

# CONNECTIONS: EXPLORING HERITAGE, ARCHITECTURE, CITIES, ART, MEDIA

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# **CONNECTIONS:** EXPLORING HERITAGE, ARCHITECTURE, CITIES, ART, MEDIA



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# INTRODUCTION

# **CONNECTIONS:** EXPLORING HERITAGE, ARCHITECTURE, CITIES, ART, MEDIA

Today the digital is ubiquitous across all disciplines connected with life in cities: urban history, architecture, planning, art, design, media, communications, and more. Examples abound.

As the Western world comes to deeper understandings of its heritage in the 21st Century, technology is ever more present in our reading of the past. Data mapping is standard in conservation and social history. Archaeologists use digital tools in geophysics, laser scanning, and compositional analysis. Landscape and architectural visualizations populate museums across the world. In architecture, computational design uses algorithms to replicate biology. Coding produces self-generated architectural form. Information modeling presents planners with interactive design in real time. The city is seen as 'smart'.

In film and animation, digital models create fictitious places on scales unimagined. Installation artists make space interactive through digitising motion, sound and heat. Projection mapping allows artists to reinterpret the past in-situ. Photographers use digital cameras to document city stories. Marketing, technology and communication mediates the city experience 24/7. In every field, educators are responding.

As the tools we use today merge and blur across disciplines, this conferences asks educators and professionals to consider the following. How can we best manage, direct and utilize the unique potentialities of this interdisciplinary and technological moment? Are we rethinking objects of art and design from the past and future? Are we reconsidering modes of communication, styles of teaching and ways of living? Are we seeing new links between designed objects, visualized spaces and cultural meanings? Are we understanding creative, documentary and media practices in new ways? Are we developing our own knowledge through the technologies, tools or thinking of other disciplines?

Based on this interdisciplinary approach, this conference publication brings together the work of educators and professionals in a range of disciplines including architecture, urban design, history, archaeology, heritage, art and film.

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# STRUCTURAL AND FUNCTIONAL CONNECTIVITY IN EUROPEAN COLLECTIVE HOUSING THROUGH CONTEMPORARY CONDITIONS

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## INTRODUCTION

The aim of this research is to create a system of analysis and diagnosis based on European collective housing taxonomy. This system will be held on the cataloguing and blending of the selected authors whose critical thinking allows us to define *Connectivity* as a contemporary condition. Besides, the primary objective of that updated definitions is to address the numerous and possible relevant authors and its interpretation<sup>1</sup> during the last decades, specifically after the appearance of the Single European Act in 1987.<sup>2</sup> Furthermore, the methodology presented through this research is the main contribution according to contemporary debates about BigData and its parametric implementation into housing projects design.<sup>3</sup> Therefore, it exists a balanced effort between the creation of the well-ordered and classified system and its resilience implementation as a direct application.<sup>4</sup> That means an exhaustive workflow and a systematic way of labelling all the parameters selected from the relevant authors, and how it is possible to order them into our contemporary catalogue. Regarding the updated definition through this research about *Connectivity* condition, the parameters list proposed is divided into two main fields, which goes from Structural to Functional. In one hand, through the first group -Structural Connectivity –, the research analyses the relationship between the objects surrounding the housing project.<sup>5</sup> On the other hand – Functional Connectivity – that second field entitled the viability to transfer from the building to the rest of the city.<sup>6</sup> After compiling all parameters into the Connectivity catalogue, the next steps are focused on transforming data collection into graphic assessments using CAD software.

Therefore, an implicit target on this work is to update the intellectual efforts during 1960 and 1970 decades to prove specific hypothesis in the field of housing, but having to *build it* on real materiality<sup>7</sup> and needing time to test and having proper feedback. Nowadays it is possible to simulate those results and moving forward faster than using, for instance, analogical tools as the *Thermoheliodon* from Olgyay brothers.<sup>8</sup> Regarding the use of computer-aiding and parameterization tools, two ways to use them have been found: a *formal parameterization*<sup>9</sup> and *critical parameterization*.<sup>10</sup> This second line of thought continues in the 1980s through testing and cataloguing the families that generate the intellectual discourse of this research. Besides, the possibility that current visual tools offer through the field of *Planning Support Systems*<sup>11</sup> allows this research to apply those authors' statements to contemporary housing field, not only through urbanism. Eventually, a dynamic analysis of the

behaviour from the visual tool using the data collection from this work will offer a new horizon to explore topological relationships – which includes on its *architectonical DNA* our reference author's criteria – in terms of *Connectivity* into collective housing research.

#### BACKGROUND

In the book Visual Complexity, <sup>12</sup> Manuel Lima offers in the second chapter the history of Modern Science based on the article entitled "Science and Complexity" by Warren Weaver in 1948. According to Weaver classification, those three groups, related to a specific period of time, are "Problems of Simplicity" covering seventeenth, eighteenth, and nineteenth centuries, then "Problems of Disorganized Complexity" during the first half of the twentieth century and following, in the second half of the twentieth century, "Problems of Organized Complexity." As Lima pointed "Not only have we recognized the presence of exceedingly complex systems, with a large number of variables, but we have also recognized the notion that these variables are highly interconnected and interdependent." In order to follow that third group, we focus on the graphic explanation of Christopher Alexander through his book "A City is not a Tree" (1965), where we can see the difference between a data organization in categories or a tree, and the right one where the "semi-lattice" methodology, offers the organization where data can be interconnected and matters not only the items itself but also the relationship between them (figure 1).



Fig 1. Christopher Alexander, A City is not a Tree, 1965

## SAMPLING

It is important to highlight that this research came from a more extended research methodology published as "Sampling Housing." <sup>13</sup> That analysis of collective housing on Europe was based on *five* main conditions which allowed us to generate a work engine, as you can see on the graphic of *five* colours spheres on the left side of the figure 2. The sphere coloured in brown, *Connectivity*, is the chosen condition to be released through this paper. The strategy based on compiling and selecting is here called *sampling*: it consists in cutting and blending parts of original texts to create and give meaning to a current and more complex reality. <sup>14</sup> The main reference authors of this research came from crossing specific MIT<sup>15</sup> and Princeton<sup>16</sup> research developments with the "Critical Thinking" of the 70s-80s in Europe – in parallel with *Structuralism* –.<sup>17</sup> Therefore, this system will be based on the cataloguing and blending of the main contemporary conditions of dwelling hold on the theoretical body from the critical thinking between United States and Europe about housing hatched in the 60s. These authors were not part of the compositional conflicts and architectonic language brought by the

*Modern Movement.*<sup>18</sup> From the beginning of the 50s to the first years of the 80s a new flow of domestic and urban readings can be found in parallel with *Team X* effervescence and social impact beyond political conditions.<sup>19</sup>



Fig 2. Sampling Housing index. Source: author

From here, an argumentative map from 1960 to 2020 about how to measure collective housing projects will be designed. This map involves the five main contemporary conditions for a complete study that benefits this research: *Adaptability, Sustainability, Connectivity, Habitability* and *Sociability*.



Fig 3. Five conditions bibliographical index. Source: author

It is possible to see in figure 3, on the left side, the graphic resume of the bibliography and the relationship between the authors and books selected by year and condition. Besides, for a better understanding of the graphic, each condition will start from the purple and blue arrows and followed by the five orange big circles, which represent the five principal publication to start to catalogue those conditions that divided *Sampling Housing* thesis. Listed below, each condition and the first reference

publication stablished as the "reference root" on each case: *Adaptability*, with John Habraken and *Supports* (1961);<sup>20</sup> *Sustainability*, by Victor Olgyay in his book *Design with Climate* (1963);<sup>21</sup> *Connectivity*, by Alexander and Chermayeff, also in 1963, through the release of *Community and Privacy*,<sup>22</sup> following *Habitability*, by Reyner Banham in 1969 with *The Architecture of the Well-Tempered Environment*<sup>23</sup> and eventually *Sociability*, with John Turner in his book *Housing by People* (1976).<sup>24</sup> The aim of this paper is to isolate *Connectivity* condition in order to visualize its data complexity into an architectonic building sample and create a system of diagnosis and assessment, using contemporary CAD and parametric software. Following, the constellation selected to describe the methodology.



Fig 4. Connectivity reference authors. Source: author

#### **METHODOLOGY**

Regarding the housing connectivity study, it is based on following the path started by Christopher Alexander through the publication with Sege Chermayeff of Community and Privacy. Due to its relevance, Alexander established a remarkable research line as the Director of the Center for Environmental Structure (CES) at University of California, Berkeley.<sup>25</sup> To create the constellation of relevant publications to transfer its definitions to the generic catalogue of the research, it is necessary to list Alexander echoes in following authors presented by chronological other – always relevant in housing taxonomy field - as Reyner Banham, Monique Eleb, Bernard Leupen, Tatjana Schneider and Alex Lehnerer (figure 4). Therefore, this tool useful for joining and matching related intellectuals summarizes the theoretical body of this research. To address the extension of this paper, Functional and *Structural* parameters will be described from the most relevant aspect of each publication in the constellation selected. Starting from "Community and Privacy", the authors show figures and graphics which explain different organizations regarding *Proximity* between different parts and different scales of the city.26 As mentioned before, Christopher Alexander started with this book a serie of publications in the 1960 decade that would remark most of the graphic references<sup>27</sup> in his following books. In terms of Morphology, Reyner Banham presented in 1976 a complete catalogue of examples in Megastructures. Urban Future of The Recent Past about the new concept of understanding the city as an "infrastructure for living." Linked to the concept of infrastructural buildings to create the future city, appearances the image Oasis Project by Ron Herron in 1968.<sup>28</sup> However, it is also important to

analyse the *Connectivity* in small scale. All works and publications from Monique Eleb are more than relevant in that aspect for the critical thinking on European housing for 1990 decade. <sup>29</sup> Inside this publication is possible to find a sample of *Absolute Compactness* by Lauvergeat and Nabères: *Le corps et l'eau (The Bodies and the Water)* and the proposal "Un+Un" for PAN 14 (1987), <sup>30</sup> published both in *Penser L'habité. Le Logement en Questions* (1988).

Besides, the second chapter about our main condition, *Functional Connectivity*, is shown by the work of Bernard Leupen, who went deeper into "time" aspects about collective housing taxonomy. Moving forward, a sketch from the book *Time-Based Architecture*, trying to describe *Transport* and *Circulation* parameters regarding a project and the surrounding city. <sup>31</sup> In parallel with that, in 2007, the research group called *Flexible Housing* released a homonymous book by Schneider and Till. <sup>32</sup> There, appears the definition of *Flexibility* in housing projects divided into two: before occupancy (*Hard*) and post-occupancy (*Soft*). To come to an end listing the main reference authors, it is remarkable the work published in 2009 from ETH Zürich of Alex Lehnerer in *Grand Urban Rules*. It contains in the first chapters a graphic catalogue of *101 rules* which analyse cities all around the world to be applied to the imaginary city of *Averuni*, like Italo Calvino with the *Invisible Cities* in 1972. <sup>33</sup>



Fig 5. Connectivity generic graphic catalogue authors. Source: author

## **GRAPHIC TOOL APPLICATION**

Those six foundational books regarding *Connectivity* as condition is the critical thinking that generates our tool: 13 parameters (figure 5) from 532 data programmed from our database. Another fundamental cornerstone of this research will be to assume digital media for the representation of the complexity of each era applied to the household. The goal is the creation of a generic pattern that could be applied to any future similar study case. All this research helps us to create a generic catalogue of parameters.

In this case, the translation of the definitions into graphic is crucial: it allows us to use a generic building and highlight, as you can see in red colour, how is it possible to measure every specific parameter. Here, the six parameters on the top are related to *Structural Connectivity*, and the seven on the bottom graphic definitions from our catalogue of *Functional Connectivity*. The main goal of this research is to become a tool for direct implementation on existing buildings. Which means that the case studies are selected also to match the theoretical moments where the reference publications

appear. The cities selected are Paris, Helsinki, Amsterdam, Madrid and Berlin between 1987 and 2007. <sup>34</sup> To follow with the explanation of the graphic tool using the generic catalogue previously detailed it is necessary to take the argument from Manuel Lima on *Visual Complexity*: looking for a critical understanding of the use of data and parameters in architecture, not only based on speculative or formal solutions. <sup>35</sup> According to the argument previously mentioned from Warren Weaver, it will be named as *Contemporary Problems of Visual Complexity*. Among the solutions shown in *Visual Complexity*, the "Circular ties" methodology is aligned with the organization through five main conditions of the *Sampling Housing* "work engine" tool (figure 6).



Fig 6. Sampling housing tool. Source: author

It is a sort of update of the already citated *Thermoheliodron* tool used by Olgyay brothers in Princeton in 1956 directly into physical models. In this case by using 3D software tools from today. Here, the dynamic graphic of our research to compare one building with the maximum and minimum control rates of the rest of the case studies. It is important to show the whole system and not only regarding *Connectivity*, because the whole system has a dynamic response, and in case you modify any data from one parameter, it changes in real time the rest of the parameters of the system. Instead of being a tool to compare, what it is the main goal is to generate a graphic tool that includes all data from the 532 items necessary to measure and create the five main conditions. In Brown, the sphere of *Connectivity*.



Fig 7. From the existing building to the 3D data visualization of all 532 data in the skeleton generated by this research. The tool as a "bridge". Source: author

In order to illustrate the proceeding – two steps to jump from the *Sampling Housing* tool to the direct assessment into a particular 3D model – in this case is selected the refurbishment "Bois-Le-Prêtre" tower from Druôt, Lacaton and Vassal in Paris (2005-2011).<sup>36</sup>

First step consists of programming *Sampling Housing* tool, which helps us as a bridge to introduce into the 3D software the specific information we want to measure and analyse in that housing project intervention. Second step, moving forward the assessment capacity of that methodology. It consists of the direct application from the work engine like a dynamic tool using several *gizmos* or devices to connect every parameter: what matters is to define the relationship between the generic catalogue to the reality on each case study. Here two different behaviour of all the system (axonometric and plan), using the *Connectivity* condition and the 63 parameters (right side of figure 7). From the whole catalogue of those 63 parameters, now it is necessary to select only the 13 parameters of *Connectivity* and go deeper. It is in figure 8 a clearer manner in brown colour: from the generic catalogue to the dynamic behaviour. In this case, the "Bois-Le-Prêtre" from Paris, previously measured and analysed. <sup>37</sup> One of the advantages of this analysis is the ability to translate graphically the data on which the study is built on. This method of analysis allows us to place the buildings from the value of each parameter, in just one glance. What becomes of most interest is the capacity to interact with the model in 3D, since it enables the collecting of data in real time and from the system control defined by the user.



Fig 8. Connectivity parameters assessment. From the generic catalogue to its application in 3D software. Source: author

#### MANIFESTO

The proposed analysis establishes the possibility for it to become a vehicle of communication that is clearer and more concise for the client, management, or any other user of concern. Once we have the building in a three-dimensional setting, it falls on us as architects to decide where to locate the signs which will serve to connect the analytical graphic and make explicit the diagnose on the building in real time. Today those seeds have been able to flourish into a graphic production of architecture where complexity is recognized as work material between that what is real and that what is virtual. We have decided to take on the challenge of making visible what to other generations was invisible, given our capacity to represent complexity with today's digital media. For each intervention using that research

technology, the behaviour of this device possesses two main functions on each building: throwing information from our database and the analytical control as a response. Therefore, one of the possible readings the device makes on the building will be to detect the conditions that are most influential on the project, in that case, *Connectivity*.

#### NOTES

<sup>1</sup> It is relevant according to the possible role of intellectuals facing contemporary debates; see Zygmunt Bauman, *Legislators and Interpreters On modernity, Post-Modernity, and Intellectuals* (Cambridge UK: Polity Press, 1987).

<sup>2</sup> Due to the necessary social and political context needed to go deeper into a relevant housing research work, the European Union is the frame chosen to unify and providing context. This help us to contrast and select among all past legislative codes those which are already useful in terms of housing taxonomy.

<sup>3</sup> See A+T Research Group "That Which goes Unseen" in Aurora Fernandez Per and Javier Mozas, *FORM & DATA. Collective Housing Projects: An Anatomical Review* (Vitoria-Gasteiz: A+T Architecture Publishers, 2016), 6-9.

<sup>4</sup> As Tafuri pointed: "A completely structuralist criticism, however, can never "explain" the sense of a work. It can do no more than "describe" it, since the only logic at its disposal is that based on *yes-no*, *correct-incorrect*, precisely analogous to the mathematical logic that guides the functioning of an electronic brain [...]. In the era of the reproducibility of the work of art, the structure of the processes of its formation — even when a calculator does not intervene in its design — is governed by the logic of automation" in Manfredo Tafuri, *Architecture and Utopia. Design and Capitalist Development* (Cambridge, Massachusetts: MIT Press, 1976), 165.

<sup>5</sup> See Herman Hertzberger, "Time-based Buildings." in *Time-based Architecture*, ed. Bernard Leupen and René Heijne (Rotterdam: 010 Publishers, 2005), 82-91.

<sup>6</sup> To highlight the first publications regarding that aspect is relevant to see the catalogue published in Reyner Banham, *Megastructures. Urban Future of The Recent Past* (New York: Harper & Row Publishers, 1976).

<sup>7</sup> For instance, two of the most relevant compilation of years in South America regarding housing construction along the path from theoretical principals to action are John F. C. Turner, *Housing by People. Towards Autonomy in Building Environments* (London: Marion Boyars Publishers Ltd., 1976) and Christopher Alexander *et al.*, *The Production of Houses* (Nueva York & Oxford: Oxford University Press, 1985).

<sup>8</sup> Victor and Aldar Olgyay used to assess in small models their bioclimatic approaches in the Thermoheliodrom machine. See Victor Olgyay, *Design with Climate. Bioclimatic Approach to Architectural Regionalism* (Princeton, NJ: Princeton University Press, 1963), 180-184.

<sup>9</sup> See the double collection in Patrik Schumacher, *The Autopoiesis of Architecture: A New Framework for Architecture. Vol. I* (Chichester (U.K.): John Wiley & Sons, Inc., 2011).

<sup>10</sup> Reed "The Syntax of a New Language" in Manuel Lima, *Visual Complexity. Mapping Patterns of Information* (New York: Princeton Architectural Press, 2011), 159-220.

<sup>11</sup> In early years from that field, see Peter Keen "Decision Support Systems: The Next Decade," *Decision Support Systems* 3 (1987): 253-265 and Britton Harris, "Beyond Geographic Information Systems," *Journal of the American Planning Association* 55 (1989): 85-90 and according to more contemporary publications is remarkable to read Stan Geertman, John Stillwell and Fred Toppen, "Introduction to Planning Support Systems for Sustainable Urban Development," *Planning Support Systems for Sustainable Urban Development* (2013): 1-15.

<sup>12</sup> Manuel Lima, *Visual Complexity. Mapping Patterns of Information* (New York: Princeton Architectural Press, 2011) 43-49.

<sup>13</sup> For a better understanding of the structure followed through this paper, see chapter one in Borja Sallago Zambrano, *Sampling Housing*. *Análisis operativo de la vivienda colectiva bajo cinco condiciones contemporáneas* [Operating Analysis on Collective Housing through Five Contemporary Conditions] (Madrid: Universidad Politécnica de Madrid, Diss. 2019).

<sup>14</sup> Part of this statement regarding the "sampling" strategy is develop in the "Sampling Contexts" conferences experience as guest curator in ETSAM Architectural Projects Department in season 2017-2018. Curator team: Begoña de Abajo, Enrique Espinosa, Carlos García Fernández, Eva Gil Lopesino, Ángela Juarranz y Álvaro Martín Fidalgo and Borja Sallago. Published in AA.VV. *Argument#1 Sampling Contexts* (Madrid: DPA Prints´ & Ediciones Asimétricas, 2019).

<sup>15</sup> The early years of computer aiding, and CAD technologies applied to architectural drawings, are deeply explained in Nicholas Negroponte, *Soft Architecture Machines* (Cambridge, Massachusetts: MIT Press, 1975).

<sup>16</sup> The prologue in Victor Olgyay, *Design with Climate. Bioclimatic Approach to Architectural Regionalism* (Princeton, NJ: Princeton University Press, 1963), 9-10.

<sup>17</sup> See Alison Smithson, *Team 10 primer.* (Cambridge, Massachusetts: MIT Press, 1968).

<sup>18</sup> See Vicent Ligtelijn and Francis Strauven, *Aldo van Eyck. Writings. Collected Articles and Other Writings* 1947–1998 (Amsterdam: Sun Publishers, 2008). <sup>19</sup> Marshall Berman, All That is Solid Melts into Air (London: Penguin Books, 1988), 11.

<sup>20</sup>N. J. Habraken, *De Dragers en de Mensen: het einde van de massawoningbouw* (Utrecht: Oosthoek, Scheltema & Holkema, 1961).

<sup>21</sup> Victor Olgyay, *Design with Climate. Bioclimatic Approach to Architectural Regionalism* (Princeton, NJ: Princeton University Press, 1963).

<sup>22</sup>Serge Chermayeff and Christopher Alexander, *Community and Privacy. Toward a New Architecture of Humanism* (New York: Doubleday & Company, Inc., 1963).

<sup>23</sup> Reyner Banham, *The Architecture of the Well-Tempered Environment* (London: The Architectural Press, 1969).

<sup>24</sup> Although the publication of this volume is dated in 1976, every research included in it results from the compendium of all the works done by Turner since 1963. See "Preface" in John F. C. Turner, *Housing by People: Towards Autonomy in Building Environments* (London: Marion Boyars Publishers Ltd., 1976), xxxi.

<sup>25</sup> Alexander wrote two more related books about these aspects of connectivity published by CES UC Berkeley: *Pattern Language which Generates Multi-Service Centers* (1968), and *Houses Generated by Patterns* (1969):

<sup>26</sup> See "Anatomy of Urbanism" in Serge Chermayeff and Christopher Alexander. *Community and Privacy. Toward a New Architecture of Humanism* (New York: Doubleday & Company, Inc., 1963), 133-152.

<sup>27</sup> See graphic works from "Town Meeting" published in Christopher Alexander, *The City as a Mechanism for Sustaining Human Contact* (Berkeley: Center for Planning and Development Research, 1966), 215.

<sup>28</sup> Reyner Banham, *Megastructures. Urban Future of The Recent Past* (New York: Harper & Row Publishers, 1976), 100.

<sup>29</sup> Monique Eleb founded with Jean-Louis Cohen in 1991 the laboratory called "Architecture, Culture et Société, XIX<sup>e</sup>-XX<sup>e</sup> Sciècle".

<sup>30</sup> *PAN* competitions (*Programme d'Architecture Nouvelle*) were initiated in 1972 and went forward to expand them to the rest european young architects when in 1988 was created *EUROPAN* competitions, continuing releasing each two years (last Europan 15 was in 2019).

<sup>31</sup> *Time-based Architecture*, ed. Bernard Leupen and René Heijne (Rotterdam: 010 Publishers, 2005), 196.

<sup>32</sup> See "Introduction to Flexible Housing" in Tatjana Schneider and Jeremy Till, *Flexible Housing* (Oxford: Architectural Press, 2007), 3-10.

<sup>33</sup> See Italo Calvino, Le città invisibili (Torino: Einaudi, 1972).

<sup>34</sup> Futher information detailed about the reasons for choosing that five cities are published in chapter four "Five Cities. Fifteen Study Cases" in Borja Sallago Zambrano, *Sampling Housing. Análisis operativo de la vivienda colectiva bajo cinco condiciones contemporáneas [Operating Analysis on Collective Housing through Five Contemporary Conditions]* (Madrid: Universidad Politécnica de Madrid, Diss. 2019), 233-247.

<sup>35</sup> "The Syntax of a New Language" in Manuel Lima, *Visual Complexity. Mapping Patterns of Information* (New York: Princeton Architectural Press, 2011), 158.

<sup>36</sup> See Ilka and Andreas Ruby, Druôt, Lacaton & Vassal, Tour Bois le Prêtre (Berlín: Ruby Press, 2012), 6-8.

<sup>37</sup> All plans and refurbishment from Anne Lacaton and Jean Philippe Vassal, *2G Libros* (Barcelona: Gustavo Gili, 2006), 58-67 and Frédéric Druôt, Anne Lacaton and Jean–Philippe Vassal, *Plus. La vivienda colectiva. Territorio de excepción* (Barcelona: Gustavo Gili, 2006), 216-241.

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# WAVES: CROSSCURRENTS OF ART, TECHNOLOGY & ENVIRONMENT

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#### INTRODUCTION

Digital displays and projections are spreading across our cities in an almost dystopian manner. As if living in a *Blade Runner* movie scene<sup>1</sup> or *Snow Crash* book section,<sup>2</sup> digital screens and visuals are embedded in our cities and the architectural structures we inhabit. Media architectures have proliferated in public spaces across the world but are mainly used for advertising. The costs associated with installing, running and maintaining these technologies are high, therefore they are predominantly used as marketing platforms by businesses that can afford to run them or purchase advertising time on them. However, these displays can be used to enhance the aesthetic experience of our built environments and challenge established cultural ideas, as for example Pipilotti Rist's *Open my Glade* (2017)<sup>3</sup> and Jenny Holzer's *Projections* (1996 - Ongoing)<sup>4</sup> have shown.

Since media displays, both screens and projections, are content hungry and increasingly present in today's built environment, it makes sense to train the next generation of creative industries workers to produce artworks for these platforms. Hence, could we use such platforms at our institutions as teaching tools and to present artworks and students' creative endeavours rather than advertisements?

Higher education institutions can provide access to these technologies by setting up their own displays and projection systems on campus, and using them as learning platforms that would otherwise remain inaccessible to students. In this paper we discuss that approach, the setting up of the learning initiative and the challenges we have encountered. We believe that by offering access to such platforms on campus we are democratising students' access to the technologies used by media and advertising industries while also improving their learning experience by displaying their artworks in public.

The WAVES exhibition gives students the opportunity of presenting their work internationally and in the public realm - outside the classroom context and away from small screens - which in turn motivates them to produce higher quality artworks; it is not just coursework or a mere exercise in content creation, they are invited to design for a specific context.<sup>5</sup> To discuss our media architecture education project WAVES in detail, we first have to introduce the platforms that have enabled this ongoing collaboration. A short description of the two sites and the institutional support should suffice.

**Media Art Nexus (MAN)** at Nanyang Technological University Singapore is a platform for curating and promoting media art content by emerging and established local Singaporean and international artists. In doing so, MAN has become the only non-commercial urban media screen in Singapore dedicated to consistently growing art content. One of MAN's goals has been to exchange created art content and interact with international universities, art institutions, collectives and research institutes.

**Gulbenkian Media Façade (GMF)** is an integrated outdoor media platform that maps projections onto the façade of the Gulbenkian, the University of Kent's Arts Centre. It is the first permanent outdoor projection mapping platform in Canterbury, accessible on campus to locals, visitors and university communities. It is part of the Gulbenkian's long-term strategy to bring digital technologies into the arts, and engage with local, international, emerging and established artists and communities. For the WAVES exhibitions (see Figure 1) we have brought these two platforms together to deliver a cross-continental urban media project, building a sense of community beyond physical space and using art to develop global awareness and cross-cultural audiovisual exchanges. Through a number of briefs over the years, the artworks produced by students (which we selected for the exhibitions) have addressed themes such as historic and literary imaginaries, science and environmental issues.



Figure 1. WAVES 1.0. exhibition video teaser at MAN, NTU-Singapore (2018). Logo by Alice Diana Isacila (EDA). Video teaser by Sam White (EDA). Image credit: Quek Jia Liang (NTU-ADM).

## MEDIA ARCHITECTURE ACROSS CONTINENTS

We are aware that working with large media architecture displays from an artistic rather than solely commercial point of view is not new and below are some examples. However, our contribution is mainly pedagogical: offering students the unique learning experience of producing artworks for the public realm and displaying them on media architectures that are comparable to the commercial media displays for which they might one day be paid to produce content for.

Media architectures are not only offering future creatives spaces where to present content produced for clients, they are also "expanding the field of contemporary public art,"<sup>6</sup> enabling artists to develop participative and interactive art forms in public that are aesthetically beautiful and increase awareness of society's needs and critical issues.

Early initiatives such as Mirjam Struppek's Urban Screens project<sup>7</sup> are to be commended for working with screens across the world to transform media architecture displays into creative events rather than

advertising platforms. Also, the proliferation of light festivals based on the original  $F\hat{e}te \ des \ Lumières^8$  (Lyon, France) are worth mentioning. These festivals attract a great number of visitors and result in substantial revenue for the host cities, as the Durham city Council report shows.<sup>9</sup>

Commercial urban screens and media façades are on the rise in Asia. In Singapore for instance, Changi Airport recently commissioned Moment Factory (Canada) to design and implement two architectural installations for Terminal 4, which led to another commission at the Singapore Zoo that culminated in the *Rainforest Lumina* installation (2018). The high production value of these works is indisputable, but why are institutions (not only Singaporean but across the world) commissioning international studios instead of local artists to generate content for their media architectures?<sup>10</sup>

For instance, the presence of international design offices in Singapore has brought forward demands for locally-trained interdisciplinary artists who possess a new set of skills. And given the demand for talented media producers in cities across the world such as Singapore and London, we believe it is pertinent exploring how higher education institutions can support new generations of creatives, who will be key *actants*<sup>11</sup> in future digital content creation, to develop those design skills.

#### LEARNING PROCESS

#### **Beyond course outcomes**

With WAVES, we provide two digital arts training platforms for Singapore- and UK-based students. The platforms are pedagogical tools beyond the classroom; they are safe learning playgrounds for experimentation where students can be creative and design content for two media architectures. The format for which students have to design differs from the desktop-screen size they are used to. We require them to consider the architectural dimensions of the sites and the typology of these spaces.

Our teaching methods allow students to experiment and make mistakes, which is crucial for meaningful cognitive development and deep-level learning. As Oscar Wilde puts it: "[e]xperience is the name we give to our mistakes;"<sup>12</sup> we learn when struggling and trying again. In their study, Moser *et al.* demonstrate that when people believe they can learn from mistakes (growth-mindset), brain regions are activated by the realisation of having made a mistake.<sup>13</sup> From a pedagogical perspective, this is key. Our students need to be made aware that individual performance is improved when they do not get things right straight away, but when they try different ideas and put them to test. Similarly, Susan Greenfield refers to the plasticity of the brain when discussing the uniqueness of individuals and how brain connections are modified over time as individuals engage with things and experience the world around them.<sup>14</sup> Learning happens along the way. Brains are dynamic entities capable of transforming their connections and adapting.

We harness these ideas to support our pedagogical approach. Already in *Being Digital* (1995), Nicolas Negroponte argued that in the digital domain knowledge is acquired by "finding out for oneself"<sup>15</sup> and this applies to all aspects of learning. Our students can choose what they want to create and what they need to learn to do so. Sometimes this involves learning a new software, other times exploring analogue techniques that are then digitised and further developed in post-production.

Our students are provided with guidance on conceptual and aesthetic aspects of the artworks, while the technical skill development is student-led. We advise them that they need to be "self-programmable"<sup>16</sup> autonomous learners and that there is little to be gained from a *passive-information-transfer* approach. Ultimately, we are preparing students to face challenging, highly demanding computer-mediated professional and social environments where individuals are expected to re-wire themselves, and continue developing their skills and knowledge throughout their working lives.

For three years, we have embraced this learning and teaching model, sharing a passion for integrative and interdisciplinary learning, discussing the performance of our cohorts, being virtually present in each other's class, reflecting on our teaching approach, and planning our collaboration every year.

# Learning and Teaching context

Even if only time-based, creating artworks for urban spaces is a complex task that requires a mix of knowledge (i.e. media, aesthetics, technology). With this in mind, both courses aim for students to:

- Develop a core competency in urban media production
- Enrich the local cultural scene with the creation of original artworks
- Explore different toolsets for authorship using industry-standard software
- Design within the context of media systems and architectural projections
- Consider the impact of public art on audiences and social interactions

With WAVES, we have sought to bring to mind: 1.) the perspective of student artists in an increasingly globalised world; and 2.) a pedagogical perspective where learning takes place across disciplines, borders and in public. Through these two angles students have a chance to share an international stage and help out with the exhibitions by designing relevant materials (e.g. website, posters, logo, photos), in line with the given themes and using content from the selected artworks.

## Visual stories for transient viewing

Since the collaboration began, we have proposed a variety of briefs for students to experiment with. The themes addressed: heritage, climate emergency, quantum physics, and global interconnectedness. Independently of whether students tackled the same brief or not, both cohorts faced the challenge of producing audiovisual stories to be displayed in two spaces where viewers are mainly in transit. Each platform has a different aspect ratio and typology, and is integrated on campus, embedded in the built environment, visible to staff, students, locals and visitors. MAN is a long media wall in a semi-indoor corridor-like space (see Figure 1) and GMF is a curved projection surface in an open space (see Figure 2). Both platforms are unlike white-cube exhibition spaces<sup>17</sup> and, therefore, the artistic content has to be visually compelling: a moving painting that draws the attention of passers-by.



Figure 2. Audience at the Gulbenkian Media Façade (GMF). Images credit: Rocio von Jungenfeld.

# A PICTURE IS WORTH 1000 WORDS

In this section, we present a selection of artworks produced by students. They are diverse in terms of their audiovisual and technical approach. We are including some of the most accomplished artistic and technical experiments that resulted from the first WAVES exhibition.

# Student Artworks at MAN (NTU-Singapore)

In this subsection, all images (Figures from 4 to 11) are credited to Quek Jia Liang.



Figure 3: 'The Flow of Violence' by Sylvester Tan (ADM, Singapore).



Figure 4: 'The Sea Monster' by Yee Hui Wong (EDA, UK).



Figure 5: 'Intergalactic' by Dan Ng, (ADM, Singapore).



Figure 6: 'Is Anyone There?' by Sam White (EDA, UK).



Figure 7: 'Give me Back My Baby' by Shiayu Lin, (ADM, Singapore).



Figure 8: 'What is Natural?' by Eleana Gabriel (EDA, UK).



Figure 9: 'Streak' by Al Azmir Bin Ibrahim, (ADM, Singapore).



Figure 10: 'Time' by Thanuja Anshela Tharmaseelan (EDA, UK).

# Student Artworks at GMF (UoK, Canterbury)

In this subsection, all images are credited to Lesley and Michael Langman.



Figure 11. From top left to bottom right: Yee Hui Wong (The Sea Monster, EDA); Sylvester Tan (The Flow of Violence, ADM); Dan Ng (Intergalactic, ADM) and Eleana Gabriel (What is Natural? EDA).

## **BENEFITS AND CHALLENGES**

Exhibiting student's artwork in public has proven to be a valuable learning and teaching strategy. We noticed the quality of students' artworks rise when presented in an international and public context. Students who were involved in WAVES 1.0. encouraged us to continue offering this opportunity to new students. Three EDA students involved in the first WAVES decided to further explore the creative potential of projection mapping and produce their final year project for GMF (Gulbenkian's 50th Anniversary). The resulting project won them the EDA Prize for Innovation and Creativity 2019 (University of Kent) which shows that working alongside international peers in Singapore and having their artworks displayed as part of the exhibition had a positive influence on their motivation to learn. The main learning and teaching challenge we face has been timing. Being in different time zones has meant we could only occasionally teach together (teleconferencing). Also, with semesters starting and finishing at different times, we had to carefully consider when the exhibitions could take place. The first time, we settled for August, while the second and third times we programmed the exhibitions for May. A different approach was needed for the third iteration due to *COVID-19* (May 2020): the artworks were live streamed online and remediated on the spot in the form of an arts intervention.<sup>18</sup>

Another challenge has been deciding whether to show students examples from previous years or not. Experience has shown that when given examples, students tend to play it safe, basing their approach on these examples rather than pushing boundaries, experimenting and following their own creative vision. Greenfield argues a person's ability to take risks during learning and the learning environment in which they grew up are interconnected.<sup>19</sup> She discusses that digital technologies are changing our brains so if students' childhood is regulated by the immediacy of digital screens and little space for cognitively developing imagination and storytelling (projecting alpha and theta wave states) in physical environments, then when it comes to imagining what the digital artworks they are creating could look like on a building or large-scale display becomes problematic. Basing ideas and projects on existing artworks is not a problem *per se* as long as sources are acknowledged. For this, however, students have to be aware of ethical and copyright implications (e.g. Copyright)<sup>20</sup> and that copying without acknowledging they are standing on the shoulders of giants and peers is not acceptable.

## NEXT STEPS AND RECAP

The international collaboration has become particularly relevant under the ongoing *COVID-19* situation, where students and academics have to work together while keeping the distance. Our experience of participating in each other's teaching environment via teleconferencing and sharing an international asynchronous exhibition is an approach that we will continue to explore and which we are certain will benefit students during these strange pandemic times.

The collaboration has also made us consider different styles of teaching and modes of communication that are not presential. We are looking into the potential of making the project expand into a joint accredited course between the two institutions and setting up a research lab. This will enable the project to grow as an international network for education and academic exchange.

As Peter Weible posits "globalization and digitization have not only changed the world but also the function and context of art along with the way art is presented."<sup>21</sup> Digital art projects such as WAVES have the potential for presenting artworks in innovative ways, and training new generations of artists to be bold and create compelling artworks for media architectures.

WAVES has brought communities of student artists together on a small scale and at low cost, which kept the project independent and allowed for creative freedom. What we learned is that it is rewarding to set up the stage through "cross - currents" of different themes and sites for two completely different experiences one to be presented during the day and another at night. Despite all the odds, when presented together in a curated manner, the themes that students explored in their artworks complemented each other. In the future, however, we should make an extra effort to encourage students to be more mindful of the location, passers-by and site.

#### ACKNOWLEDGEMENTS

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#### NOTES

<sup>1</sup> Ridley Scott, *Blade Runner* (US and Hong Kong: The Ladd Company & Shaw Brothers, 1982).

<sup>2</sup> Neal Stephenson, *Snow Crash* (Bantam Books, Penguin, 1992).

<sup>3</sup> "Pipilotti Rist, *Open my Glade (2017),*" Times Square Art, New York, accessed Aug 27, 2020, <u>http://arts.timessquarenyc.org/times-square-arts/projects/midnight-moment/open-my-glade-flatten/index.aspx</u>.

<sup>4</sup> "Jenny Holzer, *Projections* (1996-Ongoing)," various locations, accessed Aug 27, 2020, <u>https://projects.jennyholzer.com/projections</u>.

<sup>5</sup> Mark Wright in "Collective Curatorial Statement," in *What Urban Media Art Can Do: Why When Where and How?* ed. Susa Pop, Tanya Toft, Nerea Calvillo, and Mark Wright (Stuttgart: Avedition GmbH, 2016), 49.

<sup>6</sup> Tanya Toft and Susa Pop, "Preface," in *What Urban Media Art Can Do: Why When Where and How*? ed. Susa Pop, Tanya Toft, Nerea Calvillo, and Mark Wright (Avedition GmbH, Stuttgart, 2016), 21.

<sup>7</sup> "Mirjam Struppek, *Urban Screens* project," various locations, accessed Aug 27, 2020, <u>http://www.urbanscreens.org/</u>.

<sup>8</sup> "Fete des Lumieres Lyon," accessed Aug 27, 2020, <u>https://www.fetedeslumieres.lyon.fr/en</u>

<sup>9</sup> See "Cabinet Lumiere Festival 2019 & 2021 (11 July 2018)," Durham City Council, accessed Aug 27, 2020, <u>https://democracy.durham.gov.uk/documents/s93522/11%20Lumiere%20Festival%202019%20final.pdf</u>

<sup>10</sup> See Philip Ursprung, "SELF-PRESERVATION," *Artforum International* 54, no. 9 (2016): 117–18 for a detailed discussion of the difference in audiences: white cube exhibition and public spaces.

<sup>11</sup> Bruno Latour in *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford; New York: Oxford University Press, 2005) makes a compelling argument about actants and actions.

<sup>12</sup> Paul Ramsden, *Learning to lead in higher education* (London: Routledge, 1998), 5.

<sup>13</sup> See Jason S. Moser et al., "Mind Your Errors: Evidence for a Neural Mechanism Linking Growth Mind-Set to Adaptive Posterror Adjustments," *Psychological Science* 22, no. 12 (December 2011): 1484–89, <u>https://doi.org/10.1177/0956797611419520</u> for a detailed discussion of cognitive activation during mistake realisation.

<sup>14</sup> Susan Greenfield, *Mind Change: How digital technologies are leaving their mark on our brains.* (London: Rider, Penguin Random House, 2014) gives an extensive account on the plasticity of the brain.

<sup>15</sup> Nicolas Negroponte in his seminal *Being Digital* (London: Hodder & Stoughton, 1995), 199, discusses the importance of learning through mistakes in the context of digital technologies.

<sup>16</sup> Manuel Castells presents a compelling argument for the need for everyone to be self-programmable life-long learners in *The Internet Galaxy: Reflections on the Internet, Business, and Society* (Oxford: Oxford University Press, 2002), 91.

<sup>17</sup> Mark Wright in "Collective Curatorial Statement," in *What Urban Media Art Can Do: Why When Where and How?* ed. Susa Pop, Tanya Toft, Nerea Calvillo, and Mark Wright (Stuttgart: Avedition GmbH, 2016), 45.

