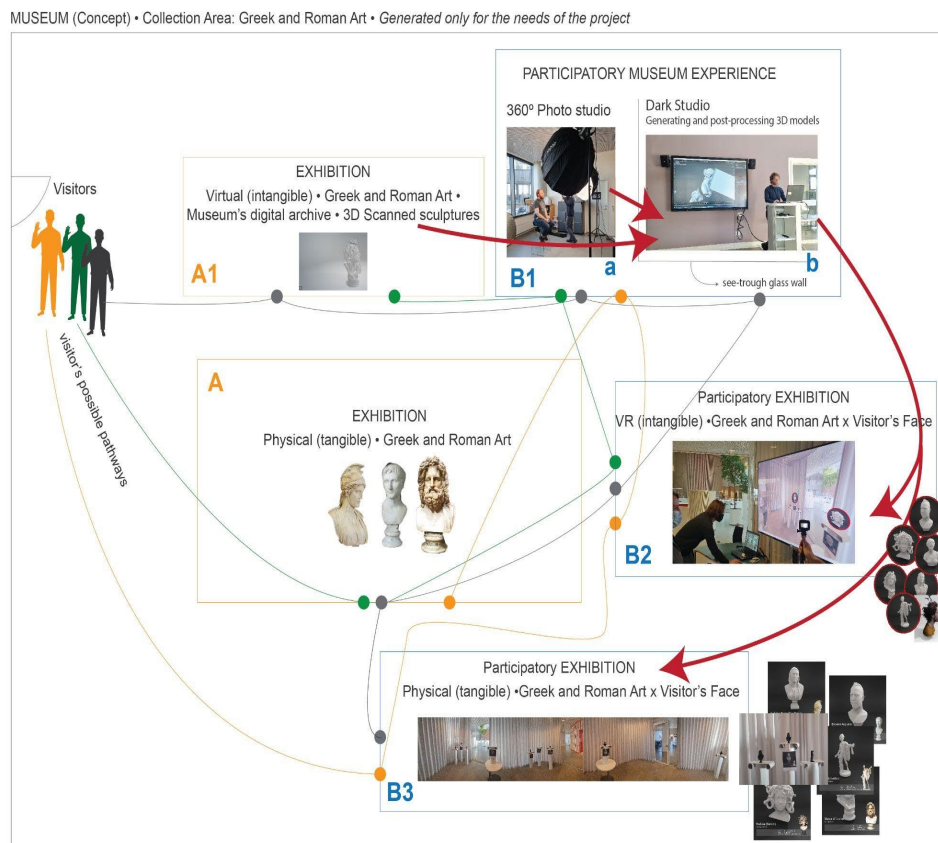


Figure 1. Distributed cognition map of the concept museum developed for the needs of the project; Parcels: A - Main exhibition, A1 - Complementary virtual exhibition, B - Participatory Museum: B1- Participatory Museum Experience, B2 - Participatory Virtual Exhibition, B3 - Participatory Tangible Exhibition (Self-generated Image(s), 2022)

EXPLORING PHOTOGRAMMETRY

Photogrammetry is a term used for describing the science of making measurements from photographs, the input consists of photographs, and the output is commonly a drawing, a map, measurements, or a 3D model. For example, most maps nowadays are created with this technology using multiple, overlapping photographs taken from aircraft or drones, and then being automatically processed by computers and their representative software.¹⁰ This same method can be applied to scanning people or objects with any camera or phone camera. Technically, anyone could take many pictures of an object from all possible directions and insert them into photogrammetry software, which tries to estimate camera positions and creates a “point cloud” (Figure 2). That translates into points in 3D space that resemble the photographed object, which allows the creation of accurate digital twins.

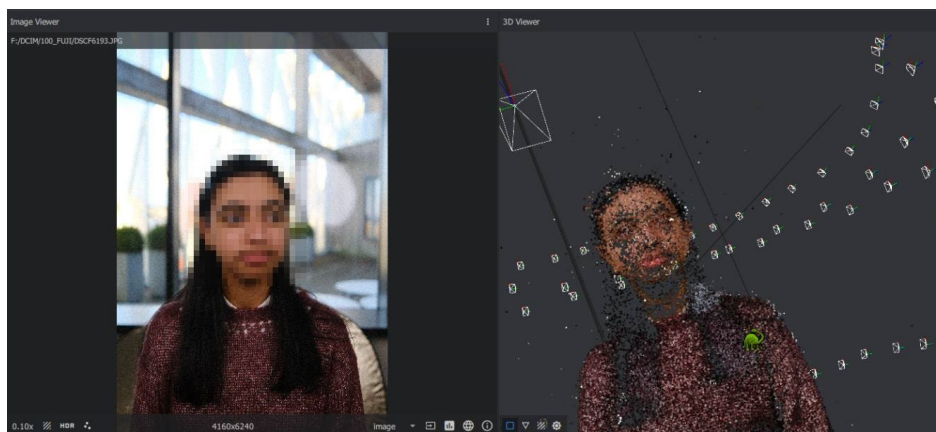


Figure 2. Point cloud example (Self-generated Image(s), 2022)

Capturing the object

Based on the different experiments with taking pictures we can say that any smartphone camera works. Several smartphones and one mirrorless camera were used in the process. However, there were no significant changes when it comes to the obtained results unless the shooting happened outside of a studio. Moving background objects could confuse the software and not include specific pictures within the computing results. The mirrorless camera performed slightly better in outside environments, as setting the aperture between 5-6 on the camera allowed the whole subject getting captured to be in focus while retaining details. In both cases, though, the group found that it is best to move around the target object in circles, varying the angle and height after each pass. During the testing phase, the number of shots taken varied in numbers. Often it was 50, 100, or even more pictures to capture every detail. Taking them does not take nearly as long as one would expect. This helped, as most of the subjects were people who had to sit still with the same expression during the sessions. They collaborated well, but it took a while to get it right, as the one taking the pictures had to adapt and learn according to each subject.

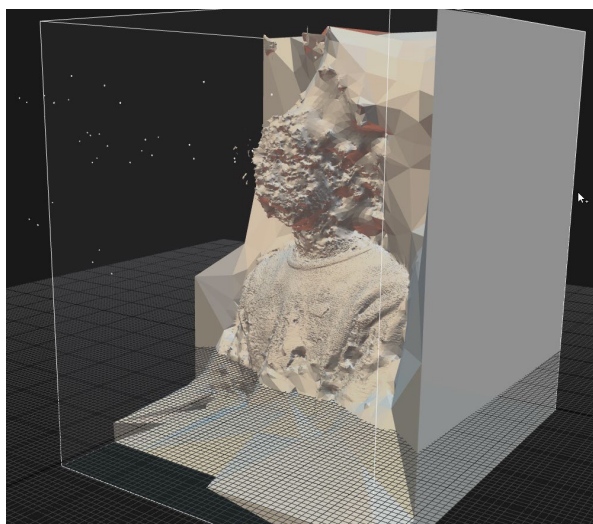


Figure 3. Software not being able to recognize the subject, due to a busy environment (Self-generated Image(s), 2022)

Finding the correct environment and camera settings proved to be a learning process; the group learned early on to avoid hard shadows. Taking pictures on a cloudy day or in a DIY studio setting yielded the

best results, as it evened out the lighting from all sides of the subjects. One could zoom, go closer or further and even mix pictures from different cameras as long as it all happens in the same environment and with the person visible. Shooting raw and mass editing for higher contrast also helped the software better recognize the subjects, but standard JPEGs resulted in a more than good enough outcome. One could even take a video, as it is possible to use a video rendered into individual frames. However, the quality of these images is much lower than a standard picture. In addition, the metadata that helps the software recognizes that the images are from the same shooting session will be missing. On top of that, it will generate hundreds of images that could take the software longer to compute.



Figure 4. Studio setting (Self-generated Image(s), 2022)

Reconstruction and post-processing

After the photo shoot session was done, the reconstruction of the 3D models through various software tools began. The workflow was simple and similar throughout the different software, just with a different algorithm and user interface. It starts with transferring all the pictures into the 3D reconstruction software and then saving the project file, so the process could be recovered if something happened during the reconstruction. This is a critical step if one wants to save time re-doing previously generated steps. Then the software renders the model, which could take up to 20 minutes up to several hours, depending on the environment in which the photos were taken. Of course, the more background noise, the longer it will take. These aspects can be box-bound limited (Figure 5), which means creating a cube around our desired subject, so everything outside of it will be excluded from the reconstruction.

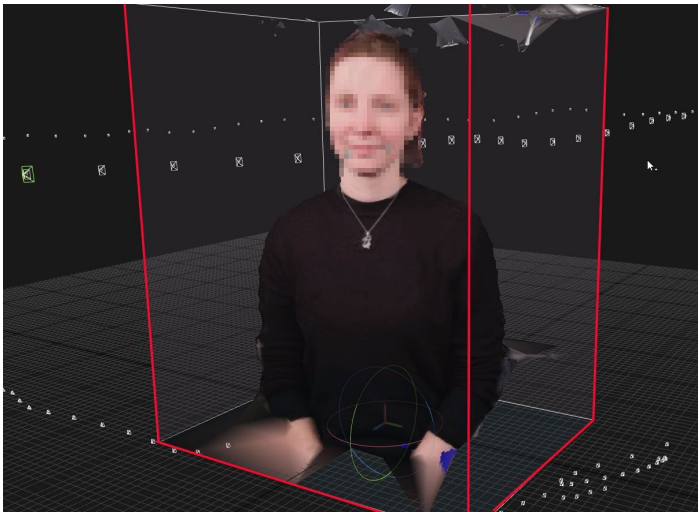


Figure 5. Box-bound subject (Self-generated Image(s), 2022)

Different pipelines were explored to determine the speed and quality of each reconstruction. An open-source software called Blender¹¹ was used to clean up and mix the faces and meshes. However, additional software was explored, such as Meshmixer¹² and Microsoft's 3D Builder.¹³ These three performed well, and the only notable difference between them is the different approaches leading to the same outcome.






Photo Session >	Picture Editing >	Reconstruction Software >	Clean up & mixing >	Outcome
Photos (Outdoors&Studio) >	Editing Raw >	ReCap (Student License)	Blender	
Photos (Indoors) >	Editing Raw >	Meshroom (Open Source) >	Meshmixer	
Photos (Studio) >	Editing Raw >	COLMAP (Open Source) >	3D Builder	
Photos (Studio) >	No Editing	3DF Zephyr (Student License) >	Blender	
Photos (Studio) >	No Editing	Reality Capture (Pay per export) >	Blender	

Figure 6. Different pipelines explored (Self-generated Image(s), 2022)

While the cleanup software did not yield different results, as it is a matter of preference, the reconstruction software mattered significantly in terms of speed, quality, and projected textures.

The first program, ReCap,¹⁴ which was acquired through student licensing, did not create whole meshes. Instead, it created a plane that was hollow and not closed off. This caused problems later down the line when it came to 3D Printing because the plane could not correctly merge with the chosen historic statue during the cleanup, resulting in an unfinished print (Figure 7).



Figure 7. Failed 3D print (Self-generated Image(s), 2022)

The second one, Meshroom,¹⁵ worked as it should, but on weaker computers, it took half a day to reconstruct usable models. While it works on small-scale objects, using it to reconstruct human heads due to its details did not result in good outcomes, and the cleanup of those models was not worth investing time and energy. COLMAP¹⁶ had similar results. The fourth one, 3DF Zephyr,¹⁷ also required via student licensing, created the best accessible results the fastest. However, the student licensing limited export functionality, so the models could not be used for their desired purpose, so the group tried a pay-per-export program called Reality Capture.¹⁸ By far, this was the fastest, and it could automatically clean and fix the reconstructed meshes within its program for no extra charge. The price greatly depended on the number and the resolution of the images, but both could be reduced with no visible effects on the outcome itself.

Once these reconstructed meshes were exported, cleaned up, and merged with the statues, the act of retopology¹⁹ was needed. In the most basic form, it simplifies a 3D model into a low-resolution and optimized form for an effortless 3D printing experience. This is an important step, as the reconstructions contributed to creating a huge 3D file, which requires optimization and conversion to enable it to be used on the web, augmented reality, virtual reality, or other relevant projects (Figure 8).



Figure 8. Virtual Reality demo showcase of the Virtual Participatory Experience B2 (Self-generated Image(s), 2022)

Overall, photogrammetry proved to be an inexpensive technology compared to automatic industrial 3D scanners, where the price could range from 20,000 USD up to 200,000 USD. With this low-cost method, one only needs a camera and a room with enough light to light up angles equally. This could easily be implemented in an exhibition as an exciting and more personal experience given the right direction. One downside is that capturing parts with flat, smooth, and solid coloured surfaces is challenging, as these objects tend to have no patterns for the software to detect. There were no right or wrong workflows, as each worked in its unique way. However, if we are thinking in terms of participatory museum experience, then the route of using paid and optimized software, Reality Capture, was deemed the most successful as it was the fastest and easiest to use for efficiency.

Meta artefacts

After experimenting with various software to generate these models, the group became confident enough to create a VR exhibition (Figure 8). A strategic move to enable co-created meta artefacts to be exhibited and explored as soon as possible, during the same visit to the museum, would give enough time to explore the original collection in parcel A (Figure 1) and B3 - the participatory exhibition consisting of the personalized 3D printed meta-artefacts (Figure 1). The tangible participatory exhibition B3 (Figure 1) is why visitors return. The participants could choose between taking the personalized 3D-printed sculptures back home or donating them to the museum and having them permanently exhibited for the duration of the attraction. It was noted that both choices were equally represented, and on top of that, around 40% of the visitors came back to participate in the museum experience again. It was interesting to note that the participants that re-visited the museum: (1) bring more people with them, usually friends or family, (2) choose to participate in the museum experience again by personalizing different sculptures than the last time, (3) choose to donate their sculpture to parcel B3 if the previous visit they decided to take the personalized sculpture with them and vice versa, (4) were familiar with the historical background of the original sculpture that they personalized in their previous visit and they were very keen on walking their friends or family through the main exhibition - parcel A, and sharing the knowledge with them.

The product of our participatory museum experience is the co-created meta artefacts or beyond-artefacts (Figure 9). The prefix 'meta' allows us to situate the co-created artefacts in a novel and modern context that surpasses the historical significance, elicits one's thirst for knowledge and brings us closer to understanding the evolutionary origins. 'Meta' represents progress and refers to an artefact that comes

from an era but survives and evolves beyond what's known. Anthropologically, it points out a cultural change and it can be referred to as cultural metamorphosis²⁰. Different value inputs were invested into the creation of these artefacts: the ancient artefacts which bear witness to history, the people's unique physique that testifies to the stage of the human evolution we are at right now, and the digital, intangible aspect of preserving and translating the combination of the past and present artefacts for enabling their use in the future.