<sup>18</sup> These are the online materials of the third WAVES exhibition. The resource was created by our students as a result of *COVID-19* pandemic, accessed Aug 27, 2020, <u>http://www.wavesartevent.com/#waves</u>.

<sup>19</sup> Susan Greenfield (in *Mind Change*) also talks about how a child's learning environment and approach determines their ability to take risks when learning in adult life, 21.

<sup>20</sup> We argue for student creatives and designers to be familiar with copyright and data protection law, for instance the "EU General Data Protection Regulation, 2018," <u>https://eugdpr.org/</u> and "EU Copyright legislation," <u>https://ec.europa.eu/digital-single-market/en/eu-copyright-legislation</u>, accessed Aug 27, 2020.

<sup>21</sup> Peter Weibel, "The GLOBALE, The New Art Experience in the Digital Age" in the *GLOBALE* [catalogue], ed. Peter Weibel (Karlsruhe: ZKM|Center for Art and Media, 2016), 7, presents an influential view on how globalisation and digital technologies are changing the art world.

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# UNDERSTANDING AND PRESERVING CULTURAL HERITAGE IN EXPRESSIONIST ARCHITECTURE USING VIRTUAL REALITY

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This paper will investigate the role of Virtual Reality (VR) as a research tool to understand and explore the relationship between architecture and film, specifically, the use of VR technology as a reconstruction method for old film sets. This analysis is followed by the examination of selected film sets in the expressionist film *The Cabinet of Dr. Caligari* (1920) directed by Robert Wiene. A virtual comparative analysis between a selection of the three-dimensional virtual reconstruction of the film sets and still frames from *Dr. Caligari* is at the heart of this discussion.

## THE ROLE OF VIRTUAL REALITY IN ARCHITECTURE

Undoubtedly, virtual rebuilding is used in other research areas, yet a detailed understanding of the application of VR and reconstruction in the field of cinematography remains puzzlingly limited. In the field of established arts such as architecture or in the evolving, even 'controversial' game design industry, Computer Aided Architectural Design (CAAD) and visualisation methods are deployed for the purpose of representing proposed buildings and structures. From architecture and cinema to music and the gaming world, *computerised visualisation* enables the audience to perceive a piece of work in "visual reproduction of reality".<sup>1</sup> In addition to visualisations of the modern and future world, these methods are used also to illustrate interpretations of older environments depicting, for example, ruined or time-worn buildings, or even geographical locations and structures which no longer exist in the present, transporting the viewer into a virtual world of the past. Architectural visualisation uses a variety of techniques, including two-dimensional representation of buildings, the enhancement of drawings, photography with collage or motion images, and three-dimensional techniques in which designers create physical, or since the twentieth century, virtual models in Computer-Generated Imagery (CGI) environments. One immersive technology, if not the most immersive, is virtual reality. According to Jason Jerald, co-founder and principal consultant at NextGen Interactions with more than twenty years of experience in virtual reality technology, "virtual reality is a computer-generated digital atmosphere that can be experienced and interacted with as if that atmosphere were real".<sup>2</sup> Users can often indulge in the feeling of experiencing a parallel universe<sup>3</sup>; by delving into a digital world in which they can interact with, and have an impact, on the VR environment. Recognising the importance of VR as a virtual reconstruction method in another field, i.e. archaeology, provides a means in this study to use similar ways of reconstruction to assess the importance of architecture in

films. Therefore, one distinct area of research takes the form of examining the significance of VR as a reconstruction method and an investigative tool to understand the nature of abstract expressionist architecture in films via visualisation.

## **EXPRESSIONISM AS A PAPER MOVEMENT IN ARCHITECTURE**

Expressionism does not have the same prevalence within the field of architecture compared to the other arts, such as theatre and cinema. One of the first concepts of the lack of expressionist architecture in the real world was described by the architect and architectural critic Sigfried Giedion, in his book Space, Time, and Architecture: The Growth of a New Tradition, in 1941, in which he stated that Expressionism's motivations were drawn from the catastrophe and fallout following WWI and the "grievances of mishandled humanity". Giedion believed the rage of people, at that time, was catalytic for the stability of Expressionism in architecture and its appearance in other fields which are related to the expression of passionate emotions. However, Giedion muses that Expressionism miscarried to "create new levels of achievement" and consequently, it could not "perform any service for architecture".<sup>4</sup>

Expressionist architecture has a limited presence as structures and constructions, and expressionist architects endeavoured for its creation and emergence within other media such as painting, writing, and the construction of film and theatre sets. This paper argues that expressionist film sets are important for restoration purposes, as the existence of the three-dimensional elements is restricted; and expressionist film set contribute to preserving cultural heritage, not only from a filmmaking perspective but also from an architectural standpoint. The archival research tends to cover the gap in historical knowledge, and the utilisation of documents pertaining to the film that would otherwise remain bound to their respective museums can contribute further towards the theory of architecture. It is not completely out of the question that, should the reconstruction of film sets through virtual reality prove a fruitful and effective way to restore and relive them, the same approach could be taken toward other expressionist works that exist solely on paper in order to breathe new life into a purely imaginary architectural movement.

# THE ROLE OF THE CABINET OF DR. CALIGARI IN ARCHITECTURE

*The Cabinet of Dr. Caligari* was cited as the reason for many critics and theorists to change their standpoint regarding the cinema as an art form.<sup>5,6</sup> Arguably, *Dr. Caligari* is the reason why, in the years following its release, individuals began to consider that films were not necessarily depictions of reality but more an artistic interpretation of an environment setting within the realms of an artistic medium.

One of the benefits of studying *Dr. Caligari*, is the film was designed in such a way that the film sets were exaggerated, to a higher extent than any expressionist film seen before. The film sets were constructed through a combination of two-dimensional painted boards. The environment and the construction of the space are reminiscent of hieroglyphs.<sup>7</sup> The drawings depict buildings within the city. The exterior and interior of the buildings are depicted with extraordinarily sharp and distorted angles, which act to disorient and promote feelings of vertigo. It is for this reason that the term *Expressionist* is often associated with distortion and overstatement.<sup>8</sup> The film's distorted sets and the eerie representation of *Dr. Caligari*'s environment were main features in influencing the next era of film production. According to Rudolf Kurtz, "art critic and the first theorist of 1920s German cinema",<sup>9</sup> expressionist architecture was responsible for the viewers' emotional connection with film's characters and storylines. According to Kurtz, viewers' perceptions whilst observing a linear shape or pattern, are completely different to the stimuli than they are to that of a jagged motif. He
explained that the designers' willingness to transfer an obscure feeling to the audience was successful through visual perception of the scenery.<sup>10</sup> Furthermore, as reported by the art and film theorist and perceptual psychologist, Rudolf Arnheim, Expressionism has a tendency to escalate the use of abnormal asymmetrical architectural characteristics, creating an intricate composition that "strives for the increase of tension".<sup>11</sup>

# THE IMPORTANCE OF THE ARCHIVAL MATERIALS IN THE VIRTUAL RECONSTRUCTION

Archival research refers to the collation of primary sources held within either archives, special collections libraries, or other repositories. The archival research formed the first and most vital step toward the original drawings. It was a necessary and reliable resource due to the vast quantities of archived material pertaining to Expressionism. The virtual reality simulation of the *Dr. Caligari* film sets at the heart of this research study utilises all available source materials uncovered during archival research in The Deutsche Kinemathek – Museum für Film and Fernsehen (German Cinematheque - Museum of Film and Television). The archived resources consist of multiple, two-dimensional architectural drawings, such as plans, elevations, and sections, originally created in 1919, which were then restored in 1960s by Hermann Warm, the architect of the *Dr. Caligari's* sets. Additional archival materials include photographs of the small-scale models which were created by Warm that same year. These archival materials are the reference for the reconstruction of the film sets, and the primary source for the comparison with the generated VR simulation.



Figure 1. Model The Cabinet of Dr. Caligari, Jeanne's Bedroom, © Deutsche Kinemathek - Hermann Warm Archiv

# VISUAL COMPARATIVE ANALYSIS

By utilising VR as an investigative tool and method of analysis, the aim is to understand better the archival materials and architectural involvement of this expressionist masterpiece. The virtual reconstruction depicts the film sets in a virtual three-dimensional form. The archival materials are used as a guide for the film sets' virtual reconstruction. Having followed the archived drawings' specifications, the virtual reconstruction could be considered the closest representation of the film's scenery in that the film's frames depict exactly how the film sets were built. Still, notable differences between the virtual reconstruction and the scenery as seen in the film remain. A comparative analysis between the two images determines the efficacy of the archival materials' use in the reconstruction

and filming process. Furthermore, a critical review of the consistency of Warm's drawings, taking the drawings' nature and their purpose into account, unveils where the disparity from drawing specifications to final product originated. This paper, therefore, provides an opportunity to better understand the nature of the creative process during the actual filming. Finally, this proposes changes that ought to be considered after evaluating the images' dissimilarities, in order to recognise and understand the changes to attain the closest virtual representation of the original film sets.

The virtual renders are quite similar to the film's frame although they differ in several respects. Some of the differences relate to the camera's settings and position, the objects' place in the film set, and the set's construction details. Taking *Büro im Rathaus* film set as an example, I can compare and contrast images a) and b) in figure 2. This process provides useful observations to help refine the original camera's position and focal point. Multiple attempts have been made in order to identify these elements. The two closest new camera's positions and focal points to film still have been taken into consideration in this paper.



Figure 2. Virtual render of Büro im Rathaus and Film still of Büro im Rathaus

The first suggestion for the camera's position has as reference points the positions of the walls in the background and the ground slant-range. Figure 3a depicts the walls' position with a red dashed line and the ground slant-range with blue dashed line on the film still. Figure 3b shows the same elements on the virtual render with the camera's position as it was proposed in Warm's drawing, with yellow and green dashed lines respectively. The observer can notice the difference between their positions in figure 3c, as all the aforementioned elements have been combined in one diagram.



Figure 3. Diagram of the walls' position and ground slant on film still and the virtual render (Warm's camera position) and the combined diagram on film still

Having considered the differences, the suggested new position for the camera is 127mm to the right and 268mm to the front of the camera's position drawn in Warm's drawing, as well as 157mm higher.

The camera's focal point has been moved to 108mm to the left and 74mm lower than the focal point in Warm's drawing. The first proposed camera's new position and the revised combined diagram is depicted in figure 4.



Figure 4. Combined diagram\_ First suggested new position for the camera

Obviously, differences remain even after achieving a match with the walls' position in the background and the ground slant-range. Firstly, a larger surface of the wall with the door in the middle of the film set is more visible than on the film still (figure 5a). Secondly, the angles of the walls in the foreground differ from those on the film still (figure 5b). The second proposal for the camera's position takes into consideration these dissimilarities.



# Figure 6. Diagram of the walls

The points of reference for the second proposal are the position and the angles of the walls in the foreground. Using the same methodology as in the first proposed camera position, the diagram in figure 6 shows the combination of these elements from the film still and the virtual render.

Taking into consideration the differences between the two images, the second recommended camera position is 704mm to the left and 549mm to the front of the camera position as seen in Warm's drawing, and 10mm lower. It was also necessary to tilt the camera 1 degree towards the right in order to achieve the angles of the walls in the foreground. Furthermore, the camera's focal point has been shifted 199mm to the right and 132mm lower than the focal point in Warm's drawing.

Having the camera in this position means the surface of the middle wall is less exposed and the angles of the walls in the foreground are following those in the film still. Additionally, the left wall in the background matches the horizontal position of the same wall in the film still as well as the furniture in the foreground. However, the wall in the middle has been moved toward the left and the ground slant-range is different, even if its perspective point does not differ substantially from the one in the film still.



Figure 6. Combined diagram of the walls' position and angles in the foreground on the film still

Taking into account these observations from the two proposed camera positions, it can be concluded that the film set walls were placed differently than depicted in the original technical drawing-plan. The first proposed camera position is more accurate than the second as more elements match with the film still. Therefore, it is proposed that the length of the left wall in the foreground is longer and tilted towards the centre of the film set. It could be also said that its opening in the middle was higher as the opening's end continues until the end of the frame in the film still.

Moving on to another film set from *The Cabinet of Dr. Caligari*, called *Schlafzimmer-Jeanne*, more distinct differences are noticeable, such as the positioning of objects in the film set, and the set's

construction details. Upon closer inspection of the foreground in this film set, differences can be seen in the construction of the bed's headboard. There are four arcs in the film still, while in the archival drawings only three arches are visible. Additionally, the arcs are higher in the film still, and they have a noticeable distance between them. Another dissimilarity can be found on the chair's position in the background. In the film still, the chair is placed in the middle column while in the virtual render , the chair has been placed on the first column on the left as Warm's architectural drawings suggest. These changes might have happened in order to achieve the most effective actors' motion during the filming.

# CONCLUSION

Through the selected film sets and their virtual reconstruction this paper has demonstrated how virtual reality can preserve cultural heritage and reconstruct essential - for the history of architecture and cinema - film sets that have been lost, damaged beyond repair, and no longer physically exist. So far, the VR reconstruction of the *Dr. Caligari* film sets highlights the nature of the creative process in a visual comparative analysis. This paper explored the changes, which the director or the designers made during the process of the design (pre-production) and the filming (production). Clearly, the expressionist architecture in *Dr. Caligari* works better from the camera's perspective, but by recreating the VR simulation, the effectiveness and the efficiency of expressionist style in architecture could be evaluated.

This is only the start of virtual reality exploration in the realm of architectural environments in cinema. An important future outcome of this research is that, barring catastrophic technical breakdowns, these reconstructed VR film sets will be made available for public viewing for all time in 'online archives', ensuring these classic architectural and expressionist film designs will not be lost or forgotten. Architects, theorists, film critics, scholars, and educational establishments at all levels of study can access these VR archives to explore and experience the film sets as near as possible to how they were intended to be 'physically', contributing to preserving film culture for enjoyment and further study.

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# NOTES

<sup>1</sup> Graham Cairns, "Reproducing Reality and the Psychological Origin of the Technological Visualisation of Space: Comments on the Theme of Visioning Technologies," in *Architecture\_MPS*, ed. Graham Cairns, (London: Routledge, 2016), 6.

<sup>2</sup> Jason Jerald, *The VR Book: Human-Centered Design for Virtual Reality* (Association for Computing Machinery, 2015), 9.

<sup>3</sup> The theories regarding parallel universes were a philosophical matter that was being explored amongst Greek philosophers such as Plato. More specific his theory had been described in Republic, and it is named The Allegory of the Cave. See: Panagiotis Athanasopoulos,  $\Pi \Lambda AT\Omega NO\Sigma \Pi O\Lambda ITEIA$  (Ministry of Education, 2013), 3–17.

<sup>4</sup> Sigfried Giedion, *Space, Time and Architecture: The Growth of a New Tradition* (Cambridge: MA: Harvard University Press, 1967), 485–87.

<sup>5</sup> Jerome Ashmore, "The Cabinet of Dr. Caligari as Fine Art," *College Art Journal* 9, no. 4 (1950): 413–14, accessed July 28, 2020, doi:10.2307/773704.

<sup>6</sup> Ted Perry, Masterpieces of Modernist Cinema (Indiana University Press, 2006), 46.

<sup>7</sup> Siegfried Kracauer, *From Caligari to Hitler: A Psychological History of the German Film,* ed. Quaresima Leonardo, (Princeton University Press, 2004), 75, accessed July 28, 2020, doi:10.2307/j.ctvc77cxj.

<sup>8</sup> Ted Perry, *Masterpieces of Modernist Cinema* (Indiana University Press, 2006), 42.

<sup>9</sup> Thomas Elsaesser, "Expressionist Cinema—Style and Design in Film History," in *Expressionism in the Cinema*, ed. Olaf Brill and Gary D Rhodes, 20. (Edinburgh University Press, 2016).

<sup>10</sup> Rudolf Kurtz, *Expressionism and Film*, ed. Christian Kiening and Ulrich Johannes Beil (John Libbey Publishing, 2016), 55–56, accessed July 27, 2020, doi:10.2307/j.ctt1pc5g0d.

<sup>11</sup> Rudolf Arnheim, *Art and Visual Perception: A Psychology of the Creative Eye* (University of California Press, 1974), 67.

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# COMMUNICATION SPACE MODULATION ON PLACE FRUITION

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# CONTEXT

The current article identifies challenges at contemporary urban settlements, suggesting approaches aimed to improve citizens quality of life within the city. The following assertions are part of a project <sup>1</sup> that proposes interactive installations production to strengthen ties between individuals, and them with the territory, increasing social emotional well-being through population participatory actions.

# INTRODUCTION

Archaic hominid stood out from wilderness by creating matters that enhanced the accomplishment of survival. Fast-forwarding, soon Civilization faced a confront between natural vs artificial phenomena, as human beings shaped the world through their action. Contemporaneously, is harsh to detach artificiality from raw nature, as we struggle not to destroy it completely. Thus, territories are assembled to fulfil a variety of goals. Throughout times, settlements were organized around human activities, centred for commercial interchanges, ruled by beliefs, with strategic and defensive purposes, mostly built around transactions. With the emergence of existentialistic thought was realized that survival is not enough... a life is to be lived, preferentially with some sort of realization. The main and most dense urban areas of the planet grew from antique commercial centralities, where trading roots intersected. Overlapped, levels of infrastructures were deployed, filing the soil with layers of implementations. Several served the intents of those who built them, others did not, and a certain entropy is building up in cities. Liminal spaces... synthetically created places, used and abandoned. A touch of discarded artificiality with a nostalgic feeling of occasions where was to be found activity now ceased. Victor Turner (1974) discusses these transitory spaces where liminality arises by a negation imposition of standard usage, where is not to be found, so far, a new purpose for that artificial city space. This occurrence is established since "persons, groups, sets of ideas, etc., move from one level or style of organization or regulation of the interdependence of their parts or elements to another level, there has to be an interfacial region or (...) an interval, however brief, of "margin" or "limen," when the past is momentarily negated, suspended, or abrogated, and the future has not yet begun."<sup>2</sup>. The current fast life pace is largely shaped by urban structure, conditioning both space to share moments and time to enjoy the places. For economic, cultural and political reasons, the construction of urbanized areas has proliferated, too often, without places for conviviality and sharing, that until the middle of the 20th century were occupied by cafés, kiosks, gardens, markets, squares... replaced by peripheral housing areas with dormitory function, with traces that, for the most part, do

not reflect the identity of their inhabitants. According to Marc Augé (1992), the multiplication of *"non-places"*, with the construction of large commercial surfaces, extensive road layouts, large hotel chains, leisure parks, vast social districts, spaces created by a rational urbanistic vision of idyllically artificial super modernity, introduced ambiguity between identity and the relationship with space. These *"non-places"* were created abstaining from reference characteristics that give the individual a sense of belonging to a place. *"The place, as we define it here, is not at all the place that Certeau opposes to space, like the geometric figure to movement, the quiet word to the spoken word or the state to the journey: it is the place of the inscribed and symbolized sense, the anthropological place"* 

To Michel de Certeau (1990) the city concept established by the urbanist discourse has operative purposes, by: creation of a rational space of its own, stripped of "all the physical, mental or political pollution that would compromise it"; "to establish a non-time" that eliminates "the inapprehensible and stubborn resistance of traditions" through "univocal scientific strategies, made possible by the levelling down of all data"; and the "creation of a universal and anonymous subject that is the city itself" with "the capacity to conceive and destroy space from a finite number of stable, isolable and articulated properties on top of each other"<sup>4</sup>. On the other hand, Certeau suggests that the inversion of this paradigm may arise from social everyday life investigation, interpreting the practices, not resulting from what the city space establishes, but from singular situations observed in its use. The urbanistic discourse has been changing, according to architect Paula Teles (2005), city should seek to establish means that respond to its inhabitants dynamics and wishes: "The flows, the movements of people and goods, information, communication, have to be alert to these new dynamics that are now boiling, they will have to be the challenge of all who have the decision, namely in the most fragile urban tissues such as cities"<sup>5</sup>.

The awareness that humans wish to enjoy community spaces, where quality is added to life by sharing places, objects and experiences, understands itself the pertinence of setting goals for creating actions that promote social inclusion, minimizing citizens inequalities, not uniformity, but equity of access to city enjoyment. In this way, it becomes clear the necessity to increase new activities that stimulate positive social relations adapted to singularities of specific urban areas, acting locally to strengthen the sense of belonging and sharing, to strengthen links among individuals and between them with the territory. Thus, it is necessary to investigate approaches that stimulate affinity connections  $^{6}$ .

# SPACE FOR COMMUNICATION

At communication, a message to be conveyed requires a support, a substrate to be spread <sup>7</sup>. City always had notes of artistic expression, some institutionalized made on demand to adorn spaces of citizenship, others of erratic generation with expression of emerging values, individual or collective. About *Street Art*, Ágata Sequeira (2015) explains the emergence of posters, stickers, murals and graffiti as an expression phenomenon with *"ephemeral and spontaneous conditions, more than circumstantial"*, being *"central in the construction of a unique relationship with the public space that surrounds them"* <sup>8</sup>. These artistic manifestations, disruptive, somehow invasive, demonstrate the desire of practices that disclose elements of expressiveness scarce at geometrically organized cities. According to Pedro Quintela (2011) new cultural mediation strategies must appear in the relationship with individuals at new ways to promote the creative practices, *"this reinvention today passes through the hybridizing dialogue between spheres that the sociological approach has long autonomized analytically and conceptually: between mediation and creation, between the institutional and the individual, between the human and the technological, between the artistic and the non-artistic" <sup>9</sup>.* 

For Cláudia Antunes and Pedro Costa (2017) new challenges that arise, regarding the ways of acting in public space, can be contemplated in city's management strategy, "issues such as participation, the collective and the ephemerality of space, gain a new relevance in the contemporary urban context" <sup>10</sup>. There is an "expanded field" of social intervention in which urban architecture must open "to new ways of operating public space" by adopting methods that rethink solutions to urban spaces problems. "It is in this sense that art can contribute to an expansion of architectural practice, bringing to the practice of projecting other mediums, such as installation and performance, which can pave the way for a new way of thinking about urban problems, in a city that is no longer static and perennial but dynamic and ephemeral"<sup>11</sup>. This concept, originated from Rosalind Krauss (1979), "expanded field" emerges as a postmodernist characteristic, highlighting two aspects: individual artistic expression and the question of the medium, as "the field foresees both an expanded but finite set of related positions for a given artist to occupy and explore, and an organization of work that is not dictated by the conditions of a given medium"<sup>12</sup> thus, placing a rupture in more austere canons of modernism. City itself opens places to expand and reveal cultural manifestation phenomena. Spaces for communication, medias where ideas, information, interests, phenomena, understandings, history, dreams... can convey.

# MODULATION OF COMMUNICATION SPACE

The sensory perception mixture, and the way an individual feels an experience, are of particularly importance. The inputs apprehension is vital in the cognitive formation, but reveal to be conformed by brain processes at meaning construction <sup>13</sup>. So... How to assemble meaningful scenarios that improve life fruition at places? The assertion that we can produce contents that can be up lifting, is revealed through history as being right. Furthermore, the well-being pursuit is not solely linked to the amount of healthcare managed to a population. Communication space mediation can be of special importance to daily existence benefit, with a correct information modulation, whether in sound, images or other sensory stimuli, it can introduce interesting perceptual experiences, producing empathic connections between individuals... similar to the stories told around a bonfire <sup>14</sup>. The means by which contemporary communication contents move, have dematerialized, launching, in ethereal code lines, graphic stains that belong to a new intangible heritage, but reveal to set an uniformization tendency, propagating similar ideas across the globe <sup>15</sup>. An intended universal equality of access to the same contents is somehow advantageous, but often the endemic and cultural specificities of some ethnicities are left out...<sup>16</sup> There are too many cases in human history where communication served bad intentions and was used for warfare with disastrous effects. But it can be considered that, just as the message can be organised in a pernicious way, there are also numerous cases where the message has been properly worked out, leading to considerable cultural and societal advances. In painting and sculpture, ancient forms of art, there are uncountable representations that summon what the author wished to manifest, leaving to the observer to interpret with the decoding tools of his cultural background. Neuro-scientist António Damásio (2017) provides clues regarding the semiotic relations established at cognitive processes while perceiving an occurrence, as "minds are composed of more than just direct images of objects or events and their translations into language. In the minds there are also many other images, relative to any object or event, capable of writing the properties and constituent relationships"<sup>17</sup>. Therefore, is pertinent and coherent to produce contents adjusted to provide delight and beauty moments, loaded with historical inheritance from the cultural matrix which characterizes people of a given place. It is a matter of paying homage to the invisible nature of the material world. For this purpose, the project plans to recollect information, and to discover identity legacy elements to develop interactive contents. Through Social Diagnosis procedures, using a new

protocol based on the *Delphi* method <sup>18</sup>, with anonymous consultation, a sample of individuals from Aveiro will be asked to participate and uncover their own identity aspects <sup>19</sup>. Afterwards, results will be discussed and validated within a *focus group* <sup>20</sup>, unveiling what identity legacy elements can be included on interactive installations, directed to this target group of people, giving voice, and image, to factors which characterize individual's ecosystem and reveal affinity links between the community and the place. At the same time, a step forward, allowing new perspectives to be drawn on possibilities, that cannot only be tied to the past, but also absorb what good it brings, always with an eye on the future... and new angles that emerge.

# INDIVIDUAL SURROUNDINGS

The information acquired through perception, implies existing at a place and time. Oddly, sometimes the individual does not even decide to attribute a particular connotation to an experience that was pulled in. Nevertheless, the interaction circumstance involves experiencing what is occurring. The direction of attention driven by intention was discussed by Martin Heidegger (1927), reasoning how the individual surrounds himself with the world he lives. Moreover, how people surround themselves with others: "As something disclosed, Dasein exists factually in the way of Being with Others. It maintains itself in an intelligibility which is public and average. When the 'now that...' and the 'then when...' have been interpreted and expressed in our everyday Being with one another, they will be understood in principle, even though their dating is unequivocal only within certain limits."<sup>21</sup>. Body establishes relationships with the world relying an inherent body consciousness, mutable and specific to each person, as Maurice Merleau-Pointy (1945) recalls, being not only a thing, but a permanent condition of the interaction experience: "is a fact that I believe myself to be first of all surrounded by my body, involved in the world, situated here and now. But each of these words, when I come to think about them, is devoid of meaning, and therefore raises no problem: would I perceive myself as 'surrounded by my body' if I were not in it as well as being in myself, if I did not myself conceive this spatial relationship and thus escape inherence at the very instant at which I conceive it?"<sup>22</sup>.

James Gibson (1978) uncovers that the individual and the environment where he lives are indivisible. Perceiving the environment at a specific point in time is the establishment of being in articulation with his context <sup>23</sup>, obtaining information as a first existential layer, as Merleau-Pointy (1945) reminds, the amount and value of inputs acquired influences how the individual senses and experience an event. James Gibson (1986) states that our senses pick different stimulus from varied origins, particularly from the environment: "Instead of a geometrical point in abstract space, I mean a position in ecological space, in a medium instead of in a void. It is a place where an observer might be and from which an act of observation could be made. Whereas abstract space consists of points, ecological space consists of places-locations or positions." <sup>24</sup>. Perceiving what is around, takes a great part in the interpretations of a reality. Conscient body moves through the ambient, challenging the establishment of stiff parameters in which a stimulus relate directly to a defined meaning. Though, it would be hard to attain an experience without perception contribution, nonetheless it is continuously fluctuating.

The body involvement is fundamental to the interaction process. Multiple sensors wrap our bodies and transmit information inputs to the brain. Senses are commonly described as: hearing, sight, taste, smell and touch, however Dean Burnett (2016) remember us to consider other inputs that contribute to surroundings recognition, "*extra' senses have already been mentioned, including proprioception (sense of physical disposition of the body and limbs), balance (the sense mediated by the inner ear that is able to detect gravity and our movement in space), including appetite, because detecting nutrient levels in our blood and body is another kind of sense*"<sup>25</sup>. These evolutionary aptitudes are linked to memories deep-rooted in our brains, as they can easily prompt past occurrences <sup>26</sup>.

Perception offers several communication possibilities, capturing indicators and information that can be used on the cognitive construct.

# CULTURAL BACKGROUNDS

Culture shapes the cognitive process, moulding the meaning given to things perceived. Frequently, meaning is uncovered due to the uses of a matter, human transactions and artistic, social, ethnic, or intellectual heritage motivations. From the cultural perspective, the production of matters are a cognitive and widening process in which artefacts are produced materially as things, but also culturally, as being a certain type of thing. Arjun Appadurai (1990) explains distinctive attributes, for cultural backgrounds comprehension in significance attribution, proposing five social landscapes: "ethnoscapes", "ideoscapes", "mediascapes", "technoscapes", and "financescapes"<sup>27</sup>. The heritage acknowledgement qualifies more adjusted designs, that respond to the needs of particular groups of people, although "as the disposition of global capital is now a more mysterious, rapid, and difficult landscape to follow that ever before as currency markets, national stock exchanges, and commodity speculations move megamonies through national turnstyles at blinding speed"<sup>28</sup>. Small detail variations can make great difference, since a feature incorporation which one cultural group love, other might hate. Eva Heller (2000) describes how divergent meanings are attributed to a certain chromatic composition perceived through socio-cultural contingencies <sup>29</sup>. Geert Hofstede (2011) also found six cultural dimensions that affect behaviour: "power distance", "uncertainty avoidance", "individualism vs collectivism", "masculinity vs femininity", "long vs short term orientation" and *"indulgence vs restraint"* <sup>30</sup>. Group's culture influence individual behaviour, constraining meaning possibilities, moulding it with behavioural conditions that refine attention to specific details. Some habits are acquired throughout life, others by heritage, inducing strong recognizable choice patterns. Parallelly, Clyde Kluckhohn (1951) reminds that behaviour equally moulds culture: "A conception, explicit or implicit, distinctive of an individual or characteristic of a group, of the desirable which influences the selection from available modes, means and ends of action." <sup>31</sup>. So, behaviour has a combination of individual capacities, influenced by patterns learned, leading to series of reactions at environment interactions.

# **MEANING AND MEANINGFULNESS**

During the interaction process, through the participation of the individual, the attribution of meanings is influenced by the perception of cultural elements, rooted in the memory, and there is a beneficial effect when using elements for which the individual feels a greater affinity. The individual establishes bonds of emotional attraction, through: Sensing, Selecting and Signifying <sup>32</sup>. Emotions happen when sensing a perceived experience. The form factor, appearance and design originate messages that reach the interacting individual. Donald Norman (2005) regards that an object must be useful or have extreme beauty to engage the need to be owned, but the true beauty of a thing has to be with more than that. To be truly attractive this product must fulfil a function and be understandable. Regarding the subject of artefacts feeling, he presents a division into three areas of attraction: "visceral", "behavioural" and "reflective" <sup>33</sup>. It is not just a case of will, at the picture that the individual builds when he needs to transmit qualities, in utilization of an experience or object selecting process. Certain matters are worked for a specific use, planned with parameters that fulfil the needs of a societal group. In any case, through symbolic construction, the messages sent by an item are seen, and implied, by a cognitive construction process. Levels of meaning come up, and draw in, or not, the attention of the individual, interacting with it.

Cognition comprises the processes that form the basis of behaviour. Cognitive structures are enhanced by perceptive stimulus, evoking feelings and signifying. Mihaly Csikszentmihalyi and Eugene Rochberg-Halton (1999) reflect on the various symbolic representations that human place in objects and on interpretations made about them. The authors consider three levels of representation through interaction with a matter: "personal", "social" and "cosmic" levels <sup>34</sup>. Meanings attributed vary with time, space, and circumstance. As a result, new forms appear based on the visual, functional or object properties, sometimes without taking into consideration the impact they have at interaction. However, some matters can reach higher significance level, an experience may awake childhood memories, signifying more than itself, in which meaning surpasses aesthetic or functional properties, "the possibility of transcendence, of discovering new psychic skills and achieving higher forms of relatedness with the cosmos"<sup>35</sup>. Meaningful innovative proposes that are reflections of the individual and collective needs, and switch-on a bright connection to the world, are desired concepts that reveal a message to others of their personal identity. In this way, the human being tries to find ways of relating his individual existence to the rest of everything, which is, to find a matter that makes the pieces of life fit, looking for transcendence possibilities, discovering new abilities and reaching-out forms to exist.

# LAST CONCERNS

The current essay expresses possibilities to strength the connection between individuals, and them with the place they live, promoting social emotional well-being through citizens participatory actions. It is an impulse in the direction of the expanded social field, increasing inclusive city areas, reducing access inequalities, and finding support ways of positive social relations at the territory, in which art fosters cohesion within urban spaces. Also, is intended to contribute to material and immaterial heritage knowledge and the discovery of innovative action methodologies in social interventions through art and design. Cultural memory must be kept, remembered and reused, adding value to our daily life, as it enables meaningful layers incorporation at design of new objects, services, experiences and events. Communication space modulation is an extraordinarily attractive way to improve wellbeing fulfilment environments boosting individual's reconnection. Additionally, establishing relations between people, at a particular place fruition, can as well generate increased affinities, with a reverberant effect, facilitating positive effects at space enjoyment. "Art in the Fruition of the Place: social well-being through interactive installations" can also be seen as a starting point project to evaluate other groups of people, towards further expanded spaces with new affinity links establishment between individuals and them with their existence place.

# ACKNOWLEDGEMENT

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# NOTES

<sup>1</sup> João Castro, Paulo Bernardino Bastos & Heitor Alvelos, *Art in the Fruition of the Place: social well-being through interactive installations* (Aveiro: Doctoral Thesis Project, 2019). Project that promotes solutions through citizens participation, addressing identified critical city problems, as is verified a separation increase between people, and emotional detachment from the place they live in. This project is endorsed by the atelier Delight Design and the research group P&P "Praxis and Poiesis: from arts practice towards art theory" of University of Aveiro, in association with research group LUME "Unexpected Media Lab" of University of Porto, both groups from ID+ "Research Institute for Design, Media and Culture".

<sup>2</sup> Victor Turner, *Liminal to liminoid in play, flow, and ritual: An essay in comparative symbology* (Rice University Studies, 1974), 75. In this essay, Victor Turner reflects on people behaviours, in the phenomenological manifestation of traditional vs modernity, talking about transitory states and impositions duel at the anthropological existence and spaces in which human action is driven.

<sup>3</sup> Marc Augé, *Não-Lugares: Introdução a uma Antropologia da Supermodernidade* (Campinas: Papirus, Edição Brasileira, 1992), 76.

<sup>4</sup> Michel de Certeau, *A invenção do Quotidiano – Artes de fazer* (Editora Vozes, 3ªEd. Brasileira 1998 ed., 1990), 172-175.

<sup>5</sup> Paula Teles, Os territórios (Sociais) da mobilidade – um desafio para a área metropolitana do Porto (Matosinhos: Ed. Lugar do Plano, 2005), 73.

<sup>6</sup> This perspective solicits actions of socio-cultural applicability that boost the creation of emotional bonds through participation, promoting activities of artistic intervention as mediator between spaces and people, embracing the identity legacy of citizens.

<sup>7</sup> Objects and other things, with which the individual surround himself, are full of layers of information. We can perceive characteristics that reveal the provenance of a raw material, how and where was produced, by whom and for what purpose, also revealing to us the underlying history of the culture that produced it. Nowadays, in the globalized information society in which we live, these characteristics are more diffuse and difficult to obtain. <sup>8</sup> Ágata Sequeira, *A cidade é o habitat da arte»: Street art e a construção de espaço público em Lisboa* (Lisboa: Doctoral Dissertation ISCTE IUL, 2015).

<sup>9</sup> Pedro Quintela, "Estratégias de mediação cultural: Inovação e experimentação no Serviço Educativo da Casa da Música", in *Revista Crítica de Ciências Sociais* (Coimbra: OpenEdition Journals, 2011) 63-83.

<sup>10</sup> Cláudia Antunes & Pedro Costa, "O campo expandido da Arquitectura e as novas formas de intervenção espacial", in *Colóquio Territórios Metropolitanos Contemporâneo*, V. Rato, T. P. Pinto (Lisboa: ISCTE IUL Repositório, 2019), 49-48.

<sup>11</sup> Cláudia Antunes & Pedro Costa, Same publication

<sup>12</sup> Rosalind Krauss, Sculpture in the Expanded Field (Monoskop, 1979).

<sup>13</sup> For example, the visualization of images with migrating birds in a V-shaped formation with the sun rising in the background can evoke memories of a near past in which everything was simpler, in which natural life flourished, provoking emotions of satisfaction, cognitive associations that generate a feeling of belonging with a natural territory, of connection with the Earth, producing meanings of a welfare enhancing nature. But still they are flying off toward an unknown future place.

<sup>14</sup> Narrated events or teachings based on the cultural heritage of a particular group of people where told while the individual who listened attentively felt the presence of the collective, the warmth of the fire on the skin, and the security of being protected from predatory threats.

<sup>15</sup> The space of dematerialised communication has proven to be a little volatile and also particularly conducive of being fugacious.

<sup>16</sup> Their condition is been unfairly characterized as representative of locations that do not yet have an evolution equivalent to the, what is sometimes called, westernized world.

<sup>17</sup> António Damásio, *A estranha ordem das coisas: a vida, os sentimentos e as culturas humanas* (Lisboa: Temas e Debates, Círculo de Leitores, 2017), 132.

<sup>18</sup> Joaquim Fialho, Carlos Silva & José Saragoça, *Diagnóstico Social – Teoria, Metodologia e Casos Práticos* (Lisboa: Edições Sílabo, 2<sup>a</sup> ed, 2017), 149-151. *Delphi* method is a structured method of Social Diagnosis, interactive, with the function of generating consensus on complex problems. This method resort to a group of specialists to formulate considerations about a particular subject. It is time-consuming because it has a series of iterative steps until a global understanding is formed that satisfies those involved.

<sup>19</sup> The new procedure inspired on the *Delphi* method, is a long process. The rounds of questionnaires will have an expected three month duration, as this procedure is an interactive and iterative process. Furthermore, the major change that was made from the initial method is that the population is settled as specialists and are solicited to intervein in the construction of their own future city places, providing information about what memories they have about their own territory.

<sup>20</sup> The *focus group* will evaluate and discuss the gathered information in order to produce the interactive installations. This *focus group* is formed by the project proponents of the atelier Delight Design, the research group P&P "Praxis and Poiesis: from arts practice towards art theory" of University of Aveiro, and the research group LUME "Unexpected media lab" of University of Porto, both groups from ID+ "Research Institute for Design, Media and Culture".

<sup>21</sup> Martin Heidegger, *Being and Time* (Oxford Blackwell Publishing, [1962 ed], 1927) 463.

<sup>22</sup> Maurice Merleau-Pointy, *Phenomenology of Perception*. (Routledge & Kegan Paul, 1945) 68.

<sup>23</sup> James J. Gibson, *The ecological approach to visual perception of pictures* (Great Britain: Pergamon Press, 1978). Meaning construction is possible because we exist, since we manifest our presence at this time on Earth, perceiving relationships within the ecosystem we manage to live in.

<sup>24</sup> James J. Gibson, *The ecological approach to visual perception* (New York: Psychology Press, 1986), 59.
<sup>25</sup> Dean Burnett, *The idiot brain* (Lisboa: Editorial Presença. 1<sup>a</sup> ed, 2016) 10-48; 141.

<sup>26</sup> Some sound frequencies can induce states of mind, and arise memories engraved on the brain. Likewise, certain images attract more than others. Shapes, geometry, proportions and distances can deliver, to the eyes, images of the environment so our brain can discover the main picture.

<sup>27</sup> Arjun Appadurai, *Disjuncture and difference in the global cultural economy* (Oxford Blackwell Publishing, 1990), 589-591. Ethnoscapes recounts the people, or community, who make the transactions between places and relate to an activity or matter of fact. Ideoscapes are an account of the religious and ideological legacies that assist and constrain the cognitive process, establishing boundaries of thought, limits and rules to Human action, they can accelerate, or stagnate, the propensity to certain ideas in detriment of others. Mediascapes examine how information is transmitted from a group of people, fragments of memories that induce meanings about why a given matter exists, also revealing reasons that led to the creation of certain objects. Spoken statements, texts, manuscripts, carved images, photos, audio-visual and other media, reveal identity and intrinsic characteristics of matters. Technoscapes are related to the technology necessity in Human activity, evidenced in the materials used, tools, technological processes and relation with final users. Financescapes are about the variability of resources provision and what can be materialized in each location, influencing the development and research on the creation of new objects, moulding the access to experiences and the cultural approach.

<sup>28</sup> Arjun Appadurai, *Disjuncture and difference in the global cultural economy* (Oxford Blackwell Publishing, 1990).

<sup>29</sup> Eva Heller, Wie Farben auf Gefuhl und Verstand Wirken (Lisboa: Garamond, [2018 ed.], 2000).

<sup>30</sup> Geert Hofstede, *Dimensionalizing Cultures: The Hofstede Model in Context*. (Online Readings in Psychology and Culture, 2011) 10-15. Power distance is related to the way different groups handle inequality individuals, measuring how less-dominant members accept the uneven sharing. Uncertainty avoidance indicates the embarrassment felt with risks, unexpected situations, and divergences of opinion. "Uncertainty avoiding cultures try to minimize the possibility of such situations by strict behavioural codes, laws and rules, disapproval of deviant opinions, and a belief in absolute truth" (Hofstede, 2011, 10). Individualism vs collectivism measures the call for people to concern them, family or organizations they belong. Masculinity vs femininity refers to aggressiveness in opposition to the individual value relationships and shows how is dealt within sensitivity and concern for the wellbeing of others. Long vs short term orientation refers to the extent to which a society maintains or adapts its traditions. "Long term oriented are East Asian countries, followed by Eastern and Central Europe. A medium-term orientation is found in South and North European and South Asian countries. Short term oriented are U.S.A. and Australia, Latin American, African and Muslim countries." (Hofstede, 2011, 15). Lastly, however of massive importance, indulgence vs restraint is related to gratification in opposition to control of basic human desires. <sup>31</sup> Clyde Kluckhohn, *Culture and behaviour; collected essays* (New York: Free Press of Glencoe, 1962) 395. <sup>32</sup> João Castro, Paulo Bernardino Bastos, & Heitor Alvelos, "Affinities and effects on place enjoyment across multimedia installations", in #18.Art: The admirable order of things: art, emotion and technology (Lisboa: Conference Proceedings #18.Art, 2020) 315-331. Sensing is related to the initial contact and the message transmitted (Norman, 2005); Selecting is the categorization that the individual makes at the levels: technical, ethnic, financial, ideological and media (Appadurai, 1990); Signifying is the representative integration, which can

be: emotional, or shaped by the cultural environment, eventually reaching transcendence levels (Csikszentmihalyi & Rochberg-Halton, 1999).

<sup>33</sup> Donald Norman, *Emotional design: why we love (or hate) everyday things* (New York: Basic books, 2005). Visceral design is related with the appearance and with the direct connection with nature, is a direct predisposition that is transversal to all, differing by taste, "(…) visceral design is what nature does. We humans evolved to coexist in the environment of other humans, animals, plants, landscapes, weather and other natural phenomena (…) as a result, we are exquisitely tuned to receive powerful emotional signals from the environment that get interpreted automatically at visceral level" (Norman, 2005, 65). Behavioural design reflects essentially on the usability aspects of an object, as the performance and the environment determine if it will deliver capabilities that satisfies its user, the development for a purpose, for a function in each location. Other levels of meaning can also be generated due to decontextualization that can mislead the object's user. Reflective design reveals us how important the message of the object is. Creating a concept, reflective design has the message and culture as the preponderant role. "*Reflective design covers a lot of territory*. It is all about message, about culture, and about the meaning of a product or its use." (Norman, 2005, 83)

<sup>34</sup> Mihaly Csikszentmihalyi & Eugene Rochberg-Halton, The meaning of things: domestic symbols and the self (Cambridge: Cambridge University Press, 1999). The "personal" level mirrors the inner self emotions, the objects used are often a reflection of what an individual feels, of what he aspires to be, of what he thinks about a subject. The motivations that lead a person to demonstrate emotions through an object, refer to the relation expressed by Donald Norman (2005). This attribution of meaning could be completely intuitive, as can be, behavioural and reflective, bringing a rationalization that allows the transmission of a built message. A "social" level of representation brings structures of attention, predictable patterns of interaction between people, to the cognitive process, as humans are gregarious living in communities. Individual expression has a very strong social dimension. An object means something to a person through the context in which it is inserted. Although, "personal" representation, which mirrors individual emotions, is also a reflection of social dynamics. This framework allows the human being to feel that he is part of a larger, or more restricted group, but integrated with other individuals. When the meaning transcends the object, is achieved a "cosmic" level of representation, and the significant becomes meaningful. "In traditional societies this cosmic level includes the great natural phenomena that control the rhythm of life: the sun, the moon, the stars; water and fire; wind and earth. Every society has to make believable connection between his own purpose and those that make the world go round." (Csikszentmihalyi & Rochberg-Halton, 1999, 38).

<sup>35</sup> Mihaly Csikszentmihalyi & Eugene Rochberg-Halton, *The meaning of things: domestic symbols and the self* (Cambridge: Cambridge University Press, 1999), 25.

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# **CONSTRUCTING THE HYBRID CITY: SHANGHAI**

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# PRELUDE

stories	are	set	in	places;	placeless	events	are	nonsensical. <sup>1</sup>
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<sup>1</sup> Paul Dourish and Genevieve Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing* (Cambridge, MA: MIT Press, 2011), p. 126.

The large bottle opener mimicking Shanghai's World Financial Center is somewhat cumbersome for quotidian use, but it appears well placed on a shelf in front of a poster announcing the movie *Masculin* Féminin - a film by Jean-Luc Godard from the mid-sixties whose famous intertitle *The Children of Marx and Coca-Cola* suggests this paper's thesis. China resists attitudes that attempt at analysis and conclusion on the basis of clear-cut categories.<sup>1</sup>



Figure 1: Shanghai World Financial Center, merchandise, bottle opener. Image reproduced from an advertisement at <u>worthpoint.com</u>.

# **ARRIVING IN SHANGHAI**

Possibly, there is no better place than an airport to begin a journey into the realms of the images that seem to mark contemporary life. Within the cityscapes of our contemporary urban centres, airports – strangely enough, despite the digital revolution – still seem to provide for the strongest images signaling connectedness. Airports are highly symbolic of the lifestyle of the cosmopolitans who

populate every urban centre that is considered important. They are symbolic of an everywhere and nowhere, of ubiquitous communication and trade. They are symbolic of a world whose life we just recently saw halted.



Figure 2: Pudong Airport - interior view. Photograph by C. Westermann.

From a planner's point of view, airports appear almost fully subscribed to the functional aspects of architecture. They are docking stations for the machines that we invented to take us into the air. They are dedicated to the transport of travellers, their luggage and other freight, and limited by the way our inventions land and take off – not quite like birds. However, the form of our contemporary airports is not only defined by the airplanes' limited possibilities of movement. Further restrictions are given by the laws that regulate the flow of travellers and goods into and out of a specific state.

Thus, while the airplanes with their restricted range of movements on the one hand define to a large extend the form of the airport, on the other hand the airport with the help of its formal expression restricts the possibilities of the passengers' movements. Airports are mediators. In the name of law, they adjust human beings to the limited possibilities of machines. They are docking stations not only for machines but also for human beings. Is it possibly this specific kind of flatness that turns architecture into the image of a building?

The anthropologist Marc Augé alluded to the notion of specific building types, such as air- ports for example, triggering a specific set of specifically contemporary life experiences. They are life experiences that seem to be detached from the past. Marc Augé calls this era supermodernity.<sup>2</sup> Airports are for him non-places. In contrast to anthropological places, these non-places seem to lack in narratives. In fact – at these non-places – narratives are substituted with what emerges most of the time as a need for identification and the fulfilment of this need respectively. Identification replaces identity.<sup>3</sup>



Figure 3: Three Times Supertall: Shanghai World Financial Centre, Jin Mao Tower, Shanghai Tower under construction. Photograph by C. Westermann.

I began this journey at an airport that will appear for many of you, who are reading this text, to be located – in one way or another – on the other side of this world. This far away place is marked by a long lasting tradition of writing language in the form of images. An excursion to this other world might help us, I think, to gain a different understanding of the images that we deal with in our urban everyday, and what they could be. I began this journey at Pudong airport in Shanghai, China – one of the busiest airports in the world.

From the airport in Pudong we can take the metro or the magnetic train to Shanghai's most famous skyline, rising alongside the Huangpu river opposite of The Bund. It is a symbol of new confidence. The third of three supertall towers – the second tallest in the world – was finished just a few years ago. On the way to the metro, I catch a glance of the airport from outside. The roof of the airport swings in confidence over enormous distances, in an apparent aspiration to take off. There will be no other memory but this image of this form in the background.

Our landscapes are populated with images. They are powerful images that have been created and used throughout history. They are produced by Architecture, and they tell stories of power and prosperity. Political powers of all schools of thought have recognised in Architecture the perfect ambassador for the efficient advertisement of their value concepts. Our cities – in the West and in the East – testify this process. The competitions for the highest skyscraper, the largest theatre, and the city that is built fastest persistently continue. Consequently, the public rarely perceives Architecture beyond its function as image. What does it mean to detach architecture from its image? What does it mean to posit the question about the beyond of the image, or rather, what does it mean to consider Architecture beyond its image of power? In which way, does the dissolution of the image possibly imply the dissolution of power itself, because power in fact presupposes the static image?

Could we initiate the re-distribution of power if we succeeded in designing buildings in such a way that they would perpetually draw forth the designing process itself? Could we imagine an architecture that does not – to cite Deyan Sudjic – "suppress the individual into the mass" in order "to glorify and magnify the individual autocrat"<sup>4</sup> Such other architecture would empower its users and finally make them inhabitants and creators of their environments.

What, if we understood the process of design as a perpetual continuation of a tale that withdraws itself from binary logic and instead opens up to a future, in which the tale is to be continued by other agents - at a point in time when the designer has already fully turned away? What kind of tools do we need?

How easily could we recognise processes of inscription and differentiate them from processes of forth-scription? How to differentiate between images of power and images of empowering?



Figure 4: Merchandise, Shanghai World Financial Center. Photograph by C. Westermann.

There is hardly any kind of object that the image of the skyline of Shanghai's Pudong has not been transferred to. The Pudong skyline represents contemporary China and its regained powers – its image lures us wherever we go.

# **CONSTRUCTING SHANGHAI**

*To the ordinary man. To a common hero, an ubiquitous character, walking in countless thousands on the streets.* [...] *He is the murmuring voice of all societies. In all ages, he comes before texts.*<sup>5</sup>

Shanghai is a rapidly changing city with a heavy influx of migrants. It gained 7 million new inhabitants in the past decade alone. Around 40% of its estimated 27 million inhabitants consist of migrants from other provinces.<sup>6</sup> They are Chinese migrants, but they do not speak Shanghainese. It is reported that the number of migrants within China will continue to rise rapidly from today's 288 million, which make more than 20% of China's total population. Between 2008 and 2018, 76 million people left their hometown to work elsewhere. Within the next ten years, according to current estimates, there will be at least another 50 million on the move.<sup>7</sup>

They work on the city's myriad construction sites, clean the city's streets and buildings, and work in factories producing goods for international consumption. Some have small shops where they sell the newest gadgets to the growing number of users of cheap smart technology – the so- called e-generation – young people of various backgrounds who have grown up as only-children, who are constantly 'wired' and have learned to adopt new technologies faster than China's cities metamorphose around them.<sup>8</sup> Many of them (again) are migrants, floating through the city, somehow detached, but connected to other places – their hometowns where they have friends and family, and rights.<sup>9</sup>



Figure 5: Workers on the way to their lunch break on the construction site of the '1000 Trees' project by Heatherwick Studio, Shanghai, November 2019. Photograph by C. Westermann.

China's household registration system allows only those with the *hukou* of a specific place access to its social security system and its educational facilities.<sup>10</sup> Importantly, the system restricts the access of those with rural *hukou* to the social security systems of urban China. While China has initiated the reform of the household registration system, the process is slow. There are numerous worries. China's cities have already grown at an unprecedented speed. There is fear this growth could run out of control. There are also worries that the decline of the work force in the countryside will lead to problems with the country's food production, not keeping up with the demands of its enormous population. The production of rice, the population's main food, still depends on manual labour. That there are relevant and understandable reasons for why *hukou* system is still in place, however, does not undo its harshness for parts of China's population. Admittedly, local governments in China have for some time engaged in experiments at various scales that aim at a better understanding of how living in the countryside could become a sustainable alternative to living in the city, and what kind of business models would work in rural China.<sup>11</sup> At the moment, the money made in the city flows into the countryside to support both the elderly and children who have stayed at `home'.

While the *hukou* system creates the most obvious, and visible form of exclusion in contemporary China, there appear to be many other forms of exclusion and detachment from the actual living environments, and all of them appear to be countered with an escape into communications that are conducted in digital channels, mostly through mobile devices to which almost everyone has access as they are cheap. There were around 1.5 mobile phones per inhabitant in Shanghai in 2018. For comparison, the mobile phone subscription rates in Western countries typically range between 1.1 and 1.25 per inhabitant.<sup>12</sup>

If the idea of place cannot be detached from physical living environments, then contemporary China may face an existential question. If the conceptualisations of place – as giving sense to events<sup>13</sup> – are not only romantic ideas that belong to the old times, or maybe to old Europe, but ideas that are universal, then there might be a reason for the emptiness on Pudong's streets and sidewalks. The ubiquity of the image of Pudong's skyline might give an honest account of what the contemporary networked city in China is like – mobile and placeless. Is there an option for shifting the situation? Is there a need for it, or a desire?

After reviewing ideas of place and narrative, and related to these, the role of media and technology, a detour via Chinese aesthetics, I suggest, could be a useful exercise in suspending fixed conceptions. China's art has a long history in thinking the viewer as a participant in the work.<sup>14</sup> Notably, the British

artist David Hockney emphasized the interactive feature of the Chinese oblique projection.<sup>15</sup> In an essay from around 1080 AD, the famous painter Guo Xi writes:

It is generally accepted opinion that in landscapes there are those through which you may travel, those in which you may sightsee, those through which you may wander, and those in which you may live. Any paintings attaining these effects are to be considered excellent, but those suitable for traveling and sightseeing are not as successful in achievement as those suitable for wandering and living.<sup>16</sup>

There is a similar emphasis on the importance of painting to be both interactive and alive in other painting manuals, such as the famous Mustard Seed Garden of Painting, which was written around 600 years after Guo Xi's essay.<sup>17</sup> Further interpretations of Chinese traditional art, which indicate notions of interactivity that are quite uncommon in Western art of the same periods, can also be found in the writings of the contemporary philosophers François Jullien and Byung-Chul Han.<sup>18</sup>

The interactive is inherent in Chinese traditional art. It is indicative of a cultural attitude that has emerged in the West only with postmodernity – an attitude that embraces the incomplete. Considering this, we might want to reconsider how we look at Chinese cities. As tempting as it appears to draw a parallel between the boom years of China now and – for example – the boom years of the USA in the 50s, as much we might go wrong.<sup>19</sup> The images we observe might look alike but structurally differ. The Chinese skyscrapers might not simply signal a process that the West has already gone through. Instead the Chinese skyscrapers and new cities, and even newer cities, might signal an intelligent way of drawing forth and walking forth on a path that is originally Chinese, and on which 'empty' places<sup>20</sup> still await their stamps – that some others will imprint in the future. Mobile technology might play a role in this process.

The journey via traditional China might lead us – post-post-modern observers in the East and West – to the idea of a new city that acts like a scroll. Multiple vanishing points relate to the complexity of narratives that make place. Sitting on the Chinese rocks of which the old masters said that they must be depicted as alive, we might learn less about China than it appears to be the case at first glance, but we might gain new perspectives on our situation, and see new options for our cities, new possibilities for creating interfaces that allow for a form of participation that turn spaces into places, and make users inhabitants.



Figure 6: Dwelling amidst Water and Bamboo (水竹居圖), Ni Zan (倪瓚, 1301-1374), Yuan Dynasty (1279-1368). Hanging scroll, ink and colour on paper, 53.6 x 27.7 cm, National Museum of China, Beijing.

# NOTES

<sup>1</sup> Jean-Luc Godard, Director, *Masculin Féminin*, Film,105 minutes. (France: Columbia Films S. A., 1966); For an analysis of the complexities of seemingly clear-cut categories dealt with in Godard's film, for which the terms 'feminine' and 'masculine' are only an example, see: Phillip John Usher, "De Sexe Incertain: Masculin Féminin de Godard (Of Uncertain Sex: Masculine Feminine by Godard)," *French Forum* 34, no. 2 (2009): 97–112; For an outline of why the film is still relevant today see: Anthony Oliver Scott, "A 60's Story That Now Looks Timeless," *New York Times* 154, no. 53122 (February 11, 2005): E3.

<sup>2</sup> Marc Augé, *Non-Places: Introduction to an Anthropology of Supermodernity*, trans. John Howe (London and New York: Verso, [1992] 1995).

<sup>3</sup> For an expanded outline of this thought, see: Claudia Westermann, "An Experimental Research into Inhabitable Theories" (PhD thesis, CAiiA, Planetary Collegium, School of Art and Media, University of Plymouth, 2011), pp. 55-67.

<sup>4</sup> Deyan Sudjic, *The Edifice Complex: The Architecture of Power* (London: Penguin Books, 2006), p. 431.

<sup>5</sup> Michel de Certeau, *The Practice of Everyday Life* (Berkeley: University of California Press, 1984), p. v.

<sup>6</sup> For statistical data see the following collections National Bureau of Statistics of China, "Statistical Communiqué of the People's Republic of China on the 2019 National Economic and Social Development," February 28, 2020, accessed July 1, 2020, <u>http://www.stats.gov.cn/english/PressRelease/202002/t20200228</u>\_

<u>1728917.html;</u> Statistica, "Dossier: China," 2020, accessed July 1, 2020, <u>https://www.statista.com/study/</u> <u>9896/china-statista-dossier/;</u> Statistica, "Dossier: Shanghai," 2020, accessed July 1, 2020, <u>https:// www.statista.com/topics/ 6673 / shanghai/;</u> Statistica, "Dossier: Migrant Workers in China," 2020, accessed July 1, 2020, <u>https://www.statista.com/topics/1540/migrant-workers-in-china/</u>.

<sup>7</sup> Statistica, <u>"Dossier: Migrant Workers in China</u>."

<sup>8</sup> Fengshu Liu, "Wired for Fun. Narratives by Members of China's E-Generation," *Young* 19, no. 1 (2011): 69–89; Fengshu Liu, "The Norm of the 'Good' Netizen and the Construction of the 'proper' Wired Self: The Case of Chinese Urban Youth," *New Media and Society* 13, no. 1 (2011): 7–22.

<sup>9</sup> Jack Linchuan Qiu, *Working-Class Network Society: Communication Technology and the Information Have-Less in Urban China*, Information revolution and global politics (Cambridge, MA: MIT Press, 2009); Jack Linchuan Qiu, "Power to the People!' Mobiles, Migrants, and Social Movements in Asia," *International Journal of Communication* 8 (2014): 376–391; Jack Linchuan Qiu, "Three Phases in the Development of China's Network Society," in *Society and the Internet: How Networks of Information and Communication Are Changing our Lives*, 2nd, ed. Mark Graham and William H. Dutton (Oxford: Oxford University Press, 2019), 341–356.

<sup>10</sup> For a comprehensive outline of what the *hukou* system is and what its consequences are, see: Chunbing Xing, "Migration, Self-Selection and Income Distributions: Evidence from Rural and Urban China," *Economics of Transition* 22, no. 3 (2014): 539–576.

<sup>11</sup> See for example: Hans-Jürgen Commerell and Kristin Feireiss, *The Songyang Story: Architectural Acupuncture as Driver for Socio-Economic Progress in Rural China. Projects by Xu Tiantian, DnA\_Beijing* (Zürich: Park Books, 2020).

<sup>12</sup> Unfortunately the Chinese data gives only the number of phones per inhabitant, while the information for Western countries is based on the number of subscriptions per inhabitant. The data nevertheless gives an indication of how popular and common mobile phones are in China, with Beijing and Shanghai ranging at the top of the list. One can be most certain that the numbers today are higher than in 2018. For the mobile phone data see: Statistica, "Dossier: Smartphones," 2020, accessed August 5, 2020, <u>https://www.statista.com/topics/840/smartphones/</u>; Statistica, "Number of Mobile Telephones per 100 Inhabitants in China in 2018, by Region," July 15, 2020, accessed August 5, 2020, <u>https://www.statista.com/statistics/278523/number-of-mobile-telephone-connections-per-100-inhabitants-in-china-by-region/.</u>

<sup>13</sup> Dourish and Bell, *Divining a Digital Future: Mess and Mythology in Ubiquitous Computing*, p. 126.

<sup>14</sup> 15I have previously written about notions of interactivity in Chinese traditional art. See: Claudia Westermann and Hai-Ning Liang, "The Potentiality of Blandness: A Journey via the East to Rethinking Interaction: Workshop - W27: Leveraging and Integrating Eastern and Western Insights into Human Engagement Studies in HCI" (CHI '15: CHI Conference on Human Factors in Computing Systems Seoul Republic of Korea, April 18 - 23, 2015, February 1, 2015), accessed July 15, 2020, <u>https://shorturl.at/cxEY9</u>; Claudia Westermann, "On Delight: Thoughts for Tomorrow," *Technoetic Arts: A Journal of Speculative Research* 16, no. 1 (2018): pp. 47-49; Claudia Westermann, "An Eco-poetic Approach to Architecture Across Boundaries," *KnE Social Sciences* 3, no. 27 (November 2019): 281–291, doi:10.18502/kss.v3i27.5533; Claudia Westermann, "Chinese Landscape

Aesthetics: The Exchange and Nurturing of Emotions," in New Horizons: Eight Perspectives on Chinese Landscape Architecture Today (Basel: Birkhäuser, 2020), 2–5.

<sup>15</sup> David Hockney and Philip Haas, Directors, *A Day on the Grand Canal with the Emperor of China, or Surface Is Illusion but so Is Depth*, Film, 46 minutes (New York: Milestone Films, 1988).

<sup>16</sup> Excerpt of *The Lofty Message of Forest and Streams* by Guo Xi, ca. 1090 CE3 Susan Bush and Hsio-Yen Shih, *Early Chinese Texts on Painting.* (Hong Kong: Hong Kong University Press, 2012), pp. 151-152.

<sup>17</sup> Mai-Mai Sze and Kai Wang, *The Mustard Seed Garden: Manual of Painting* (Princeton, NJ: Princeton University Press, [1679-1701] 1978).

<sup>18</sup> See in particular: François Jullien, *Detour and Access: Strategies of Meaning in China and Greece*, Zone Books, Originally published in French in 1995. (Zone Books, 2000); François Jullien, *In Praise of Blandness: Proceeding from Chinese Thought and Aesthetics* (New York: Zone Books, [1991] 2008); François Jullien, *The Impossible Nude* (Chicago, IL: University of Chicago Press, 2007); Byung-Chul Han, *Shanzhai: Deconstruction in Chinese*, trans. Philippa Hurd, Untimely Meditations (Cambridge, MA: MIT Press, [2011] 2017).

<sup>19</sup> Thomas J. Campanella, *The Concrete Dragon: China's Urban Revolution and What it Means for the World* (Princeton, New Jersey: Princeton Architectural Press, 2008); Thomas J. Campanella, "China: As We Once Were," *Journal of Architectural Education*, no. 2 (2010): 63.

<sup>20</sup> Compare Han, Shanzhai: Deconstruction in Chinese.

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# THE DIGITIZATION OF MARITIME HERITAGE

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# MARITIME HERITAGE IN MUSEUMS

Maritime heritage is an important part of cultural heritage, displayed on museums and other heritage sites. However, the very fluid nature of the maritime undermines challenges and resists classifications. It is hard to draw a fixed dividing line between land and sea, maritime and terrestrial, underwater and inland water, and, accordingly, to draw a strict disciplinary divide between what is and is not in the remit of maritime or underwater archaeology, history or architecture <sup>1</sup>.

Maritime heritage is layered and complex. This is reflected and constitutes as such the museums which holds this heritage – maritime museums. This is why the historian Hicks (2001) provocatively asks "What is a maritime museum?". Because maritime museums are of interdisciplinary nature . Maritime museums convoke archaeology, ethnology, ethnography, sociology, anthropology, history, geography, cartography, geology, art, biology, engineering, physics, craftsmanship, fashion, among others. Their collections hold both boats, ships, maps, maritime paintings, maritime equipment (maritime chronometers, compass), industrial production equipment (e.g. oil and gas production, fishing and canning industry), the history of societal and urban processes, workers' history, the culture of fishing and coastal communities, as well as difficult heritages <sup>2</sup>, such as transatlantic slave trade.

The fluidity of the seascape begs the question: can maritime heritage be but world heritage? As maritime archaeologist Maarleveld explains "Although international heritage is an attractive proposition that is crucial to the emancipation of maritime heritage, the inevitable conclusion is that it does not presently exist. Its theoretical existence is not accepted in practice. In discussing ways of improving the future management of maritime heritage in international waters it is argued that much depends on the inclusive interpretation of the concept of 'a verifiable link' according to the 2001 UNESCO Convention [on the Protection of the Underwater Cultural Heritage]".

Comparing the maritime museums in the UK, US and Australia, Taylor finds ideological differences in those museums' maritime stories underpinning specific national identity and sentiments of belonging, but also commonalities, which relate to the social history of the sea . As Hicks did (Hicks 2001). However, the global scope of maritime museums does not seem to be sufficiently presented in maritime museums narratives. According to maritime historian Lincoln Paine (2016), maritime museums are too focused on local history and have a narrow thematic focus, which is impoverishing from the perspective of a cultural history of the sea. "What is so ironic and confounding about

maritime museums' geocentric tendencies is that one of the main reasons for launching ourselves on to the oceans of the world is to make connections with distant places and people (...) Yet the museums that celebrate maritime history and heritage are almost myopically transfixed by their own bit of ground or water. If the location of an art or science museum does not necessarily define its breadth of vision, why should that of a maritime museum?".

# **MUSEUM DIGITAL MEDIASCAPES**

Museums are undergoing deep transformations in the 21<sup>st</sup> century. The digital transformation of museums is one of them <sup>3</sup>. There are several aspects to the museum's digital transformation, spanning from museums' digital communication <sup>4</sup> to interactive museum experiences enhanced by digital technology, such as virtual and augmented reality, 3D, multimodal interactive screens <sup>5</sup>. With the Internet and the new media, museums have a lot of opportunities but also challenges and difficulties, regarding the preservation of digital heritage, as well as its access . Moreover, given the interdisciplinary, paradoxes and fluidity of maritime heritage, the technologies of the museum, either digital or analogue, enable "the mobility, stability and combinability of collected items". Hence, museums' technologies turn collections into centres of calculation and allow for people to see artefacts combined in new ways.

Mediascape is one of the five scapes, among ethnoscapes, technoscapes, ideoscapes, and financescapes, which characterize cultural globalization, as envisioned by Appadurai, in the 1990s. These are interrelated, but disjunctive, scapes. Mediascape refers both "to the electronic capabilities to produce and disseminate information", and to "the images of the world created by these media", providing large and complex repertoires of images and narratives to viewers around the world. The concept as inspired scholars across disciplines, and so too museum scholars.

Jennifer Kidd (2014) refers to museum new mediascapes as the new state of the museum mediated environment, given that what is within the digital and non-digital realm gets blurred. Kidd argues that museums are themselves media makers, and Pierroux argues that visitors' experience is a mediated encounter with museum objects and narratives in museum settings (museum mediascapes), either digital or physical, without being constrained to formal/informal learning classifications . Museum's work, as part of a wider media ecology, that includes mainstream media, implies representations: "(...) there are issues of representation at stake here; the images of the world circulated within the mediascape by institutions such as museums are loaded – with mythology, ideology and, on occasion, intent." . Kidd ads that not only museums but also audiences, in the 'new' mediascape, make and circulate those images, as self-representations (Kidd 2014, 17).

# DIGITIZATION OF MARITIME HERITAGE: A REVIEW

We conducted a review of the literature on the database Web of Science. Aiming to narrow down our research, we used the advanced search option, and, as topics, we searched for the combination (Boolean AND) of the following search terms: "digit" as the root word (digit\*) and "maritime heritage". There were no period restrictions. The search presented 21 results, of which two were eliminated. Our dataset was constituted by 19 publications (Table 1).

To answer our research questions, we use the following categories to analyze our dataset: 1) Artifacts – What cultural heritage items are being digitized? 2) Digital technologies employed in digitization; 3) Place – where are the digitized artefacts? 4) Targeted audience – To whom the digitization is aimed at? Experts, non-experts (general audiences) or both?

Year	Authors	Article Title	Publication Outlet
2004	Bauk, SI;	Digitalization of Montenegro historical	OCEANS '04 MTS/IEEE
	Pejovic, SD;	heritage through Maritime Central	TECHNO-OCEAN '04, VOLS
	Danilovic,	Electronic Library Catalogue	1-2, CONFERENCE
	RD		PROCEEDINGS, VOLS. 1-4
2011	Menna, F;	REVERSE ENGINEERING AND 3D	4TH ISPRS INTERNATIONAL
	Nocerino, E;	MODELLING FOR DIGITAL	WORKSHOP 3D-ARCH 2011:
	Scamardella,	DOCUMENTATION OF MARITIME	3D VIRTUAL
	А	HERITAGE	RECONSTRUCTION AND
			VISUALIZATION OF
			COMPLEX
			ARCHITECTURES
2012	Fantini, F	VARIABLE LEVEL OF DETAIL IN	EGA-REVISTA DE
		ARCHAEOLOGICAL 3D MODELS	EXPRESION GRAFICA
		OBTAINED THROUGH A DIGITAL	ARQUITECTONICA
		SURVEY	
2014	Wetherelt,	<b>3D LASER SCANNING AND</b>	SECOND INTERNATIONAL
	A; Cooper,	MODELLING OF THE DHOW	CONFERENCE ON REMOTE
	JP; Zazzaro,	HERITAGE FOR THE QATAR	SENSING AND
	С	NATIONAL MUSEUM	GEOINFORMATION OF THE
			ENVIRONMENT (RSCY2014)
2014	Kreem, J	Shipwreck heritage. Digitizing and	TUNA-AJALOOKULTUURI
		opening accsess to maritime history	AJAKIRI
2014	Martorelli,	Digital Photogrammetry for	JOURNAL OF MARITIME
	M; Pensa, C;	Documentation of Maritime Heritage	ARCHAEOLOGY
	Speranza, D		
2015	Liu, DY;	Thesis Research on Dynamic Historical	2015 3RD INTERNATIONAL
	Wang, ZT	and Geographic Information System of	CONFERENCE ON SOCIAL
		Maritime Silk Road	SCIENCE AND HUMANITY
		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	(ICSSH 2015), PT 1
2015	Reunanen,	A Holistic User-Centered Approach to	ACM JOURNAL ON
	M; et al	Immersive Digital Cultural Heritage	COMPUTING AND
		Installations: Case Vrouw Maria	CULTURAL HERITAGE
2015	Balletti, C;	UNDERWATER	UNDERWATER 3D
	Beltrame, C;	PHOTOGRAMMETRY AND 3D	RECORDING AND
	Costa, E;	RECONSTRUCTION OF MARBLE	MODELING
	Guerra, F;	CARGOS SHIPWRECK	
0016	Vernier, P		
2016	Ferrari, I; et	PORTUS LUPIAE. 3D MODELING	PROCEEDINGS OF THE 8TH
	al	AND VISUAL NARRATIVE FOR	
		RECONSTRUCTING A LONG	CONGRESS ON
		MARITIME HISTORY	ARCHAEOLOGY,
			COMPUTER GRAPHICS,
			CULIURAL HERITAGE AND
			ARQUEOLOGICA 2.0):
			ADVAINCED 3D DOCUMENTATION
			MODELLING AND
			MODELLING AND DECONSTRUCTION OF
1	1		UULTUKAL HEKITAGE

			OBJECTS, MONUMENTS AND SITES
2016	Farella, E; et al	KNOWLEDGE AND VALORIZATION OF HISTORICAL SITES THROUGH 3D DOCUMENTATION AND MODELING	XXIII ISPRS CONGRESS, COMMISSION V
2017	Bruno, F; et al	Development and integration of digital technologies addressed to raise awareness and access to European underwater cultural heritage. An overview of the H2020 i- MARECULTURE project	OCEANS 2017 - ABERDEEN
2017	Solis, LM; Navarro, CC; Perez, FD	Analysis of the Naval and Maritime Heritage Diffusion on Web 2.0: Tools of the Chair of Naval Heritage and History	FUTURO DEL PASADO- REVISTA ELECTRONICA DE HISTORIA
2017	Selmo, D; Sturt, F; Miles, J; Basford, P; Malzbender, T; Martinez, K; Thompson, C; Earl, G; Bevan, G	Underwater reflectance transformation imaging: a technology for in situ underwater cultural heritage object -level recording	JOURNAL OF ELECTRONIC IMAGING
2018	Kraak, MJ; Weber, A; van Lottum, J; Engelhardt, Y	Toward VR eventscapes for spatio- temporal access to digital maritime heritage	2018 IEEE 14TH INTERNATIONAL CONFERENCE ON E- SCIENCE (E-SCIENCE 2018)
2018	Costa, E; Guerra, F	3D recording of ancient wooden boats for scientific and educational purposes	APPLIED GEOMATICS

2018	Columbu, S; Lisci, C; Sitzia, F; Lorenzetti, G; Lezzerini, M; Pagnotta, S; Raneri, S; Legnaioli, S; Palleschi, V; Gallello, G; Adembri, B	Mineralogical, petrographic and physical-mechanical study of Roman construction materials from the Maritime Theatre of Hadrian's Villa (Rome, Italy)	MEASUREMENT
2019	McCarthy, J;	Virtual Reality for Maritime	2019 23RD INTERNATIONAL
	Martin, K	Archaeology in 2.5D: A virtual dive on a	CONFERENCE IN
		flute wreck of 1659 in Iceland	INFORMATION VICUALIZATION DT II (IV 2
			2019)
2020	Barreau, JB;	A reconstruction of life on a East India	IN SITU-REVUE DE
	Gaugne, R;	Company ship in the 18th century	PATRIMOINES
	Olivier, AH;		
	Llinares, S;		
	Gouranton,		
	V		

Table 1. Articles on Web of Science on the digitization of maritime heritage

# ARTEFACTS AND ITS TOOLS

Among the most digitized maritime cultural heritage artefacts (Table 2) are shipwrecks, followed by boats and ships (including a historical warship, and historical wooden boats).

The second most digitized item are heritage sites. Four of them are in Italy: The Maritime Theatre, a maritime villa (Roman period), an ancient harbour and its maritime activity; as well as underwater heritage sites and its archaeological excavations.

The intangible maritime heritage is related with the life aboard an 18th-century ship (Le Boullongne); the Maritime Silk Road; or the ancient Mediterranean seafaring.

The archaeological and documentary materials which are brought to digital life include historical marine affairs' documents regarding the Fraternity of Seamen from the beginning of 9th century or Shipyards from the 14<sup>th</sup> century, and historical shipping data.

One article was about the dissemination of the Spanish maritime heritage thought Web 2.0, which included several online artefacts (including ships) and intangible maritime cultural heritage (such as maritime myth and legends). However, we did not count those artefacts here, as it would imbalance it. We found that the diversity of maritime heritage (as expressed in maritime museums), does not hold

correspondence in the digital world showed by this dataset.

Artefact	Frequency
shipwreck/ships/boats	10
heritage site	5
intangible	3
archaeological and documentary materials	2
Table O Distiliand Outh well la vite and An	1-61-

Table 2. Digitized Cultural Heritage Artefacts

The most used technology was Virtual Reality, followed by 3D Modelling. Under the umbrella of "Virtual Reality" are immersive installations, 3D models, digital replicas, panoramic images, interactive environments, 3D Animation - motion capture; 3D interactions, 3D reconstruction or WebVR.

Some of the artefacts digitized have used more than one technology - for instance, a 3D model is often produced with the help of a laser scanner. In our dataset, 3D modelling is more often used in combination with specific artefacts (mostly shipwrecks, but also heritage) and disciplines (archaeology).

The use of VR points to a trend towards "transparent immediacy". According to Bolter and Grusin's words, transparent immediacy is a "style of visual representation whose goal is to make the viewer forget the presence of the medium (canvas, photographic film, cinema, and so on) and believe that he is in the presence of the objects of representation".

# **GEOGRAPHIES AND PLACES**

The articles were mostly from authors affiliated with European organizations (22), followed by American continent's organizations, with two papers from Canada, and one from the USA. One article was written by a Chinese author, and the other by an Australian author. In Europe, Italy is the most frequent authors' affiliation country (9 authors from Italy), followed by England (3), France (2) and Spain (2). Cyprus, Czech Republic, Estonia, Finland, Iceland and the Netherlands are the European countries represented by one author.

Regarding museums, they are mentioned only in six articles (out of 19). In two articles museums are mentioned as potential beneficiaries of the digitization of shipwrecks. The four articles in which museums are involved are: virtual maritime museum of Parthenope University of Naples, the Qatar National Museum, the Maritime Museum in Kotka, as well the Italian museum of the Ercolano boat.

The geographical affiliation of authors generally reflects the geographical origin of the digital heritage artefact which the article refers to. For instance, the digitization of the life abroad a 10th-century French ship was conducted by French universities, and the collaboration was between historians and computer scientists of French Universities.

There are a few exceptions, and it is worth sharing them. A VR experience based on Iceland's oldest identified shipwreck was undertaken by Australian digital archaeology in collaboration with Icelandic maritime archaeologists and museum professionals. The other two collaborative digitization experiences are European, namely: SHIPWHER and i-MARECULTURE - and funded by the EU, which often demands collaboration among European countries as an eligibility criterion. The project SHIPWHER - Shipwreck Heritage: Digitizing and Opening Access to Maritime History Sources" (2010-2013) aimed to study and digitize archive materials related to shipwrecks in Estonia and Sweden, but also in Denmark and Holland, contributing to improving the access to and knowledge about the cultural heritage in the waters of the Central Baltic region. International collaboration is particularly important in the case of shipwrecks. As one can read in the project's website: "Shipwrecks are a part of international cultural heritage. Very often a single ship brings together several countries via its building location, crew, cargo and wreck location. Because of this inherent internationality, documents regarding the history of any ship are often scattered among the archives of many countries." (https://keep.eu/projects/5342/). i-MARECULTURE is an undergoing project on Underwater Cultural Heritage (UCH). It aims to raise public awareness of European identity by focusing on maritime cultural heritage, which by default bridges different civilizations (https://imareculture.eu/). It aims to enhance the visitor experience in museums and underwater parks by developing new technological solutions (which are the basis for the acronym of the project:

Advanced VR, iMmersive Serious Games and Augmented REality) which enable to increase general audiences' knowledge about the common European maritime archaeology.

# **AUDIENCES**

The digitization of maritime heritage is aimed at non-experts and to them and the experts ("both"). Experts are here considered the scholars who are specialists in their disciplinary fields of research (archaeology, engineering, architecture, computer science, remote sensing, etc).

The prevalence of "non-experts" and "both" shows the general trend towards science having to demonstrate their value beyond academia, their societal impact, which must be achieved through science communication and dissemination, as well as public engagement.

In this vein, even in articles which are mostly written to advance the knowledge in the academic community experts, state clearly that the digitization is aimed at both experts and non-experts. Those articles would usually make this type of claim: "This allows scrupulous study of ancient naval construction from both a *scientific* and *disseminative* point of view to take place, permitting to increase the knowledge and perception by the general public of this important archaeological and historical heritage" (our own italics).

The digitization of maritime heritage usually addresses this "general public", the "wider public" or, simply, "the public". Only a few articles specify that it is aimed at "divers and non-divers", "tourists", or "teachers and students".

# LIMITATIONS

This dataset has several limitations (mostly, it is restricted to one database only). However, we do not aim to provide a systematic literature review nor generalize findings. Instead, we want to use this dataset as a starting point for a reflection about maritime mediascapes in the digital era. Given the importance of Web of Science in the academic world (including in the fields of museum and heritage, history, archaeology, anthropology, sociology, tourism, information systems, etc...) we argue that this is a solid starting point to ignite the debate on digital maritime mediascapes.

# MARITIME DIGITAL MEDIASCAPES: FINAL THOUGHTS

When navigating in the digital world, we will see (more than hear), the movement of shipwrecks, ships and boats. These 3D models, which are microcosms of the social, are mostly anchored in Europe. They remind the general public of a common maritime heritage, which bridges the Nation-States and civilizations. This is the digital maritime mediascape which emerged from our dataset.

It came as a surprise that only four museums were involved in the digitization of maritime heritage. Researchers might be digitizing maritime heritage which might be under-used by museums and maybe other professionals within the Cultural and Creative Industries. Cross-disciplinarity should be *modus operandi*. For instance, we would like to see New Media Arts and digital artists made their way into the collaborative design of these mediascapes. Hence, we advocate for the strengthening of museum-university-industry collaborations and communication. This could help to foster the dissemination of this specific type of cultural heritage, especially among younger generations to whom the digital is part of their everyday lifes.

Maritime heritage is vast, but we see a trend to its visual and haptic dimension, leaving underexplored other forms of "user experience" of the maritime heritage, such as sound. We would like to hear sea chants - by which we mean the inclusion of maritime sound heritage.

Last but not least, if we are to imagine what it could be like the digitization of maritime heritage, we would like it to be accessible and diverse and participatory.

# ACKNOWLEDGEMENTS

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# THE PAVEMENT HANDBOOK FOR BRATISLAVA CITY HISTORIC AREAS – CONTRIBUTION ON HOW TO MAKE THE HERITAGE CITIES MORE RESILIENT IN THE ERA OF CLIMATE CHANGE

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#### INTRODUCTION

The impacts of climate change are already affecting our everyday life and threatening the state of cultural heritage of our cities, both tangible and intangible. These cities will face frequent extreme events in future and the risk to cultural heritage and historic urban centers from climate change will also increase."<sup>1</sup>... *Megalopolises are the best invention in the history of humankind and our future greatest hope*..."<sup>2</sup>, these words of the economist Edward Glaeser hence reflect in a broader sense current needs of urban development.