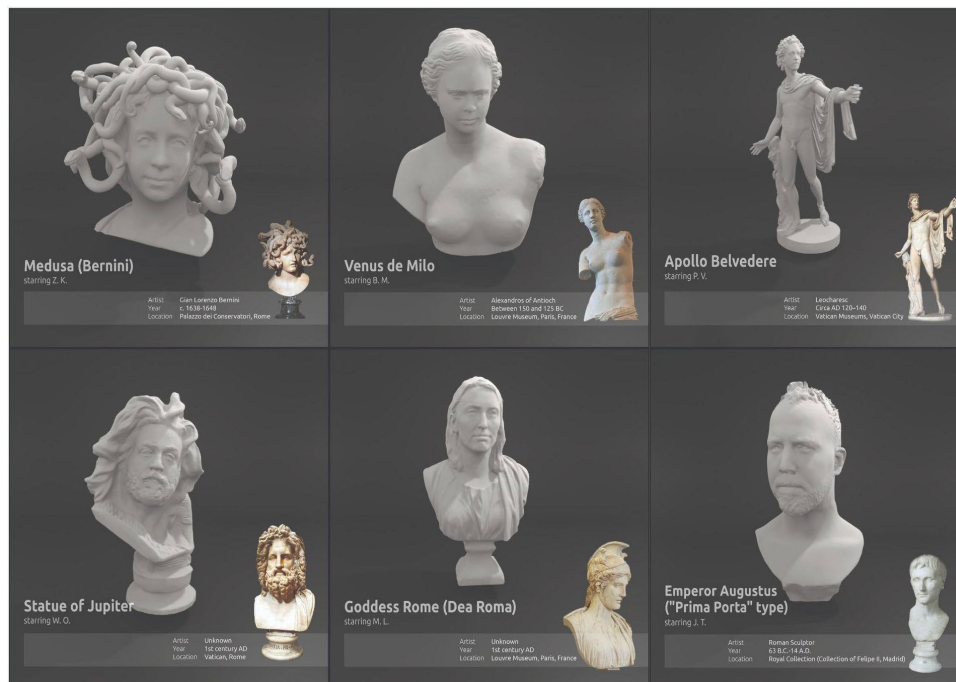


Figure 9. Meta Artefacts - the product of the Participatory Museum Experience (Self-generated Image(s), 2022)

CONCLUSION

Society is currently immersed in an interactive, digital and technological transformation. Museums should not miss this opportunity to adapt to the new times. The significance and the highlight of the work lies within the co-creation of new practices and experiences that surpass the traditional. Photogrammetry is an ideal technology for this purpose as it is efficient and allows the capture of any object in the real world to create 3D models for any proposed application. This technological exploration proved that greater visitor engagement can be achieved through evoking curiosity and inspiration.

ACKNOWLEDGEMENTS

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MATTER AND MEMORY OF THE GREAT NORTHERN

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INTRODUCTION

On December 11, 2021, a windstorm blew a gaping multi-story hole in the north façade of the Great Northern, the oldest surviving grain elevator in Buffalo, New York. Opened in 1897, this rare steel-bin structure with its brick-box shell once was the largest grain elevator in the U.S.¹ Not only did the hole open an extraordinary view into the building's interior, it also opened a look at its more intangible histories.

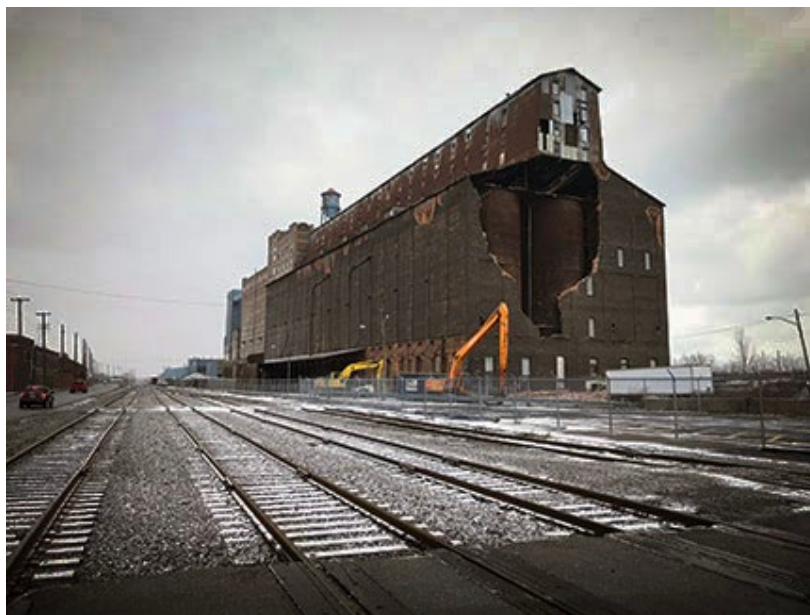


Figure 1. Windstorm damage to Great Northern Grain Elevator

What has been hidden in this hypostyle hall of steel and dust-filled air since its closure in 1962? And what do the inner workings of the building tell us about what happened there? What do they reveal about its external contexts—along its waterfront and beyond?

This paper addresses the Great Northern as an *icon of transition* in the transshipment industry in the late 19th and early 20th centuries. It will discuss the building's transformational typology and attendant labor history, both topics that are under reported, perhaps because of their less quantifiable natures.

The Great Northern grain elevator, built by the Great Northern Railway Line and put into service on September 29, 1897,² is part of a much larger industrial landscape—one that extends along the waterfronts of Lake Erie, the Buffalo River, the Niagara River, and beyond. This is the result of Buffalo

becoming a major transshipment center in the late 19th and early 20th centuries. After the 1825 opening of the Erie Canal, Midwestern-grown grain was transported to Buffalo, where it was unloaded and temporarily stored before being shipped via the canal to the east coast and onward to world markets.³ Consequently, Buffalo became the world's largest grain-shipping port, a title it held for a century, until the 1959 opening of the Saint Lawrence Seaway, which allowed direct access for large vessels between the Great Lakes and the Atlantic Ocean.⁴

From 1842 to 1942, a total of 121 grain elevators of various and evolving construction types were erected along Buffalo's waterfront: 59 wood, 1 iron, 2 brick, 2 tile, 12 floaters, 14 transfer towers, 11 steel, and 20 concrete.⁵ At the peak of activity in 1931, 38 grain elevators holding over 47 million bushels were located along the Buffalo shores forming a landscape/waterscape teaming with towering buildings, ships, freighters, trains, and exhaust fumes.⁶ As transshipment shifted elsewhere, this part of the city became a vast and unusual industrial ruin-scape of colossal silos and adjacent mills, with just a few remaining in operation.

In 1990–1991, the Historic American Engineering Record (HAER), a federal record established by the U.S. National Park Service, the American Society of Civil Engineers, and the Library of Congress, produced a detailed report on twenty of Buffalo's grain elevators, including the Great Northern. This document recognized their historical and architectural importance: "The grain elevators of Buffalo comprise the most outstanding collection of extant grain elevators in the United States, and collectively represent the variety of construction materials, building forms, and technological innovations that revolutionized the handling of grain in this country."⁷ The HAER report contained in-depth information on the construction and economic histories of the Great Northern.

CONSTRUCTION

Built by notable elevator-builder D.A. Robinson and engineer Max Toltz, the Great Northern is significant for several reasons. Described by the *American Elevator and Grain Trade* journal as "the largest and most complete grain handling plant ever put under one roof," the Great Northern Elevator was the first to employ steel grain bins on a large scale and the first to apply electricity as a source of power.⁸ The HAER report states that "[d]eployment of individual electric motors allowed increases in handling rates and made possible the introduction of the self-contained movable marine towers. Using non-combustible materials, efficient transmission systems, and the installation of dust collection equipment, the structure was built to withstand fires and explosions, a common occurrence in the wooden predecessors to the Great Northern."⁹



The interior contains a free-standing steel structure with columns that support both the circular steel bins and the four-story workhouse above. “The Great Northern contains 48 steel bins, 30 which are 38 feet in diameter and 18 which are 15.5 feet in diameter. The bins, which are formed of plates of steel riveted and welded together, stand on steel pillars several feet above the concrete floor of the elevator. The horizontal conveyor system for distributing and weighing incoming and outgoing grain was housed in a four-story-high, corrugated iron headhouse atop the elevator.”¹⁰

The non-load bearing curtain wall of brick that forms the building's exterior—a conventional shed shell—serves as a weather barrier and conceals the modernizations within. Originally, the grain elevator had three nine-story marine towers for unloading grain that moved along tracks down the length of its west façade fronting the City Ship Canal. After their collapse in 1922, two new, 145-foot towers were built in their place.¹¹

More than any other existing grain elevator on the Buffalo waterways—if not the world—the Great Northern serves as a powerful artifact of transition; it embodies the memory of what came before it, while simultaneously predicting what came after. As such, it reveals a few of the basic elements of the very definition of transition: 1) that change and adaptation occur when moving between two or more modes, and 2) that this change parallels the commonalities of the modes and yet allows for something different. In other words, transition makes the unfamiliar familiar.¹²

The Great Northern was built not only as a working grain elevator, but, also, as an experiment—a speculation. It verified the improvement of several physical features, i.e., a linear arrangement of cylindrical silos as the ideal form and organization of such forms for storing grain. It also served as the way forward for industrialists trying to make a greater profit and a backdrop for immigrants who were moving from destitution and seeking a better life. The customs and changes associated with this building address key elements of society—economics, industrialization, innovation, socio-cultural hierarchies, politics, and institutions. While there are many transitional aspects of the Great Northern, we will focus on 1) its direct role as a typological transition and 2) its reflection of labor transitions in the U.S.

TYPOLOGICAL TRANSITION

The Great Northern served as a transitional model between the older wooden elevators and the later concrete versions that were to standardize elevator construction across the globe.

During the first few decades of the Erie Canal's existence, the waterfront was populated with three-to-four story brick warehouses in the area where the Buffalo River and the Erie Canal meet. This changed in 1842 when, with the Buffalo invention of the mechanized grain elevator by Joseph Dart and Robert Dunbar, a new building typology emerged.¹³ The mechanization of grain movement and storage triggered a rapid shift in the scale and speed of operations, as inherent limitations of the human body and labor no longer imposed constraint on the overall size, capacity, and height of storage facilities. Even Joseph Dart's elevator, which first held 55,000 bushels, doubled in size in three years after its initial construction due to high demand, furthered by innovations in efficiency that allowed for twice the volume of grain to be raised per hour.¹⁴ Out of this scale increase sprang a new skyline—a city unto itself—of enormous wooden grain elevators lining the edges of Lake Erie and the Buffalo River with its many canals.



Figure 3. Buffalo grain elevators seen from the foot of Main Street

The marine leg was the primary innovation of the new mechanical elevators. Housed in the marine tower, it is a vertical conveyer belt equipped with buckets. The leg is first tilted out from the marine tower and then extended down into the hold of grain ships. The grain was scooped by the buckets as they conveyed around the end of the leg (with the assistance of human labor plowing and shoveling grain toward the descended leg) and elevated up the marine tower to a scale where it was weighted prior to being distributed into the storage bins. This system revolutionized the handling of grain in terms of labor, volume, speed, and thus, economy.¹⁵



Figure 4. Marine leg unloading grain

By 1865, Buffalo was home to 29 wooden grain elevators, some storing 600,000 bushels, and altogether storing 6 million, and capable of moving more grain in a single day than it was in an entire year just two decades before in 1842.¹⁶ However, the wooden elevators were inherently defective as a means of grain storage. Not only did the wood construction of these buildings offer a breeding ground for vermin and rot, but also, they were susceptible to destruction by fire—an unfortunate inevitability due to the high combustibility of grain, compounded by both the electrical processes of transfer and sparks from nearby trains. The Eastern Elevator, for example—Buffalo’s largest elevator upon completion and built of eight million board-feet of timber—was destroyed by fire within just four years of its construction.¹⁷ Ultimately, the wood-constructed elevators were quoted as having a lifespan of approximately just 12–15 years. By the late twentieth century, it became abundantly clear that this building type—while affordable in construction—was no longer practical and became increasingly difficult to insure. As a result, a transitional era of grain elevator development in Buffalo emerged where industrialists and engineers tested other forms of construction centered around fire protection and other grain storage problems.

The experiments of this period used iron, ceramic tile block, brick, and steel to build both stationary and floating elevators, transfer towers, and exposed steel silos. The Great Northern, as part of this transition, contained cylindrical steel silos within a larger brick box shell for weatherproofing to address some of the problems associated with steel-bin construction (usually freestanding and exposed to the elements). When put into service in 1897, it was the largest in the world.¹⁸

The Great Northern substituted steel for wood in the construction of its bins. It was 400’ long, with solid brick enclosing walls 100’ tall and capable of elevating 60,000 bushels of grain per hour.



Figure 5. Great Northern with grain vessels on ship canal

Three months after the building's completion, *Scientific American* commended the Great Northern's many innovations in a front-page article, including that it was the first to be electrically powered by nearby Niagara Falls. It had the largest conveyor belts in the world and a double system of dust collectors, "upstairs and down."¹⁹ Brushless motors with no sliding electrical contacts ensured sparkless running.

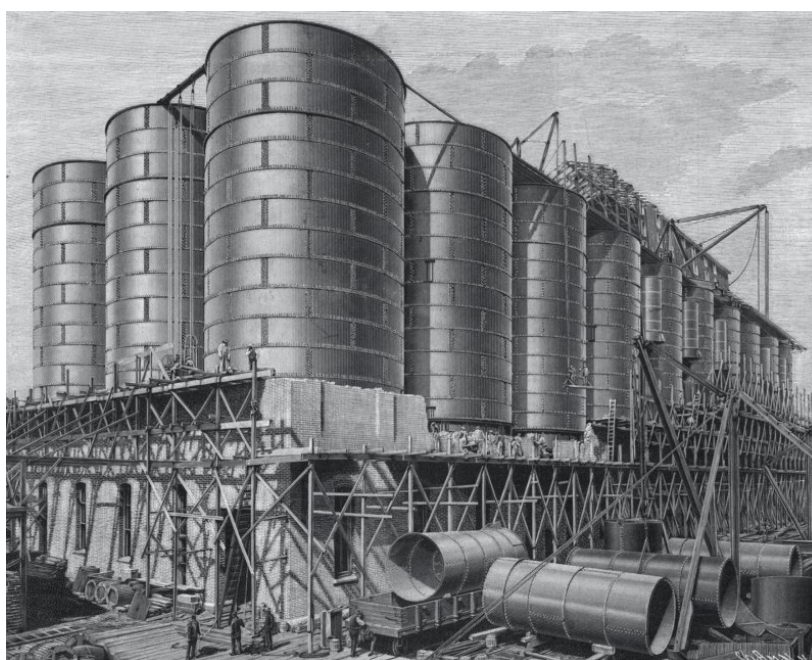


Figure 6. Engraving of The Great Northern Elevator during construction

The Great Northern reveals the hybrid construction model and the transitional concept in grain elevator development because, from the outside, it clearly adopts the form typical of its wooden predecessors—while swapping wood for fireproof brick. On the inside, however, the building reveals an entirely new, emergent logic of bin geometry, materiality, and organization—swapping rectangular wooden cribs for a linear arrangement of cylindrical steel silos. The linear organization was optimal for new electric-powered linear transfer systems, housed in both the 'basement' (or 'work floor'—at ground level) and

‘cupola’ (or ‘headhouse’—situated atop the silos). This overall approach to form and organization bears a striking familiarity with what came after—the concrete slip-form constructed grain elevators (after 1899–1900),²⁰ such as the 1906 American grain elevator, the earliest example in Buffalo, and, ultimately, the 1915 Concrete Central, a quarter-mile long complex with a total storage capacity of 4.5 million bushels—the largest grain elevator in the world at the time of its construction.²¹

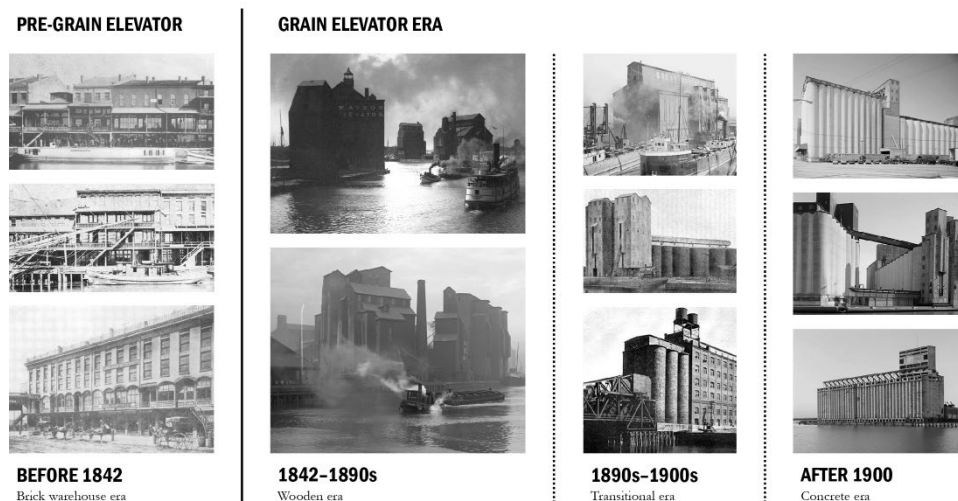


Figure 7. Visual chart of typological development in grain elevator construction.