Therefore, some of the relevant questions to ask are: How to create a human friendly city environment? How could we make the historic urban areas more sustainable and resilient? How could we get all the related parties to participate in terms of improvement of life in our historic towns? The submitted contribution is searching for answers to these questions. The aim is not only to introduce the climate change issues that the city of Bratislava is dealing with on daily basis, but also to inform about the H2020 project ARCH: Advancing Resilience of historic areas against Climate-related and other Hazards, about its principles and co-creation activities. Contribution will further specify the project work done so far and suggested methodology for the development and elaboration of the "The pavement handbook - guide to design pavements in historic areas". This poses a challenge also for urban planners and conservationists that are confronted with planning of Bratislava, as rapidly developing post - socialist city.

# INTERNATIONAL H2020 PROJECT ARCH

ARCH is a European-funded research project that aims to better preserve areas of cultural heritage from hazards and risks.<sup>3</sup> The ARCH team with the cities of Bratislava, Camerino, Hamburg and Valencia will co-create tools that will help cities save cultural heritage from the effects of climate change. ARCH will develop a disaster risk management framework for assessing and improving the resilience of historic areas to climate change and natural hazards. Tools and methodologies will be designed for local authorities and practitioners, the urban population, and national and international

expert communities. The project will present various models, methods, tools and datasets to support decision-making. ARCH expert interdisciplinary team includes four European municipalities; research scientists, city network ICLEI and standardisation organisation DIN.

In order to achieve the project objectives and ensure applicability, acceptance and replicability of results, researchers, city practitioners, local policy makers, community members and other stakeholders will collaborate closely according to a co-creation framework and through the establishment of local partnerships.

The ARCH Team of the Bratislava city case consists of three partners: The City of Bratislava - represented by the Office of Chief Architect, Faculty of Natural Sciences of Comenius University in Bratislava and Municipal Monuments Preservation Institute in Bratislava. This ensures assembly of experts supervising the fields of ecology, environment, monument protection, urban planning processes, disaster risk management and climate change adaptation.

#### **BRATISLAVA CASE STUDY**

Bratislava, with 420 000 inhabitants, is the capital city of Slovakia, located in the south-west of the country. The city is administratively divided into 5 districts, and for self-government purposes, it is further divided into 17 city boroughs, each of which is governed by an elected local government and an elected Mayor.<sup>4</sup> Bratislava City is governed by the City parliament and the elected Mayor – currently a former architect Matúš Vallo. Bratislava is often historically referred to as the Beauty on the Danube. The river has long been to its utmost importance. The tangible and intangible heritage of Bratislava covers architectural, monumental, and archaeological, as well as natural heritage. It is characterized by complex settlement arrangements with a high density of cultural monuments, which are mainly at risk from heat waves, drought, fluvial and pluvial flooding, erosion, and other extreme weather events.



Fig. 1 Aerial view of historic Bratislava City in autumn time. Source: P. Chromek

The Old Town City Borough, is Bratislava's city core. This becomes increasingly crowded during the day as people commute to work or universities and visitors arrive either by buses or by ship cruises. The Old Town consists of two main protected areas of the Bratislava city. The medieval town center gained the status of monument reservation in 1954. The enactment of a monument zone, protecting the wider city core, followed in 1992.

#### PROTECTED AREAS OF BRATISLAVA CITY

On the basis of Act No. 49/2002 on the Protection of Monuments<sup>5</sup>, Monument Board of Slovak Republic maintains a General list of National Cultural Monuments, which includes movable and immovable monuments and protected areas - conservation reserve or zone. The main strategic document that defines means of protection, preservation and regeneration of conservation areas is Principles of protection.

This applies also to the protected areas of the city of Bratislava. Conservation reserve<sup>6</sup> and conservation zone<sup>7</sup>, both located in the Old Town city borough, represent the preserved historic urban pattern of Bratislava City with most significant examples of tangible heritage such as immovable national cultural monuments. Conservation reserve consists of three different urban patterns. First, a medieval town core surrounded by remains of fortification walls, that is known for St. Martin's Cathedral, its many churches and three significant squares and narrow streets. Second, the Bratislava Castle, which is situated on the southernmost tip of the Small Carpathian Mountains and above the western side of the medieval fortification walls. Third, the riverfront below the castle, that is characterized mostly by new development.



Fig. 2 Protected areas of Bratislava City. Source of the drawing: authors; source of the background map: <u>https://www.google.sk/maps</u>

The conservation zone is further divided into three sectors, based on the character of built-up area, architecture, terrain and landscape. The eastern part is characterized by compact city blocks of historic residential houses, modernistic single houses, parks and former industrial areas transformed into residential and office buildings. The western part of Conservation zone differs from the other parts of Old Town Borough with its situation on the Small Carpathian Mountain foothills, and mainly provides residential housing (villa houses). Last sector represents the industrial area and the surroundings of the main railway station.

# CLIMATE CHANGES AND CULTURAL HERITAGE

The heritage areas of Bratislava are exposed to certain climate - related and other hazards, that are affecting the quality of life and both – built up and natural environment. The first vulnerability assessments were undertaken as part of the Horizon 2020 Resilient Cities and Infrastructures RESIN

project and meanwhile, the city has started implementing adaptation options. Due to the high concentration of impermeable surfaces, high population density as well as the concentration of cultural heritage sites, the Old Town is especially vulnerable to climate change impacts such as pluvial flooding and heat waves. These surfaces become quickly warmed up, and it gets very uncomfortable for pedestrians during the summer heatwaves. In the second half of the 20th century, the park-like Main square was paved according to its medieval origin. In 2017 the City decided to plant mature trees on this square, and the adjacent Franciscan square, to help ease the impact of summer heat on the pedestrian zone.



Fig. 3 The Main square during the summer time. Source: www.visitbratislava.com

The Old Town is located at the foothills of Male Karpaty mountains, which are densely built-up with villa houses. Paved roads and sidewalks, high building density, as well as topographical relief, increase the risks of pluvial flooding in the historical city centre.

During heavy rainfall, the rainwater comes rushing down into the lower parts of the historical centre. Underground historic buildings and monuments are at risk from pluvial flooding as a result of intensive rainfall periods, especially during summer months and augmented by aspects such as building density, surface permeability and terrain.



Fig. 4 Left - Land surface temperature model based on the evaluation of a multispectral satellite image of Landsat 8. Source: USGS/NASA Landsat8 Program, adapted by Office of the Chief Architect, 2019. Right - Model of the risk of pluvial flooding in the conservation reserve. Source: Office of the Chief Architect, 2019

The renovation and repair work of paving in the past were in fact realised by layering impermeable materials such as concrete. This approach echoes especially during the heavy rains and worsen the

impacts of pluvial flooding. Therefore, the sectional patterns of paving shall be rethought. Archaeological monuments in situ, considered within the Bratislava case study, located mostly underground, are particularly vulnerable to changes related to surface permeability, intense precipitation and rising groundwater levels.

The city of Bratislava recently developed, under the auspices of Mayor Matúš Vallo, "Technical sheets of the city of Bratislava" or so-called "asphalting manual"<sup>8</sup>. This document specifies the requirements of the City of Bratislava for design and realisation of construction work related to road management. Although the subject of developed sheets are technological procedures connected to repair works of roads in various conditions, they neither consider historic areas nor deeper sectional patterns of paving. Considering that "Technical sheets" is an "…open document that can be regularly amended with new details, the need for which will become apparent during planned repairs or new constructions. It will also be possible to modify the original designs according to the experience gained or when offering new materials and technological processes…"<sup>9</sup>, view of conservationists shall be brought into perspective. One of the ambitions of The Pavement handbook is to deepen the current knowledge and become valuable contribution to the Technical sheet of the City of Bratislava as such, considering the involvement of all the relevant stakeholders.



Fig. 5 Archeological excavation - The fore-gate of the Fishermen's Gate, Hviezdoslavovo Square. Source: M. Musilová, P. Horanský

# METHODOLOGY ON CREATING "THE PAVEMENT HANDBOOK"

Because the main concern of "The Pavement Handbook" development are historic areas that are under legislative protection (conservation reserve/zone), it is essential that its methodology is based on the monument protection goal. These areas represent a certain set of architectural-urban values and the paving (textures, materials, surfaces). Both are considered a vital part of these urban patterns and need to be considered as a part of a whole.

According to methodological documents such as Principles of protection of conservation zone Bratislava<sup>10</sup>, the paving is a feature of the street interior and as such it is a representation of a certain heritage values, therefore rules for replacement paving should be defined. The surface of roads and public spaces is required to be based on typical components, historical patterns and materials while

preferring traditional paving materials, shapes, sizes and ways of tile laying. New accessories are to be designed such as metal artifacts shaped on the basis of historical analogies, however without the use of unsuitable prefabricated or standardized elements and foreign materials.



Fig. 6 Examples of repair works of paving realized by layering impermeable materials such as concrete. Source: B. Resutík

The map of Bratislava from 1905 shows the former state of paved areas. At the beginning of the 20th century, the historic core and the main axis were covered by three types of paving: keramit<sup>11</sup>, asphalt and granite cubes.

It is noticeable that the map also shows the old paving and the paving supposed to be used later. Municipal Monument Preservation Institute is currently conducting archival and historical research with the aim to complete finds of such type of "paving maps" and to search for other relevant archive - based data from the following eras.

In terms of principles of co-creation, within the Bratislava case study tasks, we closely cooperate with our research partners from Faculty of Natural Sciences Comenius University and Bratislava City Municipality - department of the Chief Architect, while creating an interdisciplinary and intersectoral team. Last, but not least, research and further implementation of its results is conducted by building local partnerships with other important stakeholders (like experts, decision makers, building owners, public service providers, etc.).

Municipal Monument Preservation Institute in cooperation with the Faculty of Natural Sciences Comenius University are preparing data sheets of the current state of paving in protected areas. Data sheets are among most important features necessary for the pavement handbook elaboration. Each sheet contains basic information of location, characteristics and individual elements - roadway, pathway, curbs etc. Their important part is the technical information such as drainage system and other variables like color, vegetation or permeability.



Fig. 7 Projection of Historical Map to Current Cadastral Map, circle - the defunct urban pattern. Source: authors; source of the background cadastral map: https://zbgis.skgeodesy.sk

Data sheets, results from archival and historical research are valuable sources of information to the process in the next steps of creating the handbook. The data sheets as such capture the current state of paving in the protected areas and serve as a basis for implementation of this knowledge into the existing GIS system<sup>12</sup> of Bratislava city. Analyzed areas will be from the view of monument protection subsequently sorted into various categories:

- original urban pattern
- defunct urban pattern
- refurbished public spaces
- public spaces before refurbishment

The recommended design of paving takes into consideration the specific preserved heritage values in each type of structure (blocks). These values are represented mainly by the state of urban and architectural values, e. g. original plotting, location of objects on the plot and mass - spatial composition

After considering all the criteria of monument protection (type of tiles, material, type of tiles laying, tile gaps, curbs) we will further implement criteria for mitigation of most relevant impacts of climate change. This is going to contribute to a multidisciplinary and multisectoral process for development a sectional typology of the proposed paving.

# DISCUSSION

As well as other post-socialist cities, Bratislava underwent significant urban and architectural changes, especially in the second half of the 20th century. These parts are currently not only integrated in protected areas (CR, CZ), but are often declared to be national cultural monuments (Slovak National Uprising Bridge, Slovak Radio building). The second symptomatic feature of post-socialist cities is current massive construction of multifunctional urban complexes and high-rise buildings. The projection of the historical map of paving into the current cadastral map illustrates these changes. It brings knowledge about the historical character of public spaces, while presenting the preserved urban pattern and demonstrating valuable evidence of defunct historical urban footprint at the same time. The dilemma here is what kind of methodological approach should be chosen when

it comes to designing new paving, since these are new urban developments, but at the same time, they are part of historic urban fabric and shall not be considered in isolation.



Fig. 8 View at SNP Bridge, riverfront with Castle hill. Source: https://finweb.hnonline.sk

# Example of riverfront "Podhradie"

The area below the castle - "Podhradie" and the Danube embankment, is undergoing a significant urbanistic and architectural transformation, which began in the late 1960s. As a result of the construction of the Slovak National uprising bridge connecting the historic center with the newly emerging Petržalka mass housing on the other bank of Danube river, the part of "Podhradie" with Jewish quarter and synagogue was demolished. Nowadays, the bridge is an integral part of the city skyline. Another significant entry into the historical image of the city is the newly emerging construction of multifunctional ensembles - Zuckermandel and Vydrica on the demolished areas of the original urban pattern.



Fig. 9 Projection of Historical Map to Current Cadastral Map. Defunct urban pattern of Riverfront, part of conservation reserve. Source: authors; source of the background cadastral map: <u>https://zbgis.skgeodesy.sk</u>

# Example of "new downtown"

The second significant transformation is undergoing the area bordering the eastern part of the Conservation zone. The former industrial district of low factory buildings (brownfield), which was established in connection to the nearby Danube cargo port, is gradually being transformed into a new high-rise city center, the so-called "Downtown". The new development also includes the project of a new bus station, which became famous as the "largest pit" in Central Europe. Extensive underground garages, the proximity of the Danube River and its underground streams have a negative impact on the quality of the underground levels of historic buildings in the conservation zone. Heavy torrential rains that happen more and more often are intensifying this issue.



Fig. 10 New development of Downtown and new bus station under construction. Sources: https://www.autobusovastanica.sk, <u>www.bratislavskenoviny.sk</u>

#### CONCLUSION

At the beginning of the "Pavement Handbook" development process, we proceeded to conduct analysis of the current state of paved streets in the historical center of Bratislava, using local and state legislative and archival research. This represents a basis from which we have been able to develop, in close co-operation with our local and scientific partners, a methodological approach as part of the desired output - the pavement handbook of the city of Bratislava. This shall serve as a source for designing pavements in historic areas of the city. Finally, we should be able to use the knowledge and transfer the methodology into other Bratislava's city boroughs, with protected historic sites, either with rural or industrial character. The resulting document should be suitable for supporting policymakers in decision-making processes and serve as a guidance document for investment projects of all sizes.

This task is not only an issue of climate change, but also of urban planning, monument protection and last but not least – local decision making processes. Surfaces of inhomogeneous or otherwise disrupted urban historic patterns shall not be considered in isolation. The bigger picture should be considered first, while taking into account urban planning processes in order to preserve and strengthen the historic urban footprint.

#### NOTES

<sup>1</sup> "About ARCH," Project ARCH, accessed July 10, 2020, https://savingculturalheritage.eu/about/project.html

<sup>2</sup> Edward Glaeser, *Triumph of the City: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier* (New York: Penguin, 2012), unpaged.

<sup>3</sup> "About ARCH."

<sup>4</sup> "Mestské časti," mesto Bratislava, accessed July 15, 2020, https://bratislava.sk/sk/mestske-casti.html

<sup>5</sup> "Zákon o ochrane pamiatkového fondu," Slov-lex právny a informačný portál, accessed July 15, 2020, https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2014/238/20140917.html

<sup>6</sup> "Zásady ochrany PR Bratislava," Pamiatkový úrad Slovenskej republiky, accessed July 10, 2020, https://www.pamiatky.sk/sk/page/zasady-ochrany-pr-bratislava.html

<sup>7</sup> "Zásady ochrany PZ Bratislava - Centrálna mestská oblasť," Pamiatkový úrad Slovenskej republiky, accessed July 10, 2020, http://www.pamiatky.sk/sk/page/zasady-ochrany-pz-bratislava--centralna-mestska-oblast.html

<sup>8</sup> "Technické listy mesta Bratislava," mesto Bratislava, accessed July 15, 2020, https://bratislava.sk/sk/technickelisty-mesta-bratislava

<sup>9</sup> "Technické listy mesta Bratislava."

<sup>10</sup> "Zásady ochrany PZ Bratislava - Centrálna mestská oblast."

<sup>11</sup> Keramit are type of yellow ceramic tiles, patented in 1904 in former Austria - Hungary. During the 20th century they were used in public areas e.g. for road and sidewalk paving. Tiles were characterized by its yellow color, durability, but also for its surface to become very slippery when exposed to moisture. With the progress of more modern paving materials, these tiles have gradually lost their popularity on the market.

<sup>12</sup> Bratislava has an online accessible geo-information system for the general public as a part of the open-data policy. One of the project objectives is to create a new geographical - informative layer, that would be synchronized with current layers of the Bratislava GIS system. As such it would provide support not only for conservationists, investors, owners but the general public as well. Official website: opendata.bratislava.sk

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# MONUMENT NETWORKS INDUCED THROUGH LIGHTING DESIGN IN URBAN ENVIRONMENTS

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#### **INTRODUCTION**

This project emerged from the authors' observation of the inconsistent lighting used in the plethora of monuments and historic buildings in the Greek city of Thessaloniki (founded 315 BCE), which thus presents an ideal site for the creation of lighting-induced perceptual monument promenades.

Historic buildings and sites from different eras and cultures are integral parts of all cities, but particularly to those of such antiquity. They stand as a reminder of a place's past and its identity. However, these structures are often isolated within the urban landscape, and, taken out of context, exhaust their impact on passers-by. This is especially true during the night when they tend to blend into obscurity if not properly highlighted. As a result, visitors may find it difficult to make mental and spatial connections between these detached monuments, hindering their enjoyment of a foreign place and increasing their confusion. Even locals may feel detached from their historic surroundings, due to the lack of continuity, leading perhaps to a fragmentation of their sense of community.<sup>1</sup>

This paper will focus on wayfinding strategies for the creation of conceptual pathways within the urban narrative, and on how lighting design can help connect cultural elements in a city's historic centre. In order to forge associations between these elements, a perceptual architectural promenade distinguishable within the urban fabric should be specifically designed so as to retain visitors' attention, allowing for the necessary time to draw correlations within the different elements of an urban cityscape. Subliminal sensations can thus be created, to make the unique monuments part of a distinguishable and clearly readable whole.

Monuments are very often lit during the night, but due to a variety of reasons, inconsistencies may occasionally be observed between monuments of the same style even within the same city. Light, however, constituting a universal language, may operate as a tool linking historic buildings in a cohesive narrative in ways that have yet to be explored.

Throughout this paper, various wayfinding elements will be set out, and three historic city centres (Shanghai, Bremen, Strasbourg) analysed as case studies, with a view to codifying navigational concepts in night-time urban environments. The paper will culminate in a lighting proposal for the historic city centre of Thessaloniki that aims to create a monument network generated through lighting.

# DEFINING WAYFINDING AND ITS PRINCIPLES

The modern concept of wayfinding owes much to the American geographer Kevin Lynch who defined it as 'a consistent use and organisation of definite sensory cues from the external environment'.<sup>2</sup> A key factor which Lynch introduced was what he called 'mental maps'. These are comprised of five essential elements: paths, edges, districts, nodes and landmarks.<sup>3</sup>

In the process of wayfinding, the strategic link is the environmental image, the generalised mental picture of the exterior physical world that is held by an individual.<sup>4</sup> This image is a compound product of one's immediate sensation and of past experiences. An unobstructed environmental image makes wayfinding much easier. However, a structured environment can act as a framework of activity and knowledge.<sup>5</sup>

Following this statement, it is important to introduce the fundamental idea of a 'legible city' as 'a city whose various parts are or can be organised in a coherent pattern'.<sup>6</sup> For the purposes of this paper we will take this to be a perceptual architectural promenade designed to include otherwise overlooked monuments hindered from their potential to create a network.

For a wayfinding strategy to be successful there must be no 'danger of losing a basic form of orientation' combined with little bursts of confusion or surprises. This format keeps people mentally and emotionally active.<sup>7</sup>

# UNFOLDING THE CULTURAL ELEMENTS OF A HISTORIC CITY

While cities grow and evolve, cultural values need to be sustained through time, in order for the city to retain its cultural identity. Historic cities can also be modern cities, but their reputation lies in their historicity. Therefore, they need to transfer cultural facts of previous civilizations to the following generations. Their unique physical and visual attributes are also important in that they make people psychologically relaxed and culturally satisfied.

In order for this to be achieved, historic buildings and their surrounding environment need to be preserved and highlighted. Furthermore, there is a strong relation between environment and perception, while the visual value creates an immersive environment. Urban formations which are not planned and oriented may cause chaos and deform the character of historic structures. As the National Trust of England states: 'there is a "special joy" at seeing spectacular places lit up at night when normally they'd be closed, and the experience encourages the visitor to look at these places in a different way'.<sup>8</sup>

# **Categorisation of monuments**

The monuments in a city can be categorised in several ways according to their chronological period, their architectural features, location or significance. Additionally, there are buildings that are visible from a distance and can easily be reached due to their location in an imposing position, and buildings that are hidden and harder to access. During this research the monuments of Thessaloniki were organised according to their chronological period, their architectural features and most importantly by the way they are positioned within the urban plan.

# URBAN LIGHTING: A WAYFINDING TOOL WITH A SOCIAL HERITAGE COMPONENT

Urban lighting plays an important role in shaping the image and the experience of a city. If one takes under consideration the fact that cities were built under daylight and all functions took place during daytime<sup>9</sup>, urban lighting is a determining discovery, as it allows cities to redefine their function during the night. It also enables people to move around safely in the dark by expanding their activities and

socialising, thus offering the opportunity to locals and visitors to delve into a slice of a city's history and identity with positive emotional connotations.

A consistent lighting design strategy to create a monument network would offer some of the key sensory cues from the external environment in wayfinding, constantly mentioned by Lynch.<sup>10</sup> Rapid and dense urban development in recent years, along with frequent changes in city administrations with differing political agendas, have however made the creation of seamless cultural journeys in many urban centres hard to achieve. Strategies for highlighting culture have been fragmentary at best, sometimes focusing on marketing strategies to attract tourists, at other times highlighting solitary monuments. So far, in the case of Thessaloniki, there has been no systematic approach in which the monuments are considered a network or unified whole.

Lighting is essential in the creation of 'mental maps', because it helps identify nested systems of areas, the directions referring in sequence to the tackled area first, the marker for the next area and so on.<sup>11</sup> Also, it has the capacity to deflect the attention away from unsightly imperfections and emphasise the important elements of a city. It can be used to bring out the 'commonly understood symbols, codes and appearances to aid comprehension' as described by Lynch.<sup>12</sup>

A unified lighting network can thus link historic buildings together and create paths between them through the urban environment. Its main target would be to enhance and highlight the historicity of a city through a common design language legible to residents, as well as visitors, functioning as a memory tool for the resident of the urban space and as a trigger to help the visitors familiarise themselves with the history of a place or region.

#### **CASE STUDIES**

Three individual case studies will now be described as examples of lighting design impact on a historic city. The main goal of all these interventions was to highlight a historic urban area to create an attraction within the city for purposes of marketing, tourism or general historic interest.

#### Shanghai's Bund, China

Shanghai, as the host of the International Import Expo, renovated the lighting of its historic waterfront area known as the Bund, in order to create a symbolic image for its citizens and visitors, connecting people with architecture.

The main design principles were the highlighting of the architectural features of the classical 1930s façades, retaining at the same time the familiar character of the area.<sup>13</sup> The entire installation was linked to the same control system in order for all the buildings of the waterfront to interact together in unison. The project can produce dynamic shows moving along the waterfront in ways that best reveal the architecture, taking into account the ambient light in the area.<sup>14</sup>

The final result is extremely homogenous and constitutes a work of art for the city of Shanghai, despite the fact that seven design practices worked on the project. The historic part of the city retained its golden colour which the citizens and visitors were used to seeing in the past, and the moving image creates a statement for the city, providing at the same time relaxation and excitement.

#### **Bremen Lighting Masterplan**

The historic city of Bremen in Germany has been lit following a lighting masterplan. The main idea was to emphasise the architectural qualities of the city centre in order to facilitate the orientation of the citizens and visitors at night and at the same time create a pleasant atmosphere that typifies Bremen. 'The lighting scheme builds on the great density of significant facades and, by lighting specific viewpoints, guides people from one site to the next'.<sup>15</sup>

Lighting was applied to the gables and façades of the historic buildings of the city centre. The whole city appears at night as one entity of buildings, squares and streets. This provides the city with a sense of structure and orientation and at the same time defines its focus points.<sup>16</sup>

Warm white colour temperature was mainly applied, either from a distance or by highlighting the architectural features of the buildings, leading the visitor through the streets and squares of the city, offering a unique charm and atmosphere.

Bremen is a city that provides a feeling of safety and orientation, by lighting buildings, squares and streets according to a unified design. Also, the luminance contrast between the buildings and their surrounding environment enables the identification of monuments from a distance.<sup>17</sup>

# Strasbourg Grande Île historic centre

Strasbourg's Grand Île consists of the historic centre of Strasbourg that is built around the Gothic cathedral,<sup>18</sup> a UNESCO World Heritage Site that was decided to be illuminated in order provide coherence to the city's public lighting, while at the same time invite tourists and citizens to rediscover the area.

LED lighting with a wide range of white and coloured lights was used to accentuate the different architectural details of buildings, squares and bridges.<sup>19</sup> The unified lighting plan aimed at revitalising the city and enhancing its heritage<del>,</del> through the use of light and shadow, creating a more attractive view for tourists and citizens.

Dark areas of the Grand Île have been turned into beautiful lighting formations at night, while the most important buildings and sites stand out showing the different European interventions through time. The unified lighting approach provides interesting pathways for citizens, while the reflections of light through water create a stunning view.

# **Comments & Conclusions**

The concept of wayfinding is not mentioned in the description of any of these projects. Nonetheless, it is a concept closely related to many parameters taken into account in these particular cases such as orientation, safety and pathway formation within a historic city which are signified through lighting during the night.

In Shanghai the entire waterfront is considered as a unity, without a distinction between important and less important structures. In Bremen and Strasbourg the buildings are distinguished according to their significance, which is brought out by the lighting interventions. This approach helps people create an order in their mind, a 'mental map' and organise them according to specific parameters (e.g. historicity or significance).

# THE CASE OF THESSALONIKI

#### Introduction

Thessaloniki is the second largest city in Greece, located in the northern region of Central Macedonia. Due to its long and turbulent history of 2500 years it is an amalgam of different cultures and traditions, as is evident in monuments such as the Roman-era Rotunda that has served as a pagan mausoleum, a church, mosque and now a museum.

The city became part of the modern Greek state in 1912, almost a century after the liberation of the southern part of the country from the Ottomans. The catalytic event responsible for its contemporary appearance and civic plan was the great fire of 1917 which ruined most of the city's centre. Following this tragic event, Prime Minister Eleftherios Venizelos hired the French architect Ernest Hébrard to redesign the city.

Hébrard wanted to highlight local heritage as not only part of this particular culture but also of western civilisation.<sup>20</sup> His plan was to create wide boulevards, open green spaces, rectangular city blocks and a unified neo-Byzantine aesthetic among the new administrative and business quarter of the city. However, what is of great significance in relation to this research is the fact that he wanted to create large openings where monuments would be clearly visible from various points of view, and wide roads to link the monuments between them. Unfortunately, he didn't manage to complete his grand scheme and as a result his ideas were only partially implemented. Parts of his plans were scrapped or modified completely between 1920-1924 due to frequent changes in government and the unforeseen arrival of hundreds of thousands of refugees from Asia Minor in 1922.<sup>21</sup> The new city planners only used a few churches as visual reference points, but other than that largely disregarded the city's complex and rich monumental past.<sup>22</sup>



Fig 1. Thessaloniki's city plan post-1917 fire

# Analysis

The city's historic centre is demarcated on three sides by its Byzantine walls (North, East and West), and on the South by the Thermaic Gulf. It became evident through this research that within the urban ensemble many buildings of various historic periods coexist, some more visible than others. The proposal to create a unified monument network through light aims to connect structures of the same period, but more importantly monuments of different eras. Through this approach a single network will focus both on the monuments themselves, but also on the routes that lead to and link them. This way, a person, local or visitor, can further comprehend the historic value of the monuments in terms of their connection to the multi-layered history of the city, the architecture of each period and the significance of their position within the urban environment.

The structures that were chosen are significant samples of various historic periods and had a major role in the city's history. The buildings selected to be part of the lighting network belong to three important historic periods, the Roman (4), Byzantine (15) and Ottoman (9). These eras are consecutive and their traces are clearly visible throughout the city.

After on-site observation, it was noted that their lighting during the night is either restricted to each specific building (sometimes even partially), or at best to the structure and its immediate environment. In certain cases, the historic sites are left in complete darkness. As a result, the lighting design of the monuments is fragmented at best and there is no cohesive approach between them.



Fig 2. Roman Forum's existing lighting



Fig 3. Byzantine Walls and Byzantine church's existing lighting



Fig 4. Ottoman Alaça Imaret and Paşa Hamam existing lighting

# **Proposal/Results**

The map created to showcase the monument network through lighting design proposes a unified approach to navigate through Thessaloniki's historic city centre during the night. It depicts twenty seven monuments: thirteen churches<sup>23</sup>, five public baths<sup>24</sup>, one covered market<sup>25</sup>, one orphanage<sup>26</sup>, one palace<sup>27</sup>, one mosque<sup>28</sup>, a Roman forum, a fortification structure<sup>29</sup>, a victory arch<sup>30</sup> and a tower which functioned as a prison<sup>31</sup>. It is noteworthy that at least two of these monuments, Hagia Sophia and the Rotunda (or Hagios Georgios), have visible structural characteristics (eg. a minaret) of more than one historic period. This is due to the fact that they were either used for different purposes (eg. churches converted into mosques) or each civilization used the same site by building on the previous one's ruins (eg. Christian temple being built on Roman temple's ruins).



Fig 5. Monument Network Proposal in Thessaloniki through lighting design

One of the advantages of this proposal is the flexibility with which the path should be followed. It is merely a suggestion that can be executed in sections, but that provides a uniformly lit pathway to reconnect visitors with the monument network. Importantly, it offers the possibility of touring Thessaloniki's monuments at night which can be very useful under certain circumstances. In brief:

1. The monuments will be brought into a unified whole within the urban cityscape.

2. The perceptual and physical correlation between the monuments will become more evident.

3. A sense of security will be generated through clearer orientation of the visitor, whose interest for further exploration and socialising will hopefully be triggered.

4. The historic city centre will become more legible, offering a more coherent and thus more memorable urban nightscape for both local people and visitors.

A different lighting design approach for the buildings of each historic period would make the interrelation between the sites belonging to the same era more perceptible. The architecture of each period and its characteristic features would be more clearly emphasised. But the main goal would be to allow people walking between these monuments to create their own physical and perceptual path through the complexities of history, guiding themselves in their own unique way and following their own rhythm, towards their own personal 'reading' of the city.

#### NOTES

<sup>1</sup> According to Lynch 'There seemed to be a tendency for those more familiar with a city to rely increasingly on systems of landmarks for their guides—to enjoy uniqueness and specialisation, in place of the continuities used earlier. Since the use of landmarks involves the singling out of one element from a host of possibilities, the key physical characteristic of this class is singularity, some aspect that is unique or memorable in the context'.Kevin, Lynch, The Image of the City. (Cambridge, MA: The MIT Press): 78.

<sup>2</sup> Kevin, Lynch. The Image of the City. (Cambridge, MA: MIT Press, 2006): 3.

<sup>3</sup> Paths - the roads used to move around, Edges - roads which define the boundaries and breaks in continuity, Districts - areas which share similar characteristics, Nodes - strong intersection points of roads like squares or junctions, Landmarks - easily identifiable entities which are used for point-referencing, usually physical objects. Kevin, Lynch, *The Image of the City*. (Cambridge, MA: The MIT Press): 46.

<sup>4</sup> Kevin, Lynch. *The Image of the City*. (Cambridge, MA: MIT Press, 2006): 4.

<sup>5</sup> Kevin, Lynch. *The Image of the City*. (Cambridge, MA: MIT Press, 2006): 4.

<sup>6</sup> Kevin, Lynch. *The Image of the City*. (Cambridge, MA: MIT Press, 2006): 2-3.

<sup>7</sup> Kevin, Lynch. *The Image of the City*. (Cambridge, MA: MIT Press, 2006): 5-6.

<sup>8</sup>\_\_\_\_\*Should monuments be lit at night?", Caroline McClatchey, accessed May 15, 2020, https://www.bbc.com/news/magazine-15934993.

<sup>9</sup> Sandy, Isenstadt, Margaret Maile Petty and Dietrich Neumann ed. *Cities of Light-Two Centuries of Urban Illumination*. (New York and London: Routledge, 2015), xvii.

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<sup>11</sup> Tim, Fendley, "Making sense of the city-A collection of design principles for urban wayfinding", Information Design Journal 17(2), (2009): 98.

<sup>12</sup> Tim, Fendley, "Making sense of the city-A collection of design principles for urban wayfinding", Information Design Journal 17(2), (2009): 101.

<sup>13</sup> "Connecting the history and people of Shanghai with Interact Landmark", Interact IoT, accessed May 17, 2020, https://www.youtube.com/watch?v=q9mDM131bDw.

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<sup>15</sup> Ulrike, Brandi and Christoph, Geissmar-Brandi, ed. *Light for Cities-Lighting Design for Urban Spaces. A Handbook.* (Basel, Boston and Berlin: Birkhäuser-Publishers for Architecture, 2006): 132.

<sup>16</sup> "City Marketing with Light", Licht.wissen 16, accessed May 20, 2020, https://www.licht.de/de:25.

<sup>17</sup> "City Marketing with Light", Licht.wissen 16, accessed May 20, 2020, https://www.licht.de/de.

<sup>18</sup> "Strasbourg, Grande-Île and Neustadt", UNESCO, accessed May 18, 2020, https://whc.unesco.org/en/list/495/.
<sup>19</sup> "Grand Île's Historic Center", Colorkinetics, accessed May 18, 2020, https://www.colorkinetics.com/global/showcase/grand-ile-historic-center.

<sup>20</sup> Kalliope, Amygdalou, "Building the Nation at the Crossroads of 'East' and 'West': Ernest Hébrard and Henri Prost in the near East", Opticon1826, (16): 15, (2014): 7-8.

<sup>21</sup> Mark Mazower, Salonica City of Ghosts, (London: Harper Collins, 2004): 325-6.

<sup>22</sup> Mark Mazower, Salonica City of Ghosts, (London: Harper Collins, 2004): 329-330.

<sup>23</sup> These are: Hagia Sophia, Hagios Demetrios, Osios David, Vlatadon Monastery, Hagios Nikolaos Orphanos,

Hagios Panteleimon, Hagia Ekaterini, the church of the Twelve Apostles, the Rotunda (Hagios Georgios), Panagia Chalkeon, the church of Acheiropoiitos, the church of Metamorfosi tou Sotiros and Profitis Elias.

<sup>24</sup> These are: the Byzantine Bath, Yahudi Hamam, Pasa Hamam, Aigli Yeni Hamam and Bey Hamam.

<sup>25</sup> Bezesteni covered market.

<sup>26</sup> Alaca Imaret.

<sup>27</sup>Galerius' Palace complex.

<sup>28</sup> Hamza Bey Mosque.

<sup>29</sup> The Byzantine Walls and the Heptapyrgion.

<sup>30</sup> Galerius's Arch, more commonly known as Kamara.

<sup>31</sup> The White Tower, which is also the city's symbol.

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Fig 1. Thessaloniki's city plan post-1917 fire,

https://upload.wikimedia.org/wikipedia/commons/f/f2/ThessaloniqueH%C3%A9brard.PNG, Accessed July 29,2020.

- Fig 2. Roman Forum's existing lighting, personal archive.
- Fig 3. Byzantine Walls and Byzantine church's existing lighting, personal archive.
- Fig 4. Ottoman Alaça Imaret and Paşa Hamam existing lighting, personal archive.
- Fig 5. Monument Network Proposal in Thessaloniki through lighting design, personal, created by the authors.

# GARDEN OF CHANGES – AN APPROACH TO EMBRACE THE FORKING PATH STRUCTURE OF SINGAPORE'S FORMER YUNNAN GARDEN IN VIRTUAL REALITY

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# INTRODUCTION

The artistic research project *Garden of Changes*, is an approach to embrace the forking path structure of Singapore's former Yunnan Garden as a representation of choice and the difficult decision process, supported through the divination method of the iChing – in a room-scale Virtual Reality experience.

The project is a collaborative effort between the three artists, educators and researchers Benjamin Seide, Ross Williams and myself. Since 2017, we are exploring how the experience of being in the Chinese inspired Yunnan garden on NTU campus in Singapore might be captured and represented digitally.

The initiative for the project stemmed from my earlier artistic research in which crossroads and intersections played a major role in symbolising the difficulty of being confronted with choices and decision making. As the emergence to visualise this challenge in art history, the myth of *The Choice of Hercules* and its representation could be understood. The popular example presents Hercules as a symbol of strength and courage at a crossroad, uncertain which way to choose at the entrance to adulthood. The personifications of Virtue and Vice tempt him to go on either their ways: the hard, steep and rocky path leading to glory or the wide and easy one, guiding to a comfortable, pleasant life, but into perdition. His body and face show the struggle between the two temptations. From the ancient legend of Hercules, I adapted the iconography of crossroads into my work and transferred the quest for an ideal forking path to visualise the difficulty of choice.



Fig. 1. Hercules' Choice between Virtue and Vice<sup>1</sup>

# **CROSSROADS AS VISUALISATION OF CHOICE**

My starting point was a series of images during the search for an ideal intersection, to visualise the moral dilemma in the moment just before a decision has to be made. Soon I realised that a single fork in the road seemed not sufficient and felt inspired to illustrate Jorge Louis Borges' often cited short story *Garden of Forking Paths* with a panorama, which I stitched from several images together and therefore comprised multiple vanishing points – an idea to purposely confuse the viewing direction and decentralise the focus of the image. In Borges' narration, any of all possible futures can be chosen without eliminating any one of the others, and lead for that reason to parallel, simultaneous times and universes in which all possible lives can be explored. His following quote became a maxim for the interlinking connections of interactive media:

In all fictional works, each time a man is confronted with several alternatives, he chooses one and eliminates the others; in the fiction of Ts'ui Pên, he chooses - simultaneously - all of them. He creates, in this way, diverse futures, diverse times which themselves also proliferate and fork.



Fig. 2. One of the many intersections in Yunnan Garden<sup>2</sup>

Still not satisfied with the captured intersections in the first stage, I explored the amazing structures of the gardens of Versailles in France. What appears well-structured from above appears eye-level as the

most confusing labyrinth. All paths look similar and it is difficult to see if one has been at any point before and which might be the right direction to leave again. To illustrate the structure, I adjoined a map based on the satellite view with the geographic coordinates and a schematic drawing to the panoramic images.

The images were captured at each of the 16 intersections throughout the four annual seasons, spring, summer, autumn and winter. Each of the panoramic images consists of twelve individual photographs which were manually stitched together. In this way, even more varieties were possible, with more or less than the actual number of paths.

As a preliminary result, the images were printed as large panoramas and displayed on a wall, but did not immediately result in the desired effect of displaying the overwhelming choices and confusing the viewer – therefore the presentation in the immersive environment in the cylindrical *PanoramaLab* at ZKM, the centre for art and media in Karlsruhe, followed as a next step.

# THE CHOICE OF VIEWING DIRECTIONS

Back in 2012, the panoramic images were projected as in the 360° rotunda and animated in a way that paths open up and close again throughout the change of the seasons. In addition, spatial audio served as a supporting element to attract the audience to different viewing directions. Voices expressed their confusion in eight different languages, questioning where they were coming from or wondering in which direction to go. In this way, the audience was engaged to walk around, look into all directions and be captivated in the quest for the right path through the changing projected structure. The most immersive experience was achieved in the iCinema environment at UNSW Sydney. The projection in the large cylinder with 10 metre diameter not only covered the peripheral vision with a smooth curvature, but reached down all the way to the floor at a height of 4 metre.

As cylindrical panoramas are quite rare, it was necessary to explore different forms of presentation, for instance on mobile devices with a built in gyroscope, before it was easily feasible to display 360° imagery through Virtual Reality headsets. Intrigued by this possibility, I intended to explore how the difficulty of decision making could be represented in VR, again – through intersections and crossroads.



*Fig. 3. The development of the pathway structure for Yunnan Garden VR, combining the orthographic map from the aerial survey with the detailed topographic map*<sup>3</sup>

After moving to Singapore in 2014, the forking path structure of the Yunnan garden on NTU university campus provided a potential representation of the theme. The garden was built in 1955 as

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part of what was then a Chinese University. According to old photographs of this time, it was a wideopen space, but already contained most of the significant elements. In the following decades, the huge trees became the dominant part of the garden, together with the beautifully arranged structure of pathways, which only is obvious in an aerial view. Its main components are beyond the lush greenery and the interconnected walkways architectural elements such as a massive gate, a huge ancestral monument, rock sculptures and seven pavilions.

After the announcement that the garden will be re-constructed and undergo major changes in 2017, it was only natural to immediately start a project to capture the current garden as good as possible and preserve it in a virtual environment. As the Yunnan Garden's layout also offers views in all directions, the objective to create a 360° production was obvious. Benjamin Seide, an expert in special effects and sound designer Ross Williams joined the team. As the date of the reconstruction was not announced, it was necessary to act immediately and capture the garden with panoramic images and video.

Six locations were identified by us as particularly significant and it was one of the aims to engage the viewer to actively turn the head - or even the body - and explore all viewing directions, mainly guided by the four dancers. Although even the empty paths may invite to look around and explore the different directions, the guidance of a human figure proved to be much more engaging.



Fig. 4. Secret Detours adjusted for the cylindrical environment<sup>4</sup>

During the development of the 360° video, it became the foundation of research to explore a wide range of presentation formats, beyond the classic headset:

• An upright dome: the iDome could be seen as a small Omnimax theatre. The curved screen covers the peripheral vision and immerses the viewer while a trackball enables the rotation of the projected video.

• In the full-dome set up, the main focus is on the upper hemisphere with the dancers appearing in full size – however the forking paths appeared less intriguing.

Similar to the initial panoramic photograph, the presentation on a 15 by 2metre large LED media wall convinced with multiple vanishing points and in particular with the dancers in life size, although most of the area with intersections had to be cut off due to the extreme panoramic aspect ratio of 15:2. The format worked well to bring the vanished green bushes and trees back to life, however not on the regard to visualise viewing choices.

# CHOICE OF VIEWING AND WALKING

As the viewing experience of the spherical video convinced most in regard to engaging in the choice of viewing directions, an additional level of immersion was introduced to the project by creating a VR room-scale experience (in Epic's Unreal engine), allowing the viewer to actually walk along the pathways. As a starting point, the garden was captured with a drone in order to produce an orthomosaic map for an accurate size. In addition, the aerial images were used to create a rough 3D reconstruction, resulting in a rather fragmented version of the garden, which was later used in an abstract VR experience of the garden. As a next step, we developed a full room-scale Virtual Reality, to bring our audience physically into the garden and allow them to walk around in the room-scale model.

The process of re-creating the garden as a 3D-approximation started with reconstructing the ground topology, plotting the exact tree positions and laying out the walkway path structure by utilising a detailed topographic map, combined with the orthographic image from the aerial survey.

After identifying detailed positions, species and numbers of trees, a threefold strategy followed:

- Firstly, tree assets were sourced to match the required species,
- then a range of variations of these tree assets created

• and experimented with captured trunks and bark textures of existing trees in the garden to combine them with the tree assets.

Based on the structure of the pathways, trees were added as indicated on the original landscaping map of the garden as well as all the architectural elements, such as the gate, pavilions and the monument.

To achieve the impression of a tropical garden, it was necessary to combine several plant species with each other. For instance, a rain tree, which is very common in Singapore, hosts several native plants that grow on other plants, such as the bird's nest fern. Accordingly, ferns were added to the branch forks of the rain trees, which enhanced the level of detail and increased the tropical appearance to the VR experience.

During this process, not only the tropical plants received a lot of attention, but also the pathway structure with its adjacent drainage system. Several attempts were explored to make them look less artificial and add a good amount of patina.

This VR recreation of the Yunnan Garden could then potentially serve as the stage for a range of different content such as a short movie, a game or a botanical educational guide.

# THE FORKING PATH STRUCTURE OF THE GARDEN AS DIVINATION DEVICE

The following section describes more details about the project Garden of Changes which invites to explore the park along the pathways in the central area, but may also be used as a divination tool.

The user is invited to stroll around, meander and ponder which direction to take. Inspired by the continuous quest of finding the best direction at each intersection – and in life – the garden, reconstructed in Virtual Reality, becomes the stage for the ancient Chinese manual of divination, the iChing. As is generally known, it is based on eight symbolic trigrams and sixty-four hexagrams, which are translated in terms of the principles of yin and yang. These hexagrams are interpreted in the Book of Changes, to which the title of the Garden of Changes refers. There exist different methods to generate the lines which build each hexagram. The most traditional involves a rather complicated procedure of laying yarrow stalks in several stages, which would not be feasible in a VR environment. But since the park is about walking, we are asked to leave the straight path and so every single fork in the road is an invitation to turn left or right again and again; these considerations have helped us to discover the place as the locale for another labyrinth that is in our head. The confusing questions to

which we cannot initially find a response and then with a few pans and turns surprisingly may answer them nevertheless. The fork in the road is not just a crossing, but rather an arbitrary division of the course to reach a goal on different routes, a goal that does not even exist when strolling around.

Therefore, another common method of the iChing is applied: throwing three coins with the interpretation of head or tail. However, in the Garden of Changes, the throwing direction on the diverging pathways became relevant and depending on the results of the throw, each line can be either static or changing. With changing lines, one does not only have a single answer to the question but the transitional hexagram can relate to interpretations from several sides.



Fig. 5. A line for the hexagram of the iChing appears after throwing three coins in one direction<sup>5</sup>

Entering on the path through the main gate of the garden, a voice-over welcomes the user to the Garden of Changes and invites to pose a burning question for which an answer may be found at the other end of the garden. To receive this reading, the user has to proceed to six different intersections which offer bundles of three Chinese coins. A concept plan on the right side at the entrance visualises the structure of the garden and the locations of the coins. However, the coins, which hover above the ground can be picked up in any order, any path can be taken between the starting point at the gate and the reading at the monument – without limitation of time. Both locations, as well as the main pavilion offer a map, indicating the intersections at which coins have already been thrown. In addition, the pavilion offers more information about the connection of the Yunnan garden to the iChing. The garden layout connects to the cardinal directions, which are also reflected through the trigrams. as well as the elements such as Earth, Mountain, Water, Wind, Thunder, Fire, Lake and Heaven.



Fig. 6. Trigrams in the VR pavilion indicate the connection to the elements and cardinal direction, the map on the table displays the already visited intersections<sup>6</sup>

# CONCLUSION

Contrary to speedy gamification or the pace of jump-and-run games, the Virtual Reality application invites to ponder, reflect and appreciate the green reconstruction of the vanished trees. In this regard, the experience is quite similar to being in the actual garden itself. The many intersections interrupt a straight traversing of the garden and challenge the passer-by to stop and ponder which direction to take. Most paths offer not only alternatives in the route ahead but also to turn back and evaluate alternatives – very similar to the experience in the 360°-environment in the headset which offers omnidirectional viewing.

Even if we managed successfully to capture and recreate components of the garden digitally – the experience of being in the natural tropical environment with its muggy atmosphere and the particular scents and sounds – including some annoying insects – cannot be reached by virtual means.

#### NOTES

<sup>1</sup> Annibale Carracci: *The Choice of Hercules*. 1596, Oil on canvas, 166 cm × 237 cm (65 in × 93 in); Capodimonte Gallery, Naples. PD. commons.wikimedia.org/wiki/File:Annibale\_Carracci\_-\_The\_Choice\_of\_Heracles\_\_\_WGA4416.jpg

<sup>2</sup> Elke Reinhuber, Benjamin Seide and Ross Williams: *Arial View of an intersection in Yunnan Garden*. ©2016 Elke Reinhuber/VG Bild-Kunst Bonn.

<sup>3</sup> Elke Reinhuber, Benjamin Seide and Ross Williams: *Screenshot during the development of Yunnan Garden VR* . ©2019 Elke Reinhuber/VG Bild-Kunst Bonn.

<sup>4</sup> Elke Reinhuber, Benjamin Seide and Ross Williams: *Secret Detours, presented in the PanoramaLab at ZKM Karlsruhe, Germany.* ©2017 Elke Reinhuber/VG Bild-Kunst Bonn.

<sup>5</sup> Elke Reinhuber, Benjamin Seide and Ross Williams: *Garden of Changes*. ©2019 Elke Reinhuber/VG Bild-Kunst Bonn

<sup>6</sup> Elke Reinhuber, Benjamin Seide and Ross Williams: *Garden of Changes*. ©2019 Elke Reinhuber/VG Bild-Kunst Bonn.

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# **METAMORPHOSIS OF THE CITY WALLS**

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#### THE CITY AND THE CAMERA

The city, an ever-changing, ever-evolving organism, is a prolific storyteller. If we observe and listen closely, we begin to hear the stories it has to tell plastered all over its walls. It tells tales of joy and tragedy, laughter and tears, prosperity and poverty, and power and weakness. The city becomes a nourisher, a teacher, a stage for opportunities, and these qualities create a bond between the listener and the storyteller that becomes quite well-knit. With time the citizen and the city begin to become one. Along with the architectural infrastructure, the city inhabitants become characters in these tales. This project's goal was to capture one of those stories narrated by the city in a series of photographic images as photography offers a selective view of architecture and constructs its narratives.

Everything in this world now desires to be recorded 'to flow into this eternal memory'<sup>1</sup>. This study's prime subject is Lahore's city through a camera, and it sets upon a journey to find a story that would be archived into this perpetual consciousness. This project dealt with the photograph as part of the description and interpretation of its architecture and landscape. The objective was to acquire knowledge and techniques that lead to developing the ability to construct photographic images critically that are highly specific in their context and meaning.

Every citizen has had long associations with some part of his city, and his image is soaked in memories and meanings.<sup>2</sup> The city preoccupies the inhabitant at a conscious and subconscious level, and sometimes we forget about all the drama it entails every day, and that is where images come into play, reminding us of these narratives. In towards a philosophy of photography, Vilem Flusser argues that the advent of photography has fundamentally altered humankind: 'man forgets that he produces images to find his way in the world; he now tries to find his way in images.<sup>3</sup>

The city is an evocative concept, a word that generates a rainbow of images, perhaps as diverse as the disciplines and frameworks within which it may be studied, one of them being photography. The awakening quality of the city makes us aware of the vibrant colors it has to offer, creating this neverending drama as a dancer who improvises steps along the way, making it essential to capture this hustle and freeze it. That photograph becomes an image of the world as if in a coma, turned to stone; animate become inanimate, humanity made statuesque, eerie, *unheimlich.*<sup>4</sup>

When we sew these images together, the city becomes a storyteller raising questions with the diversity it offers. Contrary to the view sometimes offered that the city is the melting pot, the grand equalizer separates, divides, distinguishes and discriminates. It is only by placing the various shades of color nearby that we can see the subtle distinctions. In this manner, the city bares the differences and focuses the ironies of contemporary life, its aberrations and tyrannies.<sup>5</sup> This aspect of the city was to be captured in these series through studying it beyond its architecture.

# THE CITY AND ITS WALLS

Lahore is the second-largest city of Pakistan, with an area of 1772 km<sup>2</sup> and a population of 11.13 million, so it was not easy to decide where to begin. As a wanderer walking through this city's streets, the study began by taking photographs of some familiar places, becoming aware of the scenes that one usually does not pay attention to and documenting them. The photograph in figure 1 is from the first quest that leads to the documentation of Lahore's walls. Passing by this church wall was an everyday ritual, but after this photograph was taken, the realization was drawn on how people transform the city walls and how such scenes are ubiquitous in Lahore. This boundary wall was occupied by a shoe mender who used this as a display surface to hang shoes that he had mended. This transformation created an activity in the street where people would bring their broken shoes to fix or a passerby who just happened to break their shoes while walking could stop by. Consequently, this photograph leads to the idea of exploring the transmogrifying nature of the walls of Lahore as architectural elements in their urban setting.



Fig 1. Shoes and leather rags hanging from the boundary wall of a church

Walls are one of the primary architectural elements, and by definition, a wall acts as a building block in a structure, dividing, surrounding, or enclosing a space, defining an area, providing privacy, demarcating a boundary, or carrying the load. They play a significant role in creating the spatial configuration of a city. As one roams the city streets, they encounter all sorts of walls; sometimes these walls become our companion as we walk along with them. They translate as blank canvases of opportunities for a particular demographic in Lahore like the shoe mender who could not afford a shop, so he settled for a wall that the city offered him and set up his station. This way, the definition of the wall begins to take a new meaning. It is no longer a wall that was meant for creating a bounded private space, but it translates into an opportunity to earn a living. Likewise, numerous walls in the city where endeavors such as selling clothes and other everyday items, setting up barber stalls, or opening up mechanical workshops occur. Moreover, if one begins to observe a wall where such an endeavor took place, the activity happened there can be guessed by the imprint of the remnants left behind.

# Process and Technique of Photographing the City Walls

"From the earliest days of its invention, the photographic medium has had a particular resonance with the architectural subject matter. In the pioneering days of photography, the relationship was to some extent born of necessity, buildings being one of the few subjects that would withstand long exposures, but the affinity goes much deeper, photography seemingly having unique ability to explore and represent architectural space and form, and even to express fundamental architectural ideas and concepts."<sup>6</sup>

Therefore, to understand the situation of this uncanny occurrence of these activities in the mundanity of the day-to-day world, it was essential to photograph—these walls at two different times, the presence and absence of the activities.

Therefore, utilization of the wall was an idea that needed visual. The photographic approach to convey "what we thought was familiar is made strange; in ruptures, to the surface mask of every day, It is in the street that significant experiences occur, where magic and fantasy have their home in the unexceptional everyday streets of the contemporary city.<sup>7</sup> This concept of the almost magical transformation of an architectural element would have been challenging to communicate through drawn plans and sections; therefore, an interdisciplinary approach was vital.

# **Photographic Inspiration**

Two approaches were adopted in order to create these visuals taking inspiration from the works of Ed Ruscha with his interest in serial imagery and the mundane to create many series of photographs that did not document a journey or narrative in particular and are devoid of human presence. His first book *Twentysix Gasoline Stations* (1962), literally features photographs of gas stations he found on the way between Los Angeles and his parent's home in Oklahoma. Similarly, the titles of the books such as *Every Building on Sunset Strip* 1966 and *Thirtyfour Parking Lots* (1967) function as predictable descriptions of the subject matter. Determined by the book formats' rhythmic logic, Ruscha's photographs display a sequential, non-narrative order. Ruscha emphasizes the serial character of photography by numerical indications in the titles, which contrasts sharply with Henri Cartier-Bresson's notion of the decisive moment. Ruscha, by contrast, is more devoted to structures than the unique moment. Instead of the photographer's formal decisions, the photographic apparatus' primacy is emphasized instead of representing a singular moment containing an entire action, the photographic series fragments, and dilutes the action so that nothing looks 'unique'.<sup>8</sup>



Fig 2. 'Every Building on the Sunset Strip' by Ed Ruscha 1966 unfolds to 296 inches in length



Fig 3. An unfolded section of 'Every Building on the Sunset Strip'

# The Approach in Capturing the Metamorphosis

Some walls stretch out for hundreds of meters; the first approach involved using the technique of stitching photographs together in Photoshop to conceive a complete continuous image of the wall (fig 4 - fig 7.1). Photographic cropping is always experienced as a rupture in the continuous fabric of reality<sup>9</sup>. The images taken were not meant to be cropped as they represented the walls in their entirety and continuance. Therefore, to achieve this, it was necessary to photograph each segment of the wall from the same angle, distance, and height so that all the photographs had the same frame and could be easily sewn together to capture the whole wall in a single image. The photographs were taken both in the presence and absence of the activities transpiring through the city walls. Both photomontages created for each wall were juxtaposed to illustrate the metamorphosis. Unlike Ruscha's work, this was done on foot with a tripod as entire buildings were not photographed.<sup>10</sup> This process led to more of a documentation style of creating an image where everything is recorded with a very straightforward attitude.

The second approach involved serial photography; however, unlike Ruscha's series, the purpose was to tell a story and show the connection between architecture and human presence. Instances, where numerous city walls were being used by service providers such as barbers, shoe menders, and mechanics, were photographed with this technique in mind of repeating the same concept in many variations and forms (fig 8 - fig 10). In one case, the barbers were photographed with their set up against a wall. Maintaining a similar ratio of proportions for each frame so that when they are displayed together, a comparison can be made, and parallels can be drawn. Again, this procedure was carried out twice, once early in the morning when the barbers had not yet arrived and their setup was all packed up, and once after they had arrived, opened up their work against the wall and got busy cutting and trimming hair. These images at different times of the day were composed to emphasize the shift between them and show the walls' transmogrifying nature.

# THE PHOTOGRAPHIC SERIES



Fig 4. Boundary wall of Mayo Hospital (early morning)



Fig 4.1. Boundary wall of Mayo Hospital laden with clothes (afternoon)



Fig 5. Boundary wall of Mayo Hospital (early morning)



Fig 5.1. Boundary wall of Mayo Hospital laden with accessories (afternoon)



Fig 6. Boundary wall of Mayo Hospital (early morning)



Fig 6.1. Boundary wall of Mayo Hospital laden with miscellaneous items (late afternoon)



Fig 7. Boundary wall of an educational institute (early morning)



Fig 7.1. Boundary wall of an educational institute laden with posters and frames (late afternoon)

Figures 4 to 6.1 show the Mayo Hospital's boundary wall built for security between the street and the hospital. However, during the day and fulfilling this purpose, it transforms into a vibrant bazaar outside the hospital periphery, completely giving this wall a new meaning. For the past 20 to 30 years, it has been lined with people selling clothes and other miscellaneous items. People come here early in the morning to open up their stalls and makeshift shops. They put everything they have to sell up on the hospital boundary wall, and things that do not fit on the wall are scattered on the footpath next to the wall. People passing by make stops to buy anything they might need or find interesting or merely just window shop or "wall shop" as these are certain stores without windows.

Figures 4, 5 & 6 show segments of the same wall photographed early in the morning between 6:00 am - 7:00 am. It is the time when the vendors have not yet arrived or are just beginning to arrive. A closer look will bring out the people's etchings by observing these walls that seem empty right now. Nails, strings, and strips of wood clinging to the wall in no particular order waiting for things to be hung on them. These are the remnants of the activities that indicate the imminence of a bazaar.

Along with this, carts can be seen parked next to these walls. These carts are loaded with goods that are about to become part of the wall. The owners entrust the city with their belongings, wrap a cloth

around them, tie it up, and leave for the night, trusting the city to find their carts untouched when they arrive the next day. This situation portrays the blind trust between the city and its inhabitants, where the citizens feel like they can rely on the city.

When the vendors arrive, they open up their carts and bedeck these empty walls with everything they have to offer to earn something for the day and return to their homes with bread and some money. All the stock that they have is pre-used or with minor disregardable defects. They buy it in bulk at a low rate per kilogram from shipments that have been sent to Pakistan by other countries that no longer need these things, reinforcing the phrase 'one man's trash is another man's treasure.' As the morning passes, these walls begin to fill up, and the bazaar emerges in full swing. Figures 4.1, 5.1 & 6.1 shows these once bleak walls now bright and colorful laden with all sorts of items as if they were growing out of these walls becoming a part of them. Akin to leaves growing out of tree branches that change colors with seasons and fall during autumn and regrow in spring, the metamorphosis of the walls of Lahore continues to transpire.

Imagine passing by this wall laden with t-shirts, pants, socks, undergarments, shoes, hats, sunglasses, helmets, curtains, clocks, printers, cooking utensils, art, golf clubs, sports equipment, vacuum cleaners, and other electronic devices. It is as if they are dressing up the once barren walls, adding life to the city, creating a new movement that charges the streets with new encounters and activities. A new bustle is created where one can hear the vendors chanting the prices of the goods they have to offer on the top of their lungs, trying to lure in the passersby composing a new melody for the city to dance.

Figure 7 shows a relatively empty brick wall of an educational institute early in the morning; however, on closer observation, rows of strings can be seen strung between each column, indicating that something might be displayed here later during the day and indeed, fig 7.1 goes to prove this. Both images show this wall's transformation from being desolate and bare to being plastered with an assortment of posters and frames. Ranging from movie stars' posters to religious scholars, one can buy whatever fancies them to decorate their rooms. These walls become a gallery on the street when it displays framed calligraphy of Quranic verses to paintings. The wall that was once just there to create a boundary and secure the institute now has an entirely different function that arose through this metamorphosized wall.





Fig 8. City walls being used by barbers



Fig 9. City walls being used by shoe menders



Fig 10. City walls being used to open up workshops

Figures 8, 9 & 10 are a collection of photographs composed to show how the city walls are being used by people to provide services to earn a living — an extension of how this project started from photographing the church wall being used by a shoe mender. The collection of images on the top in each series were taken early in the morning, showing the walls left with their equipment and shading devices rolled up, the barbers leaving behind their chairs and shoe menders their tools in trunks, and makeshift hanging mechanisms for shoes and the mechanics leaving behind tire tubes, a few hooks in the wall or a bench, again entrusting the city with their belongings. All these alterations act as clues to what kind of ventures materialize here later in the day shown in the collection of images at the bottom series from figures 8 to 10. A barber will arrive and open up his set-up, roll out the cloth from the top of the wall for shade, push a table against the wall, prop up his mirror on it or hang it from the wall along with his scissors and a few towels and wait for customers. It is interesting to see how one can get a haircut or shave on the side of a street out in the open with the city acting as a stage and the wall as a backdrop. A shoe mender will come to his wall, open up his trunk of tools and materials, hang them on the wall, along with the shoes he has fixed or need to be fixed. People on the run can also get their shoes polished from here. A mechanic will also put out all his equipment on the wall, and his space will begin to act as a very convenient pitstop, usually for cyclists and motorcyclists.

These walls are scattered all around the city, showcasing set-ups built by the people to create their workspace. These series are endless because such scenes can be found in almost every corner of the Lahore city. This collection of photographs was also shortlisted from various pictures portraying the variety of improvisations people had made. From utilizing walls of parks to those on main roads, walls under bridges, walls of construction sites, walls of others' homes and even walls of graveyards, churches, and mosques, people try to grab every opportunity they can.

# CONCLUSION

These encroached interventions of the citizens reflect an odd sense of ownership of certain portions of a city that have been left vacant but seen as an opportunity. It is like nobody wants to leave this city of opportunities. With time that 'space' becomes their 'place.' While supporting a particular demographic, these walls are also speaking about the city's socio-economic state, bringing into focus the ironies of contemporary life and showing the differences that the city bears. These mediations are sometimes opposed by people who do not find them essential and merely see them as an inconvenience; however, Pakistan's Urban informal economy depends on such activities. As street vendors cater to a clientele of lower and lower-middle-income people, which form the majority of the population, urban planners oppose the idea of evicting them and encourage their integration in urban spaces. On the other hand, the government may conflict with this ideology, which is why some vendors would hesitate while being photographed as they thought they might be reported for illegal activity. Therefore, all photographs taken were with the peoples' consent, and with time and several visits, a new connection was formed between the "people of the walls" and the photographer as someone telling their story.

While this might be considered an encroachment, it is indeed a rather beautiful one, as these walls begin to break the silence and deliver a message by becoming characters in the story that the city has to tell. They create social dialogue and initiate conversations. They are like two sides of a coin carrying a different picture on each face.

By observing the shapeshifting nature of the city walls as an architect, the visuals created contribute to realizing how as a planner of the urban environment, one can redesign this architectural element to morph into something vastly required by the inhabitants. This project's outcome identifies the potential for the multifunctional design for public walls of such kind and how we can increase their utility through design. However, this may interrupt the city's spontaneous dance by turning a phenomenon that is quite natural into something that is forced. Therefore, it may be best to leave it up to the inhabitants. They should decide how to change or add to the definition of such elements to bond with the city, and its architecture can be instinctive, voluntary, and free-spirited, contributing to a truthful story rather than a planned one. These walls are no longer barriers; they are mediators between the city and the citizen.
#### NOTES

<sup>1</sup> Vilem Flusser, Towards a Philosophy of Photography (Göttingen: European Photography, ed Derek Bennett, English Edition, 1984), 18

<sup>2</sup> Kevin Lynch, Image of the City: Image of the Environment (The MIT Press, 1960), 7

<sup>3</sup> Flusser, Towards a Philosophy of Photography, 7

<sup>4</sup> Timothy Wray, "Haunted Halls of Mirrors: Photography and the Phenomenology of Emotional Space" in *Camera Constructs: Photography, architecture and the Modern City,* ed Timothy Wray and Andrew Higgot, (Routledge, 2012) 109

<sup>5</sup> Gulzar Haider "The City Never Lies", (Inquiry 2 June 1985), 38

<sup>6</sup> Higgot Andrew and Timothy Wray, Introduction: Architectural and photographic constructs in Camera Constructs: Photography, architecture and the Modern City, (Routledge, 2012) 1

<sup>7</sup> Timothy Wray, "Haunted Halls of Mirrors: Photography and the Phenomenology of Emotional Space" in *Camera Constructs: Photography, architecture and the Modern City,* ed Timothy Wray and Andrew Higgot, 111

<sup>8</sup> Steven Jacobs, "Leafing Through Los Angeles: Ed Ruscha's Photographic Books: Serialism and Immanent Minimalism" in *Camera Constructs: Photography, architecture and the Modern City,* ed Timothy Wray and Andrew Higgot, (Routledge, 2012) 216

<sup>9</sup> Rosalind Krauss, "The Photographic Conditions of Surrealism." (The MIT Press, 1981)

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# LESSONS LEARNED: TOWARD A TRANSGRESSIVE AND TRANSDISCIPLINARY PEDAGOGY FOR STEAM STUDENTS

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#### INTRODUCTION

First in a series on What's Missing? New Ways to Teach Old Knowledge for STEAM Education.

As traditionally trained designers, we have experienced the flexibility of simple skills such as hand drawing. As formally trained researchers, we have seen the power that structured research tools bring to exploration learning.<sup>1</sup> As technologists, we have encountered resistance from faculty, corporate coworkers and others against using new tools. In this first paper we present a collection of autoethnographic classroom research to help define the space we are working in and outline a comprehensive conceptual framework that we intend to expand across the series.

An initial candidate pedagogical model is proposed. Grounded in the work of design philosophers and researchers, this could provide a base for refining STEAM education. Six projects are analyzed to show forms of transdisciplinary education that produce actionable project outcomes and competent, engaged student-citizens. These projects are analyzed together for suggesting better methods of teaching creative skills synthesis in a rapidly changing world.

To this end, we are integrating at our own level and with control, a new form of transdisciplinary education that recognizes and practices what worked in the past in new ways.

# EXTEND

How can educators extend what works well in physical, studio-based, in-person and hands-on education into the digital realm while compensating against issues that repeatedly arise in the digital?

At Arizona State University (ASU), several programs use forms of what can be called Exploration Learning, based on the Boyer Report recommendations<sup>1</sup> that attempt to answer some of the challenge posed by Miller summed up as "It is hard to avoid the observation that these two recent trends are inherently **experiential**, involve **making** things (rather than learning about things), and lie outside the traditional school curriculum."<sup>2</sup> (author's emphasis). This is closely related to what IBM calls

developing the 'T-Shaped' professional<sup>3</sup> in that these large enterprises need workers who can selfmotivate, self-inform, do research and effectively communicate.

# THE 4:3 MODEL

The **4:3 Model For STEAM** (our term) can be a rigorous, research-first framework for this kind exploration learning education. Elements of it are found in Design Research programs worldwide but not generally taught as a conceptual framework for STEAM. Other elements are found in programs such as the ASU Interplanetary Initiative's Bachelors of Technological Leadership that emphasize asking questions then making tools to answer those questions<sup>4</sup>.

In the 4:3 model, formal design thinking, research and practice are the glue that holds all transdisciplinary work together. This framework can be operationalized in many different settings but pedagogically is intended for use in an exploration learning curriculum of posing questions, conducting research and making potential solutions. Design is treated as a strategic, overarching asset that informs all levels of education and enterprise.

#### Friedman, et al.'s, Research Frameworks:

Friedman, van der Waarde, Norman and others<sup>5</sup> have outlined this framework in an extensive discussion on the 'PhD Design' email list, based on integrative work begun decades ago by Schön<sup>6</sup>. This framework encompasses essentially all forms of research in three categories.

Basic research includes searching for general and abstractable principles. This should be generative and capable of making predictions.

Applied research applies those principles to specific problems and may generate new questions.

Clinical research applies these to specific cases, leading to guidelines to specific problems.

To create a comprehensive conceptual framework that integrates into STEAM curriculum, we recommend a second phase space to integrate these frameworks.

# Buchanan's Levels of Design:

- 1. Visual & Symbolic
- 2. *Objects & Artifacts*
- 3. Activities & Organized Services (Experiences)
- 4. Complex systems

Buchanan's four levels of design<sup>7</sup> are a way to understand all material and virtual crafting of the built environment. These levels of design are also applicable, if constrained by subject matter, outside of the design fields.

Design education in this new context encompasses a wide array of knowledge domains by necessity. No longer is architecture a singular pursuit, the architect must understand management, economics, electronics, some elements of the underlying issues in a software-driven world. Same for the industrial, graphic, or interior designer. These integrative skills extend in reverse through other fields

as design thinking and exploration learning. Early, strategic design produces better and more sustainable outcomes at all levels.

#### PROJECTS

Six projects are presented in brief to provide a base for our initial analysis.

#### **AR CM SANDBOX**

One of the most difficult topics to teach introductory construction management students is how to read civil engineering site plans, details, grading plans and topographic information. This information is imperative for students to fully grasp in order to excel in future estimating and scheduling courses.. Initially, breaking down "the layers of information involved with a single drawing can be daunting to students who have never attempted to simplify and extract specific data from the document"<sup>8</sup>.

In an effort to streamline the introduction of civil site plans and topography drawings to undergraduate students at Wentworth Institute of Technology, augmented reality through the use of simple sensors and visual projections was leveraged, in a lab setting. Through the use of this hands-on tool to physically model scaled site conditions, students are immersed in a real-time response and feedback loop in which they can test their understanding of complex topics in the engineering and construction management disciplines.

The major findings from the initial research related to the use of the AR sandbox were further solidified through the analysis of a second round of survey data and lead to developing new lab module in the same undergraduate course (Figure 1 below) using the visual assembly of various 2D drawings into a final 3D product via the use of a 3D printing activity.



Figure 1: Students interacting with the augmented reality sandbox.

**Takeaway from the AR Sandbox:** Multi-modal visuals with real-time interaction between 2dimensional and 3-dimensional information enhances student understanding of complex layers found in design and construction documentation.

#### **CM 3D PRINTING**

"Spatial thinking ability is critical to understanding the information portrayed in construction drawings..."<sup>9</sup>. Understanding how graphical information on a two-dimensional sheet of paper is lifted

into the third dimension in physical space is crucial to defining construction specifics and ultimately project scheduling, estimating and project management.

The advent of 3-Dimensional printing (3D Printing) has changed the landscape of the design and construction industry and ultimately impacted the way technical subjects are explained and viewed in the classroom. This process of viewing in 3D first and translating back to traditional drawing views can be leveraged when introducing the connection between the designed and physical spaces.

Students were exposed to 3D computer modeling software with basic geometric concrete masonry unit (CMU) block models that matched a handout of 2-Dimensional drawings of the same objects. This allowed the students to explore the 3D object, in real-time, while connecting the faces and model print layers (Figure 2) on the computer screen to different types of drawings on the handout.



Figure 2: Highlights of a simple concrete masonry unit (CMU) model that was utilized as the basis for exploring standard model views and drawing views.

**Takeaway from CM 3D Printing:** Just because you can, doesn't mean you should. The use of cutting-edge technology in lieu of traditional teaching methods does not always directly result in higher retention rates for students related to required course content.

# CELESTIAL GAZE

The Celestial Gaze Method<sup>10</sup> or CGM is used to explore what Taylor<sup>11</sup> calls Social Imaginaries in exploring optimal futures. The CGM consists of two complementary systems of photo-elicitation as described by Lapenta<sup>12</sup> based on Collier's photo-interviewing techniques<sup>13</sup> for exploring future narratives through subject image-generation and narration.

The first technique uses a series of cards of planetary images laid out in a grid or strip that participants select images, then use those cards to tell a story of their future in outer space. Typically a participant will work through a series of 3 exercises in which they select images from a grid of cards, from just a single source, and then narrate a story. This was always done as an individual exercise.



Figure 3. A participant describes and selects from a set of single topic cards, Mars in this case.

The second technique was tested with middle school students. The students drew images of their futures as citizens in outer space and narrated them on video. This was done as both individual exercises and group co-creation.

The data generated is used in three ways. The first use is to render statistical information on the participant's perception of imaging technology as it changes through time. It was used to generate narratives about space futures that were utilized for ethnographic analysis or for planning product/environment development. Further use and analysis of the method has shown it to be a powerful tool for describing social imaginaries as applied to futures narratives.

# Takeaway from the Celestial Gaze Method:

Reimaging and re-building old methods for use in new ways can produce unexpected, positive results.

# LUNA CITY 2175

Luna City 2175 was the theme for ASU's annual Emerge festival in 2018 with author Kim Stanley Robinson as artist in residence.

Luna City is a futuristic space simulator in a theatrical setting, or serious research as play. Luna City presents a future in which people live, work and play in a robotically-built 'Superadobe'<sup>14</sup> sandbag dome and tube city encircling a giant crater at the Lunar south pole. Over the course of a weekend in March, 2018, approximately 900 people experienced the lush regolith-and-bamboo environment, rich graphical treatments and experienced a slice of life with several dozen actors simulating the future of daily life on Earth's nearest neighbor.

Luna City started as a series of formal thought exercises among an ad-hoc group of writers, space scientists, dramaturges, artists, designers and engineers. Over the course of 8 months, it involved nearly 200 people in the creative process. Work was conducted in-person, in realtime conferences online and through an extensive Slack and Google Drive infrastructure. Sketches and concepts became structures, performances, costumes and a living block of a space city in that time.

Design of Luna City's built environment iterated rapidly across student teams handling construction, artifacts, costumes, systems, wayfinding and animations. Student developers were afforded considerable autonomy toward look, feel and function as long as their work functioned with other's designs. This created a layered, lived-in and vibrant feel to the city.

# Takeaway from Luna City 2175:

The right tools, funding and programmatic support make all the difference between success or failure.



Figure 4. Visitors in the Luna City habitat during a VIP evening.

# LUNA CITY: SCNEE VR HABITATS

SCNEE was an undergraduate capstone project offshoot of Luna City 2175. SCNEE involved creating a technically and geographically realistic second Lunar habitat in Unity virtual reality (VR) complete with population, life support and a garden dome. A series of animated augmented reality posters and a bit of futuristic real estate salespersonship completed the project.

Four undergraduate Seniors, most of whom were also working on production of Luna City, spent their school year building an accurate 3D model of a second Lunar polar habitat. This habitat was conceptually located in Amundsen Crater near Luna City's Shackleton Crater site. It used NASA 3D geometry to represent the terrain with a custom VR habitat model based on their research with ASU's School for Earth and Space Exploration. Inside the habitat, virtual characters could be encountered working, walking and maintaining the structure.

The students had a 1:1 ratio of mentors and support including one outside programmer, one graduate advisor, a Luna City mentor professor and their capstone professor. This level of support enabled them to create a realistic experience grounded in science and product design.



Figure 5. The SCNEE team holding augmented reality (AR) posters with their virtual reality (VR) system running behind them at Luna City 2175.

# Takeaway from SCNEE:

Extensive support, access to tools and grounding in real-world data make a difference in learning outcomes.

# VIMS 2020 DATATHON

VIMS (ASCE) held an architectural visualization competition in February and March 2020 during the beginning of the pandemic quarantine. A multi-disciplinary student team composed of members from Wentworth Institute of Technology, Auburn University and Arizona State University, took second place in the inaugural American Society of Civil Engineers (ASCE) Computing Division 2020 Datathon Competition in Tempe, Arizona this spring.

For Phase 1, the competition team generated a coordinated Building Information Model (BIM) from a provided set of building documents. This model was then evaluated by subject matter experts for completeness, semantic data representation, model accuracy and final renderings and a video presentation.

After successfully navigating Phase 1, the team switched gears and focused on the generation of a single-person Virtual Reality (VR) model of the building using open-source gaming engines. This final model, which was developed utilizing Unity 3D, was evaluated for VR model completeness.



Figure 6: 3d View of Native Building Information Model Produced by the Student Team.

Overall, this project showcased the ability for future, multidisciplinary teams to collaborate quickly in an all virtual environment. The competition team spanned three time zones, with students spread across 2,500+ miles of distance. Communication was handled largely via Slack, cloud data sharing and the Autodesk BIM360 tool. Live VR development took place in rapid succession through scrum development techniques and the outcome proved to be quite successful with such short timeframes for each respective deliverable. An additional Augmented Reality model was developed using Microsoft Hololens and VisualLive software.

# Takeaway from the VIMS Datathon:

Dedicated teams tend toward narrow scopes but work quickly and efficiently inside that context. Adhoc teams tend toward broader skill sets while bringing unique assets to bear with an ability to work across wider constraints. This enables a certain speed when approaching deadlines despite shifting infrastructure. Each approach has strengths and weaknesses.

# ANALYSIS

# **Analysis of Project Takeaways**

Enhancing student comprehension, uptake and skills retention using appropriate technology enhances the educational experience for everyone involved. Using new tools to solve old problems and old tools to solve new problems produces unexpected and often positive results. Balancing teams with projects and appropriate funding, tools and mentors helps enhance outcomes.

# **Analysis of Needs**

Students increasingly work asynchronously, even across time zones. Many are older or otherwise nontraditional undergraduates, balancing complex life tasks with student duties. Educators and platforms by necessity will have to embrace and evolve to accommodate these students.

Some undergraduates seem to be forgoing the purchase or use of laptop or desktop computers in favor of mobile phones. While cost saving, this approach means slower, less accurate work, no work accomplished or a lack of access to professional grade software.

As many have experienced with the pandemic, not everyone's level of Internet access is consistent. This was true before COVID-19 but is emphasized now as bandwidth and computing power also hold implications for class and justice issues.

## **Analysis of Tools**

Drawing is rapid. It is flexible. Drawing as a core skill affords students the ability to rapidly test and communicate very complex forms, building or site massing, concepts, motions and visual compositions without committing to endless digital rendering, Photoshop or other tools. Drawing strips away the unnecessary while enabling better use of those tools later. As Professor Leake is quoted "To do engineering you've got to be able to visualize."<sup>15</sup>

The nuances of 2-dimensional, hand-drawn work is typically lost when jumping straight into a digital media. However, the manipulation of digital data, once these details are understood, is expedited and lends itself towards an interest in generative drawing techniques and rapid-prototyping.

Developing an understanding of physical drawings enhances a move into the third dimension of space, the vertical nature of plan. Physically replicating a hand drawn plan through full model construction helps students to understand physical space, limitations of construction technology and how their own internal process translates into the real world.

Microcontrollers like the popular Arduino can help students to integrate sensors, actuators, data transmission and some amount of intelligence into a wide range of projects. These tools use simple, commodity electronics together with open source hardware and software to put an expanding set of abilities in front of students.

An important and often overlooked aspect is the nature of closed vs open source software. Some software, specifically Revit, AutoCAD, SolidWorks, and the Adobe suite have little in the way of open source competition. There is a duality to this in that undergraduate students need to know how to operate the software they will use as professionals while being aware of open source alternatives.

# CONCLUSION

*Speed of knowledge* is the singular factor in stimulating thought. Students want to see the end result before they understand the details. Understanding this reality assists the educator in developing situations in which *rapid iteration* for students becomes a learning process and not an exploratory process. This allows the students to stay engaged with solving a problem while not necessarily focusing on optimizing a solution. Optimization can come later.

Learning the *in-between processes* is important, software doesn't solve everything. Research, iteration and working through roadblocks (mental, academic, personal) are exactly what help students grow. Simply giving credit for assumed effort is not enough.

Tools are important but *attention span* and application of skills are more important. Keeping and helping students focus on tasks, in-person or virtually is vital. An age of distractions can not keep the next generation from being prepared for life.

Formal research always wins against unstructured brainstorming. Structured thinking methods, from De Bono's Six Thinking Hats to IDEO's quiver of design thinking tools afford quick but also accurate ways to ideate. A world of design research, design thinking and other forms of applied psychology provide a wealth of new tools for all enterprises.

# NOTES

1. "(L)earning is based on discovery guided by mentoring rather than on the transmission of information. Inherent in inquiry-based learning is an element of reciprocity: faculty can learn from students as students are learning from faculty." Kenny, "Reinventing Undergraduate Education: A Blueprint for America's Research Universities."

2. Miller continues on page 5, "Learning to make things is inherently experiential, as compared to learning about things, which is much more cerebral. Those who work in the arts have always understood this. The arts have long focused on self-expression, design and studio "thinking," and pedagogies that involve long hours of practice and emotional engagement—like recitals and concerts. Mastery, rather than knowledge, is the primary goal of the arts. In the arts, it matters as much or more how you say or do things than it does what you say or do. Technic is the hallmark of artisanship, not knowledge alone." Miller, "Why the Hard Science of Engineering Is No Longer Enough to Meet the 21st Century Challenges."

3. Committee on Integrating Higher Education in the Arts, Humanities, Sciences, Engineering, and Medicine et al., *The Integration of the Humanities and Arts with Sciences, Engineering, and Medicine in Higher Education*.

4. Elkins-Tanton, "SESE Online Teaching Presentation, July 2020."

5. The origins of this framework began as a discussion on 'Clinical Research and Clinical Guidelines' on the PhD-Design email list, see Friedman et al., "Clinical Research and Clinical Guidelines."

6. "The application of basic science yields applied science. Applied science yields diagnostic and problemsolving techniques which are applied in turn to the actual delivery of services. The order of application is also an order of derivation and dependence. Applied science is said to "rest on" the foundation of basic science. And the more basic and general the knowledge, the higher the status of its producer." See Schön, *The Reflective Practitioner: How Professionals Think In Action.* 

7. As with Miller, John Dewey heavily influenced Buchanan's thinking about design, and experience. "To gain some idea of how extensively design affects contemporary life, consider the four broad areas in which design is explored throughout the world by professional designers and by many others who may not regard themselves as designers. See Buchanan, "Wicked Problems in Design Thinking."