At the Great Northern, we see the direct translation from the previous generation to the new generation—from exterior to interior.

In 1901, *Engineering News* cited the Great Northern as one of the best and most important engineering works of modern times. Today, the building stands as the only known remaining of its type and construction in the world.²²

Architectural historian Reynar Banham, who spent four years in Buffalo,²³ wrote on the significance of the steel (and tile) versions of grain storage in grain elevator construction history: “Developments during this period passed on an important legacy to the age of reinforced concrete elevators that was to follow. First, because of the complex problems involved in building with steel, the highly trained modern structural engineer now took charge of elevator construction. Second, the cylindrical shape became the standard form for bins. (This allowed individual bin sizes to exceed the 15,000-bushel capacity of timber crib bins.) And third, engineers were required to scientifically study and understand the physical properties of grain when at rest and when in motion.”²⁴

While it is the landscape of concrete silos with which we are most familiar today, the Great Northern stands as a testament to the rich development of the typology and its associated innovations, in a period of exponential growth of industry in Buffalo associated with the transshipment of grain.

LABOR TRANSITION

Attendant to the evolution of grain elevator typology is the evolution of working conditions and labor practices that fueled the grain industry in Buffalo.

The promise of work brought immigrants from many countries including Ireland, Italy, Germany, and Poland to Buffalo throughout the 19th and early 20th century. Of these groups, the Irish were the predominant group working in the grain and shipping industry. Escaping poverty and later famine in Ireland, many were destitute when they arrived in the U.S. and, thus, were willing to take any job. Additionally, prior to 1900, most of Buffalo’s Irish immigrants were unskilled or semi-skilled laborers.

Consequently, they took the least desirable jobs available in the city—working as longshoremen, grain scoopers, and rail car loaders along Buffalo’s rapidly-industrializing waterfront.²⁵

Prior to 1842, men carried barrels or bags of grain on their backs from boat to dock where it was then stored in warehouses known as “flathouses,” before being transported to market. This laborious work changed dramatically with Dart and Dunbar’s elevator invention. The mechanized marine tower and leg system allowed workers to plow and shovel grain toward the descended marine leg and into the conveyor belt buckets directly from the hull of the ship. These men—the first generation of scoopers—worked up to 20 hours per day during peak seasons on the waterfront.²⁶



Figure 8. Scoopers in the hull of a grain ship assist the marine leg.

With manual labor (before 1842), ships were unloaded at a rate of 150 bushels per hour. By comparison, the mechanical elevator (as supported by relatively nominal human labor) yielded an unloading rate of 1,000 bushels per hour.²⁷ Even though the mechanization of grain movement and storage meant significantly reduced labor per bushel, because of the exponential growth of the industry, there was still exponential growth of labor demand associated with the industry. As a direct, but partial result of this immense growth, Buffalo became the 8th largest city in the U.S. by 1900.²⁸

It is important to note that the express purpose of grain elevators is for the handling and temporary storage of grain. In essence, they might be thought of as a series of ‘transition stations between producer and consumer.’²⁹ Thus, their primary ‘inhabitant’ is grain. They are not buildings made for people. Instead, people serve as glorified machine parts. When machine parts are broken, they are replaced by new ones.



Figure 9. Façade of the Great Northern facing the ship canal.

One can understand the location of workers by identifying the openings in the Great Northern. They occupied the peripheral spaces—the cupola, or headhouse, and basement, or work floor. Most of the building’s enormous volume was devoted to bins, which held the massive weight of grain that came and went throughout the seasons. The cupola and basement supported the bins and served as the spaces of human labor as did the equally-peripheral spaces of the bordering grain ships themselves.

Safety

The Great Northern, with its many innovations, addressed several safety issues, i.e., fireproofing, dust collectors, etc. While these improved conditions for workers, they did not solve them entirely. Fires and small explosions from grain dust accumulation still occurred. Workers were exposed to numerous serious and life-threatening hazards, including suffocation from engulfment and entrapment in grain bins, falls from heights, airborne contaminants, and crushing injuries/amputations from grain-handling equipment, such as sweep augers and conveyors. These types of hazards rendered the handling of grain to be one of the most hazardous jobs in the U.S., both then and now.³⁰

Pat Needham, a retired scooper, described his and a co-worker’s accident:

“A line snapped. We heard a boom. Him and I both landed in the grain . . . The leg kept taking the grain up. I was sliding down the grain towards the leg. I’m telling them, “Throw out the leg.”—so I could pull myself back up. So they shut that down. The conveyor that’s in the leg that’s got the buckets on it, if you get close to it, it’ll suck you in and tear you up. Billy Lane McGrane, he was hollering. He was in pain. And I just didn’t want to look. I tasted blood in my mouth . . . I couldn’t get up . . . I could move my arms, but that was it. There was a fireman working the next gang . . . He come right over when he heard there was an accident . . . They pulled me out with one of the winches. My testicles were ruptured . . . Both of Billy’s legs were broken.”³¹

Without question, the material and spatial experiments of the Great Northern focused on improving safety. Whether this was more about the financial losses so prevalent in the wood-constructed elevators, high cost of insurance, or genuine concern about worker safety is uncertain. Regardless, its advances in workplace safety ran parallel to the emergence of the unions in the U.S., which focused in large part on negotiating better working conditions.

Unions

Union organization near Buffalo’s waterfront in the First Ward began in the mid-19th century with scoopers and longshoremen.

According to writer David Tarbet, “Initially, boat captains were responsible for hiring the scoopers. But that was not easy from the water. Eventually they relied on saloon keepers to round up the scoopers and

sent them to the elevator ready to go to work when the ship arrived.”³² Called ‘saloon bosses’, these men not only organized the scoopers for work, but also provided them with food, drink, and lodging above the bar. These items were deducted from the scooper’s wages; often, they were caught financially, especially if their bar bills totaled more than their pay and they were not chosen for the work crews. Consequently, many could not pay their debts and wound up in legal trouble. Essentially, saloon bosses controlled the lives of workers in the grain industry. The system was repressive and harsh. Gaps in boat arrivals and seasonal down times prevented regular employment. Frequent accidents associated with the grain industry put workers in harm’s way. As a result, the climate was ripe for union organization. Like other U.S. labor forces employed in the industrial sector, those involved in transshipment in Buffalo organized to fight for fair wages, reasonable hours, and safer working conditions. At a more conceptual level, these organized workers, like their national counterparts, promoted the just society, honest labor, and independent citizenship.³³

Beginning with the workingmen’s parties of the 1830s, advocates of laborers’ rights launched a series of reform efforts that spanned the nineteenth century.³⁴ Among these groups was the Workingman’s Movement, one of the first labor organizations in Buffalo. Along with other early groups (some affiliated with the railroads—others with dock work and mill work), they organized demonstrations and strikes for higher wages from as early as 1849 onward. During the second half of the 19th century, workers’ unions strengthened nationwide. Most notable were the National Labor Union—launched in 1866—and the Knights of Labor, which reached its high point in the mid-1880s. In 1882, the Buffalo scoopers, stevedores, and longshoremen were chartered through the Knights of Labor and, after many organizational shifts, ultimately became the International Longshoreman’s Associate of Grain Shovelers Union Local 109.³⁵



Figure 10. Grain Shovelers’ Strike of 1899.

In the landmark 1899 Grain Shovelers’ Strike, waterfront workers protested dramatic wage cuts. They attacked William ‘Figgy’ Connors, a prominent saloon boss who employed approximately 16,000 men at that time. By stranding an armada of grain ships in Lake Erie, the Irish workers who unloaded their cargo holds overthrew an oppressive contract labor system that gave saloon bosses control of the waterfront. This strike marked the beginning of a series of labor disputes throughout the early- to mid-20th century that focused on workers’ rights and safety and serves as a prime example of the struggles of unions and organized labor at that time.³⁶

The Great Northern is an example of Touraine's theory that social change emanates from changes in types of production. The shift from the more stable, human-based loading and unloading of grain towards mechanized unloading certainly challenged changes in a worker's financial and personal life, attitude, and sense of autonomy—not always for the better. In essence, these technological changes challenged workers' value systems. Somewhat surprisingly, while most laborers were quite desperate to make even a meager living, they still found the courage to stand up for improved conditions and workers' rights.

CONCLUSION

The Great Northern is anything but a static object. It has been and will continue to be all about passage. Reynar Banham's description of the interior emphasizes motion: "The space is laced lengthwise by flat rubber belt conveyors loaded with grain and laced diagonally by more movable chutes for directing the flow of grain. Weigh bins over the heads of the main bins measure the flow, batch by batch, as it goes from bin to bin."³⁷ Just as grain moved through the chutes, bins, and hoppers, so too did the typological and social changes that came with industrial innovations. These remain embodied in the commanding physical presence of the Great Northern—a corporeal testimony to global advancements in architecture and technology, situated at the meaningful interchange of human values. It is this interlacing of the material and immaterial that best reveals the hybrid histories of the Great Northern, awakened to consciousness by the 2021 windstorm and its new state of venerable vulnerability.

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- ¹ Mark Sommer, "Great Northern Elevator Damaged by Buffalo Windstorm," *The Buffalo News*, December 11, 2021, https://buffalonews.com/news/local/great-northern-grain-elevator-damaged-by-buffalo-windstorm/article_efdff666-5aee-11ec-b6bc-83fa3d238239.html
- ² Thomas Leary, John Healey, Elizabeth Sholes, "The Great Northern Grain Elevator." *Historic American Engineering Record*. (Washington, D.C.: Library of Congress, 1991), accessed May 10, 2022, 4. <https://tile.loc.gov/storage-services/service/pnp/habshaer/ny/ny1600/ny1668/sheet/00001v.jpg>
- ³ Prior to the opening of the Erie Canal, the most efficient way to transport crops from the Midwest was down the Ohio and Mississippi Rivers, out the Gulf of Mexico, and up the coast.
- ⁴ Francis Kowsky, "Monuments of a Vanished Prosperity," in *Reconsidering Concrete Atlantis: Buffalo Grain Elevators*, ed. Lynda Schneekloth, (Buffalo, NY: The Urban Design Project, School of Architecture and Planning, University at Buffalo, State University of New York, 2006), 26.
- ⁵ Provided by Larry Mrug, grain elevator specialist at Explore Buffalo. For a complete list of concrete elevators erected in Buffalo, including dates and capacities, see "The Grain Elevators of Buffalo," *Historic American Engineering Record*, 70-72.
- ⁶ Kowsky, "Monuments of a Vanished Prosperity," 26.
- ⁷ Thomas Leary, John Healey, Elizabeth Sholes, "The Grain Elevators of Buffalo." *Historic American Engineering Record*. (Washington, D.C.: Library of Congress, 1991), accessed May 10, 2022, 8. <https://tile.loc.gov/storage-services/master/pnp/habshaer/ny/ny1600/ny1667/data/ny1667data.pdf>
<https://www.loc.gov/pictures/item/ny1667/>
- ⁸ *American Elevator and Grain Trade* 16 (15 December 1897): 205
- ⁹ Leary et al. "The Great Northern."
- ¹⁰ Leary et al. "The Great Northern."
- ¹¹ Leary et al., "The Great Northern."
- ¹² Beth Tauke. "TRANSition," in *Into the Great Abyss: Proceedings of the 13th National Conference on the Beginning Design Student*, ed. Thomas Sofranko, (Baton Rouge, LA: Louisiana State University School of Architecture, 1996) 25-26.
- ¹³ Clearly, the storage of grain has been an architectural challenge for thousands of years. Consequently, there are many precedents for even the vertical the storage of grain from antiquity and across civilizations worldwide.
- ¹⁴ Joseph Dart, "The Grain Elevators of Buffalo," in *Publications of the Buffalo Historical Society* (Buffalo, NY: Buffalo Historical Society, 1879), 402.
- ¹⁵ Kowsky, "Monuments of a Vanished Prosperity," 26.
- ¹⁶ Dart "The Grain Elevators of Buffalo," 402.
- ¹⁷ For example, in 1859, a fire destroyed the New York Central wood elevator killing two. In 1913, an explosion destroyed another grain elevator, killing at least 17 men and injuring 60 more. The elevator, located at the Husted Milling and Elevating Co. at Elk and Peabody Streets in Buffalo, was left in flames after the dust explosion in the wooden side of the elevator. "Buffalo, NY, June 25, 1913, Grain Elevator Explosion" *Olean Times*, June 25, 1913. https://ebrary.net/131066/health/buffalo_june_1913_grain_elevator_explosion
- ¹⁸ To put this in scale, just a half century earlier, 54 of Dart and Dunbar's first elevator would have fit into this building.
- ¹⁹ "Fireproof Steel and Brick Grain Elevator," *Scientific American*, Vol. 77, No. 26 (DECEMBER 25, 1897), p. 401, 407, accessed May 31, 2020. <https://www.jstor.org/stable/10.2307/26117557>
- ²⁰ The Peavey-Haglin Experimental Concrete Grain Elevator in St. Louis Park, Minnesota was the first experiment in slip-form concrete grain elevator construction (1899–1900). James H. Shiere (1981-05-23). National Register of Historic Places Inventory-Nomination Form: Peavey-Haglin Experimental Concrete Grain Elevator (Report). National Park Service, accessed July 29, 2022. https://npgallery.nps.gov/NRHP/GetAsset/NRHP/78001547_text
- ²¹ Thomas Leary, John Healey, Elizabeth Sholes, "Concrete-Central Grain Elevator." *Historic American Engineering Record*. (Washington, D.C.: Library of Congress, 1991), accessed May 10, 2022. <https://www.loc.gov/pictures/resource/hhh.ny1671.sheet.00001a/>
- ²² Elizabeth Licata, "Preservation-Ready: The Great Northern Grain Elevator," *Buffalo Spree*, April 19, 2011, updated November 20, 2020, accessed June 3, 2020. https://www.buffalospreed.com/wny_life/preservation-ready-the-great-northern-grain-elevator/article_cdfef1f61-5c46-54d7-9832-38aa53be2c88.html
- ²³ Reynar Banham taught in the Department of Design Studies, School of Architecture and Environmental Design, State University of New York at Buffalo from 1976–1980. In the acknowledgements of *A Concrete Atlantis* (p. viii),

Banham acknowledges summer fieldwork conducted with SUNY-Buffalo students in 1977, 1978, and 1979, and with Columbia University students in 1982. <https://archplan.buffalo.edu/People/facultyfellows/banham-fellow.html>

²⁴ Reynar Banham, *A Concrete Atlantis: U.S. Industrial Building and European Modern Architecture, 1900-1925*. (Cambridge, MA: The MIT Press, 1986) 136.

²⁵ "Scooping was seasonal work, dependent upon the traffic of shipping on the Great Lakes and Erie Canal. During the winter Irish laborers often took work on the railroads or as workers in other capacities such as digging canals and warehouse slips and repairing Buffalo's sea walls. "The Irish Scoopers," *Buffalo Architecture and History*, ed Chuck LaCiusa, accessed May 18, 2022. <https://buffaloah.com/h/irish/>

²⁶ John R. Commons, "Types of American Labor Unions: The Longshoremens of the Great Lakes" *The Quarterly Journal of Economics* 19, no. 1 (November 1905): 61-62 <https://www.jstor.org/stable/1882555>

²⁷ Robert B. Riley, "Grain Elevators: Symbols of Time, Place, and Honest Building" in *AIA Journal* 66, no. 12 (November 1977), 50-55. A local merchant, Mahlon Kingman was skeptical of Dart's innovation and goaded him by saying that "Irishmen's backs are the cheapest elevators.") Dart, Joseph, "The Grain Elevators of Buffalo," 401.