8. Cribbs, "Engaging Augmented Reality to Introduce Civil Engineering Site and Grading Plans to Undergraduate Students."

9. Ibid.

10. Gigantino and Trinidad, "Interpreting the Celestial Gaze Through A Technologic Lens: Exploring Professional and Public Views of Outer Space through the History of Space Imaging."

11. An extensive discussion on culturally-situated narratives is in Taylor, *Modern Social Imaginaries*.

12. Collier, et al. used "photographic essay" and "photo-interviewing", these terms were formalized in Pauwels, Lapenta, Pink and others into "photo-elicitation" in Margolis and Pauwels, *The SAGE Handbook of Visual Research Methods*.

13. Collier, Collier, and Hall, *Visual Anthropology*.

14. Khalili's Superadobe is a sandbag and barbed-wire rammed earthbag construction tectonic initially developed for lunar bases in the 1980's that has seen extensive use in building residential earthship houses and disaster relief structures. See Khalili, *Ceramic Houses and Earth Architecture*.

15. This article extensively discusses the re-convergence of engineering and design disciplines, partially around the utility of drawing as visual thinking, see Fountain, "Putting Art in STEM."

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# IMMERSIVE DESIGN FICTION FOR URBAN EXPERIENTIAL FUTURES: TECHNIQUES AND REFLECTIONS FROM THE CLASSROOM

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# ABSTRACT

Immersive design fictions (IDFs) place participants in virtual reality and invite them to engage with interactive elements as if they were a character in a speculative storyworld. This approach offers a rich palette for crafting speculative experience through embodied interactions with environments, objects, and other agents. This paper illustrates a technique for incorporating IDF methods into the design classroom and argues that IDFs can be valuable tool for thinking speculatively in embodied and spatialized ways. Further, by situating speculative interaction in a virtual storyworld, IDFs also offer experiential anchors for considering the social implications and ethics of a design fiction scenario. These points are illustrated through a range of examples from student work, including projects that explore: climate futures, pandemic futures, speculative automation services, modular housing technologies, and a revolutionary speakeasy.

# AUTHOR KEYWORDS

design fiction; immersive design fiction; virtual reality; speculative design; experiential futures.

# INTRODUCTION

Over the past decade, in fields of design and HCI, design fiction has developed as a method to probe design possibilities, defamiliarize assumptions about technology, and open up critical discussion about social implications. Blending science fiction and science fact, design fictions serve as diegetic objects that practitioners and researchers can use to explore possible futures and other speculative scenarios. In Julian Bleecker's now canonical 2009 web essay about design fiction, he argues that any story designers tell about a new technology or interface is also a story about the interaction rituals<sup>1</sup>— the protocols, routines, and social meanings—that we imagine accompanying and evolving alongside an emerging technology or novel interface.<sup>2</sup>

Elsewhere, I have argued that the prototypical 'diegetic object' of design fiction has typically prioritized discursivity over embodied experience by treating the latter as an epiphenomenon of the designed object—as something to be provoked in the *imagination* rather than something to be experienced directly. <sup>3</sup> Some have described this distinction as an "experiential gulf" between our

ability to imagine the future and our ability to experience it.<sup>4</sup> However, increasingly, designers and researchers have developed creative ways to bridge this gulf by integrating approaches from speculative and embodied design. This work includes: experiential future,<sup>5</sup> speculative ritual design,<sup>6</sup> speculative enactments,<sup>7</sup> games as speculative design,<sup>8</sup> tangible envisioning in public space,<sup>9</sup> and speculative civics.<sup>10</sup>

Immersive design fiction (IDF) similarly expands the purview of design fiction beyond the diegetic object<sup>11</sup> to include broader experiential phenomena. VR has long been demonstrated as a medium of experience design,<sup>12</sup> and in particular, research has identified 'presence' (a perceptual cue) and 'immersion' (a broader experiential parameter) as key aspects that characterize VR.<sup>13</sup> Immersion in VR includes spatial immersion and immersion through participant agency, while IDFs also incorporate diegetic immersion—which includes immersion with other characters, objectives, constraints, and story logic within a fictional world.

# **Immersive Design Fiction**

By situating design fiction within VR, IDFs present a "slice of life" in a speculative storyworld and offer a more embodied lens for grappling with the implications of design fiction scenarios. Specifically, IDFs enable users to explore new kinds embodied actions, interaction rituals, navigable environments, all placed in the context of a coherent storyworld. Research on IDFs has argued that immersive design fictions are particularly well suited for prototyping embodied, social, and contextually rich aspects of speculative experiences and storyworlds.<sup>14</sup> Existing work in this area includes a case foundational study exploring speculative interfaces and interaction rituals for creative collaboration [Fig. 1]<sup>15</sup> as well as a VR exhibit for the United Nations called Simtainer, that explores the future of modular health, agriculture, and housing [Fig. 2].<sup>16</sup>



Figure 1: An immersive design fiction scenario exploring the future of creative collaboration in industrial design <sup>17</sup>. Sponsored by Steelcase Workspace Futures, the project was developed by Max Kreminski, Michael Kozlowski, and Keshav Prasad, and directed by Joshua McVeigh-Schultz and Scott Fisher of the Mobile and Environmental Media Lab at the University of Southern California.



Figure 2: Simtainer VR exhibit was created by the Emerging Media Lab of the Institute for the Future. The project uses shipping container as a motif and physical anchor to explore modular futures of housing, health, and agriculture. Developed by Alexander Goldman, directed by Toshi Hoo and Dylan Hendricks.

This paper expands on this research by focusing on IDF as a pedagogical vehicle that incorporates methods of speculative ritual design,<sup>18</sup> design fiction worldbuilding,<sup>19</sup> and embodied improvisation<sup>20</sup> in social VR. IDF methods in the classroom can be used to: (1) enable creators and VR participants alike to think speculatively with-and-through the body, (2) explore the relationship between embodied experience and the designed environment, (3) scaffold critical discussion about the social implications and ethics of a design fiction scenario.

#### **IMMERSIVE DESIGN FICTION IN THE CLASSROOM**

The following section illustrates IDFs as vehicles for exploring experiential futures in a pedagogical context. For the past two years, I have been teaching students to create immersive design fictions in VR as part of an advanced interactive media class for upper division design undergraduates. The course focuses on VR design as a medium for prototyping spaces, interfaces, and experiences. While this is an advanced interactive course, students enter with a core skillset in 2D graphic design, and for many of them, this is the first class where they have had to think deeply about and fully embodied 3D spatial experience. As part of a first assignment, students are asked to design an environment to support a particular kind of social interaction in VR. They specify what kind of interactional goals they want to support, and then, using a variety of tools,<sup>21</sup> they prototype and test an environment in VR to see how well it supports these goals.

In preparation for this first assignment, students watch excerpts of William H. Whyte's documentary *The Social Life of Small Urban Spaces*<sup>22</sup> to inspire them to think critically about the ways that the built environment can influence how social interactions unfold—sometimes in unexpected ways. Then, drawing from research on social VR<sup>23</sup>, students examine the ways that environmental architecture and context cues can shape social interactions in VR. The class surveys a range of social VR applications, including: Rec Room, Altspace, VRChat, and Anyland, and we discuss the ways that context cues can invoke a sense of place and shape different metaphors of activity in VR<sup>24</sup>. We also look at the ways that the architecture of space can shape affordances of movement and evoke feelings of exposure to, or protection from, risk.

After learning how to prototype VR interactions in Unity,<sup>25</sup> students develop a final project, in which they create an immersive design fiction, exploring a particular social issue through the lens of an experiential prototype of a possible future. During their initial ideation process, students collaborate in

small "studios" to develop a coherent vision for a shared storyworld. Here they draw on methods of worldbuilding—a system of collaborative authoring developed by production designer Alex McDowell.<sup>26</sup> A key to effective worldbuilding is anchoring the exploration of an imagined world by starting with a very clear "what if" scenario. For example, "what if the pandemic persisted for a decade?" Such a provocation might open up a series of cascading implications involving, for example: urban landscape and architecture, social rituals of consumption, etc.

Next, students hone in on a particular slice of experience in the world they've developed and explore it using methods of speculative ritual design,<sup>27</sup> beginning with a "puppet show" improvisation with small figurines and overhead sketches [Fig. 3], in order to flesh out the spatiotemporal beats and structure of a potential ritual or social routine.



Figure 3: Documentation of ritual "puppet show" design method, including overhead sketches of space, figurines representing humans, and clay props.

This method invites participants to attend to the particular ways that partitions of space and time map onto social roles, movement of bodies, and symbolic transformation of the objects and participants involved. During this exercise, I emphasize to students that I am agnostic about whether they focus on the concept of 'ritual' or mundane alternatives like 'routine' or 'activity' — but I emphasize that methods of speculative ritual design offer is a lens through which we can start to see the symbolic structure of familiar routines with fresh eyes (for example, see the diagram in Figure 4 on the ritual of making a purchase).



Figure 4: Making a purchase as analyzed as through a ritual lens.

Students then translate this ritual "puppet show" into an embodied improvisation<sup>28</sup> in VR that incorporates techniques of bodystorming and Wizard-of-Ozzing [Fig. 5]. For this phase, students create a prototype environment in VR, utilizing Mozilla Spoke and Mozilla Hubs to interact with one another in a shared VR environment. Lastly, students build their final VR experience prototypes in Unity using a VR interaction library and deploying their experience to the HTC Vive or Oculus Quest.



Figure 5: Students conduct an embodied improvisation utilizing Vive Trackers as part of an embodied improvisation with a "Wizard of Oz" technique for controlling a robot avatar in VR.

Throughout these processes, students engage in discussions with myself and one another. At the completion of the course, students demo all the projects as part of a final in-class review, in which we discuss specific of design choices that shape the experience as well as broader topics such as social implications and ethics of a given technology or scenario. These discussions serve as reflective vehicles for design<sup>29</sup> and support the process of thinking-through-making.<sup>30</sup>

# Student immersive design fiction work

Student IDF projects have covered a range of topics including: climate futures, pandemic futures, speculative automation services, modular housing technologies, a speakeasy in a nationalist dystopia, and familial relationships with robots. Climate futures in particular, has proven to be a common exploration topic, with students often depicting urban coastlines submerged in floodwaters. In this work, students grapple with the lived experience and behavior patterns of inhabitants occupying these changing landscapes. For example, Figure 6 shows a project exploring rituals of local travel/commuting by boat in an urban landscape transformed by rising sea level.



Figure 6: An interactive VR experience exploring rituals of local transportation in flooded urban coastal environments. Created by Rachael Rodriguez (2019).

This past semester, students also explored possible COVID-19 futures, examining how architecture, urban design, and social rituals of consumption might be reshaped by an extended pandemic. For

example, Figure 7 depicts rituals of temperature-check and sanitization that could occur at the thresholds of public buildings like supermarkets. Class discussions during in-progress iterations for this project focused on reimagining the architecture and human flows of the supermarket, touching on questions such as: How might the store be partitioned by thresholds? How would the sanitization ritual be spatially demarcated from the rest of the store? And what role would human workers play, if any?



Figure 7: An interactive VR experience depicting a robot-driven temperature-check and sanitization ritual that occurs before a participant can enter into a supermarket. Created by Kevin Lu (2020).

Student projects have also covered various forms of technological innovation, including an exploration of an urban landscape transformed by an automated driving service [Fig. 8]. In-progress discussions for this project led to an exploration of how to guide VR participants to move within an unfamiliar house's interior. Subtle audio and visual cues were designed to guide the participant to a virtual tablet, then to an exterior, and finally into an automated vehicle. Crafting these micro-interactional beats proved crucial in supporting the VR participant's capacity to suspend disbelief and imagine that the house and morning commute were their own.



Figure 8: An interactive VR experience depicting an automated driving service. Created by Cameron Kurtz (2020).

Other automation related projects opened up broader discussions about social implications and ethics of automation technology. For example, one project focused on drone-based package delivery [Fig. 9] and provoked speculation about new practices of theft (such as shooting drone packages down from the sky) as well as a conversation about the dynamics of theft and the ethics of theft deterrence mechanisms in the context of increasing social inequality.



Figure 9: An interactive VR experience depicting automated package delivery by drones. Created by Pablo Wu (2020).

A number of students explored augmented reality (AR) futures, touching on topics ranging from emotions in public space to the economics and aesthetics of neighborhoods. The immersive design fiction presented in Figure 10 envisions a wearable interface that enables one to control an AR overlay that conceals an otherwise bleak and monotonous housing environment. This project prompted a broader conversation about how urban environments might be experienced simultaneously through different perspectives (augmented layers) and how these differing aesthetics might disrupt the ways that space communicates status and a shared sense of place.



Figure 10: An interactive VR experience depicting a wearable bracelet interface that enables the wearer to turn on and off an AR overlay, transforming an otherwise bleak and monotonous housing environment into a lush hillside. Created by Elissa Crevoiserat (2020).

Other students explored the housing crisis in the San Francisco Bay Area and posed a "what if" scenario involving a new technology utilized for mobile airborne housing [Fig. 11]. Their VR experiences explored ways that such a technological innovation might ultimately be influenced by new forms of social stratification. Classroom discussion during final review foregrounded the ritual of waiting for one's mobile house-drone to "pick them up" after a shift at work and explored how elite "pick up" experiences might differ from more working class analogues.



Figure 11: Two VR projects, side-by-side, both existing in the same storyworld. On the left is a luxurious floating housing scenario for elites—created by Ashley O'Brien (2019). On the right is where lower income workers wait post-shift while their modular houses queue for "pick up"—created by Angela Gabriel (2019).

Many students gravitated to elements of dystopia in their work, and I consistently attempted to guide them to think in more hybrid or complex ways, for example, considering pockets of utopic vision within broader dystopic worlds (and vice versa). One group of students developed a scenario involving future United States that had entirely succumbed to authoritarianism and climate-induced economic decline [Fig. 12]. Discussions opened up by this project included an exploration of the role that digital traces in the environment might serve in facilitating clandestine political resistance movements.



Figure 12: Documentation of a VR project exploring a revolutionary speakeasy in a hyper-nationalist dystopia. Top left shows exterior of building. Top right shows initial false décor (with hidden passage behind curtain). Bottom left shows stage and night club venue. Bottom right shows dormitory bunks. Co-created by Cody Baker, John Shollenberger, and Yumiko Inoue (2019).

Within this world, they developed a community that resisted authoritarianism by congregating in a revolutionary speakeasy. When the VR participant enters a nondescript bar, they encounter a passageway behind a red curtain and are transported to another room, a clandestine meeting spot that doubles as a night club and subterranean dormitory.

# REFLECTIONS

Previous research on IDFs called attention to a set of opportunities unique to this approach including: positioning the user as an embodied character in a storyworld, redesigning familiar interaction rituals for new fictional contexts of use, and using the virtual storyworld as a testing ground for unpacking design fiction ideas. Based on this exploration of immersive design fiction in the classroom, I will here elaborate on several additional opportunities that characterize the unique possibility space opened up by IDF methods. Specifically, engaging with speculative rituals, routines, and other situations in VR enables creators and participants alike to consider the way an experience might actually *feel* in the body through specific sequences and combinations of actions-in-context. In the classroom, this engagement can open up nuanced discussions about the micro-interactional beats of an experience or the subtle ways that choices and agency are embedded in the architecture of space and the context cues of place.<sup>31</sup>



Figure 13: .Bot: an interactive VR experience depicting a showroom where participants can purchase a robot family member. Created by Elena Avaltroni and Dominika Laukova (2019).<sup>32</sup>

Unlike traditional design fiction "artifacts," immersive design fictions foreground the relationship between an experience and its surrounding context in very explicit ways. Spatiality and environmental design are non-optional. In one project, students created a glass showroom where participants could purchase a robot family member [Fig. 13]. Despite elaborate visual branding, the environment outside of the showroom had been left empty, prompting questions from the class about how the urban landscape might evolve in the context of the nuclear family being destabilized by robot family members. Consequently, even though the students didn't design this aspect of the urban landscape, the empty environment nevertheless became a focus of attention and prompted a rich conversation about this feature as a missing element.

In these sorts of design discussions with students, conversations about speculative technologies or possible futures were anchored by the specifics of a spatiotemporally concrete and contextualized VR experience. In our conversations, this shared experiential anchor seems to unlock unique processes of imagining, as participants inferred beyond the purview of a singular experiential instance to consider the surrounding world that envelopes the local VR scene. Along similar lines, science fiction writers like Samuel R. Delany have long described the ways that sci-fi literature often invites the reader to read between the lines in order to make inferences from incomplete information<sup>33</sup>—a process that Scott Bukatman refers to as 'inferential activity.' "Sentences such as 'The door dilated'... allude to the complexity of a world that must be constructed through inference."<sup>34</sup>

Unlike literature or film, IDFs offer different modes of inferential activity and a different vantage point from which to unpack the social implications of a particular design fiction scenario. Since

landscapes are constrained by navigational and visible limits, participants are invited to imagine beyond the limits of their own local purview and to make inferences about the wider world based on what is directly in front of them. Likewise, temporal constraints set up a similar dynamic. While IDF experiences typically take place within a demarcated period of time and focus on engagement with a specific set of interactional goals, they nevertheless invite participants to infer broader cultural patterns of activity. A singular event (such as a specific instance of a sanitization ritual) can point indexically to a much wider category or "genre" of experience. Further, the singular event or situation can stand in metonymically for an entire world or ideological system, as in Clifford Geertz analysis of ritual as a microcosm standing in for an entire cosmology.<sup>35</sup> For example, the experience of shopping for a new robot family member maps onto an entire ideological system of shifting values around human relationships. In this way, IDFs can support inferential activity in the form of metonymic imagination, whereby experiential instances "stand in" for broader cultural patterns, systems, and ideological structures.

In sum, as an embodied medium, IDFs demand specificity in terms of the ways that actions are primed, sequenced, and spatiotemporally contextualized. By foregrounding embodied action and environmental context, IDFs support engagement with experiential forms of knowledge, "thinking speculatively" with-and-through the body. This richly embodied approach to design fiction represents an alternative lens for exploring the social implications of a design fiction scenario through the specificity of a particular slice of an experiential world. And from this unique vantage point, creators and VR participants alike can activate new forms of inferential activity derived from the spatiotemporal constraints of VR and the processes of indexical and metonymic imagination.

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#### NOTES

<sup>1</sup> Bleecker borrows the concept of the 'interaction ritual' somewhat obliquely from Erving Goffman's book of the same name.

<sup>2</sup> Julian Bleecker, *Design Fiction: A Short Essay on Design, Science, Fact and Fiction, Near Future Laboratory* (Near Future Laboratory, 2009).

<sup>3</sup> Joshua McVeigh-Schultz, "Designing Speculative Rituals: Tangible Imaginaries and Fictive Practices from the (Inter)Personal to the Political" (2016); Joshua McVeigh-Schultz, "Designing Speculative Rituals and Other Tangible Imaginaries," in *Unfrozen - A Design Research Reader By The Swiss Design Network* (Zürich: Triest Verlag, 2018); Joshua McVeigh-Schultz et al., "Immersive Design Fiction: Using VR to Prototype Speculative Interfaces and Interaction Rituals within a Virtual Storyworld," in *Proceedings of the 2018 on Designing Interactive Systems Conference 2018 - DIS '18* (the 2018, Hong Kong, China: ACM Press, 2018), 817–29, https://doi.org/10.1145/3196709.3196793.

<sup>4</sup> Stuart Candy and Jake Dunagan, "Designing an Experiential Scenario: The People Who Vanished," *Futures*, no. June (2016), https://doi.org/10.1016/j.futures.2016.05.006; Stuart Candy and Jake Dunagan, "The Experiential Turn," *Human Futures*, no. December (2016): 26–28.

<sup>5</sup> Candy and Dunagan, "Designing an Experiential Scenario: The People Who Vanished."

<sup>6</sup> McVeigh-Schultz, "Designing Speculative Rituals: Tangible Imaginaries and Fictive Practices from the (Inter)Personal to the Political"; McVeigh-Schultz, "Designing Speculative Rituals and Other Tangible Imaginaries"; Nicolas Nova, "Design Ethnography? Towards a Designerly Approach to Field Research," in *Empowering Users through Design: Interdisciplinary Studies and Combined Approaches for Technological Products and Services* (Springer, 2015), 119–28, https://doi.org/10.1007/978-3-319-13018-7\_7; Nicolas Nova et al., "Curious Rituals: Gestural Interaction in the Digital Everyday Life," 2012.

<sup>7</sup> Chris Elsden et al., "On Speculative Enactments," in *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17* (the 2017 CHI Conference, Denver, Colorado, USA: ACM Press, 2017), 5386–99, https://doi.org/10.1145/3025453.3025503.

<sup>8</sup> Paul Coulton, Dan Burnett, and Adrian Gradinar, "Games as Speculative Design : Allowing Players to Consider Alternate Presents and Plausible Futures," in *Design Research Society* (Brighton, UK, 2016).

<sup>9</sup> Michael Smyth and Ingi Helgason, "Tangible Possibilities—Envisioning Interactions in Public Space," *Digital Creativity* 24, no. 1 (2013): 75–87.

<sup>10</sup> Karl Baumann et al., "Infrastructures of the Imagination," *Proceedings of the 8th International Conference on Communities and Technologies - C&T '17*, 2017, 266–69, https://doi.org/10.1145/3083671.3083700; Carl Disalvo, Tom Jenkins, and Thomas Lodato, "Designing Speculative Civics," in *CHI '16, Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 2016.

<sup>11</sup> Bruce Sterling, responding to Bleecker's essay, crafted the oft-quoted working definition of design fiction as the "deliberate use of **diegetic prototypes** to suspend disbelief about change." Note: 'Diegetic' here comes from the film-term diegesis (shorthand for "the imagined storyworld of a filmic work").

<sup>12</sup> Scott S. Fisher, "Recent Developments in Virtual Experience Design and Production," ed. Scott S. Fisher, John O. Merritt, and Mark T. Bolas (IS&T/SPIE's Symposium on Electronic Imaging: Science & Technology, San Jose, CA, 1995), 296–302, https://doi.org/10.1117/12.205871; Jason Jerald, *The VR Book: Human-Centered Design for Virtual Reality*, First edition, ACM Books 8 (New York: acm, Association for Computing Machinery, 2016).

<sup>13</sup> Mel Slater, "Immersion and the Illusion of Presence in Virtual Reality," *British Journal of Psychology* 109, no. 3 (August 2018): 431–33, https://doi.org/10.1111/bjop.12305.

<sup>14</sup> Joshua McVeigh-Schultz, "Immersive Design Fiction for Urban Experiential Futures" (Connections: Exploring Heritage, Architecture, Cities, Art, Media, Canterbury, UK: Architecture, Media, Politics, Society (AMPS), 2020); McVeigh-Schultz et al., "Immersive Design Fiction."

<sup>15</sup> McVeigh-Schultz et al., "Immersive Design Fiction."

<sup>16</sup> Toshi Hoo and Dylan Hendricks, *Simtainer*, Virtual Reality Exhibit, n.d., https://vimeo.com/216507798.

<sup>17</sup> McVeigh-Schultz et al., "Immersive Design Fiction."

<sup>18</sup> McVeigh-Schultz, "Designing Speculative Rituals and Other Tangible Imaginaries"; McVeigh-Schultz, "Designing Speculative Rituals: Tangible Imaginaries and Fictive Practices from the (Inter)Personal to the Political."

<sup>19</sup> Paul Coulton, Miriam Sturdee, and Mike Stead, "Design Fiction as World Building" (RTD Conference, Figshare, 2019), 4230036 Bytes, https://doi.org/10.6084/M9.FIGSHARE.4746964.

<sup>20</sup> David Sirkin and Wendy Ju, "Using Embodied Design Improvisation as a Design Research Tool," *International Conference on Human Behavior in Design*, no. October (2014): 1–7.

<sup>21</sup> Prototyping tools for this phase included: Tiltbrush, Google Blocks, and Mozilla Spoke (published to Mozilla Hubs).

<sup>22</sup> William H. Whyte, Social Life of Small Urban Spaces (Conservation Foundation, 1980).

<sup>23</sup> Joshua McVeigh-Schultz, Anya Kolesnichenko, and Katherine Isbister, "Shaping Pro-Social Interaction in VR: An Emerging Design Framework," in 2019 CHI Conference on Human Factors in Computing Systems Proceedings (Glagsow, Scotland, UK: ACM Press, 2019); Joshua McVeigh-Schultz et al., "What's It Mean to 'Be Social' in VR?: Mapping the Social VR Design Ecology," in Proceedings of the 19th International ACM SIGACCESS Conference on Computers and Accessibility - DIS '18 (the 19th International ACM SIGACCESS Conference, Hong Kong, China: ACM Press, 2018), 289–94, https://doi.org/10.1145/3197391.3205451.

<sup>24</sup> McVeigh-Schultz et al., "What's It Mean to 'Be Social' in VR?"

<sup>25</sup> For their second project, students are introduced to designing VR within the Unity development environment, leveraging the VRTK v4 library, and deploying to the HTC Vive. The VRTK library enables them to leverage an existing interaction library and prototype VR scenes quickly without having to grapple with sophisticated programming challenges. While this approach supports students who are less familiar with programming, it also enables more experienced coders to prototype quickly and focus on experience design over technical challenges. <sup>26</sup> Alex McDowell, "Storytelling Shapes the Future," *Journal of Futures Studies* 23, no. 3 (March 2019): 105–12, https://doi.org/10.6531/JFS.201903\_23(3).0009.

<sup>27</sup> For more on the methodology and approach of speculative ritual design see McVeigh-Schultz's 2016 dissertation for USC: McVeigh-Schultz, "Designing Speculative Rituals: Tangible Imaginaries and Fictive Practices from the (Inter)Personal to the Political."

<sup>28</sup> Sirkin and Ju, "Using Embodied Design Improvisation as a Design Research Tool."

<sup>29</sup> Phoebe Sengers et al., "Reflective Design," in *Proceedings of the 4th Decennial Conference on Critical Computing: Between Sense and Sensibility*, CC '05 (New York, NY, USA: ACM, 2005), 49–58, https://doi.org/10.1145/1094562.1094569.

<sup>30</sup> Matt Ratto, "Critical Making: Conceptual and Material Studies in Technology and Social Life," *The Information Society* 27, no. 4 (July 2011): 252–60, https://doi.org/10.1080/01972243.2011.583819.

<sup>31</sup> Steve Harrison and Paul Dourish, "Re-Place-Ing Space: The Roles of Place and Space in Collaborative Systems," in *Proceedings of the 1996 ACM Conference on Computer Supported Cooperative Work*, CSCW '96 (New York, NY, USA: ACM, 1996), 67–76, https://doi.org/10.1145/240080.240193.

<sup>32</sup> For documentation of this project see: <u>https://www.behance.net/gallery/88275543/BOT</u>

<sup>33</sup> Samuel R Delany, *Starboard Wine: More Notes on the Language of Science Fiction* (Pleasantville, N.Y.: Dragon Press, 1984).

<sup>34</sup> Scott Bukatman, *Terminal Identity: The Virtual Subject in Postmodern Science Fiction* (Durham: Duke University Press, 1993).

<sup>35</sup> On this point, I recognize Gavin Melles, who—in a recent workshop exchange for DIS 2020—connected my ideas on inferential activity and experiential metonym in immersive design fiction to Clifford Geertz's classic framing of ritual as a metonymic mapping of cosmology. For more, see the ritual of Balinese cock fighting as described in: Clifford Geertz, *The Interpretation of Cultures: Selected Essays* (New York: Basic Books, 1973).

<sup>36</sup> Ajit G. Pillai et al., "Communicate, Critique and Co-Create (CCC) Future Technologies through Design Fictions in VR Environment," in *Companion Publication of the 2020 ACM Designing Interactive Systems Conference* (DIS '20: Designing Interactive Systems Conference 2020, Eindhoven Netherlands: ACM, 2020), 413–16, https://doi.org/10.1145/3393914.3395917.

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# MUTUAL MENTORSHIP: A PEDAGOGICAL APPROACH TO VIRTUAL REALITY

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# INTRODUCTION

Having interfaced with dynamic digital tools their entire life, the current generation of students pull from a variety of experiences that crosscut disciplinary boundaries–e.g. museum exhibits, simulation rides, drones, and virtual reality (VR) video gaming. The latter of which, despite its shared commonalities with spatial and experiential environments, is anything but ubiquitous in the modern architecture curriculum. Herein lies the perfect opportunity to allow, indeed encourage, students a modicum of autonomy in an education, a new discipline, for which they are uniquely (as a generation) qualified through Independent Study–leveraging their familiarity of digital tools to pursue creative implementations more directly related and unquestionably beneficial to the architecture profession.

One such opportunity might address and at least partially correct the knowledge-imbalance that exists between educator and learner by reversing roles when necessary–providing mutual mentorship that explores progressive digital tools in an architectural realm. This project looks into a case study wherein academic supervision and pedagogical approaches take on a role of consultation and facilitation–rather than direct instruction–through a VR Independent Study course.

## CONTEXT

Introduced briefly during the compulsory course, Digital Media II, students were exposed to VR using cardboard VR headsets in groups. The emerging field of VR is discussed and interested students are encouraged to deploy this technology in their work as a design tool. Following the completion of this course, students were then eligible to propose a VR research project. Framed as an Independent Study to harness the capabilities of emerging technology, this VR exploration took place over the course of one semester. This case study exhibits the work of two second-year architecture students under the supervision of two faculty members throughout the course of the Independent Study. The students were provided by the school with access to an Oculus Rift Headset and a secluded space to conduct their work safely.

# PEDAGOGICAL APPROACH

Today's students often have a technological advantage over their professors, especially with regard to digital tools (owing simply to their later birth-years), therefore, would it not behoove academia to facilitate opportunities that advance the growth of both instructor and student? The pedagogical approach is to leverage the inherent digital knowledge of young students and to support their growth

in progressive fields of digital technology by sharing resources and research methodologies. This creates mutually beneficial relationships where the expertise of the faculty is able to intersect the expertise of the students. The realm of VR has great potential for engaging this pedagogical approach.

With limited resources, it is often difficult to provide full courses dedicated solely to the exploration and hypothesizing of new media. Herein lies the perfect opportunity to have students self-guide a small portion of their education with the Independent Study. While the topic of VR may not be ubiquitous in architecture curriculum just yet, its trajectory is pointing in that direction. Few experienced faculty are knowledgeable on the subject, yet the familiarity of incoming students who are well versed in VR gaming culture could be leveraged here. VR is a powerful tool, pushing the role of technology as a means of communication in representational media. VR redefines the very nature of communication and experience to be entirely between a person and technology, both collaborating and working harmoniously with each other to provide any meaningful function.<sup>1</sup> There are many tools and processes that are entirely dependent on technology for every aspect of their being, but there are few, if any, experiences that one could have that are so fully integrated with technology that they thoroughly eliminate the normal set of interactions dictated by the built environment.

#### STUDENT APPROACH

In this instance, two students took on the task of converting their engagement with VR video games into a research course that asked: *How could VR gaming culture (and VR in general) contribute to the design processes of architecture in academia?* While for many it is still quite easy to be enamored by the transformational environment that VR brings, it was important for the students to look beyond it as an outcome and to explore it as a tool in the process of design. In their book, *Understanding Virtual Reality: Interface, Application, and Design*, Sherman and Craig explain that "the key elements in experiencing virtual reality...are the virtual world, immersion, interactivity, as well as the people on the creating and receiving sides of the medium."<sup>2</sup> Through the course the students will inherently touch, interact with, and come to terms with these elements that define the virtual world.

#### PROCESS

The course was structured into three overarching units which guided their research project. Within these stages of the project, the goals were set out by the students. This structure began with Research and Planning, followed by Experimentation and Iteration, and finally Documentation and Reflection. The students set their primary focus throughout the project, with a goal to ultimately design within the VR headset itself.

#### **RESEARCH AND PLANNING**

To begin the project, the students work initial research and planning included learning about the VR and modeling software compatible with the school's equipment while simultaneously researching and testing video game maps that would eventually become the basis of their study. Compatibility and accessibility drove the software investigation for both the modeling and VR software. This investigation included research industry standards for both gaming and architecture, reaching out to companies and conducting demonstrations to test the capabilities. For the VR Software criteria such as accessibility of a student version, ability to import complex masses, the need for material and environmental manipulation guided the process. For the selection of modeling software criteria such as accessibility of a student version, the need for an extensive material library, and compatibility across programs guided the process.

Modeling and Visualization Software Analysis:

• Oculus was chosen as the main VR headset because the students were easily able to access it, it had reliable sensors and controllers, and the University had previously purchased the system. In addition, the students had previous experience with Oculus through personal ownership of the system.

• Enscape was considered as a post rendering software, but was ruled out due to the fact that the student version does not possess an easily accessible material library.

• Rhinoceros 6 was considered and chosen by the students to be used in recreating the base model of the in-game buildings because it had previously been used by the students and they were confident that they could recreate the buildings accurately within the program. The students also recognized that Rhino possesses an extensive material library and crisp rendering capabilities.

• V-Ray for Rhino was the students' first choice to be used as a post-rendering software and material editor but was ruled out due to incompatibility.

• Lumion was explored as an option to be used as a post renderer but was omitted by the students because they found that it was not easily accessible to obtain a license.

• Unreal Engine by Epic Games was to be used by the students to create an incredibly realistic environment within which to place their buildings. However, the program proved to be slightly too intense for the students' laptops and also was restricted by Epic Game's watermark within the program.

• EyeCAD VR was obtained as a limited time full-access trial. The students were able to complete all of the tasks that they aspired to do within this program, including assign materials, move objects, manipulate lighting, weather, and create an environment.

Simultaneously as the software research was underway, the students were working toward the selection of their game. The criteria included accessibility, graphic quality, map immersion and the intricacy of the in-game built environment guided the process. It was important to the students that they were able to accurately recreate the building themselves, therefore it was necessary for the in game play to allow exploration on both the interior and exterior of the buildings. Game Analysis:

• Call of Duty: WWII was chosen for this investigation because it is set in a time period with historical significance. In addition, the maps are home to easily accessible and translatable buildings which allowed for a more smooth and accurate recreation of the 3-D model.

• Call of Duty: Black Ops 3 was not chosen as a base for the investigation because it is set in a futuristic environment and time period. The game is also graphically inferior to the other games that were considered.

• Call of Duty: Black Ops 4 was considered as a base for the investigation because it takes place in a more modern era, but was ruled out due to the fact that many of the architecturally-intriguing buildings were inaccessible.

• Tom Clancy's Rainbow Six Siege was not chosen as a base of the investigation due to the fact that the scale of the buildings found in-game were not a good fit for the intended outcome.

It is important to note that participating students are open and adaptable to scenarios that may be beyond their initial goals. When experimenting, initial intended operations may not be attainable, so shifting desired outcomes–sometimes well into the semester–to make relevant findings is an important part of the endeavor. With regard to this project, the majority of the challenges and observations noted by the students had to do with discovering the correct games to engage and the correct hardware and software choices to achieve their desired goals. The result of their research guided them to choose EyeCAD VR, Rhinoceros for modeling, and Call of Duty: WWII. This was a significant aspect of the

research process as it was how they were framing the research question and what tools they needed in order to further that.

# **EXPERIMENTATION AND ITERATION**

Given the chosen VR and modeling software the students began working through their recreation and visualization of a particular environment along the waterfront. Their existing context and point of departure related to a popular video game Call of Duty: WWII that simulates the catastrophe war rages on buildings. They hoped to execute the process of physically building structures from Call of Duty in the VR headset and then to issue the materials necessary for a life-like recreation of the buildings as they may have been pre-war. They choose to isolate and recreate two adjacent buildings. Figure 1 shows a series of images that were used as the bases of their study of the exterior of the building. In order to analyze the buildings the students played the game over and over again capturing screenshots when they were able to find unique viewpoints. When playing the game for research purposes the students found that they discovered a unique experience of the qualities of the environment through this lens. In Figure 2 a selection of interior images are shown that were used to fully analyze the materials and objects that made up the space.



Figure 1<sup>3.</sup> Existing exterior images essential to analysis from Call of Duty: WWII maps.



Figure 2<sup>4</sup>. Existing interior images essential to analysis from Call of Duty: WWII maps.

During the beginning phases of the project, the students were simultaneously learning how to implement the VR software on their own while completing some of the base modeling in Rhino. As the basic forms and spaces emerged they continued to add detail and then test materials prior to conducting the same process in VR. While rebuilding in Rhinoceros was quite natural for them, attempting the same process in VR introduced new challenges. The students found that the act of designing within the VR headset had limiting options due to the fact that specific, accessible programs were not capable of creating the complex masses that make up a building. One of the challenges of virtual environment design is that the environment is not bound by the same laws of nature that govern structures and spaces in the built environment. Virtual environments do not contain physical matter or natural forces, may not facilitate the same movements or limitations of movements, and do not provide feedback when touched.<sup>5</sup>

At this point in the project, this student decided that they would import their model into EyeCAD VR and further develop the details using the VR software in order to achieve a depiction of the pre-war environment. Virtual environments introduce simultaneously visual and experiential interactions that layer geographical, experiential, psychological, and formal qualities.<sup>6</sup> It was necessary to layer the geographic information, experiential paths, and formal details that would inform the psychological effects of the structure. Figure 3 highlights some of the details that they focused on in the recreation of the experience walking through the buildings.



Figure 3<sup>7</sup>. Analysis of Call of Duty: WWII map images in the recreation process. Top image manipulate transparency and hinges of skylights. Middle: Capture circulation pathways and view points. Bottom: Indicate opening type and entry experience in VR

In VR the students were able to manipulate the transparency and the hinges of the skylights to more accurately depict the interior experience. It was important that the skylights were functional and able to open up as that would change the lighting condition on the interior of the building. The experience of the view in VR was determined by the defined path of circulation and established viewpoints. Therefore it was essential that the person was able to walk through the entire building, a capability that not all of the initial researched VR software afforded. In order to make this possible it was necessary to indicate the openings and entry experience such as door swings, corridors and any sort of journey though and around the building. In addition to these aspects the students were able to manipulate material, lighting and environment as seen in Figure 4.



Figure 4. Student generated process images using EyeCAD VR

As when often faced with challenges of working autonomously with limited resources, goals of the course shifted to accommodate new findings along their research path. The students were, however, able to assign and experiment with materials and to create and compare post-rendering effects of their constructed Rhino model, their objective became to use the VR programs to manipulate the appearance of the model–including landscape, lighting, and weather. This mutual initiative ultimately establishes a position, demonstrating VR's contribution to the experiential qualities that have substantial effects on the architectural design process.

# DOCUMENTATION AND REFLECTION

The student's documented their work in a video, poster, and booklet that showcased their process throughout the semester. The video portion was an example of their initiative using software that was not incorporated in other classes. Some of the highlights of the research were virtual engagements with weather. They were able to simulate snow and rain, and they recorded this in their process video. The students were mentoring both instructors and other classmates by initiating engagement with new software and sharing it. This sharing particularly related to Research Day shown in Figure 5 where they presented their work to the University community. Their exhibit included a computer and a monitor that showcased process videos. They also had the Oculus headset for demonstrations where guests were able to navigate around their project. They were careful to keep students safe while 'blindly' engaging in the virtual experience.



Figure 5. Students presenting their work to peers, faculty and community at the University Research Symposium.

The students included a series of frequently asked questions that came about while they were sharing their research at the University Research Symposium. Some of those questions pertained to hardware and software issues such as: *What programs did you use? What type of computer is being used?* These questions showed the interest that peers had in understanding the feasibility of implementation of VR in their studio work. Other questions pertained to the engagement in the virtual environment: *Can you build things inside of the VR headset?* And *Can I go in the water?* This last question illustrates the excitement that students had by being able to transcend conventional and pragmatic boundaries fully embodying the virtual environment through the headset.

In an end-of-semester survey, the students shared highlights, challenges, and notes for improvements. Some of the highlights pertained to the self-satisfaction of knowing that one could teach themselves the tools needed to complete an experimental project and having the ability to take an idea from concept to reality. The students also indicated that they enjoyed exploring with VR and that they were very pleased with their finished product. The challenges with the Independent Study–as seen by the students–related to self-guiding their semester and finding a challenging and meaningful focus to the project. They also indicated that planning, learning new software, and time management contributed to the many challenges of the under-taking. The students put together a series of recommendations for similar courses in the Architecture Department and highly recommend the pursuit of future Independent Studies. They felt it was so beneficial to take this type of investigative challenge, that it could even become a school requirement for students. Other areas for improvement they identified related to university resources and space allocations with wi-fi accessibility for future VR experiments.

# CONCLUSION

As expected, the endeavor was mutually beneficial for both students and instructors to continue learning and cultivating the language of picking up and adapting to new digital software. Unexpectedly, however, the student findings also proved to be beneficial to their peers. Much of the pedagogical approach consisted of steering the students into an investigative process so that they could pursue a research question and realize an outcome. This aspect was successful and noted by the students in their end-of-semester survey as such. Another benefit of the course was seeing the students take ownership of the project as they fine-tuned their skills at seeing, analyzing, and representing spatial configurations. Additionally, with engagement in the University's Research Day, the students

were able to practice and develop skills related to verbal communication and public engagement to convey their findings while discovering ways to foster passions outside the classroom towards their architectural studies.
#### NOTES

<sup>1</sup> Jason Jerald, The VR Book: Human-Centered Design for Virtual Reality, (Illinois: Morgan and Claypool Publishers, 2016), 10.