²⁸ "Theodore Roosevelt Inaugural," in *National Historic Site: New York, National Park Service*, accessed June 3, 2022,

<https://www.nps.gov/thri/buffalotimeline.htm#:~:text=1900%20Buffalo%20is%20th%20largest,takes%20oath%20at%20Wilcox%20Home.>

²⁹ Tauke, 27. Tauke used this term to describe a building with the primary purpose of 'passing through'. In *Grain Dust Dreams*, David Tarbet also writes about the concept of this transience. Tarbet, 18.

³⁰ "Grain Handling" in *Occupational Safety and Health Administration*, accessed on June 13, 2022.

<https://www.osha.gov/grain-handling#:~:text=These%20hazards%20include%3A%20fires%20and,death%20in%20grain%20storage%20bins.>

³¹ Bruce Carter and Joel Carter, "Spilling Grain" in *Redtail*, accessed on June 10, 2022.

<https://redtailmedia.org/spilling-grain/>

³² David Tarbet, *Grain Dust Dreams*. Albany: State University of New York Press, 2015, 60

³³ "Labor Movement," in History, accessed on June 2, 2022. <https://www.history.com/topics/19th-century/labor> Economist David Ricardo's developed the labor theory of value, which posits that the value of something depends on the amount of labor required to produce it. This includes the labor required to produce the raw materials and machinery that are involved in the production of the goods produced. David Ricardo, "On Value," in *On the Principles of Political Economy and Taxation*, (1817), accessed on June 1, 2022,

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³⁴ Melvyn Dubofsky and Joseph McCartin, *Labor in America: A History*, 9th ed. (Chichester, West Sussex, England: Wiley-Blackwell, 2017. 48.

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³⁵ Timothy Bohen, *Against the Grain: The History of Buffalo's First Ward*. Buffalo, NY: Petit Printing, 2012. 94.

³⁶ Bohen, 94.

³⁷ Reynar Banham, *A Concrete Atlantis: U.S. Industrial Building and European Modern Architecture, 1900-1925*. (Cambridge, MA: The MIT Press, 1986) 121.

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PUBLIC INTERIORITY: REVELATORY HISTORIES

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INTRODUCTION

How much can we push the concept of interiority away from the traditional disciplinary limits of spatial interior architecture? In exploring *public interiority* in previous research projects, I have explained it as an experiential phenomenon rather than a tangible thing. This phenomenon can be contextualized through atmospheres, programs, psychologies, and politics—amongst other things. But, what is interiority is simply that feeling of "other" within a greater context? The Oxford Dictionary describes *other* as "denoting a person or thing that is different or distinct from one already mentioned or known about" and interiority as "the inner character or nature; subjectivity" of things. We can perceive any circumstance as a condition of interiority if its inner character differs from the exterior context. So, herein, I explore the material drivers of public interiority. These palimpsestic qualities of exterior urban space and place create a condition other than the general milieu—a public interiority driven by city-markings and material textures.



Figure 1. Useless Window Thomasson, Ridley Road Market, London, image by author

DISCIPLINARY CONTEXT

Public interiority—experiencing outside places as interiors—is a fleeting condition determined by several factors. Public interiority embraces usage, political contexts, psychological states, and atmospheric qualities, starting with building form as a baseline. Designer Julieanna Preston described an interior as "something temporal, something impermanent, unrepeatable, maybe even virtual."¹ We can experience interior-like conditions in the urban outdoor realm with atmospheric conditions (both mood and meteorology) that promote interiority. For example, an interior zone can be delineated by fog or mist, as with the Diller Scofidio's Blur Building. Or interiority can be delineated by mood and charged environmental psychology, as with spaces that recognize the tenants of "prospect and refuge"² like the Granary Square steps. Politically charged conditions of public interiority in urban exteriors are often informed by overarching systems of power or difference---privately owned public spaces (POPS in New York, for example) or areas that inherently include or exclude groups like London Underground stations without stroller-accessible exits, excluding women with young children.³ Programmatic public interiority is most clearly revealed in exteriors whose usage lends itself to interior conditions (an outdoor market or a sleeping in a hammock, for example).

Public interiors that disregard enclosure and exist within the exterior urban realm are critical to contemporary interior architectural theory and practice. The concept attempts to reframe the field of interiors into more human-centered and experiential methods, rather than being delineated by the building façade or entrenching ourselves deeper into the tired disciplinary debate about the delineation between the architecture and interiors professions. This project distinguishes itself from other works on the interior since it blends empirical understandings of space with urban theories. It recognizes interiority's primary features—human-scaled, responsive, and phenomenologically driven spaces, regardless of built form. The formal aspects of variegated facades and arcades have been well-documented by scholars. But, *Public Interiority* distinguishes itself from this formalism by advocating for experience and surface within the urban realm. Like interiority, contemporary culture increasingly challenges the reductive nature of binary classifications. This fluidity should be understood to apply to places that enrich inhabitants' spatial interactions and lived experiences.

I posit that we should design by firstly understanding the previous atmospheric qualities and cultural-political contexts of these extended interiors⁴—and then designers (trained and untrained) can reveal these conditions via loose-fit design frameworks. Designers should imbed care and maintenance into the "already there" public exterior-interiors.⁵ As Graeme Brooker states, "Appropriating the existing through maintenance, repair, cleaning, mending reuse, reworking, restoring, filling in..." An important aspect of this work is the concept of care, repair, maintenance, and continuity as acts of "preservation without permission." Embedded in this idea is the ownership of public space within the commons, rather than ownership by the originating designer or a private entity. A shared interest is applied to a place when it is repaired, maintained, and modified in incremental ways. What is chosen to remain, be cleaned, or removed indicates the value the collective places on space or conditions of interiority.



Figure 2. Outdated Hackney Downs Carnival Poster, Ridley Road Market, London, image by author

I'm exploring how to uphold public interiority as a temporal, impermanent thing while simultaneously formulating exterior-interiors that reveal and relive a site's past. Looking at the invisible city, the accretions, and other ubiquitous city-markings, designers can create a nuanced outline for self-organized adaptability—rather than heavy-handed and alien architecture authored by an absent designer or architect. By acknowledging the positive qualities of layered and rich urban surfaces and spaces--we can see the passage of time, the values of the current community, and the communities that occupied the place before. Suppose we understand architecture as a living thing, constantly adapted by users and residents, rather than a polished and final design installed by the designer. In that case, we understand the conditions of interiority that can be unveiled by fleeting, non-architectural accretions, surfaces, and temporal installations. Herein I will review case studies of vestigial remains and public interiorities in two cities--London and Bucharest. These cities have been chosen for their robust palimpsestic qualities and distinct cultural-political histories. *I will cover the leftover conditions of each place.*



Figure 3. Empty Supermarkets and Farmers Market, Piața Amzei, Bucharest, image by author

BUCHAREST AND PROGRAM

Bucharest's *Piața Amzei* neighborhood currently houses outdoor markets, food vendors, Romani traders, and a neighborhood center. This *piața* contains structures from several prior eras: the kingdom of Romania (1881-1947), the socialist Romanian republic (1947-1989), and the current parliamentary republic. The city hall building, built in 1938 and is at the center of the *piata*, was constructed during the Kingdom of Romania. The apartment blocs encircling the open *piata* were built during the socialist republic era. The current parliamentary republic era has witnessed numerous interior fit-outs of shops and market hall renovations.⁶ The covid-19 pandemic and the 2021 Romanian political crisis have created a somewhat less stable local economy.⁷ As a result, shops have closed or moved, and others have moved in.

In comparison with 2018, there are far fewer vendors in the market area and almost no one relaxing in the center of the *piata*. Old signs describe temporary (past-due) reopening dates, covering the vacant shop windows. One example is the *Piața Amzei* Mega Image supermarket. The former location shows a sign saying it is temporarily closed, while Google maps still indicate that it is open, and a new location was recently built around the corner.⁸ There are two additional closed supermarket sites at the *piata*, sitting empty since 2018 and 2020. Giant billboards and graffiti cover other buildings and windows. This layering of leftover conditions expresses a bricolage quality to the city, expressing the interests and priorities of the residents of *Piața Amzei*.

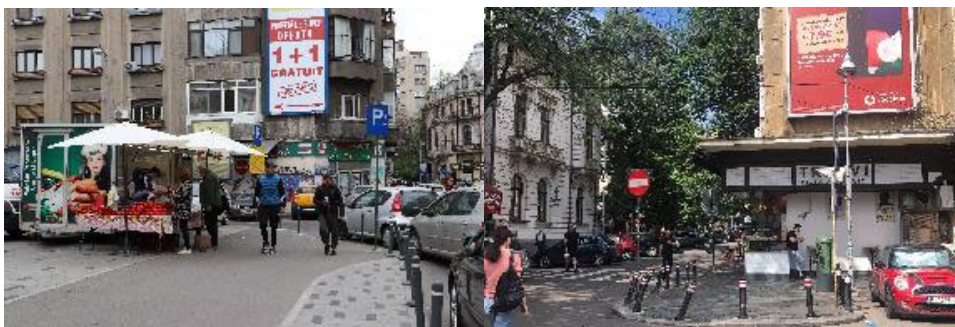


Figure 4. Billboards, *Piața Amzei*, Bucharest, image by author

Piața Amzei is becoming less of a public interior and more of a sign and symbol system with this economic downturn. We can compare this to Venturi Scott-Brown's "duck or decorated shed" and "non-city" theories within *Learning from Las Vegas*.⁹ To build upon those theories, we can claim that *Piața Amzei* has become a wrapper covering the literal interiors bordering the *piata*, like Times Square in New York or Piccadilly Circus in London. We could easily remove the buildings, keep the signs and symbols, and still maintain the character of the place. The existing surfaces of the *piata* also offer a robust argument for non-constructed urban interventions that prioritize place. These include experiential public interiority and the signs and symbols covering the inner walls of the urban void. It can be said that experience and surface offer equal contributions to place above architecture. In terms of public interiority based on program and usage, *Piața Amzei* of 2018 is a prime example. In 2018, more people occupied *Piața Amzei*, and one could see evidence of both public and private (interiorist) activities.

Simmel and other post-structuralist thinkers have described a system of signs and symbols that organize our world.¹⁰ They outline a network of culture-based understandings that drive public life and our inward-looking conditions of interiority. Inside this structure, certain undertakings are often performed indoors, and others are often performed outdoors. Design theorist Ed Hall addresses networks of understanding when we write about proxemics. Hall defines proxemics as "the study of how [a person] unconsciously structures microspace—the distance between [people] in conduct of daily transactions, the organization of space in [their] houses and buildings, and ultimately the layout of [their] towns."¹¹

From Hall's system of concentric rings of spatial perception, we can bounce toward a similar diagram signifying interior-related activities. Imagine that these rings represent most private activities toward the core and least private as they expand out and away from the body. The ultra-private activities involve intimacy, and the body, the most public interiorist activities engage with more prominent space, larger quantities of people, and the city itself. Yet, are still interiorist activities. We can interrogate the condition at Piata Amzei through the lens of these usage-driven conditions of interiority. For example, vendors perforate the private-public rings of interiority by selling goods outside. Vendors at Piata Amzei further penetrate these boundaries, occasionally sleeping in the open air of the piata or disposing of their packaging and trash on the sidewalk.

The quotidian, everyday spectacles are revealed to us when "indoor activities" are performed in the urban outdoors. When we invert the system and habitual activities create user-driven public interiorities, we become more conscious of the system of norms that drives them. People internalize these relationships within a greater context—they consider how it's "other," and thus, these conditions become public interiorities. Through a spectacularization of the everyday, interiority is revealed. Usage and program, manipulated by time-based accretions and leaky facades, amplify public interiority in dense conditions like cities.

LONDON AND MATERIAL

*Now shifting to an analysis of London: The city's eastern boroughs, like Hackney, have likewise evolved and display the materials and textures of previous sign and symbol conditions and remnant architectural forms. The architectural relics that are useless but still maintained are known as Thomassons. Coined by Japanese artist Akasegawa Genpei in the 1970s, these vestigial conditions were named after an American baseball player who played in Japan—some say bad recruit, Gary Thomasson was considered a useless leftover after poor performance following a move to Japan.¹² Japanese publisher Chikuma Shobō, later published Genpei's *Thomasson Illustrated Encyclopedia*, which listed a taxonomy of types of Thomassons.¹³ Some examples include:*

- The Useless Staircase (a stair to nowhere)
- The Useless Doorway (a door that has been filled in)
- The Useless Window (a window that has been filled in)
- The Hisashi (eaves that protect an architectural feature that's no longer present)
- The A-bomb (outline of a demolished building on the adjacent building that remains)
- The Elevated type (a door or other feature on a floor level higher than the ground floor)
- The Outie (something sticking out of the recently sealed wall, like a door knob)
- The Uyama (a sign with letters missing)
- The Castella (a blocked-in window that protrudes from the wall)
- The Boundary (a guardrail or fence whose purpose is not immediately apparent)
- The Abe Sada (the remains of a telephone pole cut down.)
- The Useless Bridge (a bridge over a filled-in river)
- Evaporation (a faded sign)

Thomassons are distinguished from other layered conditions by the nature of their care and maintenance. The phenomena of Thomassons and urban palimpsests, signs, symbols, non-constructed architectural interventions, and individual and collective experiences can create a sense of public interiority.

The Ridley Road Market in Dalston, a neighborhood in London's Hackney borough, may contain the best examples of layered signs, Thomassons, and public interiorities. The Ridley Road Market began in the 1880s and has been a longtime hub for various groups, including the Jewish community and

immigrants from Turkey, the Caribbean, West Africa, and the Middle East.¹⁴ These different groups have coexisted at Ridley Road from the beginning, albeit with varying compositions over the years.

We can see evidence of the Thomasson phenomenon in the non-architectural signs and symbols affixed to the Ridley Road near environment. For example, the Ridley Road Market threshold shows proof of a "Useless Window" Thomasson above the Kingsland Butcher. The windows that once overlooked the market have been enclosed. The leftover posters of carnivals past and businesses long-closed shape the material texture of this place and create a sense of other or interiority within the urban realm that is distinct from the general surroundings of Dalston.

One way we can understand the concept of public interiority we can think of it as *doing interiors* in an exterior zone. To occupy exterior spaces like they are interiors, people should carry out activities customarily performed indoors. Another way we can think of interiority is to consider a space that embodies the atmospheres or psychologies of the interior---the "other" space, introversion, or moodiness. Ridley Road focuses on user-generated and material-generated public interiority and its deployment. From a North American perspective, the Ridley Road market demonstrates typically-interior activity in the urban realm. The programs or uses of space shape the conditional interior. They generate from entrepreneurial activities like selling produce, textiles, and clothing (or, as I witnessed, more illicit things) in the open-air market. The condition of interiority also derives from the vendor's quotidian experiences and how their life unravels within the public realm of the Ridley Road market, all for others to observe. London's atmospheres (both the planting seasons calendar of the region and diurnal conditions of the city) help reveal and inform this breed of interiority.

CONCLUSION

In closing, we can claim that layered surface qualities, including Thomassons and signage, create a sense of place. Activities and human interaction also generate this sense of place. Buildings, architecture, and voids in the urban form are not owned by a particular time, group of people, or architect. The communities that inhabit these spaces collectively design and reappropriate the place in a way that transcends the authorship of the architect and designer, creating new public interiorities.