<sup>2</sup> William R. Sherman and Alan B. Craig, *Understanding Virtual Reality: Interface, Application, and Design (The Morgan Kaufmann Series in Computer Graphics)*, (Michigan: Elsevier Science, 2003), 6

<sup>3</sup> Glen Schofield and Michael Condrey, Sledgehammer Games, *Call of Duty: WWII*, Activision, 2017, Microsoft Windows 10. Map: London Docks.

<sup>4</sup> Glen Schofield and Michael Condrey, Sledgehammer Games, *Call of Duty: WWII*, Activision, 2017, Microsoft Windows 10. Map: London Docks.

<sup>5</sup> Matthew E. Gladden, "A Phenomenological Framework of Architectural Paradigms for the User-Centered Design of Virtual Environments," *Multimodal Technologies and Interaction* (2018): 3, accessed June 1, 2020, doi:10.3390/mti2040080

<sup>6</sup> Matthew E. Gladden, "A Phenomenological Framework of Architectural Paradigms for the User-Centered Design of Virtual Environments," *Multimodal Technologies and Interaction* (2018): 5, accessed June 1, 2020, doi:10.3390/mti2040080

<sup>7</sup> Glen Schofield and Michael Condrey, Sledgehammer Games, *Call of Duty: WWII*, Activision, 2017, Microsoft Windows 10. Map: London Docks

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## DIGITAL BRANDING LUXURY STUDENT 'HOTELS' AT UK UNIVERSITIES

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*Figure 1. Screen grabs from the short film,* The Death and Life of UK Universities © *Igea Troiani and Tonia Carless (2020).* 

#### MARKETING UNIVERSITY AS A PLACE EXPERIENCE

Before Covid-19, universities were places where students gained an onsite education through face to face teaching. As Jonathan Coulson, Paul Roberts, and Isabelle Taylor note; "the steps of the library, the arcades of the faculty building, the lawns where lazy afternoons are spent, these are [or were] the

backdrop against which the experience of academic life in all its complexity occurs [or occurred]." <sup>1</sup> Prior to their semi-privatization, universities were sites of refuge from work where students could hurriedly or unhurriedly learn, think, experiment, protest or procrastinate while living away from home. Nowadays because students need to get a degree as quickly as possible to reduce their debt most graduate as fast as they can. Neoliberal governance has forced universities to run as entrepreneurial education businesses so that they are a direct conduit for work and as a consequence, university estates have had to change their image, ideologically, architecturally and spatially. Up until the global pandemic, major and minor universities alike were refashioning the appearance of their campus by demolishing or refurbishing university heritage or building new architectures so as to attract more students to increase revenue. Many UK universities have embarked on, are midway, or have finished large-scale expansion plans<sup>2</sup> most of which include providing new architectures that meet the demands of Generation Z 'kids' or the PlayStation generation – born between 1995 and 2012 - who have grown up in more affluent times than their parents, have a heightened sense of consumerism and luxury, and are attuned to highly sophisticated media and computer environments. In the book, Future Campus: Design Quality in University Buildings, Ian Taylor<sup>3</sup> contends that building "student 'Hotels'" (his phrase) is one key rebranding tactic to transform university-owned heritage, creating at the same time additional revenue streams beyond tuition fees. Because 'academic capitalism'4 is, like any other form of capitalism, dependent on the incessant production and consumption of images in the mass-media as Susan Sontag notes in On Photography<sup>5</sup>, universities develop sophisticated on site and digital marketing campaigns to advertise their newly fashioned campus in an increasingly competitive H.E. sector.

This essay builds on an on-going cinematic survey of the changing neoliberalization of UK university campuses, started in 2016 by the authors. Since then we have been filming the physical transformation that has been occurring in the lifecycle of many university campuses throughout the UK as part of a self-funded research film project entitled *The Death and Life of UK Universities*.<sup>6</sup> (Figure 1) *The Death and Life of UK Universities* interrogates both the onsite and virtual representations of, for example, the 'walk-through' films of prospective university and residential architectures using Henri Lefebvre's<sup>7</sup> notions of space and Guy Debord's<sup>8</sup> writing on the *spectacle* as socially productive forces considering both material and medium arrangements and developing a textual reading to analyse the ideological ground of this spatial reconfiguration. Repositioning the real social and historic space of the university as a collage film works into and through the medium of architectural design and systems of codified representations that are understood to be excluding particular parts of the real space as a form of ideological specialization.

Our research is purposely not for university or architectural practice publicity, nor is it funded by any industry or media partners. We have no corporate sponsorship, and nor have we sought any. Wherever possible we are making the film ourselves and with the lowest of tech. As such it seeks to be an independent critique of university heritage and the machinations of mass media and design production for the economy. The research returns critique, as a spatial practice, through the medium of film within the context of university estates. The film allows for a reconsideration of university space that has been reconstructed through claims of it being not fit for purpose – arguably an out of date product whose previous spatial usages are no longer globally market competitive.

At the level of the city, subtitled 'University Brandscapes,' the essay offers a precise analysis of the increasing capitalization of space in this academic scenario, whereby existing spaces and their cultures are transformed and reconfigured *for* rebranding. This is examined through the university campus space itself and beyond, as the university extends into the realm of the city and wider global context, consuming and re-presenting the histories and cultures of the city in which it is located. The

spatial reprogramming of universities and their visualizations and marketing has intensified post Covid-19 as each university vies for its global position and as physical space further collapses into the digital realm. New buildings, particularly, but not exclusively, in the post-1992 former Polytechnic set of new 'modern universities' require new advertising slogans, billboards, websites and promotional videos to increase their marketability. The exterior image of the university presented to the global marketplace needs to engage fully with the 'culture of marketing and the marketing of culture' at all levels – highbrow, middlebrow, lowbrow and nobrow<sup>9</sup> - using everything available to a university for it to capture prospective student 'customers'. The most exploited resources include its city, buildings, staff profile, history, alumni and research and student grant or competition successes. Because of our focus on academic capitalism and university advertising, Barbara Kruger's '*Untitled (I shop therefore I am)*' (1987)<sup>10</sup> and Kruger's Futura Bold Font are incorporated and applied critically in this research to consider the exploitation of media advertising techniques used for university marketing propaganda.

At the level of room design, subtitled 'Selling Student 'Hotel' Interiors,' examines the resultant shifts in occupation and use of the space, directing understanding of the process of increasing commodification against that of a naturalizing condition of spatial university property development. We collage university room video tours with Tracey Emin's 'My Bed' (1998)<sup>11</sup> to highlight the commodification of, on the one hand excessive behaviour in public and on the other, the student university experience. Student experience here does not refer to the solely academic experience but also incorporates an understanding of how to tie (university interior) design to (university) life style<sup>12</sup> choices. The university experience can include a sense of success and happiness, and a sense of failure, which can lead to depression, loss of self-confidence and/or suicide which are grappled with inside a student's bedroom and beyond. Any experience of student life is backgrounded mentally by the accruing substantial, sometimes lifelong student debt carried into a graduate's work life experience. While other writers have studied the university campus today mostly from an (essentially uncritical, promotional) design or historical perspective<sup>13</sup> and there is substantial literature emerging mostly, but not exclusively, in the United States<sup>14</sup> and UK<sup>15</sup> on architectural design and advertising, this essay is original because of its focus on the use of reconfigured university space for marketing, examined through filmmaking that includes site specific field work, rather than solely textual exposition. The paper asks: How can academic-filmmakers challenge the film-making technique architect-practitioner-filmmakers use to sell designs to their university estate clients to critique academic and residential property capitalism today?

#### UNIVERSITY 'BRANDSCAPES'

According to Richard P. Dober, university buildings and campus designs formerly "define[d] and celebrate[d] a sense of place; communicate[d] an institution's purpose, presence and domain; and generate[d] an image charged with symbolism, graced by history."<sup>16</sup> Universities, old and new, use physical features to give their campuses a unique external local, national and global visual presence done through the use of elements that include landmark buildings, architectural style, landscaping and materials.<sup>17</sup> And just like the cities they are in, university 'brandscapes', a term coined by Anna Klingmann in her book, *Brandscapes: Architecture in the Experience Economy*,<sup>18</sup> are capitalizing on cityscapes and vice versa in the real and virtual realms through their use of university "landmarks are cultural currency" to quote Dober.<sup>19</sup>

In the refashioning of the campuses of old and new universities already visited for this research, most have at least one iconic building – completed or underway – to showcase in publicity. On the main, the older, longer established, elite universities have a greater stock of iconic projects; being designed

in styles that are generally more decorative. Those universities generally also have greater access to capital for more ambitious estate redevelopment programmes, gained in part from endowments. While older, universities contain some buildings that adopt a modern (mainly Brutalist) style which like newer universities they want to rid themselves of, both old and new universities can appoint fashionable, contemporary, signature architects – foreign or national – to enhance their campus brand status – the status of the architect's brand, carrying that of the university who appoints them. Images of these new signature university architectures and campus expansion or changes are used to increase marketization through rebranding. Iconic cityscape marketing photographs of the icon projects are used alongside a continuous stream of slogans, advertisements, propaganda posters and 'lift-you up' university billboards.

The university sells a "monopoly of appearance"<sup>20</sup> through its multiple representations of both real and projected or digital space. The images create the passivity required of the student as consumer, where all is positive, and nothing can be contested. This commercialization happening through these forms of image marketing and selling space is parallel to, and like that of the competitive, globalized city, and is "more than a continuation of old trends but, rather, represents a massive appropriation of public resources and urban space."<sup>21</sup> This is the totalizing capacity of the branded university space, simultaneously attracting and promoting its own appearance.

In considering campus image marketing and selling of university space through digital branding, slogans and advertising, it is important to frame Lefebvre's understanding of the all-pervasive nature of space which can lead to considerable slippage between concepts which might ordinarily be constructed as distinct and separate, such as the difference between space and the image of space. The image of space, in this context, is implicit and fundamental in the digital branding and selling the image of student life. In Lefebvre's words "it is representational space, [and] that which can be directly experienced through its associated projections and which leans towards the visual, physical rather than verbal symbols."<sup>22</sup> Understanding this in the context of how images of the university flow in a reciprocal way, both as a social relation and as a mediated spectacle, is important to offer any interruption, critique or antidote.

The plethora and range of circulated university images extend from individualized and directed marketing prospectus and accommodation selections, to urban scale hoardings imaging future spaces, all displaying the spectacular model of socially dominant life theorised by Debord, in *La Societe du Spectacle* (1967) which was based on Karl Marx and Friedrich Engels's concept of 'false consciousness'. As a cinematic neo-Marxist critique of capitalist society, *La Societe du Spectacle* can be considered as an "affirmation of appearance and affirmation of all human life, that is of social life, as mere appearance"<sup>23</sup> and where "commodity fetishism dominates by imperceptible though palpable things."<sup>24</sup> For Debord, "In societies dominated by modern conditions of production, life is presented as an immense accumulation of *spectacles*. Everything that was directly lived has receded into a representation." <sup>25</sup> "The spectacle is not a collection of images; it a social relation between people that is mediated by images."<sup>26</sup> And in the setting of the rebranded university spectacle allows for a separation of an unreal to real university student life in the university.

University student enclaves act as a social fantasy, partitioned off from the rest of the city which in turn opposes the claims of any deeper integration manifest in its branding through the use of images and slogans such as 'the university for our city'. The film considers the performative effects of the branding, its real outcomes, effects and consequences and embeds the work of Barbara Kruger in it, namely her iconic screen print on vinyl, *I shop therefore I am* (1983) to critique the visual economy within the city. A subtle wordplay of Rene Descartes "I think Therefore I am,"<sup>27</sup> Kruger implies that in a modern consumer-driven society, we are no longer defined by what we think but rather by what

we buy. Amanda Ramsey and Ryan Gallagher write that "[Kruger's] anti-consumerist art criticizes members of society who feel as though it is necessary to replace their own self-worth with materialistic items." <sup>28</sup> Ironically in 2004, *Untitled (I shop therefore I am) was sold for a record* \$US601,600 at Phillips de Pury & Co. New York.<sup>29</sup>

#### **SELLING STUDENT 'HOTEL' INTERIORS**

Students who have grown up as 'neoliberal subjects'<sup>30</sup> are accustomed to more luxurious standards of living that the original rudimentary dormitory style accommodation with shared dining halls and gender-segregated bathrooms that earlier generations of university students resided in and university student accommodation today is designed to meet consumer expectations. The 'student hotel' as a contemporary neoliberal model of university housing suits the expectations of this demanding client market and universities are happy to charge exorbitant fees for their purpose-built accommodation depending on their desirability as a university of choice. Many architects who specialise in designing university student housing have become experts in designing and producing images of differing levels of luxury student housing rooms and building types most of which resemble the different options one might have in a 3\* or 4\* hotel. Like a hotel, students typically pay for the use of a gymnasium, sports facilities etc. on top of their room rental expenses.

The online experience of luxury student accommodation is an invaluable marketing tool, before and after the housing is built. The creation of the image of luxury student accommodation in an urban university or pastoral university has become the task of architects working in this sector and the glossy animation walking-through, virtual simulation of the student building and room options is valuable marketing material for any university wanting to be competitive in a neoliberal marketplace. Here the interior experience of space becomes a sophisticated means to capture the market, with visuality and generational preferences featuring highly.

Fully branded interiors show upmarket, luxury, corporate style office furniture and coffee shop tableware, setting the scene for the new, highly productive, caffeinated, digital worker in the student residence. Every "student 'hotel'" room has their own ensuite and kitchens are designed like those in the share-houses of young professionals, luring students into independent living in accommodation that can sometimes exceed their own home. The student rooms are on display, self-merchandising, windows onto the street, open to the voyeurism of the circulating branded space and student body. Halls of residence become rebranded as 'Private Halls', exclusive and separate from either the city or from the educational context of the previous formation of university campus. Privacy here is about exclusivity and isolation in a commercially driven, graded, experiential condition, sold on the back of an increasingly lucrative financial loan system. It is far from the construction of the previous model of university dwelling, either as democratic, collegiate or civic education space.

The walls of the residence are laminated with images of books, a flattened outline of the history of knowledge production. Furniture is grouped for intimate exchange and shared tables are set with coffee table books (unable to be housed in real shelving). There is no possibility for study work or exchange, digital or otherwise in these spaces. They are constructed entirely for the brand image to circulate and sell the upmarket hotel where nothing happens. The student has become a commodified tourist, visiting and consuming their temporary city and its occupants for commercial pleasure.

But the interior experience of the student room has never been as innocent or as squeaky clean as the architect's animations allude to, a feature captured in Tracey Emin's Turner short-listed artwork, *My Bed*, first created in 1998. The unmade bed, strewn with cigarette butts, empty vodka bottles and discarded condoms came about from a post-sexual and depressive phase in which Emin's life where she stayed in bed for four days without eating of drinking anything other than alcohol. *My Bed* 

symbolizes the space of play and experimentation with sexuality, drugs, alcohol etc. which can characterize university student life and also the way in which that version of student life can be sold and exploited under capitalism. In July 2014, *My Bed* sold at a Christie's auction in London for more than £2.54 million or \$US 3.77 million, a huge spike since it sold to world-class art collector Charles Saatchi in 2000 for just over £150,000.<sup>31</sup>

#### THE SOCIETY OF THE SPECTACLE AND REBRANDED UK UNIVERSITIES

Wendy Brown<sup>32</sup> contends that "neoliberalism literally *marketizes* all spheres" and "configures human beings exhaustively as market actors" in a world where everything is for sale and everything can be bought. The experience of being a university student, going to university and living on campus can be sold online before experiencing it on location just as it can be commodified into the artwork, My Bed. Following critiques by Debord, the Situationist International (SI) and Kruger that offer a commentary on consumption of a society or consumer driven society, The Death and Life of UK Universities asserts that there has been a form of spatial collapse between the architectural digital images and the real space and the consequential way in which students live in and occupy university estates. To reposition these images as a conscious history, as a lived and experienced model through our film (as we and Debord have done) allows questions about what is being sold and how the space of the university as a whole is diminished through it. The advertising slogans, "Rooms to suit you", "Student living re-defined", "always succeeding" and the hoardings' scale and multiplicity serve to overlay and frame the domestic lived experience of student life and an implication of the position of the student as temporary tourist body and owner of that city, through which the ongoing capitalization of the space of the university continues. The manner in which lived experience has been filtered out of the marketing images has further served to flatten the possibility of lived experience. The social life of the student and social exchange becomes an arguably false representational space with artificially constructed cultures in which the image of the professionalized student defines the graduate's lifestyle pre and post university.

The wider framework of the implied university is diminished precisely through the circulated architectural images. The implied social standing and wealth of the student body and its affiliations are projected from the branded interior and urban landscape. The university as a class and or political community has collapsed into the singular notion of commercial property and income generating property. The economic and political conditions have shifted the space from one of a physically or intellectually, knowledge based productive economy to one of property rental, and financial acquisition through the saleable units of both time and space across the estate. The shifting ownership of the university estate can also be scrutinized through the film as its' property becomes devoid of academic possessions and which can be sold on the open, global market as investment shifts. This process is heightened now under the current conditions of Covid-19 where some physical estates will suffer from immediate and potentially longer-term withdrawal from the global marketplace. The use of the term 'estate' here is keenly associated with the transfer of possessions and property of the deceased<sup>33</sup> and here it becomes resonant with the Death of the UK university through its representational space. The broader question emerging from the film is: what are the wider effects of this not only on the university but on civic space, knowledge construction and society?

#### NOTES

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<sup>2</sup> Coulsen, Roberts and Taylor, University Planning and Architecture, 10.

<sup>3</sup> Ian Taylor in Ian Taylor ed., *Future Campus: Design Quality in University Buildings* (London: RIBA Publishing, 2016), 3.

<sup>4</sup> Sheila Slaughter and Larry L. Leslie, *Academic Capitalism: Politics, Policies and the Entrepreneurial University* (Baltimore and London: John Hopkins University Press, 1997).

<sup>5</sup> Susan Sontag, On Photography (London: Penguin Books, 2008), 178-179.

<sup>6</sup> Igea Troiani and Tonia Carless dirs., *The Death and Life of UK Universities* (Short film) (Oxford, UK., 2020).

<sup>7</sup> Henri Lefebvre, Writings on Cities (Oxford: Blackwell, 1996).

<sup>8</sup> Guy Debord, La Societe du Spectacle (Paris: Buchet/Chastel, 1967).

<sup>9</sup> John Seabrook, Nobrow: The Culture of Marketing, the Marketing of Culture (London: Methuen, 2000).

<sup>10</sup> Barbara Kruger, *I shop therefore I am,* 1987 (Screenprint on vinyl, 125 x 125 cm).

<sup>11</sup> Tracey Emin, *My Bed.* 1998, Tate: On Ioan from The Duerckheim Collection 2015. (Box frame, mattress, lines, pillow and various objects).

<sup>12</sup> Bruce Mau, Kyo Maclear, Bart Testa and Bruce Mau Design, *Life Style* (Design) (London: Phaidon, 2000).

<sup>13</sup> Richard P. Dober, *Campus Design* (New York, Chichester: John Wiley and Sons, Inc., 1992); Coulson, Roberts, and Taylor, *University Planning and Architecture*; Jonathan Coulson, Paul Roberts, and Isabelle Taylor, "The Future of the Campus: Architecture and Master Planning Trends," in *Perspectives: Policy and Practice in Higher Education* 19, no. 4 (2015): 116-121; Jonathan Coulson, Paul Roberts, and Isabelle Taylor, *University Trends: Contemporary Campus Design* (London and New York: Routledge, 2014).

<sup>14</sup> Hal Foster, *Design and Crime (And Other Diatribes)* (London: Verso Books, 2002); Anthony Vidler ed., *Architecture Between Spectacle and Use* (Williamstown: Sterling and Francine Clark Art Institute, 2008).

<sup>15</sup> Graham Cairns, *Deciphering Advertising, Art and Architecture: New Persuasion Techniques for Sophisticated Consumers* (Farringdon, Oxfordshire: Libri Publishing, 2010); Leslie Sklair, *The Icon Project: Architecture, Cities, and Capitalist Globalization* (New York and Oxford, Oxford University Press, 2017).

<sup>16</sup> Dober, *Campus Design*, 3.

<sup>17</sup> Dober, *Campus Design*.

<sup>18</sup> Anna Klingmann, *Brandscapes: Architecture in the Experience Economy* (Cambridge, Mass.: MIT Press, 2007).

<sup>19</sup> Dober, *Campus Design*, 5.

<sup>20</sup> Guy Debord, The Society of The Spectacle and Other Films (London: Rebel Press, 1992), 65.

<sup>21</sup> Saskia Sassen, The Global City. New York, London, Tokyo (Princeton: Princeton University Press, 1991), 317.

<sup>22</sup> Henri Lefebvre, *The Production of Space* (Oxford: Blackwell, 1991), 38-39.

<sup>23</sup> Debord, The Society of The Spectacle and Other Films, 64-65.

<sup>24</sup> Debord, The Society of The Spectacle and Other Films, 73.

<sup>25</sup> Excerpt from Guy Debord's *Society of the Spectacle* film (1973)

<sup>26</sup> Excerpt from Guy Debord's *Society of the Spectacle* film (1973)

<sup>27</sup> "I think, therefore I am" (Latin: Cogito, ergo sum) was a dictum coined in René Descartes in *A discourse on method* first published in 1637. René Descartes and John Veitch, *A discourse on method* (London: J. M. Dent; New York: E. P. Dutton, 1937).

<sup>28</sup> Amanda Ramsey and Ryan Gallagher, "Barbara Kruger: A Detailed Analysis," *2103 AP MHS Research Papers* (April 1, 2013) https://sites.google.com/site/2013apmhsresearchpapers/barbara-kruger,

<sup>29</sup> Carol Vogel, "An Appropriate Finale for a \$9.2 Million Auction," *The New York Times* (November 9, 2004) <u>https://www.nytimes.com/2004/11/09/arts/design/an-appropriate-finale-for-a-92-million-auction.html</u>

<sup>30</sup> Wendy Brown, *Undoing the Demos: Neoliberalism's Stealth Revolution* (New York: Zone books, 2015), 110.

<sup>31</sup> Hannah Ellis-Petersen, "Tracey Emin's Bed is sold at auction for over £2.5M," *The Guardian* (July 1, 2014) <u>https://www.theguardian.com/artanddesign/2014/jul/01/tracey-emin-my-bed-sale-auction</u>

<sup>32</sup> Brown, Undoing the Demos, 31.

<sup>33</sup> Andrea Luka Zimmerman dir., Estate A Reverie (Film) (London: Second Run, 2015).

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# HISTORY AND NATURE BLURRED: EXPERIMENTATIONS AND SOCIAL DESIGN IN TAIWAN

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Fig 1. Japanese Excursion with E.H. Wilson and Unknown Indigenous Tribe Photo Credit: The Herbarium of Taiwan Forestry Institute

#### HISTORY

Imagine this essay as if it was written on tracing paper alongside various objects on an old fragrant cypress table to tell a story. We will start with a specific glass plate on the table. This artifact is one of the first recorded photographs by the Taiwan Forestry Research Institute and shows the complexity and hybridity of Taiwan's history.

Within the frame, we first have the surrounding figures of the unknown Indigenous tribe wrapped in cloaks, either intentionally or unintentionally blurred on the photograph's perimeter. This is due to the long exposure time needed for the technology and the uneven coat propagated on to the plate, which is apparent on the Indigenous tribesmen's faces. The location of the photograph is unknown, which further blurs the origins of the Indigenous tribe. Either way, it hints at how the photographic technology was used at the time and its capabilities in the field of botany.

At the center of the photograph, we have the British plant collector and explorer, Ernest Henry (EH) Wilson, who helps date the glass plate to around 1917-1922 as those were the years he was in Taiwan. The most notable fact about Wilson in Taiwan is his "discovery" of Rhododendron Kanehirai by lake Lu-Zui.<sup>1</sup> In the context of this photo, with Wilson's intentional centering, it raises the question of who is considered to be the expert at the time.

Surrounding Wilson, we have what appears as Japanese soldiers at first glance, but based on closer inspection and conversations, discover that these are a combination of Japanese botanists and military personal in government-issued uniforms.<sup>2</sup> Notably, to Wilson's right, we have Ryozo Kanehira, whom the flower that Wilson discovered is named after. Japanese botanist and explorer, Kaneheria is seen here alongside many other photos around this period with a slight kind natured smile. In this digitized glass plate, Kanehira has both arms extended to two different tribesmen, one sitting in front of him who seems young, and another to Kanehira's right who seems in motion during the documenting process of the event.

Through his botanical research, Kanehira came into contact with many of the 16 Austroneasean nationally recognized tribes in Taiwan.<sup>3</sup> These do not include 13 other tribes still fighting for local or national recognition. While this recognition can benefit tribes, since it usually comes with government stimulus aid, it is a difficult and arduous process to obtain. Indigenous tribes in Taiwan have been decimated by colonialism and generational sinicization, and therefore cannot "pass" the purity tests required by the government. Kanehira, in the latter part of his career, focused on Indigenous plants.<sup>4</sup> The image I have described conveys multiple narratives: of technologies of socialization, such as colonialism and governmental recognition, as well as Indigenous knowledge preserved by Kanehira and circulated through generations.

The ever-changing relationships between this artifact, the individuals crystallized within it, and how we inspect it are the root of Taiwan's complexity and hybridity. These social and technological tools, or moments, capture the relationships between the landscape, technology, and humans. And as humanity's social awareness expands of other cultures through digital technologies, so does our understanding of who should be considered the expert, or given the leadership role. Can you imagine what glass plates could exist from this era if the Indigenous tribes were trained and given the camera?



Fig 2. Chief's Residence, Tainan, Taiwan Photo credit: Tsung-Yeh Artist Residency

#### **HYBRIDITY**

Just as this artifact presents multiple and blurring narratives, the project that I began in 2017 with my collaborator, Mitsu Salmon, also investigated layers of histories, translations, and cultures. Our first experience was at an artist residency in Madou (eye in Sirayan language), on Tainan's outskirts, Taiwan's old capital.<sup>5</sup> Situated on top of an old Meiji Sugar Company factory and regional offices, this current residency covers both old factory and colonial period Japanese residential headquarters. Our exhibition space was the former Chief's residence made from cypress wood and surrounded by imported and Indigenous plants, some of which Kanehira named.

The architecture of this house and surrounding buildings connect to the Japanese experimentation in Taiwan during the colonial period of 1895-1945. During the Japanese occupation, architects would travel to Taiwan to experiment in building modular Jo Style buildings, consisting of red brick and cypress wood, as they had more freedom there than Japan.<sup>6</sup> Cypress wood, once in abundance in Taiwan, is now protected by the Taiwanese government. It was a fundamental material that Japanese architecture was built with in Taiwan, and exported to Kyoto during the 20th century.<sup>7</sup>

However, today's compelling experimentation is not the washitsu style rooms reverberating with Mandarin, but the tone of the hybridity of imported and native plants influencing the structure from the outside. The imported trees speak to the past inhabitants, such as Kanehira. The Indigenous trees and their aerial roots speak to the folklore connected to the Indigenous tribes, such as the local Sirayan tribe. For example, the expansive and cascaded aerial roots of the Banyan trees near the Chief's residence have stories connected to them regarding being a stairway for the gods to descend from heaven to earth.<sup>8</sup> These layers all contribute to what makes the architecture of this built structure, and many like it in Taiwan, where the interiority and exterior collapse in the multiplicity of the past as it pertains to the flora.

During our initial three months in southern Taiwan, we were fortunate enough to meet with numerous local individuals who shed light our research's perspective. This redefined our understanding of built structures and how the play with space is interpreted in various hybrid methods specific to Taiwan. One example of this was working with architecture professor Hungyi Chen, who plants trees with various communities as a large part of his research and practice under the concept of eco-decolonization. This act of planting trees serves the purposes of economic development, flood prevention, and a connection to heritage and conservation. This furthers the idea of how trees are connected to the land and built structures in a community. There's a knowledge gap between small

scale farming and the agricultural industry. These community-oriented initiatives, where there is sweat equity, technological development, and social infrastructure, advance Taiwan's hybridity today. Building on this sense of history and grafting, for the Taipei Artist Village residency in 2018, we were allowed to create a collapsed sense of history in the gallery. In other words, a century under an hour. The gallery was filled with plants, sounds, and shadows in a scenario that mimics what we have come across. This was to highlight tools used by botanists in the 20th century and amplify their ghost tones of personal stories associated with Kanehira —a social hinge to the tools by furthering the idea of a socio-technological intervention. Additionally, we were intrigued by the collapsed gallery space of the Taipei Botanical Gardens, an offshoot of the Taiwan Forestry Institute that started in 1895 with the help of Ryozo Kanehira. Its structure suggested that nature is open to history, susceptible to archival tools, and its space compelled a rethinking of history and nature. In Nature and Architecture, Elizabeth Grosz writes:

Rather than seeing it as either fixed origin, given limit, or predetermined goal, nature, the natural must be seen as the site and locus of impetus and force, the ground of a malleable materiality, whose plasticity and openness account for the rich variability of cultural life, and the various subversion of cultural life that continue to enrich it. The natural must be understood as fundamentally open to history, to transformation, or to becoming, as open as cultural, as innovative, temporal and historical as the purview of social, psychical, and cultural life.

Our installation incorporated electronic bird circuits that were developed during the residency in Madou and were activated by the gallery walls' reflective surfaces. The intriguing aspect of the circuits was not only the electronic biomimicry in their frequency but also the rhythms that define the surfaces of this space.

Additionally, to give more agency to the plants, inductors and radios in the speculative space brought plants alive with feedback loops of the micro voltage from the plants extracted and transmitted to high gain amplifiers to power both lights and transmit noise over short-range radios.



Fig 3. Installation shot, Taipei Artist Village, Taipei, Taiwan Photo Credit: Wei Hsinyen

In these experiences and installations, nature and architecture become codependent, intertwined, and blurred. Botanical tools such as a microscope coupled with plants' agency create virtual entanglements with history, current inhabitants, and purview of the future. The collapsed and at times artificial silhouettes of imported plants are backdropped with colors that mimic the lush green spaces that fight urbanization in Taipei, more personal and poetic colors related to Kanehiras family and orchids, and

events such as fires that of Yangmingshan in the 20th and 21st century. They all serve the purpose of experimentation in their own right and perpetuate hybridity and materiality.

#### SAUBAU

In the winter of 2019, we were able to revisit the old Meiji Sugar Factory for the Madou Sugar Industry Arts Triennial. Our main objective was to understand further the landscape and the histories connected to it in the context of performance and research methods that could be left behind. Similar to the glass plates, notions of displacement, fragmentation, contraction, and expansion happen simultaneously between nature and architecture. Aside from looking at built spaces indoor and outdoor on and near the Meiji sugar factory, we wanted to inspect the land more numerically. Where data acquired from the soil via digital sensors displays readouts of what constitutes viable conditions for sugar factories and farming. In our return, we wanted to inspect how do we respond as visitors again? And how does one on the x and y axes balance nature and built structures with contemporary tools?

Alongside creating a movement and sound piece for the festival, we had the opportunity to work with local researchers to develop specific technology that would be a modern-day equivalent to a botanical tool from the past. A tool that lives between the agricultural industry and local farming and benefits current communities with generational roots to the land. This was a shift from our creative practice to produce ephemeral work and take on more of a facilitative and investigatory role within a community. The Sirayan tribe, given their sinicization, is still attempting to get national recognition as an Indigenous tribe.9 This sinicization stems from a history of living in the valley and not the mountainside. Since 2017, they have been in flux in terms of finally being nationally recognized with constant hurdles. Through casual conversation and visits with Wan Shu-Chuan and Edgar Macapii, and a social design approach, we started the research and prototyping method by recording the oral history of the tribe as well as musical instruments such as the nose flute. This was loosely a form of social design as Ezio Manzini puts it, and to create a social and technological intervention in the environment.<sup>10</sup>Additionally, it built on research we had come across in determining where sugar factories were built during the Japanese colonization and the corresponding fertile land.<sup>11</sup> In correspondence over a few months, we focused on finding out what distinguishes the Sirayan tribe from others orally and sonically. Based on these conversations, recordings, and data collection of the soil moisture sensor prototypes, we directed the research and output towards an automated process of the instruments. In other words, a sonification of the land explicitly showing changes in pitch and tempo of the nose flute in relation to the soil moisture data. For example, a low disruptive pitch of the instrument corresponding to dryer soil and a higher soothing iteration for more moist parameters.

Continuing to work with our colleague and friend, Hungyi Chen, we wanted to develop these sensors further socially and were able to do so with the Rukai Tribe. The Rukai's main population is situated in the Pingtung area and is often miscategorized as the Paiwan tribe, given their close proximity in the mountains. The Rukai tribe is allotted a certain amount of land in the mountains by the Taiwanese government for farming as well as land in the plains for housing. However, the farming property is remote from where many of the tribe members currently live. Therefore, the land and its actual upkeep are difficult; given the physical distance and precarious infrastructure one has to trudge to reach the land itself. Therefore, the sensors were further developed to check the land remotely over cellular data.

In this iteration of the soil sensor, we integrated solar cells to power the sensors themselves as a solution to the physical barriers to check on them periodically. Given the fact that we were primarily looking at soil moisture, the solar aspect became an additional sensor of its own. Meaning that, when

the land was dry, the sensor was working and functioning and alerting the farmer when needed. However, if a rainstorm was passing through, there is the chance that the solar panels would turn off, and consequently, given the rain volume, the sensor would not be needed. We were fortunate enough to install the initial solar version of this sensor on the mayor's property of the Rukai tribe. He could check remotely on any of his devices from any distance on or off the mountain. Appropriately, we named the sensor Saubau which is a common greeting in the Rukai language. This naming speaks to the larger goals we have in Taiwan, which is to create more socio-technological tools that local communities can experiment with. As you can see in this photo, we were also fortunate enough to plant a tree on the mayor's land named after Ryozo Kanehira. And my collaborator, who is planting the small tree in the photo, has a slight smile, similar to her great grandfather.

That brings us back to how we started this conversation: by examining a photo and its participants' roles. Expertise is much more diffused and decentralized since the glass plate. Our installation highlighted dynamic arboreal and social structures, but how do you design a tool to convey this environment and its tangled legacies? Can that method of capture be an apparatus that can be translated from one place to another, from one community to another? How will that socio-technological instrument tune its measurements to the intertwined relationships of nature and history?



Fig 4. Installing of soil and environment sensor at Rukai Village with Mayor Photo credit: Yang Shu

#### NOTES

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<sup>2</sup> Robert Kowalczyk, Panel discussion, Kansai Roundtable #23, 8 December, 2019, Kyoto University, Kyoto, Japan

<sup>3</sup> "Gov't officially recognizes two more aboriginal tribes" The China Post,

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<sup>4</sup> Fan Suwei, Personal Interview, 3 June 2018

<sup>5</sup> Pan, Maggie. Personal Interview, 13 April, 2017

<sup>6</sup> Meng-Ying Shen, Chao-Ching Fu & Chun-Hsi Wang (2015) "Minimum Habitable Dwelling and the Transformation of Public Housing Design in Taiwan from 1920 to the 1960s," Journal of Asian Architecture and Building Engineering, 14:2, 247-253, DOI: 10.3130/jaabe.14.247; Chao-Ching Fu and Ming-Chih Tsai "Hybridity In Taiwanese Architecture Built During the Japanese Period" Traditional Dwellings and Settlements Review, Vol. 16, No. 1, Post Traditional Environments In a Post Global World: Ninth International Conference , December 14-18, 2004, Sharjah/Dubai, UAE: Conference Abstracts (FALL 2004), p. 35

<sup>7</sup> Peet, Yin. Personal Interview, 20 May 2017

<sup>8</sup> Chen, Hungyi. Personal Interview. 3 May 2017

<sup>9</sup> Macaili, Edgar. Personal Interview. 23 February 2019

<sup>10</sup> Manzini, Ezio. Design, When Everybody Designs: An Introduction to Design for Social Innovation. MIT Press, 2015

<sup>11</sup> J.C.M. Oliveira, L.C. Timm, T.T. Tominaga, F.A.M. Cássaro, K. Reichardt, O.O.S. Bacchi, D. Dourado-Neto and G.M. de S. Câmara, Soil temperature in a sugar-cane crop as a function of the management system, Plant and Soil, Vol. 230, No. 1, Special Section on the third European Nitrogen Fixation Conference (March (I) 2001), pp. 61-66

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### ON THE USE OF BIM AND PARAMETRIC MODELLING FOR BUILDING DESIGN: IMPLICATIONS AND RISKS ON THE QUALITY OF ARCHITECTURE.

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#### INTRODUCTION

Parametric approach applied to building design, based on the creation of algorithms capable of generating geometries dependent on multiple parameters, has shown the ability to explore design space on performance bases. This contamination between architectural design and information technology has proved successful as it can be governed by architect and engineer with medium coding skills and is open to the implementation of analysis, procedures, and methods from other disciplines, such as evolutionary optimization or machine learning, until a few years ago far from architectural design.

Due to the logics of the building design and construction process, is generally necessary to abandon the parametric approach in the design development phases in favour of more traditional design methods for different reasons: lack of implementation of parametric tools in concurrent design software, lack of knowledge on concepts like the flexibility of design space and rush to permitting phases. Because of this, there is a risk of not fully exploiting the advantages of parametric design.

At the same time, it is recognized that the most disruptive technology in Architecture, Engineering and Construction (AEC) is Building Information Modelling (BIM), a process that aims to compress all the information of a building into a single digital model. This technology is used today not only to document a project but also to design it. This is leading to radical changes for all the figures involved in the construction process. Therefore this paper recognizes the undeniable benefits of the tools, investigates some of the possible risks that threaten the quality of architecture and looks at their merging with other methods, like Model Based System Engineering (MBSE), as an opportunity to reinforce the effectiveness of these tools.

This paper deals with issues that affect a niche of the overall architectural production which, however, is significantly expanding year by year.

#### PARAMETRIC METHODS AND ARCHITECTURAL DESIGN

A design effort, or more generally an effort aimed at creating a real or abstract object, ends with defining the characteristics of this object. Parametric design is considered a paradigm shift since the object being designed is not the final output, but a set of instructions capable, if strictly followed, of generating an object. The initial conditions that are assumed before executing these instructions are

variables that in their changes allow the instruction set to generate different object. The set of instructions can take different forms: algorithms, programming codes, physical models, text etc. An example of textual instruction is given by Christopher Alexander<sup>1</sup> for designing a barn whose final shape depends on the context in which it is inserted, and other functional parameters. Therefore, parametric approach to the architectural design is an "attitude of mind"<sup>2</sup> although it is often reduced to the use of a certain type of software and tools.

Executing an instruction whose result is necessarily unique is a procedure that is particularly suitable for digitization. The instruction set shown in the notes can generate a very high number of different final objects. This leads to a difficulty in selecting the final design output. For this reason, the parametric approach is typically used with tools capable of quantifying the quality of an output from an analytical point of view.

The application of this approach in the field of architecture dates back to the design of shape-resistant structure by using physical models. Designer like Antoni Gaudi, Pier Luigi Nervi, Heinz Isler, Frei Paul Otto and others<sup>3</sup> shared similar methods to optimize their architecture in several aspects. For others, like Felix Candela, the instruction took the form of variable-parameter mathematical equations<sup>4</sup>. In the same vein, but certainly of greater influence, is the contribution to the discipline of Luigi Moretti: he defined "parametric architecture"<sup>5</sup> as well as the excellent results shown in the "*XII Triennale di Milano*" where he presented several sports stadium<sup>6</sup> optimized by equi-desirability curves.

#### Critical positions and parametric narratives

It may seem to be facing an optimal way of designing to be applied to any type of process. However, the main limitation of this approach lies in its complexity. Other causes are the difficulty of working concurrently and the need for IT skills not always present in the curriculum of architects. In fact, the first Computer Aided Design (CAD) software was meant to be used with a parametric approach<sup>7</sup>, but software that allowed to directly use primitives like lines and surfaces to design were more successful. From this opening to digital models derived the idea of using standardized procedures to design not a whole building, but complex primitives such as walls, slabs or beams. The paradigm shift, this time, lies in inserting in these primitive some information such as the materials used or the mechanical and thermal properties. This leads to the conception of Building Information Models (BIM).

Today there is a new interest in parametric design that brought several changes in numerous architecture and engineering firms. These changes do not just affect their products but also their workforce and design workflows. Three different narratives can be identified in the use of the parametric approach<sup>8</sup>:

• *Parametric formalism:* Almost comparable to an avant-garde, this narrative characterizes the architectures with the most daring formal proposal of recent years. Digital-based designers related to this narrative propose to substitute the manual designer in form-finding function. This narrative is the one with the broadest theoretical and methodological foundations, mainly thanks to the works of Patrick Schumacker. In particular, in the parametricist manifesto<sup>9</sup>, formal indications are given to the designer.