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NOTES

- ¹ Julieanna Preston, *Performing Matter: Interior Surface and Feminist Actions* (Baunach, Germany: Art Architecture and Design Research, 2014). Julieanna Preston, "Being under, with THIS room," *Interiors*, 11 (2021): 234, doi: 10.1080/20419112.2021.1962055 2021.
- ² Annemarie S. Dosen, and Michael J.Ostwald. "Prospect and Refuge Theory: Constructing a critical definition for architecture and design," *The International Journal of Design in Society* 6, no. 1 (2013): 9-23, doi:10.18848/2325-1328/CGP/v06i01/38559
- ³ Matrix, *Making Space: Women and the Man-Made Environment* (London: Verso Books, 1984).
- ⁴ Sonya Grace Türkman "Data as Memory: Contemporary memory collection practices in extended," *Interiors : Design, Architecture, Culture* (2020), doi: 10.1080/20419112.2020.1840840
- ⁵ Graeme Brooker, "Inner Appropriations: De-growing the Interior," in *Appropriated Interiors*, ed. Deborah Schneiderman et al. (New York: Routledge, 2021), pp.183-204.
- ⁶ Raiden, "Cinci Primarii Interbelice [Five Inter-War Town Halls]," București Vechi și Noi [Bucharest Old and New], accessed July 28, 2022, <https://bucurestivechisinoi.ro/2011/03/cinci-primarii-interbelice/>
- ⁷ Robert Kiss, "Guvernul Cîțu, aproape demis. Ce urmează. [Cîțu Government, Almost Dismissed]," Digi24 RO, accessed July 28, 2022, <https://www.digi24.ro/stiri/actualitate/politica/guvernul-citu-aproape-demis-ce-urmeaza-1689193>.
- ⁸ "Piata Amzei," Google Maps, accessed July 28, 2022, <https://tinyurl.com/54hpjfm>.
- ⁹ Robert Venturi, Denise Scott Brown and Steven Izenour, *Learning from Las Vegas* (Cambridge, Mass: MIT Press, 1972).
- ¹⁰ Georg Simmel, "Rome," *Theory, Culture & Society* 24, no. 7-8 (2007), 30-37.
- ¹¹ Edward T. Hall, *The Hidden Dimension* (Garden City, NY: Doubleday, 1969) and Edward T. Hall, "A System for the Notation of Proxemic Behavior," *American Anthropologist* 65, no. 5 (1963): 1003–26. <http://www.jstor.org/stable/668580>. Note that quote was modified to make the statement genderless.
- ¹² Stein Farstadvoll. "Vestigial Matters: Contemporary Archaeology and Hyperart," *Norwegian Archaeological Review* 52, no. 1, 1-19, doi: 10.1080/00293652.2019.1577913.
- ¹³ Akasegawa Genpei, *Thomasson Illustrated Encyclopedia* (Tokyo: Chikumashobo Ltd., 1996).
- ¹⁴ James Rippingale, "Ridley Road: The slow death of an East London street market," *Aljazeera*, January 19, 2019, <https://www.aljazeera.com/features/2019/1/19/ridley-road-the-slow-death-of-an-east-london-street-market>

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TANGIBLE PHILOSOPHY WITH VIRTUAL REALITY FOR TOEGYE'S *TEN DIAGRAMS ON SAGE LEARNING*, <SUNGHAKSIPDO VR>

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INTRODUCTION

Sunghaksipdo (聖學十圖), known as *Ten Diagrams on Sage Learning*, was created in 1568 by Toegye (1501~1570), who was one of the most prominent Korean Confucian scholars of the Joseon Dynasty.¹ *Sunghaksipdo* is the final and therefore the most mature work left by Toegye. As appointed as a great tutor of the king but was unable to continue performing his role because of the illness, Toegye wrote *Sunghaksipdo* with the hope that the king would be a 'sage' monarch. Toegye made *Sunghaksipdo* as a book and a standing 10-folding screen and gave them to the king, therefore the king could read and look at them every day.

Although *Sunghaksipdo* exists tangibly as a book and a ten-folding screen, it also exists intangibly as spiritual and philosophical values in our society. It emphasizes that the awareness of innate morality would ultimately guide individuals in the righteous direction. *Sunghaksipdo* shows deep faith in good human nature (based on the Mencian premise). *Sunghaksipdo* includes diverse visual diagrams, such as symbols of circles and squares, and a total number of 1860 Chinese characters explaining such symbols. Regarded as a very rare and valued work in the intellectual history of the world, this work has been evaluated as the crystallization of Korean Confucianism.

Unfortunately, today's public cannot properly decode and understand this invaluable work because of their unfamiliarity with ancient characters and cryptic symbols as well as the complexity of its content. However, its spiritual and philosophical values can be perfectly applied to today's layman. So, we came to think we needed to illuminate it again.



Figure 1. *Sunghaksipdo* as a Book and a Ten-folding Screen

In this paper we discuss our <Sunghaksipdo VR> project which created since 2018. We planned to update and modernize this old (in)tangible legacy with today's virtual reality (VR) technology.

Currently <Sunghaksipdo VR> was created as ten separate VR works (13-minutes each). We call each work as a ‘VR chapter’ (The first VR chapter in <Sunghaksipdo VR> is corresponding to the first diagram of *Sunghaksipdo*). To experience the entire chapters, the audience need to have approximately 130 minutes. Exploring philosophy in old times through new media technologies, we aim to find its contemporary meaning and value in our times.² Particularly we explain 1) what we have focused on developing this project by reinterpreting the visual diagrams from the original work and 2) how we have transformed the texts and images into experiential and perceivable ways in VR. This includes 3) how we use new media to realize philosophical and spiritual values.

VISUAL DIAGRAM AND CONCEPT OF GYUNG (敬)

Sunghaksipdo’s visual diagrams show how Neo-Confucian philosophical concept can be raised and evoked. Toegye emphasized using diagrams as a method of philosophy. Before creating *Sunghaksipdo*, Toegye created “Explanation of the Diagram of Heavenly Mandate (天命圖說).” This is a diagram that shows the concept how human is endowed one’s characteristics from heaven. In the diagram the principle penetrating the universe and humans was compressed into one single picture with a brief explanation. The similar visual diagram reappeared in *Sunghaksipdo*. In *Sunghaksipdo*, we have focused on where the concept of ‘Gyung (敬)’ is made and how it was emphasized by Toegye. All concepts of Neo-Confucianism are open to interpretation. They transcend linguistic expressions, leaving possibility that everyone can understand and interpret in their own ways.

Using a diagram for conveying complex concepts is not only found in Eastern philosophy. Western philosophers have also created the visual diagram to incorporate ideas. Bergson uses the inverted cone image to describe his idea of memory.³ Foucault uses the visual metaphor of Panopticon for his analysis of Modern society of surveillance and punishment.⁴ Deleuze and Guattari also use visual metaphors and conceptual diagrams. They even regard philosophy as ‘the plane of immanence,’ which is a starting ground where ideas evolve and intertwined with each other and create new ideas.⁵ Likewise, we thought that *Sunghaksipdo*’s visual diagram is also the plane of immanence. In Toegye’s ten diagrams, the size of symbols, lines and circles establish relationships between concepts and represent important meanings. In this way, Toegye’s diagram helps to expand the concept continuously by restructuring it in viewers’ mind. This is very similar to Deleuze and Guattari, as they already emphasized in *What is Philosophy?* (1994). They say, “There are no simple concepts. Every concept has components and defined by them. It therefore has a combination. It is a multiplicity, although not every multiplicity is not conceptual.”⁶ They also claim that philosophy is a constructivism: Constructivism has two different complementary aspects: the creation of concepts and the laying out of a plane. If concepts are like multiple waves, rising and falling, the plane of immanence is the single wave that rolls up and unrolls them.”⁷

Sunghaksipdo presents many paired concepts. Two different, seemingly contradictory concepts are arranged at the two endpoints of one axis. And this kind of axis also exists as two sets. Each of axes indicates the depth of the concepts that penetrates the essence (the vertical axis) and the breadth that encompasses a variety of the concepts (the horizontal axis).⁸ Therefore, these two axes cross each other, making an X-shape. Furthermore, the shape of X reveals the very moment of ‘Gyung (敬).’ We will explain this a bit later in detail, but we will first articulate Li (理) and Qi (氣) as one of important and most well-known examples of paired concepts.

Li (理) and Qi (氣)

Li (理) and Qi (氣) are good examples showing how concepts interact and forming a network image on a plane of immanence (diagrams). Achieving Gyung depends on how you understand the concept of Li and Qi. Throughout *Sunghaksipdo*, To reach the Gyung (敬), Toegye repeatedly guides the reader to keep an eye on Li amongst the continuous fluctuation of Qi. Li is manifested as “the Supreme Ultimate.”⁹ Li denotes the principle of reality of both natural laws and the ultimate ethical criterion. In the oriental thought Li is often identified with the ancient Greek notion of logos. In today’s emerging trend of Speculative Realism, it is like the concept of “Real Object (RO).”¹⁰ As the principle of reality is perfectly evident, authentic, and real, therefore, when one seeks such principle with a perfectly empty and spiritual mind, there should be no failure to apprehend it.

Li is not observable in phenomenon without Qi. The term Qi refers to “vital stuff,” “psychophysical stuff,” and “lively material.” Li can only be perceivable in the behaviour of Qi. “Li and Qi do not separate (理氣不相離).”¹¹ Although Li does not exist independently without Qi at all, the role of each concept is different logically. Thus, “Li and Qi do not mix (理氣不相雜).”¹² Although it sounds contradictory, this is what Li and Qi are and how they work.

Because the relationship between Li and Qi is so complex, if we understand it through the diagram, it helps to grasp it intuitively. As discussed, in Deleuzian method, a concept is not grasped alone, but is grasped in correlation with the other concepts in diagram. The scope of the concept can be broadened if any complex concepts can be spread out on a two-dimensional plane. In addition, the depth of the concept is doubled when the concept is overlapped and understood on the horizontal and vertical axes. Likewise, understanding the relationship of Li and Qi is not easy. But this understanding is very important to investigate things correctly and extend the proper knowledge. That’s why the sixth diagram of *Sunghaksipdo* is entirely devoted to explaining this relationship between Li and Qi.¹³ As hard as to understanding Li and Qi, achieving the mind of Gyung properly (after understanding Li and Qi) is even more difficult. *Sunghaksipdo* suggests applying this process of learning into one’s life as a serious and dedicative practice.

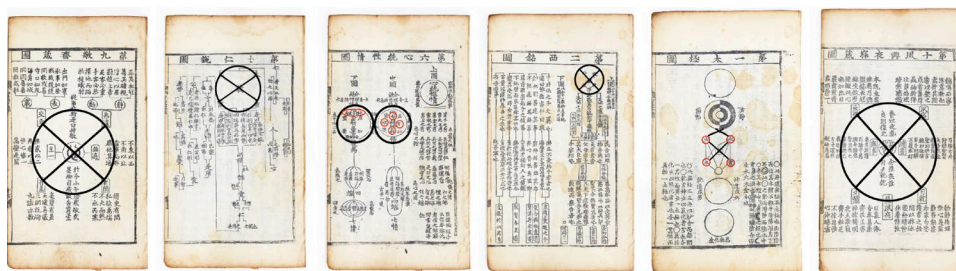


Figure 2. The X-shapes found in *Sunghaksipdo*

Gyung (敬)

As described above, when this kind of two paired concepts intersect each other, the intersection is shaped as Gyung. In other words, where the significant crossing happens is the very moment when the Gyung is achieved or fulfilled. In *Sunghaksipdo* Gyung is explained in two ways. First, Gyung is the moment when extended knowledge is realized through a complex and layered diagram. It refers to the very moment of enlightenment that comes to us when we try to understand two opposing concepts, such as Li and Qi, yin and yang, in and out, activity and quiet, maybe male and female, penetrate to and unite with each other. Second, Gyung is the growth that is generated by the accumulation of the moments of realization of that knowledge. Such growth is called cultivation in Confucianism. This is the moment where the qualitative change itself in one's virtue when piling up and accumulating the moment of

enlightenment. Therefore, Gyung has a dynamic feeling of instantaneousness and continuity at the same time.

Toegye describes Gyung as the moment of enlightenment at which the mind is transformed and expand beyond the limited inner awareness: “When one reaches the point, where one has exerted effort for a long time, one day everything will suddenly interpenetrate (豁然貫通). Then the external and internal, subtle, and gross [qualities] of all things will be apprehended.”¹⁴ Therefore, for Toegye, Gyung is also regarded as something that could seek for or cultivate through daily sincere practice. According to Toegye, when we embody Gyung, a task to get a sagehood is complete. Gyung (敬) is an ability to respond to and commune with such the principle of reality. Gyung is the beginning and the end, and alpha and omega of Sage learning.¹⁵

While creating <Sunghaksipdo VR>, in this reason, we thought that what if this kind of Gyung, something like speculative reality, can be touchable. What if such reality can approach us, and we can pass it or connect it? We have created the <Sunghaksipdo VR> to enable the audience to stay in this philosophical space-time and understand the philosophy in a tangible and perceivable way.¹⁶ Therefore, in our VR project, Gyung is the trajectory of dynamic swirls of morality amid the reality’s virtual emptiness. In <Sunghaksipdo VR>, sometimes we present this Gyung as an object or objects. Or sometimes we present it as a trigger for interaction.

Gyung as Object and Object for Interaction



Figure 3. Gyung as Object presented in <Sunghaksipdo VR>

In our VR, Gyung as object visualizes as a shining object. If real objects could be seen, these kinds of shiny objects would be a way to visualize them. We also thought that if we can visualize the very moment of the acquisition of knowledge, it would be bright. Shining objects enhance the feeling of such entities as sublime or holy ones. Also, we got to make such objects into balls. The first diagram named “The diagram of the Supreme Ultimate” starts with a circle representing ‘the Supreme Ultimate.’ We thought that this circle could be represented as a ball in a virtual three-dimensional space. Therefore, in <Sunghaksipdo VR> Gyung object is sometimes presented as shining marbles on a chessboard, or stars or the Moon in the sky.

For example, the sixth VR chapter based on the sixth diagram, entitled “The diagram of the saying ‘the mind combines and governs the nature and the feelings’ (心統性情圖)” implies the “Four-Seven debate.”¹⁷ Since it delivers very complicated and metaphysical lesson, Toegye tried to describe its core contents in metaphorical way, using the famous metaphor of ‘the Moon printed on thousand river (月印千江).’ We also tried to deliver the contents of this debate in perceivable ways in VR. Thus, when entering the first scene, the audience on board in the river can see the Moon in the sky. They can see the reflection of the Moon in the water, while hearing the narrated explanation of the debate. The narration tells that how Li and Qi interact each other and how we need to hold Li when we think it is not shown clearly because of one’s muddling situation.

In addition, we have designed the audience can interact with Gyung object in the VR. In the sixth VR chapter, the audience can fish the Moon in the river after understanding Li and Qi while watching the Moon and its water reflection. In the first and the second VR chapter, the audience can observe a shining ball flying into/through them.

In the final section of the first VR chapter, we implemented the scene where a thousand stars are shining in the sky. This scene uses a chart of the constellations and the regions they govern (天象列次分野之圖) created in the Joseon Dynasty.¹⁸ And suddenly one of the stars among myriad stars flies into the viewer’s chest. This is a moment awakening the viewer with a fact that each individual entity comes from the heaven, and therefore each one is precious enough. In this way, by interacting with such objects the VR audience can form a certain type of relationship within the context. The second VR chapter was also implemented like this. The narration of the second VR chapter tells, “[Qi] that which fills up all between Heaven and Earth has become my body. And [Li (the principle)] that which directs Heaven and Earth has become my Nature. Therefore, I, tiny being, am commingled in their midst. All people are from the same womb, and all creatures are my companions.”¹⁹ In this way, it delivers a message that all things are connected to each other. Again here, suddenly a shiny marble object called ‘Gyung’ created by the intersection of Heaven and Earth, or Father and Mother enters the viewer’s body. It means a kind of moral obligation towards the ten thousand beings (萬物), and in turn the ten thousand beings are part of ‘I’ (民吾同胞, 物吾與也). In this VR scene, these shining objects are the same components making us. These moments reveal the network of the relationship between the two different entities such as heaven and oneself, or the parents and oneself.²⁰

Gyung through Interaction

As aforementioned, according to Toegye, Gyung is something that we seek and cultivate through daily sincere practice. Our VR also conveys this idea by providing a chance of refining the mind and building up Gyung, particularly interacting with Gyung object. The third 'Elementary Study Guide' teaches that one should practice keeping one’s body neat and tidy, and this is the first thing people should learn.²¹ This practice is the foundation of respecting oneself. And this is a children’s version of learning Gyung. Since this chapter is for children, we created the first section of this VR chapter as a small game. In this game, the viewer as a game player need to organize the cluttered objects in the room. Through this process, the player can collect the small marbles of Gyung. If all small marbles are obtained and piled up, then the player can get a big Gyung marble.



Figure 4. The third VR chapter based on “The Diagram of Elementary Learning”

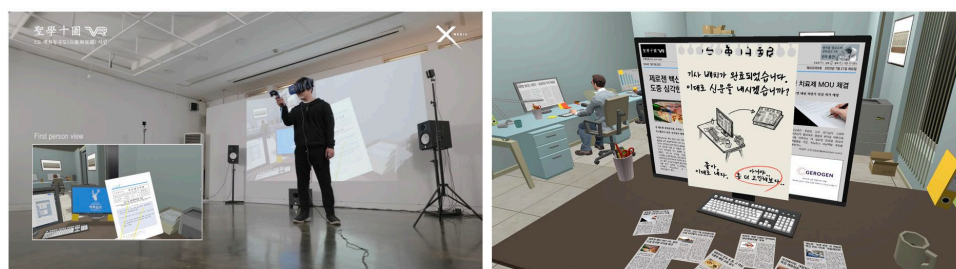


Figure 5. The fifth VR chapter based on “The Diagram of Rules of the White Deer Hollow Academy”

On the other hand, the fifth diagram awakens the need for lifelong study for those who have already entered society after studying. This is to awaken the original good intention of the very first mind of study. Our fifth VR chapter is thus designed as a game for adults.²² The game consists of three stages(levels) of play. At the first stage, the viewer as a player becomes a rookie at a newspaper company. As the level goes up, the player becomes a chief-editor (senior reporter) and then the representative of the company. At every stage, the players encounter several situations making a small or big decisions in their job. They need to agonize whether to decide for the company’s benefit or against of it with a journalist’s responsibility.²³ Being exposed in this kind of situation, the player was asked to think of what the right way of being a member of society. This VR evokes that although the meaning and purpose of study today are very different from those of the past, we should remind the meaning of study. Studying is to cultivate oneself and to fill it with virtue, so to reach out such virtue to others. Studying is not to win, but to grow. We tried to make the players ask themselves what they are doing with what they had been given.

Lastly, in the tenth VR chapter, the viewer can get to Gyung by writing the letter Gyung. Through this interaction, we intended to implement the process for VR viewer/player to build Gyung through the art of cultivating ourselves. In this process every interaction is performed by the viewer’s bodily experiences. The core idea is that Gyung can be achieved through constant cultivation with ceaseless effort. In this way, the VR viewer can accumulate Gyung object as a way of cultivating oneself or by building virtue. Toegye emphasized pursuing or following Gyung is the gate to the Way (Tao 道).²⁴

CONCLUSION

We are often asked why this project had to be developed via VR technology. Since *Sunghaksipdo* is full of visual diagrams, we have wanted to expand and develop such diagrams with new ways. We also wanted to take the viewer into the virtual time and space and provide them with experiencing it vividly. This process can make the viewers into participants and subjective performers. Thus, we thought that VR is the only method we can realize this. While the audience wonder around the newly developed *Sunghaksipdo*, we have also hoped that they can also look at the very detail of how several different concepts are fold and unfold. This is hard to experience in real venues. In our case, since the value and the gut, or the very contents of it is hard to transfer into a tangible way, we have spent large amount of time to produce it.

Finally, today, when the earth is suffering from various environmental crises, believing that all things are interconnected and valuing them equally becomes one of the most requested virtues for humans. Returning to the core of a moral cosmology of Confucianism becomes important again. We are looking for a way to restore that old heritage virtue with <Sunghaksipdo VR> project. We claim that <Sunghaksipdo VR> is a unique and initiative approach of creating an intangible heritage, particularly as a delivery of its philosophical and spiritual value with new media technologies.

ACKNOWLEDGEMENTS

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NOTES

¹ In his early years, Toegye deeply immersed himself in the study of *I Ching* and Neo-Confucianism. He was a head instructor of Sungkyunkwan, which is a president of the first-class university at that time of Joseon. When king Myeongjong suddenly died in 1567, his successor king Seonjo appointed. And Seonjo asked Toegye as a tutor of the king. But, because he wanted to study himself, he declined king's offer several times. However, being continuously asked by the king and unable to refuse such requests any further, he taught Seonjo shortly. But because of his illness, Toegye resumed office at the age of 68. Instead, he wrote many advisory documents including *Sunghaksipdo* for the king. Also, later Toegye established his own school called "Dosan-seodang (later this became Dosan-seowon)." For him, this is the place to study and teach his disciples while being engrossed in meditation. In 2019, with eleven other seowons, Dosan-seodang was designated as World Heritage by UNESCO.

² More information about <Sunghaksipdo VR> project is on the project homepage: <http://visionguider.com> and YouTube channel: <https://www.youtube.com/channel/UCeRrC7Fu62fRvfcYdr454Gw>.

³ Henri Bergson, *Matter and Memory*, trans. Nancy M. Paul and W. Scott Palmer (New York: Zone Books, 1988)

⁴ Michel Foucault. *Discipline and Punish: The Birth of the Prison*. trans. Alan Sheridan (New York: Vintage Books, 1995) (Original work published 1975).

⁵ Gilles Deleuze and Felix Guattari used diverse visual metaphor developing their philosophical ideas particularly following the Bergson's visual concepts. Therefore, they use the metaphor of the fold, and plateau, rhizome, and finally 'the plane of immanence.' See Gilles Deleuze and Felix Guattari. *What is Philosophy?* trans. Hugh Tomlinson and Graham Burchell (New York: Columbia University Press, 1994), 35-39.

⁶ See Gilles Deleuze and Felix Guattari. *What is Philosophy?*, 15. Also, Deleuze and Guattari say, "In any concept there are usually bits or components that come from other concepts, which corresponded to other problems and presupposed other planes. This is inevitable because each concept carries out a new cutting-out, takes on new contours, and must be reactivated or recut" (18).

⁷ In *What is Philosophy?* Deleuze and Guattari explain, "the philosophical concept is closer to a sequence of events, such as a dice being thrown every time, rather than a jigsaw puzzle put together at once" (35). They also say, "[The plane] is a table, a plateau, a slice; it is a plane of consistency or, more accurately, the plane of immanence of concepts, the phenomenon" (35). "The plane envelops infinite movements that pass back and forth through it, but concepts are the infinite speeds of finite movements that pass only through their own components" (35-36).

⁸ It means to enlighten others by traversing longitudinally and horizontally with extensive knowledge. The philosophical meanings of the vertical and horizontal axes (橫說豎說) are first introduced in the East in *Zhuangzi*.

莊子(雜篇), 第24篇 徐無鬼, "橫說之則以詩書禮樂, 從說之則以金板六弋"

⁹ The name of the first diagram of *Sunghaksipdo* is "The Diagram of the Supreme Ultimate (太極圖)"

¹⁰ Graham Harman argues object-oriented ontology (OOO). In *The Quadruple Object*, Harman describes his theory of object as fourfold. According to him, there are two types of objects, which are Real Object and Sensual Object. Also, these have two types of qualities, which are real qualities and sensual qualities. Real Objects are objects that withdraw from all experience, whereas sensual objects are those that exist only in experience. We thought that Li or Gyung is similar to Harman's Real Object. Real objects also have real qualities, but neither is accessible. See Graham Harman mentions the concept of "Real Object" in *The Quadruple Objects* (Winchester, UK: Zero Books, 2011).

¹¹ Chu Hui, "在物上看 則二物渾淪 不可分開 各在一處" (朱子大全文集, 卷46, 答劉叔文)

¹² Chu Hui, "在理上看 則雖未有物而已有物之理 然亦但有理 而未嘗實有是物" (朱子大全文集, 卷46, 答劉叔文).

¹³ Although Li and Qi sound like old concepts, contemporary Korean (or East Asian people including Japanese and Chinese) still use these terms frequently in daily life without noticing they are using such terms. Such as, when Koreans encounter an absurd situation, we say, "그럴 리가 없다," which means there is no ways how Li works like that. Another example would be Gamqi(감기), which means "a cold" or 'flu' in Korean. Each character of the word means someone feels a different Qi than usual. Li and Qi connect to each other and circulate repeatedly and therefore the relationship of Li(理) and Qi(氣) creates a network.

Also, the sixth diagram of *Sunghaksipdo* is entirely devoted to explaining the relationship between Li and Qi. Toegye discussed such a relationship with Go-Bong Daeseung Ki (1527~1572), who was a philosopher twenty-six years younger than Toegye. Their discussion and debate, later named "Four-Seven Debate (四七論爭)", last for about eight years. It is recorded as a historically meaningful and beautiful discussion between the two philosophers.

¹⁴ (豁然貫通) Leah Karlmanson is a Western scholar who points out that this momentary penetration in Eastern Neo-Confucianism can explain more clearly what speculative realism is trying to say in the West today: "In his commentary on the Great Learning (大學), Zhu Xi describes the moment at which the mind is transformed beyond the limited inner awareness of the petty person: "When he reaches the point where he has exerted effort for a long time, one day [everything] will suddenly interpenetrate (貫通). Then the external and internal, subtle and gross [qualities] of all things will be apprehended [...]" (qtd. in Adler 2004: 134). At this point we can better appreciate the resources that the Confucian tradition brings to the dilemmas of speculative realism: this sudden interpenetration of internal and external—this resonant attunement of mind-qi through the apprehension of li—is speculation par excellence." Joseph A. Adler, "Varieties of Spiritual Experience: Shen in Neo-Confucian Discourse," In *Confucian Spirituality*, Vol. 2, ed., Tu Wei-ming and Mary Evelyn Tucker (New York: Crossroad, 2004). This is requested in, Leah Karlmanson, "Speculation as Transformation in Chinese Philosophy: On Speculative Realism, 'New' Materialism, and the Study of Li (理) and Qi (氣)," In *Journal of World Philosophies*. 3(1), 2018, 17-30.

¹⁵ As the first diagram entitled "The Diagram of the Supreme Ultimate (太極圖)" starts with a circle. This first circle presents 'Taeguk', the 'the Supreme Ultimate.'

¹⁶ See Lee et al. *Tangible Philosophy*, <Sunghaksipdo VR> (Seoul: Chungnam, 2020).

¹⁷ The Sixth diagram is called "The diagram of the saying 'the mind combines and governs the nature and the feelings'" (心統性情圖). This diagram is based on "the Four-seven debate." *The Four-Seven Debate: An Annotated Translation of The Most Famous Controversy in Korean Neo-Confucian Thought*, trans. Michael C. Kalton, Oaksook C. Kim, Sung Bae Park, Youngchan Ro, Tu Wei-ming, and Samuel Yamashita (Albany, NY: State University of New York Press, 1994), Also, look at the note 13.

¹⁸ The constellation image of Cheonsang Yeolchabunyajido (天象列次分野之圖, a chart of the constellations and the regions they govern), created in the Joseon Dynasty. We described how we use the constellations in our VR in the paper "VR for Toegye's Ten Diagrams on Sage Learning: Experiential Space-Time based on the Concept of Eastern Philosophy." See Lee, Hyun-Jean, Wonjean Lee, Hyungsin Kim, & Jeong Han Kim. "VR for Toegye's Ten Diagrams on Sage Learning: Experiential Space-Time based on the Concept of Eastern Philosophy", In *Proceedings of the 25th International Symposium on Electronic Art*. 128-133. 2019.

¹⁹ "Heaven is called the father and Earth is called the mother. Therefore, what fills up all between Heaven and Earth, that is my body, and that which directs Heaven and Earth is my nature. All people are from the same womb, and all creatures are my companions." Toegye. *To Become a Sage: The Ten Diagrams on Sage Learning*, trans. Michael C. Kalton (New York: Columbia University Press, 1988), 56.

²⁰ In the fifth VR, the audience find themselves underneath the ground and see a seed sprout and grow with the care of the neighborhood being surrounded by five insects. These insects represent 仁義禮智信. The viewer observes how the seed blooms with the great care of the insects. Or the viewer can see that waterdrop circulates in its phase as four seasons change as in the seventh VR. The four virtues of human resembling the four virtues of nature as the manifestation of Gyung. This kind of caring and helping one to grow and spring up is another process of Gyung.

²¹ We call this third VR chapter to <Sohak-do VR>. This is based on the third diagram named "The Diagram of Elementary learning (小學圖)"

²² We call this fifth VR chapter to <Baeklokdonggyu-do VR>. This is based on the third diagram named "The Diagram of Rules of the White Deer Hollow Academy (白鹿洞規圖)"

²³ This game uses the rhetoric of failure, which is one of methodologies used to promote critical game design. This rhetoric is discussed by Gonzalo Frasca and Ian Bogost. Frasca mentions that this kind of game intends to make players feel failure in the process of achieving the goal of the game. This repeated feeling of failure does not immerse players, but rather produces a psychological distance from it. Thus, this strategy leads players to think critically about what is happening on the screen and about the issue in a game. See Ian Bogost, *Persuasive Games: The Expressive Power of Videogames* (Cambridge: The MIT Press, 2007), 84-89. Also See Gonzalo Frasca, "Videogames of the Oppressed: Critical Thinking, Education, Tolerance, and Other Trivial Issues," In *First Person: New Media as Story, Performance, and Game*, eds. N. Wardrip-Fruin and P. Harrigan (Cambridge: The MIT Press, 2004), 85-94.

²⁴ Toegye says, "The wise men of later times could not but take up the task of setting these concepts in diagrams and pointing them out in treatises in order to show others the gate for entering the Way (入道之門) and the foundation for accumulating virtue (積德之基)." See Toegye. *To Become a Sage: The Ten Diagrams on Sage Learning*, trans. Michael C. Kalton (New York: Columbia University Press, 1988), 29

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MAPPING HERITAGE(S) OF ÉVORA: HERITAGE URBANISM IN OBJECT AND EXPERIENCE

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INTRODUCTION

A heritage city is an archive of both tangible and intangible heritage(s). Cities that are fully functional are meant to be in transformation towards a heterogeneous narrative in contrary to the homogeneous past posing heritage(s) under a risk of “lost in translation”. But the narrative of heritage can live despite of the odds and challenges! This paper gives an effort to gain insight of the case of Évora, a UNESCO world heritage site and a fully functional European city. It is the center of historic settlement which dates back to the Roman period and beyond. It is an excellent example of historic Portuguese territory rich in artistic, cultural and socio-political history of two thousand years. Layers of history and cultural heritage are deposited for years in the architecture, urbanism, urban morphology, cultural geography and many other fronts of the city. The architectural characteristics of Roman-Gothic as well as Gothic-Manueline style dominate the urban landscape at the city centre.

At present Évora has a large educational facility. Despite the restriction on alteration and new construction, the city performs attracting tourists continuously, hosting the life and business of regular residents and acting as a regional capital. An understanding on how the city is functioning (connectivity, legibility, services and amenities, educational, health) can be an important cultural knowledge to follow in other cases. Mapping on different tangible (places, buildings, gardens etc.) and intangible (urban connections, accessibility, cultural identity etc.) indicators denote the identity of this settlement. The aim of this paper is to find out how the world heritage site is retaining a cultural identity and performing functionally sound in all aspects, how the heritage city and heritage urbanism relates to object and experience; how the present society fits in the heritage infrastructure of “centro historico de Évora” (Historic centre of Évora, to be called “CH” henceforth), how the heritage city responds to the contemporary HUL approach of UNESCO and how it addresses the social agendas of urbanism.



Figure 1. Évora, UNESCO World Heritage Site in Portugal (image sources: *Viaje al Patrimonio*, *Viver Évora*, Google street view and author)

THEORITICAL FRAMEWROK

Évora during Pre-World Heritage Status

The city of Évora, during and after having the World Heritage status, transformed the historic centre and the surrounding to keep the development as par with heritage sensitivity and towards valorisation and branding of the city of Évora. The developments were targeted to economic activities and revenue generations based on cultural tourism, like many other parts of the world but it made the liveability expensive for the residents and local users, which resulted in many empty houses and empty business establishments inside the historic centre. Given the development and transformations are one sided and partial devoid of interests of many stake holders, there is scope now to evaluate the existing heritage infrastructure, urbanism and other determinants as stated above to view the city in the lens of Historic Urban Landscape (HUL) as well as the concept of Heritage Urbanism.

World Heritage site

The historic centre of Évora was declared a World Heritage Site by UNESCO in November 1986 on two criteria [Criterion (ii and iv)] for exhibiting significant cultural development over a span of time reflected in architecture, monumental art and town planning as well as being a significant influencer in terms of architecture and urbanism illustrating significant stages in human settlement in another continent¹. UNESCO has some fabulous notes² on the city regarding Integrity and authenticity³

The protection management of the Historic Centre of Évora (HCÉ) along with the buffer zone, is organized and financed by the Câmara Municipal de Évora (CMÉ), the Regional Directorate for Culture of the Alentejo and the Directorate General for Cultural Heritage (DGPC) under the law “the Decree no. 140 of 15 June 2009 under the Law no. 107 of 8 September 2001”. Any work including civil construction is only allowed with prior assessment and monitoring so that there is no loss of physical features, authenticity or any other form of distortion to cultural assets. Qualified staff and state of the art technologies, proper methodologies and resources are engaged to ensure the above.

Historic Urban Landscape

The intangible qualities of the city life make a city livable and sustainable for people from all social and economic strata if they remain functional within the “Heritage Infrastructure” (intact urban morphology from ancient times, the exact old houses and the historic ambience). There is more upgradation ambition on international level with 2030 agenda of Sustainable Development - Goal 11 (SDG 11), countries

have pledged to “make cities and human settlements inclusive, safe, resilient and sustainable”⁴. Within this goal, Target 11.4 aims to “strengthen efforts to protect and safeguard the world’s cultural and natural heritage”.

World Heritage Convention for historic cities displayed success across the world but only in isolation without any incorporation with the surrounding urban, social, environmental and landscape context (in many cases including Évora⁵) that hampers relationship with local host and population, devalues the cultural identity. To address this critical position of cultural assets and heritages UNESCO develops an integrated approach to manage heritage sites and objects called Historic Urban Landscape (HUL) Approach (14 worldwide pilot project at present). It is a set of holistic, interdisciplinary and inclusive recommendations by UNESCO to be adopted and enhanced over World Heritage Convention aiming at guided change to historic cities, but mostly in a conflicting context between ‘development’ and ‘urban heritage conservation’. It is based on the recognition and identification of a layering and interconnection of natural and cultural, tangible and intangible, international and local values present in any city.⁶ The HUL approach extends beyond the notion of ‘historic centre’ or ‘ensemble’ to include the broader urban context and its geographical setting as well as social and cultural practices and values, economic processes and the intangible dimensions of heritage as related to diversity and identity.”⁷

Heritage Urbanism

Urbanism refers to the lifestyle and characteristics⁸ people possess in urban dwelling which includes the time scale to accommodate changes, transformations and stimulations. As a disciplinary field urbanism examines and evaluates contemporary discourses and theories to address the basic uncertainty of traditional planning⁹ and in answer offer new disciplinary approach that includes multidisciplinary factors (heritage is a potential one) and exploits strategic urban designs as a tool of intervention. Societies and settlements that contain natural and cultural Heritage evolve continually and are the embodiment of the inextricability of tangible and intangible heritage.¹⁰ In urban and landscape context, heritage urbanism considers the revitalization and enhancement of cultural heritage in spatial, social, political, economic and environmental milieu.

According to Obad and Bojanić¹¹ the term Heritage Urbanism first received public acquaintance at an international conference under the title Cultural Heritage in Zagreb in 2015 and the discourse was being developed gradually in following years. The approach and method of heritage urbanism were presented (as an active agent for urbanism) in two books published by Springer: *Quality of Life in Urban Landscapes* (2018) and *Cultural Urban Heritage* (2019). This includes multidisciplinary agenda of tourism, financial policy, housing, etc. and views heritage as a non-isolated and active object that acts for the integrity in society and settlement as well as possess the quality of inclusiveness. 17 models of Heritage urbanism were discussed in the book *Cultural Urban Heritage*¹² in search of an universal model that has the following hypotheses.¹³

METHODOLOGY

The Key Strategy

The research problem identified in the section of introduction is tackled by a series of activities and evaluating Évora against key themes from the theoretical framework (HUL, Heritage urbanism and social agenda) by the key strategy of looking at combination of maps (by author and interviewee) to reveal some meaningful interpretation. An understanding on how the city is functioning and mapping on different tangible (places, buildings, gardens etc.) and intangible (urban connections, accessibility, cultural identity etc.) indicators reflect upon spatial justice and inclusion. The methods followed include “mapping interviews” of the residents and commuters of different age, gender and profession. The data is further analyzed and synthesized by Interpretative Mapping.

Interpretative mapping

Interpretative mapping can be conceived as a process in between (or combination of) cartographic mapping and cognitive mapping. Interpretative maps have author's interpretation along with geographic reference and drawn with a skillset with reference to cartographic maps (figure 2a). This method is explained elaborately in a previous publication¹⁴ of the author.

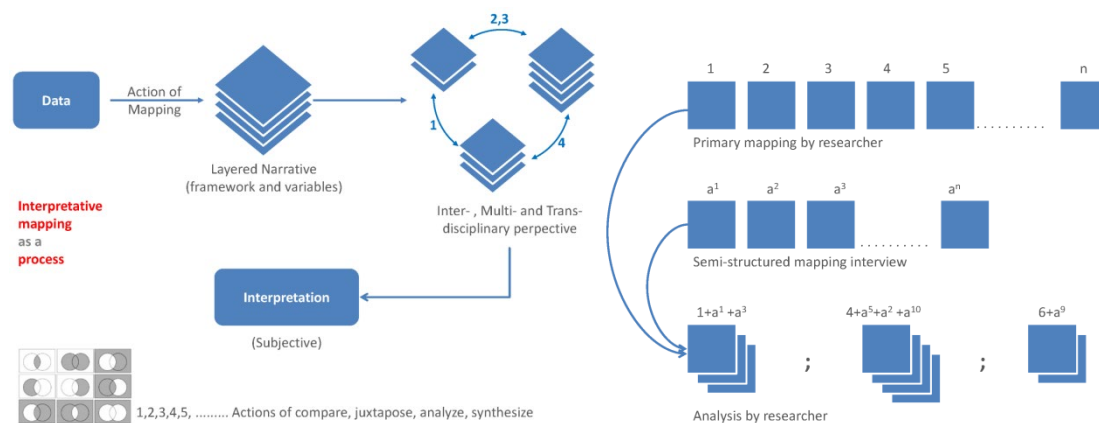


Figure 2. (a) The process of Interpretative Mapping¹⁵ and (b) Mapping at different stages

Mapping interview

Mapping interview (a semi-structured interview) is an essential part of this research to know the opinions of the users of the city how they feel, perceive and think about the city. They are the largest stakeholders and primary actors of socio-cultural, economic and political activities. The interview was designed to collect information, especially spatial information from the interviewee by illustrating on a given “key map”, include legend, and write short comment to enhance the mapping in response to some given questions. The questionnaire for the mapping interview is very simple but it corresponds to the core themes of theoretical framework here. Cultural value, heritage infrastructure, transportation, urban landscape, spatial organization, perceptions, economy, tourism, accessibility, affordability, etc. are the themes behind the designed questions. The details of the “design of interview” can be found in the link¹⁶ provided in endnote. The primary mapping by researcher and data from mapping interview is further analyzed for results (figure 2b). To approach a specific target group (resident and commuters) that fulfill a certain criteria (Long exposure to the CH) “Snowball sampling method”¹⁷ was used as a useful, popular and acceptable method.

Mapping interview is unique and important because an empty map in hand may intrigue¹⁸ spatial thinking and recalling memories more intensely and interviewee have freedom to define geometry, space, place, features, experiences and ideas.

Other survey methods to support mapping

Other type of surveys were conducted to accomplish and support the primary mapping by researcher namely photographic surveys, walking survey, cycling survey and driving survey which aided understanding (and mapping later) on vehicle maneuverability, explicit walking and cycling experience due to surface condition and material and one way road system.

Digitization in GIS program

The open source GIS program “QGIS 3.22” is used to do all kind of mapping activities by author as well as digitizing the interview responses (to ensure comparability and geo-referencing). All statements from the mapping interview that has spatial implication were expressed by geometric elements and

different symbology (point, lines and shapes, color, pattern, hatch, styles, transparency and effects). Non-spatial responses are noted and discussed separately.

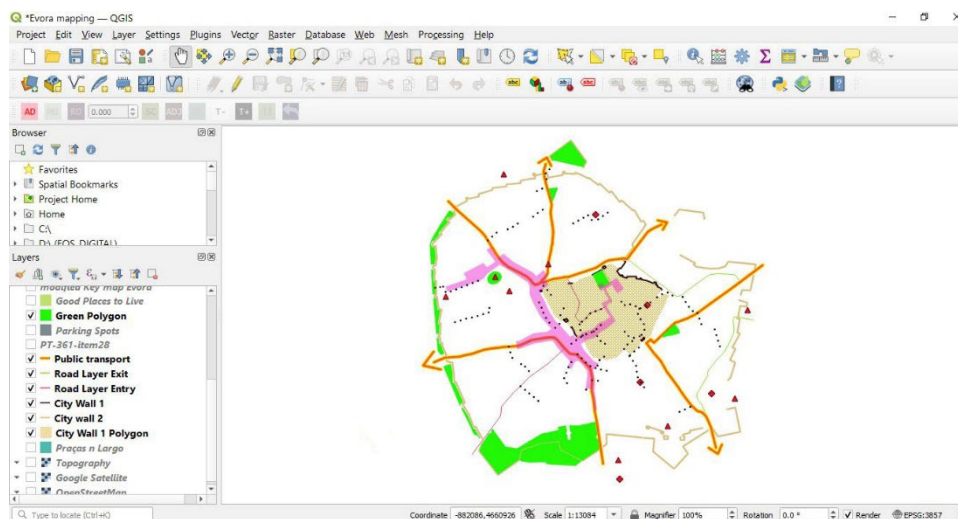


Figure 3. Mapping activities in QGIS 3.22

RESULTS AND DISCUSSION

Primary Mapping by researchers

There are many primary mappings done by author (e.g. Layers of historic periods, Public places, Pedestrian network, Tourist occupation etc.) which makes the basics of analysis. One example is displayed in Figure 4.

Maps from Interviewee

A total of 33 respondents participated resulting slightly increased number of maps because some of the participants provided separate maps for positive and negative questions/vibes. Highlights of the maps are in figure 5.

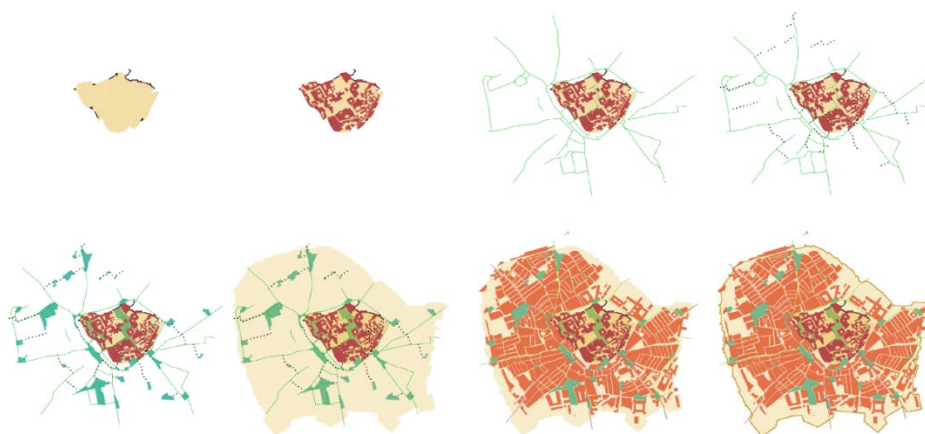


Figure 4. Historic development of the historic centre of Évora

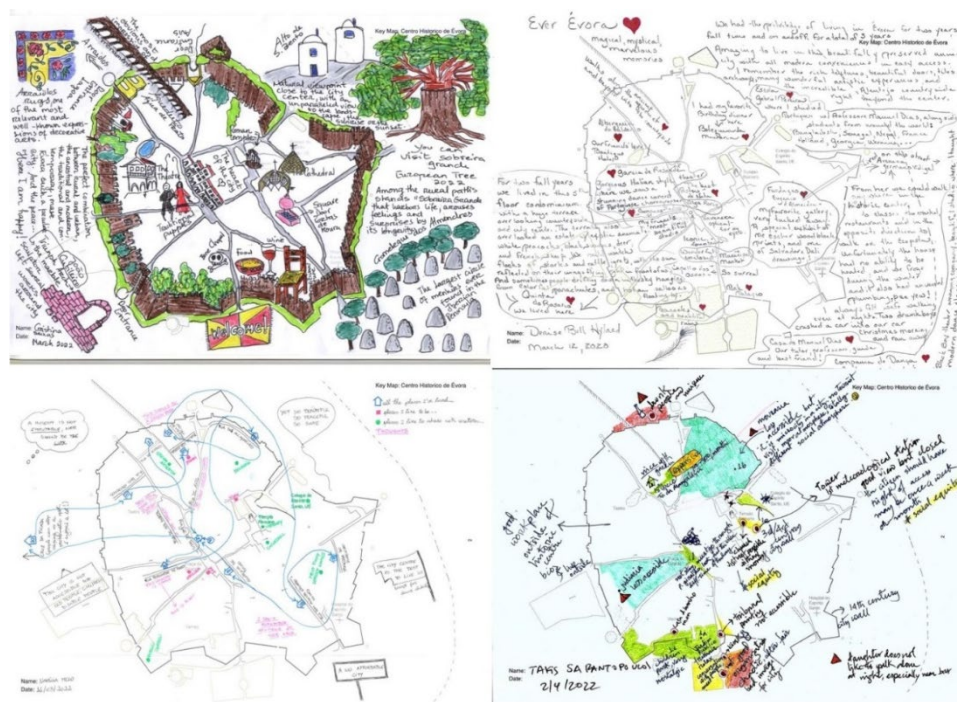


Figure 5. Output from Mapping Interview. All the output can be seen in this link¹⁹.

Analysis 1: Array of Memories and Concerns

Given the comments, drawings and illustrations, it can be deduced that interviewees identified many spots in the key map for which they have certain feelings, memories, thoughts, concerns and statement. They are either a building or square/prça/garden or a segment of a street and are listed and tabulated for frequency of mention by the total number of respondents. They are marked as positive (+), negative (-) and concern (±) as well along with number of mentions. The table is stated below-

Nº	Places				List of Interviewee (code number)																						
		(+)	(-)	(±)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	Praça do Giraldo	13		2																							
2	Theatre	4		3																							
3	Aqueduct	4																									
4	Rua do Muro		1																								
5	Porta de Avis	2																									
6	Porta Velha de Lagoa	2		1																							
7	Porta de Raimundo	1																									
8	Entry point of Rua da Republica	1	1																								
9	Porta Rua Serpa Pinto	1	1																								
10	Portas de Moura	2																									
11	Rua do Raimundo			3																							
12	Rua 5 October	2		2																							
13	Triumph Arch	1																									
14	SHE	2																									
15	Largo do Alvaro Velho	2	1																								
16	Igreja do Sao Vicente	1																									
17	Oficina Bar	1																									
18	Bone Chapel	2																									
19	Palace/Patio de Sao Miguel	1																									
20	Rua de Avis			1																							
21	Cathedral of Évora	4																									
22	Roman Temple	10																									
23	Garden of Roman Temple	3																									
24	Barahona Palace	1																									
25	Main Axis	4		3																							
26	Public Garden	11																									
27	Children Garden	5																									
28	Hospital ES	2	4																								
29	Jardim dos Colegiaes	2																									
30	Public Library Évora	2																									
31	Cemetery	1	1																								
32	Pousada dos Loios			1																							
33	Town Hall/CM	1																									
34	Mouraria	9	1	3																							
35	Judaria	2		2																							
36	South East Part (area between Rua d	2																									

Figure 6: Part Table²⁰ showing total of 65 places. All text of responses can be found in the link²¹.

Regarding the integration the answer is not straightforward rather it lives inside the history how the historic centre and the surrounding neighbourhood became united under the regulation of Camara Municipal de Évora. The peripheral areas around the CH have reached its present state step by step. Before the master plan phase of Évora, in 1976 there were 14 unauthorised neighbourhoods (informal, built without permission).²³ With the objective of an integration of these neighbourhoods with the CH, a circular road network around the CH was planned so that it could avoid thoroughfare inside CH effectively. This circular road became itself a kind of border, frontier which was not foreseen by the responsible. The lands around the circular were considered for development in anticipation of a crowded and busy city but it was not realized as expected leaving spaces like Rossio, the car park in front of SEF, as well as at porta de aviz empty and without investment.



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João”(Figure 8). But grossly, the noble idea of urban integrating was kind of alien, imposed and ignoring the local existing elements which resulted in questionable success of the process. There are other places²⁵ of concerns like this.



Figure 8: Empty ground of Rossio (a) Past activities [image source: ViverÉvora] (b) Present annual fair [image source: odigital] (c) informal parking all the year round [image source: Maria Eugenia Delgado Casale]

The movement of integration of CH with outside neighbourhoods destroyed a lot of functionalities around Évora which include urban agriculture that was present inside and outside of CH. There is toponymic evidence²⁶ to testify this fact. It brings in another observation of the negative perception of spaces (from mapping interview). In the following mapping exercise (Figure 9), positive spaces are mostly on the west side along the wall while the negatives are on the North, South and east side.

The fortified wall is quite high, originally designed to keep away potential attackers and therefore is not in a very welcoming scale to human. Non-productive functions (like parking lot) directly beside the wall, proves to be fearful, disliked and negative spaces. Similar places but when the wall is integrated and mediated by gardens and landscape, the scale become enjoyable and welcomed by users and thus give a positive connotation.

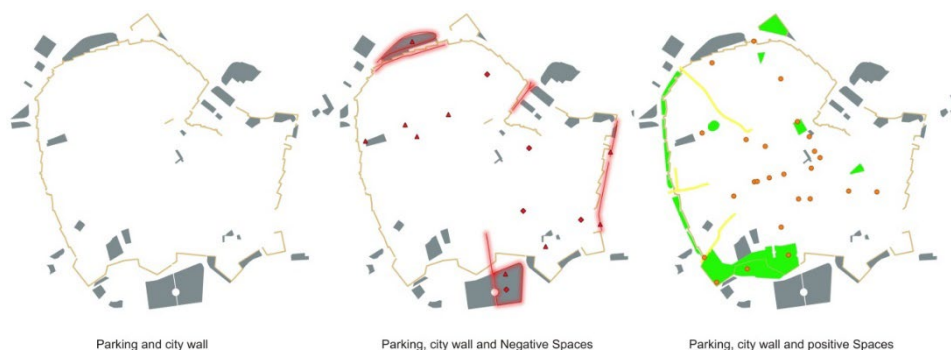


Figure 9. (a) Parking and city wall, (b) Negative spaces and (c) positive spaces and landscape

CONCLUSION

Is UNESCO World Heritage Status an asset for Évora or a burden? What is more hegemonic – the object or the experience? - the tangible or the intangible? The discourse of heritage urbanism tries to find an answer whether to take (or not) a capitalist approach of preserving and conserving the cultural heritage for the sake of conservation with an aim of cultural tourism and revenue generation from that; or keep a balance between because the tree cannot live healthy if the root is in poor condition. It is a burning question whether Évora (historic centre to be more specific) might keep along the principles of Historic Urban Landscape approach and comply with the wider context and adopt contemporary approaches to heritage urbanism. When there is a special asset attached to a city, e.g. Heritage, then a

Heritage Urbanism becomes integrated with the city-systems. It is quite clear from the analysis sections that the heritage infrastructure and administrative mechanism at the moment requires to be updated by including social and strategic endeavours to proceed towards the future. Obad et al²⁷ rightly identified that the urban interventions for exploiting the existing heritage assets needs to be accomplished in detailed thematic layers: urbanscape, naturescape, heritagescape, walkscape, soundscape, mindscape, ambiencescape, touristscape, waterscape, archaeologicalscape, publicscape etc. Évora needs gardens and green spaces as such amenities are seriously lacking especially between the historic centre and the neighbourhoods outside and this contemporary trend of landscape approach can be a very effective linking element through neighbourhoods.

ACKNOWLEDGEMENT

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NOTES

- ¹ Jim Haw, 'The UNESCO World Heritage Site Selection Process', *Scientific American Blog Network*, 10 June 2013, <https://blogs.scientificamerican.com/expeditions/the-unesco-world-heritage-site-selection-process/>.
- ² Évora has retained its characteristics within the Vauban-style wall built in the 17th century..... overall integrity has been preserved in terms of both its individual monuments and its townscape. The rural landscape to the north has remained largely unchanged.....Ever since the city walls were classified in 1920 under national law, conservation measures were implemented in accordance with internationally recognised principles..... Despite the adaptation to modern times in the 20th century, most of its buildings have preserved their structural authenticity and the morphology of the city block has been preserved.
- ³ World Heritage Centre UNESCO, 'Historic Centre of Évora', UNESCO World Heritage Centre, 1986, <https://whc.unesco.org/en/list/361/>.
- ⁴ Mladen Obad Šćitaroci and Bojana Bojanić Obad Šćitaroci, 'Heritage Urbanism', *Sustainability* 11, no. 9 (10 May 2019): 26–69, <https://doi.org/10.3390/su11092669>; UNESCO Institute of Statistics UIS, 'Sustainable Development Goal 11.4', UNESCO Institute of Statistics, 18 November 2016, <http://uis.unesco.org/en/topic/sustainable-development-goal-11-4>.
- ⁵ Filipe Themudo Barata, Urban planning process of Évora, 25 May 2022.
- ⁶ WHITRAP, 'THE HISTORIC URBAN LANDSCAPE (HUL)', 2013, <http://www.historicurbanlandscape.com/themes/196/userfiles/download/2015/1/5/0rIneczs0ltzg72.pdf>.
- ⁷ UNESCO, 'RECOMMENDATION ON THE HISTORIC URBAN LANDSCAPE' (UNESCO, 10 November 2011), <https://whc.unesco.org/uploads/activities/documents/activity-638-98.pdf>.
- ⁸ Merriam-Webster, 'Definition of URBANISM', 2022, <https://www.merriam-webster.com/dictionary/urbanism>.
- ⁹ KU Leuven, 'Landscape Urbanism - KU Leuven', 2015, https://onderwijsaanbod.kuleuven.be/2015/syllabi/e/H02Q2AE.htm#activetab=doelstellingen_idm12549936.
- ¹⁰ Elizabeth Brabec et al., 'Cultural Landscapes and Heritage Values', 2015.
- ¹¹ Obad Šćitaroci and Bojanić Obad Šćitaroci, 'Heritage Urbanism'.
- ¹² Mladen Obad Šćitaroci and Bojana Bojanić Obad Šćitaroci, 'Models of Revitalisation and Enhancement of Cultural Heritage and Sustainable Use', in *Cultural Urban Heritage*, ed. Ana Mrđa, The Urban Book Series (Cham: Springer International Publishing, 2019), 457–75, https://doi.org/10.1007/978-3-030-10612-6_29.
- ¹³ "Heritage is not a burden but a potential for development and a strategic national resource; it is not sufficient to protect and conserve heritage, it must also be renewed and interpreted in a sustainable manner.....inclusion into the contemporary and future life of towns, settlements and communities; heritage is not to be perceived as a static object, but as a creative subject."
- ¹⁴ Shajjad Hossain and Filipe Themudo Barata, 'Interpretative Mapping in Cultural Heritage Context: Looking at the Historic Settlement of Khan Jahan in Bangladesh', *Journal of Cultural Heritage* 39 (September 2019): 297–304, <https://doi.org/10.1016/j.culher.2018.09.011>.
- ¹⁵ Subjectivity is one of the main characteristic which is both strength and weakness of the process. The strength of subjectivity is to be used to advantage research outcome.
- ¹⁶ <https://sites.google.com/view/mapping-heritage-urbanism/mapping-heritages/mapping-%C3%A9vora>
- ¹⁷ Charlie Parker, Sam Scott, and Alistair Geddes, 'Snowball Sampling' (SAGE Publications Ltd, 2020), https://eprints.glos.ac.uk/6781/1/6781%20Parker%20and%20Scott%20%282019%29%20Snowball%20Sampling_Peer%20reviewed%20pre-copy%20edited%20version.pdf.
- ¹⁸ The fact is later confirmed by some of the interviewee who stated that they were very intrigued to think about the city spatially when they were handed over the piece of paper having Key map of Évora (almost empty but with few reference lines of the city). They found out that it, being a semi-structured interview, is a fun exercise to virtually roam around the city and note down several positive and negative vibes and their thoughts that would not be possible otherwise (i.e. just writing and speaking or answering questions in likert scales).
- ¹⁹ <https://sites.google.com/view/mapping-heritage-urbanism/mapping-heritages/interview-inputs>
- ²⁰ This is a partial view of the table. Full table has 65 places identified and total of 33 respondents.
- ²¹ <https://sites.google.com/view/mapping-heritage-urbanism/mapping-heritages/opinions>
- ²² There can be little bias in data due to "outliers" for personal preference and therefore the actual considerable number might be a little less than 16. This issue of limitation is discussed in the section 5.6 limitation and justification
- ²³ Filipe Themudo Barata, 'Managing Old and New Urban Environments in the City of Évora: Difficulties in Fixing Long-Term Cosmopolitan Public Policies', in *Cosmopolitan Habitat: World, Citizens, Living Space: A Research Agenda for Urban Resilience*, ed. Jörg Schröder et al. (Berlin: jovis Verlag GmbH, 2021); Barata, Urban planning process of Évora.

²⁴ The proposed plan was sent to Junta de Freguesia and through there the community sent back their opinion and a revised plan and then the municipality was obliged to discuss with the community.

²⁵ Bull fight arena opposite to children park and corn warehouse besides the academic service building of UÉ still have some occasional functions but perhaps might be anticipated to be empty in future.

²⁶ “Chafariz de El Rei” was a place for Fountain of the king, “(Bairro do Poço) Entre Vinhas” was the place for grapes, “(Bairro de) Bacelo” was also for grapes- Bacelo is the name of grapes when young.

²⁷ Obad Šćitaroci and Bojanić Obad Šćitaroci, ‘Heritage Urbanism’.

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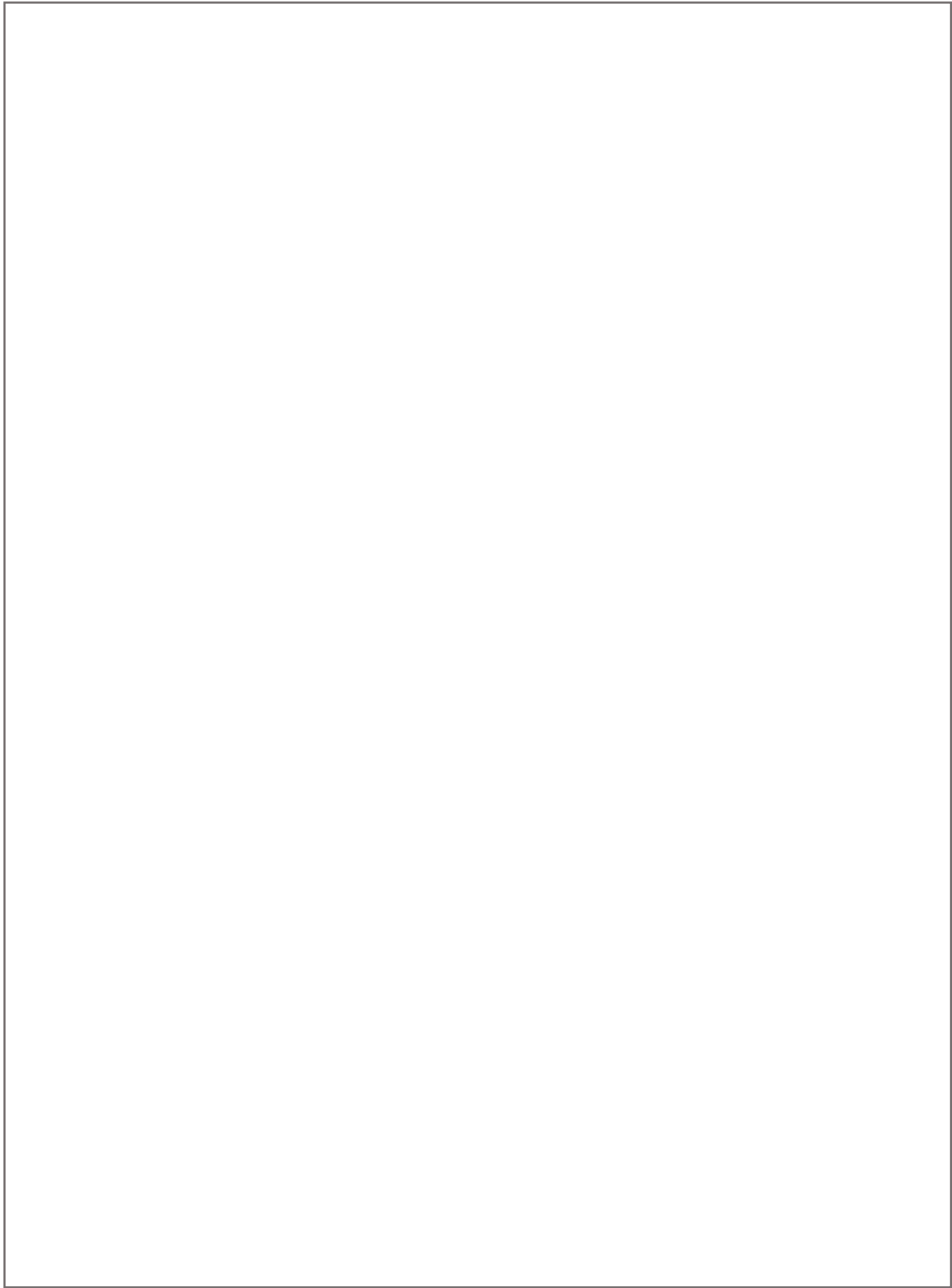
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