• *Parametric BIM:* This narrative proposes to enrich the advantages of BIM with "*embedded* sensor procurement procedure, building simulation modelling, intelligent 3-D libraries, price engines and bidding systems"<sup>10</sup>. These are new technologies that can give important benefits to the project, but labor-intensive procedure for their implementations are still required and can lead to problems later described.

• *Workflow parametric:* It is a less rigorous and more critical narrative towards the tools used. Seen in application typically project-driven such as optimization procedure on façade, structures or participatory process<sup>11</sup>, this narrative proposes the exploration generative computational process as design method with no declared language influences.

#### **BUILDING INFORMATIONAL MODELLING AND ARCHITECTURAL DESIGN**

The current generation of BIM software for architectural design arise from object-based parametric modelling<sup>12</sup>. These software are an excellent compromise between the absence of variability in CAD objects and the excessive effort to program a variation in the pure parametric approach. In a BIM process, the building is actually designed by *assembling* objects, not be *understand* or *unfolded*. This is due having available not abstract objects, such as "lines or "surfaces" like in CAD or algorithms like in parametric approach, but real object to which we easily associate a cost or a manufacturing company. The term *assembling* is used with no technological characterization but derives from the additive logic which is used when designing in a BIM software.

A 2016 survey claims that 96% of large firms (with 50 or more employees), 72% of midsized firms, and 28% of small firms use at least one BIM software<sup>13</sup>. Such a broad diffusion cannot only come from regulatory pressure but is due to benefits in design, construction and post-construction phases. These benefits are summarized in the BIM Handbook<sup>14</sup>: "more accurate visualization of a design, automatic low-level correction when changes are made to design, generate accurate and consistent 2D drawing, earlier collaboration of multiple design disciplines, extract cost estimates during the design stage, improve energy efficiency and sustainability, synchronize design and construction planning, discover design errors and omissions before construction, use design model as basis for fabricated components, synchronize procurement with design and construction, better manage and operate facilities, integrate with facility operation and management systems".

#### Changing the concept of quality: A risk we are facing.

Past researches and professional practices show that a main quality of BIM that allowed it to be accepted, or even to be endorsed by various government technical tables, is the decreased possibility of making design errors. The most obvious errors that the use of BIM can avoid are interferences, or *clash*, between the different systems that make up a building (es: architectural, structural and piping). This is guaranteed by models that are consistent and explorable not only by designers but also by builders, installers, customers etc. This aspect, from which derives the possibility to work concurrently, or to put another way of decreasing the design time and effort, it is one of the principles in advertising these tools among increased productivity.

Franco Purini unifies this exaltation of the technical aspects of architecture under the term of *neofunzionalismo*<sup>15</sup> (neo-functionalism). In particular he recognized the risk to abandon the idea that architecture has a meaning that goes beyond the technical and construction aspects.

It is not difficult to identify why those who control the work of architects or constructors like BIM so much. Livio Sacchi talks about this increase in the *software* part of architectural design to better be ready to face its *hardware* aspects on the construction site<sup>16</sup>. He, in antithesis with the negative examples of Calatrava's *Rome Sports City* and Fuksas's *Rome Convention Center*, recognizes how these technologies can reduce the risk of waste of public money thanks to the constant control of construction, management and maintenance costs by coordinating the design actions, theoretically, from conception to demolition.

In a society where waste of taxpayer's money is an important cultural theme, we risk not taking the maximum that tools such as BIM and parametric design can offer, being satisfied just by cost control

and emerging behaviour reduction. In particular, parametric design's mainly recognized benefit is the possibility to optimize quantitative aspects in the architectural design leaving out all the advances of exploring the design space on a performative base.



Santiago Calatrava's Rome Sport City<sup>17</sup> (2005 – in progress) & Massimiliano Fuksas's Rome Convention Center<sup>18</sup> (2016).

But is this sufficient to guarantee a quality architecture? The constriction of the 7 dimensions of BIM<sup>19</sup> in a single model is pushing towards a progressive increase in the definition of the architectural project. In fact, today we are witnessing the mutation of the documentation that accompanies the architectural project. We are moving from designing a schematization of an object with the minimum information capable of fully describing the project towards a model with a 1:1 level of detail. In BIM designs that are more detailed, the final model will turn out to be a digital twin of the constructed building that facilitates the phases of *utilization, support* and *retirement*. One of the challenges of architecture in the future will be precisely to manage the relationship between information and perceived architectural quality.

Designing using models with such high definition levels can make it inconvenient, or excessively expensive in terms of time and costs, to investigate design alternatives. In a quality architectural process it is necessary to contain the effort to verify if it is better to modify choices previously made. Giancarlo de Carlo spoke extensively about this need to explore different solutions to a single problem as "progetto tentativo" (trad. *trial and error design*). Franco Purini instead spoke of architectural design as a game of chess where it is essential to ponder the first move<sup>20</sup>, but the use of excessive complex procedure or workflow could make it inconvenient to put each piece back in place and start our chess game again. Therefore, it is necessary to develop a greater awareness of these tools to not incur in methodological errors.

A widespread question is if the tools we use to design influence the final output. The answer is obviously and is not difficult to consider design tools as architectural materials themselves<sup>21</sup>. However, in this gradual transition to BIM the risks are, in some respects, greater than the transition from manual drawing to Computer Aided Design. This regulatory pressure risks pushing to design buildings with forms, materials, technologies and products that best lend themselves to be enriched with information in the 7 BIM dimensions. We cannot understand today whether this risk has already materialized, but in the future, it will be necessary to look at the buildings built in these years to see if BIM has brought homologation instead of quality.

#### For a different vision of parametric design and BIM

Considering BIM as the only tool to design and document buildings risk diminishing its effectiveness. It is more appropriate to start talking about BIM as a platform in which not only different information converge, but also different project methodologies can find space. Today software and computational power are available to carry out parametric design in a BIM environment. Examples are the open-source Rhino.Inside for Revit, Dynamo for Revit or Grasshopper live connection for Archicad.

It is worth asking whether this possibility of using two such powerful tools concurrently can overcome the well-known problems of the parametric design and some defects of BIM. Among the problems of parametric methodologies, we find an increase in design cost (actually more time and professionals are needed), difficult in implementing new types of variability, higher computational demand and other technical problems related to the field of software engineering<sup>22</sup>. Some problems to be solved require the designer to acquire more IT skills. For others, it is appropriate to look at past experiences. Despite the visions of the parametricist manifesto<sup>23</sup> there are examples of high quality architecture that used parametric methodologies as a tool alongside more traditional design techniques.



Zaha Hadid Dongdaenum Design Plaza<sup>24</sup> (2014) & Frei Paul Otto's Multihalle<sup>25</sup> (1975).

A way to take the best that parametric design can offer, in terms of optimizing fitness functions, saving material, increasing sustainability and formal research, is to consider it a tool that is not appropriate to use for every design, design part or design phase. Considering only the technical quality in a field such as aerospace (for which parametric software were designed in the first place) parametric models of smaller assemblies and subassemblies of the entire design have been used successfully thus following the *workflow parametric* narrative. Designing a building in this way also would not distort the role of the architect, but rather reinforces the importance of a figure capable of governing a complex process. The attitude towards BIM in the design phase, must not be aimed at creating an *as built*, or a *digital twin*. Instead it is appropriate to use BIM as a platform where to build a simplified version of the building as a system through an abstraction of reality without unnecessary components. These models should be used to facilitate understanding of the object being designed but also to examine 'what if' scenarios. After a successful architectural design phase, it will be possible to enrich these models with the information required by the various regulations.

This proposed attitude has many points in common with the Model Based System Engineering which can give the following benefits<sup>26</sup>:"*improved communications, increased ability to manage system complexity, enhanced knowledge capture*".

A further element that drives to look at System Engineering is the awareness that even in the conceptual phases of designing a complex system, such as a building, it is necessary to involve

professionals from different disciplines. A greater knowledge of the concurrent approach would be an additional tool for designers. The concurrent approach, introduced in the defence field<sup>27</sup> and then used in aeronautics, space, automotive, electronics, computer industry and more, aims to reduce the time necessary for the development of a project. It is based on the application of 7 principles<sup>28</sup>: *parallel work-group, parallel product decomposition, concurrent resource scheduling, concurrent processing, minimize product interfaces, minimize process interfaces, minimize computer interfaces.* These are aspects that have always been present in the world of *civil at large* design. Due to the increasing complexity of the designed buildings, they deserve to be approached more methodologically without stopping at what software and tools offer.

#### CONCLUSION

One of the challenges of architecture in the future will be to avoid that a project with a high level of design and information will be automatically considered by a legislator, a municipality or a customer as a design of quality. It is necessary to recognize the risk that these information-based architecture models could be evaluated by the so-called "algorithmic neutrality" which can certainly capture the quantitative performance, but not the qualitative one. It will be necessary to reiterate the idea that the absence of errors in a project is a necessary but not sufficient condition for a quality architecture.

A design and a design process of greater awareness and quality can be obtained by replacing the aim of having a digital twin with that of having a test platform in which compose and decompose our project. We must not treat BIM as a method for piling information into geometries. It is necessary to take a step back and rediscover that sometimes the most important information for a marble cladding are not the *quantity take off*, its position in the *Work Breakdown Structure* (WBS) or the day it will be mounted.

Parametric design could be used in BIM to simplify its application thanks to the objects and assets that BIM offers. But is also appropriate to overcome rigidities of some of these objects and assets thanks to the possibility of variation and modification offered by the parametric design. Using parametric design in a BIM environment allows to not stop at the creative and formal limits that may afflict a software. In this way, it is possible to decrease and control the influence that a design tool has on the design itself.

This more flexible attitude allows to take advantage of the benefits of the parametric design not only in the schematic design or construction phase but throughout the entire design process and life cycle of the building.

#### NOTES

<sup>1</sup>Christopher Alexander. The timeless way of building (New York: Oxford University Press, 1979), 179-181. The patterns that a farmer could follow to build a barn is reported:

"Make a barn in the shape of a rectangle, 30-55 feet wide, 40-250 feet long, the length at least 3x feet, where x is the number of cows the barn has to hold.

Orient the barn so that its ends connect easily with the paths where cows come in from the fields, and with the local road.

Divide the inside of the barn into three parallel aisles: two cow milking aisles down the outer sides, and a central hay-storage aisle.

Make the central aisle 16-38 feet wide, and the outer aisles 10-16 feet wide. In certain cases, one of the side aisles can be shorter than the central aisle, thus taking a notch out of the rectangle.

Between the outer edge of the central aisle and the two outer aisles, place two rows of columns. The columns are equally spaced, and the distance between the last column and the end wall is equal to the distances between columns. Choose a column spacing between 7 and 17 feet.

If the column spacing is ?-IO feet, make the columns 4 x 4's. If the column spacing is 10-I4 feet, make the columns 6 x 6's. If the column spacing is 14-17 feet, make the columns 8 x 8's. The columns are tied together, along the length of the barn, by the main purlins sitting on top of the columns.

Make the roof of the barn a symmetrical pitched roof, and make the pitch over the outer aisles flatter, or equal to, the pitch over the central aisle-so that the pitch will usually break over the main columns along the purlins. Both pitches are between 20 and 40 degrees to the horizontal.

If the length of the barn is less than 150 feet, place the main doors at the ends, roughly on the center line of the central aisle. If the barn is more than 150 feet long, place the main doors in the side walls, roughly halfway along, and let the side aisles be interrupted by the doors.

If the two rows of columns which define the central aisle are more than 18 feet apart, tie them together by horizontal tie beams, all at the same height, and within 3 feet of the tops of the columns.

Make the side walls 7-10 feet high, and the peak of the roof 15-25 feet high.

Frame the side walls by a system of vertical studs, connected by horizontal sill (bottom) and plate (top), and, if you wish, by a middle horizontal member-all these members 2 x 4's.

Place the studs in the side walls to line up with the columns of the central aisle, and place the main rafters in the same planes as the studs and columns, sitting on the plates and purlins which run over these members.

Place rafters from opposite sides of the roof, meeting the main ridge beam.

Brace every corner in the framing of the side walls with a diagonal 2 x 4, about 3 feet long.

Connect the tie beams running across the central aisle to the main columns, by diagonal braces.

Connect the main purlins to the main columns, with diagonal braces 3-4 feet long. If the column spacing is more than about 2 I feet also use double braces, the outer ones about 6 feet long."

<sup>2</sup> Hugh Whitehead. Foreword to Elements of parametric design, by Robert Woodbury (New York: Routledge, 2010),1.

<sup>3</sup> Bill Addis. «'Toys that save millions' - A history of using physical models in structural design» Structural Engineer, 4 (1991):12-27.

<sup>4</sup>Massimiliano Savorra and Giovanni Fabbrocino, «Felix Candela between phylosophy and engineering: the meaning of shape» Structure and Architecture: Concepts, Applications and Challanges (London: Taylor & Francis, 2013), 253-260.

<sup>5</sup> See the definition of "architettura parametrica" edited by Luigi Moretti contained in Paolo Portoghesi, Dizionario enciclopedico di architettura e urbanistica (trad.: Encyclopedic dictionary of architecture and urban planning) (Roma: Editoriale Romano, 1968), 377.

<sup>6</sup> Luigi Moretti, Catalogo della mostra di architettura parametrica (trad. catalog exhibition of parametric architecture) (Milano: Arti Grafiche Crespi, 1960).

<sup>7</sup> Ivan Edward Sutherland, Sketchpad, a man-machine graphical communication system. Cambridge (Lincoln Laboratory, Massachussets Institute of Technology, technical report, 1963).

<sup>8</sup> Alfredo Andia and Thomas Spiegelhalter, «Toward automatic design and construction» in Post-Parametric automation in design and construction, ed, by Alfredo Andia, and Thomas Spiegelhalter (Norwood: Artech House, 2016), 22.

<sup>9</sup>Patrik Schumacher, «Parametricism as Style: Parametricist Manifesto». presented and discussed at the Dark Side Club, 11th Venice Biennale of Architecture, Venice, 2008.

<sup>10</sup> Andia and Spiegelhalter, *Toward automatic design and construction*, 22.

<sup>11</sup> Giuseppe Canestrino, "Use of parametric approach for user's-oriented development in building design: prelimanry investigations." (paper presented at the conference Urban Planning & Architectural Design for Sustainable Development – 5th Edition), *Urban and Transit Planning - Edition 2: Towards Liveable Communities: Urban places and Design Spaces* (Cham: Springer, 2020).

<sup>12</sup> Chuck Eastman, Paul Teicholz, Rafael Sacks and Kathleen Liston. *BIM Handbook. A guide to building information modeling for Owners, Managers, Designer, Engineers and Contractors* (Hoboken: John Wiley & Sons, 2008),29.

<sup>13</sup> The American Institute of Architects, *Firm survey report* (Washington: The American Institute of Architects, 2018).

<sup>14</sup> Eastman et al, *BIM Handbook*, 16-21.

<sup>15</sup> Franco Purini, «II BIM. Un parere in evoluzione. (trad: BIM. An evolving opinion) » in *Op.cit. Selezione della critica d'arte contemporanea (trad: Op.cit.: selection of contemporary art critic)* (2018): 6.

<sup>16</sup> Livio Sacchi, «La fine del disegno? (trad.: The end of the drawing?) » in *Op. cit. Selezione della critica d'arte contemporanea (trad: Op.cit.: selection of contemporary art critic)* (2015): 5-16.

<sup>17</sup> Image credit: photography by Simone Artibani under license CC BY 2.0

<sup>18</sup> Image credit: photography by Fabrizio Russo under license CC BY 2.0

<sup>19</sup> A BIM with a high level of development consists of 7 dimensions. The first three concern the geometric properties of the design. The additional dimensions introduce information on construction time management (scheduling), measurement and cost control (estimating), sustainability and management.

<sup>20</sup> Franco Purini, Comporre l'architettura (trad.: compose the architecture) (Macerata: Editori Laterza, 2000): 6.

<sup>21</sup> Purini, *II BIM. Un parere in Evoluzione,13.* Purini builds this concept with reference to Vittorio Gregotti's concept of material.

<sup>22</sup> Rick Smith. *Technical notes from experiences and studies in using Parametric and BIM architectural software* in an Internal report, Virtual Build Technologies technical notes, 2007.

<sup>23</sup> Schumacker, *Parametricist Manifesto.* The first of the 5 agendas proposed to push the development of parametricism is *Inter-articulation of sub-systems: "The ambition is to move from single system differentiation – e.g. a swarm of façade components - to the scripted association of multiple subsystem– envelope, structure, <i>internal subdivision, navigation void. The differentiation in any one systems is correlated with differentions in the other systems"* 

<sup>24</sup> Image credit: photography by Nestor Lacle under license CC BY 2.0

<sup>25</sup> Image credit: photography by Immanuel Giel under license CC0 1.0

<sup>26</sup> International Council on Systems Engineering (INCOSE), «Cross-Cutting Systems Engineering Methods» in *Systems engineering handbook*, 180-190. (San Diego: Wiley, 2015),180-190.

<sup>27</sup> Robert Winner et al., *The role of concurrent engineering in weapons system acquisition.* (Alexandria: Institute for defence analyses, 1988).

<sup>28</sup> Brian Prasad. «Seven enabling principles of concurrency and simultaney in concurrent engineering.», *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, (1997): 185-204.

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## LANDSCAPE IN MOTION. Score-Maps, Design Processes and Choreographic Creation

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#### INTRODUCTION

This presentation addresses a current project, Landscape in Motion, which is conceived as creative research in the fields of landscape design and performing/digital arts. Through an interdisciplinary approach, the project aims to develop a new site-sensitive methodology that honors cultural/aesthetic and environmental heritage in both urban renewal design processes and in site-based arts. Specifically, the project seeks to inform landscape design and site-specific performance processes in order to offer innovative approaches for future experience of our cities.

Landscape in Motion focuses on the infrastructures and industrial areas in the richly layered neighborhoods of Ramsay and Inglewood in Calgary, Alberta (Canada). These neighbourhoods boast complex interfaces between the city centre, rivers, cultural heritage sites, mobility infrastructures, industrial sites, brownfields and vacant land. The area is also crossed by the Canadian Pacific Railway (CPR), historical infrastructure with significant symbolism, but controversial value due to the fact that it is representative of how European settlement impacted places of great importance for indigenous people. The frequent, lasting metallic noise of the CPR trains constantly recalls this contentious history. Mixed land use and diverse urban tissues create a landscape made of contrasts, frictions, and disorientations. But it is also one that captivates the human imagination. Human-scale places (such as the main thoroughfare through Inglewood, or the picturesque single houses) that interface with the vastness and inhospitality of major urban infrastructures and industrial areas offer much to fascinate both designers<sup>1</sup> and residents.

At present, the implementation of city plans in Calgary includes the imminent construction of a new LRT line that will radically alter the Ramsay/Inglewood area. The City considers this infrastructure as both an evolution of the transit system and a platform for development<sup>2</sup>. This impending, and indeed currently in-process, transformation drove landscape architect Enrica Dall'Ara to seek out innovative ways to both preserve and highlight the cultural heritage of Ramsay and Inglewood, while also developing a methodological process that might be applied to other urban renewal endeavours. As such, Dall'Ara embarked on a landscape analysis and design project of the neighbourhoods in her Landscape Architecture studio course at the University of Calgary in 2018 and 2019. The investigative and mapping processes that emerged from this course inspired the further research work that we describe here.

In 2018, Dall'Ara approached site choreographer Melanie Kloetzel and asked if she would be interested in collaborating on a landscape design project that would explore the current landscape of Inglewood and Ramsay from the perspective of artistic inquiry on a human bodily scale. Thus, the project Landscape in Motion was born. This presentation will focus on the processes of, first, developing a methodology for the project and, second, defining a lexicon for the key output of "score-maps", an annotation system that serves as a means to inform both landscape design and choreographic creation.

#### **BACKGROUND AND OBJECTIVES**

Landscape in Motion acts as an interdisciplinary inquiry to analyze the relationship between major urban infrastructures and the human scale<sup>3</sup>. In particular, the project takes as a premise that urban infrastructures and their hardscapes can be re-imagined as cultural and/or green infrastructures<sup>4</sup> through the mechanism of the human body<sup>5</sup>. Within the project, the body – and, more specifically movement and dance – acts as a measuring and perceptual tool, to highlight and evaluate the potential of urban infrastructures for their environmental and social value. The artistic expression serves as a poetics for both site investigation and recording<sup>6</sup>, and is particularly inspired by Land Art and other site-based artistic efforts<sup>7</sup>.

One contribution that has been critical to our project is the well-known intersection of landscape design and choreography by American landscape architect Lawrence Halprin (1916-2009) and dancer/choreographer Anna Halprin<sup>8</sup>. In particular, the Halprins' "Motation" drawings have been significant as they translated notational systems for dance-landscape interactions into diagrammatic representations, which functioned to document, direct and depict movement through space over time<sup>9</sup>.

The Halprins' pioneering efforts acted as inspiration for the development of our approach, which aims to effect more sensitive inquiries into the cultural and perceptual values of urban landscapes in the face of aggressive urban revitalization efforts. We embarked on a project that would examine existing urban landscapes using both spatial data (mapping)<sup>10</sup> and experiential activities (on site surveys, and site-specific physical and aural performance methods), in order to develop specific creative outputs. These outputs include digital landscape representation, score-maps to influence landscape design and choreographic creation, dance films, a documentary of the process, and landscape meta-design for the site; the goal is for these outputs to be interactively linked to each other and available through an on-line platform.

#### A DEVELOPING METHODOLOGY

Background research for the project began through student mapping and design projects in Dall'Ara's Landscape Architecture Studio course. In particular, the analysis phase included an investigation of Inglewood/Ramsay using methods that Dall'Ara has been developing for several years through her professional work, research and pedagogy; these methods emphasize the role of both structural/morphological systems and components related to cultural, perceptual and symbolic values<sup>11</sup>. The main objective has been to interpret, through landscape analysis and design, both the structure(s) of the landscape and its ephemeral or intangible conditions<sup>12</sup>.

Borrowing from the landscape architecture studios' work, which paid particular attention to infrastructures, interfaces, boundaries<sup>13</sup>, barriers, connections, and lost and residual spaces, Dall'Ara and Kloetzel began making multiple journeys through the neighbourhoods, focusing on both cultural and phenomenological properties of the areas. These walks, which narrowed down the options for physical investigation, figured as critical for the project's development in order to ensure a depth of

analysis of particular sites, as well as for addressing the smaller scale of the human body within the grander scale of neighbourhood as a whole.

As potential sites began to emerge – including a neighbourhood park (Jefferies Park) in Ramsay, marginalized spaces adjacent to the rail tracks nearby the Ramsay Design Centre (hosted in a historic building), and a courtyard of the oldest brewery in Inglewood – a series of questions also began to surface. How should we address the different scales of the project? How could the four-dimensional nature of lived and danced experience be translated into mapping? What combination of 'viewing' would support the process? How could we ensure that our notation integrates "physical characteristics of space" and "non-physical characteristics, such as images, impressions, meanings or experiences"<sup>14</sup>? And, critically, how could mapping and language in both design and dance be used in a way that would not reenact colonial imperatives?

Cognizant, in particular, of these colonialist erasures and assumptions within mapping practices, and aiming at emphasizing the role of *time* in defining both the palimpsest of the site and the human cognitive experience of it<sup>15</sup>, Dall'Ara and Kloetzel started to employ the term 'experiential archaeology' to help frame the upcoming mapping endeavor. As an idea, Dall'Ara and Kloetzel thought of experiential archaeology as a way to highlight the personal and experiential nature of being in place while also bringing into play concepts developed within critical cartography<sup>16</sup>, landscape architecture theory, and site-specific performance theory<sup>17</sup> in order to ensure the inclusion of diverse bodies that have traversed a site over time.

From the site-specific dance perspective, Kloetzel framed the mapping project for the dance research team around her recent anthology *Site Dance: Choreographers and the Lure of Alternative Spaces*, co-edited with Carolyn Pavlik (2009), which lays out four main concerns within site-specific performance: history, phenomenological/physical interactivity, aesthetics, and community relationships. Thus, as the project progressed into the mapping phase, the dance research team began to conceptualize its on-site exploration around these four main areas. Specifically, the idea of experiential archaeology allowed the dancers to combine their deepening knowledge and impressions of the individual places through iterative experience with what Kloetzel started calling a 'light-flâneuse' kind of engagement<sup>18</sup> that prioritized diverse experiences of a site across both time and a diversity of bodies.

In the initial visit to each individual site, Dall'Ara and Kloetzel purposely withheld information from the dance researchers in order to glean their first impressions of the place. Inevitably, this first effort focused on the physical components of the site, although due to the site-specific performance training undergone by the students, their impressions were typically heightened in terms of sensory input, i.e. discussions of sound and smell, in particular, stood out as critical components alongside visual and aesthetic elements. Yet, the dance research team quickly leaped into a second phase, prioritizing physical and phenomenological engagement with the site. Mapping such engagement via a focus on 'action' terminology that arose from improvisational interactions, each dancer crafted an 'environmental dialogues' map that began to offer suggestions as to what might be critical to include in the upcoming 'score-maps'.

While the dancers focused on personal experiences of site, the landscape architecture team embraced the concept that "double-glances" should be fostered in a cross-scalar way: a 'small-scale' glance at proximity and detail and a 'large-scale' glance at the landscape systems and scenery<sup>19</sup>. The need for an in-depth investigation into the historical evolution of the site also emerged as critical, as we wanted to interpret and represent simultaneously both space and time, key markers of analysis within landscape design and choreography. Accordingly, the landscape architecture team developed a series of maps that emphasized key historical periods (including present-day) and infrastructure of the area.

These maps were layered into an axonometric representation integrated with a timeline. By complementing the maps with perspective views of the site, viewers could gain a more immediate understanding of the environment's features<sup>20</sup>. Specifically, within the perspective views, landscape components such as historic buildings, historic infrastructures, and vegetation systems were highlighted as protagonists<sup>21</sup>.



Figure 1. Landscape analysis. Jefferies Park

These landscape representations and information were shared with the entire team, a key step that allowed the dance researchers to recognize significant moments in the area's history, as well as infrastructural and other physical changes over time. To add to these insights, the whole team was able to join with two Ramsay residents (also consultants for the project) in order to glean a deeper understanding of the sites from the community perspective. The sessions with the landscape architecture team and with community members greatly influenced the 'experiential archaeology' for the dance researchers, allowing the next period of fieldwork to unfold via an altered perspective on the sites.

For the final two steps – creating historical maps and community maps – the dance research team used the light-flâneuse approach to consider what kind of movement and sensory experiences might have been readily or frequently experienced by a diversity of Ramsay or Inglewood residents at each site. Imaginative ideas around movement in pre-European settlement, late nineteenth century, 1920s, 1960s, 1990s, current, and even future eras began to emerge. Considerations of clothing worn, odors, textures, ground surface, pervasive sounds, social restrictions, and infrastructure-body interfaces began to grow in import. In the community-focused mapping, age range stood out as critical based on the personal narratives we heard, prompting the dance researchers to adopt different age 'lenses' for their mapping.

As an additional step to support the fieldwork, we arranged for a session with team member Mary-Ellen Tyler, a landscape ecologist, so that the whole research team could be informed by 'more-thanhuman' concepts<sup>22</sup> around plant and animal ecology<sup>23</sup>. Compiling and synthesizing all this information – historical, ecological, physical, improvisational, community, and aesthetic insights – the dance research team then created comprehensive action-oriented maps that could function as a critical base for the development of the final score-maps by the design team.



Figure 2. Dancers' synthesis mapping

#### **CRAFTING SCORE-MAPS**

#### Seeking a common ground between disciplines

In order to create relevant and applicable content/representation within the score-maps for both dance and landscape architecture, the team focused on terminology and concepts that are significant for both disciplines, individually and collectively. To start, we reflected on our principal intentions for linking the fields of landscape design and site-specific dance, specifically analyzing and (beneficially) impacting the way we interact with and live in the (urban) environment (*life in the landscape*). Concepts that stood out included, one, emphasizing the key role of cognitive experiences, sensory impressions, and sense of place for affecting our relationship to place; two, deciphering and dialoguing with the atmosphere of the place<sup>24</sup>; three, fostering a respectful and meaningful humanenvironment relationship<sup>25</sup>; and, finally, exploring on-site (inter/intra)actions<sup>26</sup> as a key element, as the relational movements between dancers and site offered a baseline for further analysis.

With these intentions, we developed a conceptual framework that could both underscore the parallelism of the fields and directly impact the development of a corresponding lexicon for the scoremap's legend. We identified four categories of site investigation that are vital to the two disciplines (History, Environmental systems/Environmental dialogues, Culture and Society/Community, and Aesthetics). By focusing on these crossover areas of concern, we are currently defining beneficial and, more importantly, *legible* score-map legends and diagrammatic content that can lead to further development in both fields; in short, we are aiming for score-maps that can foster, first, landscape meta-design and compositional meta-design, second, landscape design and choreography, and, finally, built design and site-based dance performance.

#### An annotation system: Score-maps' lexicon

As (inter/intra)actions are the fundamental component of our investigation into the humanenvironment relationship, the score-maps prioritize annotations that specify *key actions* by the dancers, as well refer to the *quality* of these actions. Along with stating these basic actions and qualities via text, the score-maps delve into *space* and *time* as essential dimensions for both disciplines. Importantly, the score-maps that we are currently developing include information at both the site scale and the human body scale in order to define the (inter/intra)actions more specifically.

For example, spatial information includes components such as Urban Fabric, Circulation Infrastructure, Topography, Vegetation Patterns and Water Bodies; these are then integrated with annotations regarding human interactions with the environment, specifically such choreographic inputs as Background/Foreground, Kinesphere, Pathway (movement trace), Level, and Facing.

The time dimension poses different challenges. In the same way that we are exploring how to represent the more minute human bodily scale alongside the neighbourhood scale, we are also attempting to illustrate long term temporal aspects of landscape processes alongside the much shorter temporal experience of human movement. As such, we are experimenting with offering a series of images that can show landscape processes (such as historical transformations and seasonal changes) as well as a focus on time-based choreographic ideas such as rhythm (tempo, pattern, syncopation), duration and stillness.

An additional topic and inspiration for both choreography and landscape design - that is, the presence, movement and flows of non-human or more-than-human beings and materials in the environment - is one that is being addressed in our further development of the score-maps.

To contend with the complexity of the project, we have found that hybrid representation techniques (i.e. collage techniques, combining photos, text, drawn images, etc.) as well as composite<sup>27</sup> and multimedia score-mapping offer the best potential. This approach arose as a consequence of our intention to develop an annotation system whose iconography is both expressive and immediate to read.

Thus, we opted for three-dimensional score-maps that use 3D models as a working tool to structure the skeleton of spatial information. Along with different views, such as plan and perspective views, we found better options for effectively communicating our ideas. Combining multiple views allows for different and complementary information: the plan view acts as an overview of the main spatial organization of landscape components, bodies, actions, and movement pathways; while the perspective view more powerfully expresses the scenery, and (especially through hybrid techniques), the *atmosphere* of the place, with an emphasis on human experience and perception. Of critical importance, the perspective view is also a kind of representation through which the score-map expresses its potential to prefigure design concepts and scenarios, as well as choreographic presentation tactics (particularly with regard to foreground/background and sequential structure).

As a first level of coding, components that play the role of codes/symbols are represented in color or by means of photographic collage for emphasis in both plan and perspective views. Conversely, the elements that serve as the "neutral" basis are in black and white, traced through simple wireframes. The color-coding used in the landscape analysis phase to distinguish significant historical periods has been used throughout the process of crafting the score-maps.



Figure 3. Score-maps. Perspective view prototype

Beyond this main structure of the score-maps, we are exploring how callout drawings derived from the plan view and/or perspective view can allow us to change scale (for instance, from the site scale to the body scale), and multiply the possibilities to add more detailed information. We are also addressing the challenge of representing choreographic sequence and theme via a series of interrelated perspective views that use a "key frames" method. This is a strategy that could show transitions between actions, transitions between different landscape conditions or processes (e.g., seasons, weather-related changes, different times during the day, etc.), and different thematic concepts within the choreography (e.g., different age 'lenses' or historical periods).



Figure 4. Score-maps. Plan view prototype

#### CONCLUSION

While the crafting of methodology and score-maps is still underway, we are excited about the project and its prospects for landscape architecture and site-specific performance. Through our approach, which is experimental and experiential (and often improvisational), we are also aware of certain challenges. For example, as we finalize the score-maps, dance films, and meta-design outputs, among others, we are particularly cognizant of the *differences* between contexts; thus, we are aiming to craft a useful methodology, one that respects individual contexts and the individual artists/designers that interact with them. In short, in developing a methodology and an annotation system that could be used by other artists, designers and scholars, we seek to preserve the capacity for others to *adapt* these  $tools^{28}$  to their own iterative experiences at a diversity of sites.

Overall, we believe the process of intertwining our disciplines is promising from the perspective of deepening our understanding of urban landscapes and enriching the discourse on our cities. As these art and design processes inform and influence one another, we glimpse a model of human-place interaction that can expand our awareness of and connection to the urban landscapes that surround us.

#### NOTES

<sup>1</sup> Roxi Thoren. Landscapes of Change: Innovative Designs and Reinvented Sites (Portland: Timber Press, 2014). 2 The City of Calgary, "About the Green Line," accessed June 5, 2020. http://www.calgary.ca/Transportation/TI/Pages/Transit-projects/Green-line/vision.aspx, accessed July 3, 2018 <sup>3</sup> Kelly Shannon and Marcel Smets, The Landscape of Contemporary Infrastructure (Rotterdam: NAI010 Publishers, 2010); Dane Carlson. "The Humanity of Infrastructure: Landscape as Operative Ground," Scenario 03: Rethinking Infrastructure (2013), accessed May 20, 2018, https://scenariojournal.com/article/humanity-ofinfrastructure/.

<sup>4</sup> Tobias Plieninger and Claudia Bieling, *Resilience and the Cultural Landscape: Understanding and Managing Change in Human-Shaped Environments* (Cambridge: Cambridge University Press, 2012); Czechowski et Al., 2015; Karl Kullmann, "Thin Parks/Thick Edges: Towards a Linear Park Typology for (Post)Infrastructural Sites," *Journal of Landscape Architecture* 6, no. 2 (2011): 70-81, doi:10.1080/18626033.2011.9723456; Denis Cosgrove, "Landscape as Cultural Product," in *Theory in Landscape Architecture: A Reader* (Philadelphia: University of Pennsylvania Press, 1984), 165-66.

<sup>5</sup> Susan Leigh Foster, Choreographing Empathy: Kinesthesia in Performance New York: Routledge, 2010).

<sup>6</sup> Nick Kaye, *Site-Specific Art: Performance, Place and Documentation* (London: Routledge, 2000); Katrina McPherson, *Making Video Dance* (New York: Routledge, 2006); Erin Brannigan, *Dancefilm: Choreography and the Moving Image* (New York: Oxford University Press, 2011); Sherril Dodds, *Dance on Screen: Genres and Media from Hollywood to Experimental Art* (New York: Palgrave Macmillan, 2001); Judy Mitoma, Elizabeth Zimmer, and Dale Ann Stieber, *Envisioning Dance on Film and Video* (New York: Routledge, 2002).

<sup>7</sup> Melanie Kloetzel and Carolyn Pavlik, *Site Dance: Choreographers and the Lure of Alternative Space* (Gainesville: University Press of Florida, 2009); Victoria Hunter, ed., *Moving Sites: Investigating Site-Specific Dance Performance* (New York and London: Routledge, 2015); Mike Pearson, *Site-Specific Performance* (New York: Palgrave Macmillan, 2010).

<sup>8</sup> Married partners, as well as frequent collaborators, Anna Halprin and Lawrence Halprin, often engaged in interdisciplinary projects, many of which centred around their home space and 'dance deck', which was designed by Lawrence for Anna in the 1950s.

<sup>9</sup> Lawrence Halprin, *Cities* (New York: Reinhold Publishing, 1963); Lawrence Halprin, "Motation" *Progressive Architecture* 46 (1965): 126-33; Lawrence Halprin, *The RSPV Cycle: Creative Process in the Human Environment* (New York: George Braziller, 1969); Lawrence Halprin, *A Life Spent Changing Places* (Philadelphia: University of Pennsylvania Press, 2011); Lawrence Halprin and Rachel Kaplan, *Moving Toward Life: Five Decades of Transformational Dance* (Hanover: Wesleyan University Press, 1995); Alison Bick Hirsh, *City Choreography: Lawrence Halprin in Urban Renewal America* (Minneapolis, University of Minneapolis Press, 2014).

<sup>10</sup> Mapping is carried out as an interpretive and creative process of landscape investigation and design. See James Corner and Alex S. MacLean, *Taking Measures Across the American Landscape* (New Haven: Yale University Press, 1996), James Corner, *The Landscape Imagination: Collected Essays of James Corner, 1990-2010* (Princeton: Princeton University Press, 2014), and Jill Desimini and Charles Waldheim, *Cartographic Grounds: Projecting the Landscape Imaginary* (New York: Princeton Architectural Press, 2016).

<sup>11</sup> Stephen Daniels and Denis Cosgrove, *The Iconography of Landscape* (Cambridge: Cambridge University Press, 1988); Giunta Regionale Lombardia, "Linee Guida per L'Esame Paesistico Dei Progetti Ai Sensi Dell'Art" *30 Delle Norme Di Attuazione Del Piano Territoriale Paesistico Regionale* (2002).

<sup>12</sup> Donald Appleyard, Kevin Lynch, and John Randalph Myer, *The View from the Road* (Cambridge and London: MIT Press, 1964); Enrica Dall'Ara, Matteo Zamagni, and Sara Angelini, "ASA Landfill," *Paysage Topscape* 26, (2016): 104-05; Enrica Dall'Ara, "Ecologia ed Estetica di un Sito Industriale / Ecology and Aesthetics of an Industrial Site. ASA Landfill, Castel Maggiore, Bologna, Italy," *Architettura Del Paesaggio* 37, *Professione Paesaggista 2, The Landscape Architect* 2 (2018): 41-44; Enrica Dall'Ara, "L'Atmosfera nel Progetto di Paesaggio," *L'Italia del Paesaggio* (Bologna: Il Mulino, Anticipated 2020).

<sup>13</sup> Michel Corajoud, "Le Projet De Paysage: Lettre aux Étudiants" in *Le Jardinier, L'Artiste Et L'Ingénieur* (Paris: Éditions de L'Imprimeur, 2000), 37-50.

<sup>14</sup> Stuart Rose, *A Notation Simulation Process for Composers of Space* (College of Education, Michigan State University, 1968), quoted in Premjit Talwar, *Notation Systems in Architecture* (Boston: MIT Press, 1972), 27.

<sup>15</sup> Kenneth Lynch, *The Image of the City* (Boston, MIT Press, 1960); Kaye, *Site-Specific Art*; Mike Pearson and Michael Shanks, *Theatre/Archaeology* (London: Routledge, 2001).

<sup>16</sup> Jeremy Crampton, and John Krygier, "An Introduction to Critical Cartography," *ACME: An International Journal for Critical Geographies* 4:1 (2005): 11-33; J. B. Harley, *The New Nature of Maps: Essays in the History of Cartography*, ed. Paul Laxton (Baltimore and London: The John Hopkins University Press, 2001).

<sup>17</sup> Pearson and Shanks, *Theatre/Archaeology*; Pearson, *Site-Specific Performance*; Kloetzel and Pavlik, *Site Dance*; Hunter, *Moving Sites*; Karen Barbour, Victoria Hunter and Melanie Kloetzel, *(Re)positioning Site Dance: Local Acts, Global Perspectives* (Bristol, UK: Intellect Books, 2019).

<sup>18</sup> Lena Hammergren, "The Re-turn of the Flaneuse," in *Corporealities: Dancing Knowledge, Culture, and Power*, ed. Susan Leigh Foster (New York and London: Routledge, 1996), 53.69.

<sup>19</sup> Enrica Dall'Ara, "Naturae in Essere, Delitiae in Potenza/Naturae in Being, Delitiae in Potential," 76 Libbre E XVI Soldi/76 Pounds and XVI Coins (Venezia: Grafiche Leoni, 2012): 58-63.

<sup>20</sup> Dermot Foley and Eimear Tynan, "The Relationship between Landscape Representation and Landscape Design," *The Journal of Architecture* 17, no. 1 (2012): 119-29, doi:10.1080/13602365.2012.659916.

<sup>21</sup> Interestingly, the argument for place and its structures/materials acting as protagonists has also received much attention in the site dance field; Melanie Kloetzel, "Location, Location, Location: Dance Film and Site-Specific Dance," in *Dance's Duet with the Camera: Motion Pictures*, eds. Telory Arendell and Ruth Barnes, (London: Palgrave Macmillan, 2016), 19-47.

<sup>22</sup> David Abram, The Spell of the Sensuous (New York: Vintage Books, 1996).

<sup>23</sup> Chris Reed and Nina-Marie Lister. *Projective Ecologies* (New York: Actar Publishers, 2014).

<sup>24</sup> Dall'Ara, "L'Atmosfera nel Progetto di Paesaggio"; Derek P. McCormack, "Atmospheric Choreographies and Air-Conditioned Bodies," in *Moving Sites: Investigating Site-Specific Dance Performance*, ed. Victoria Hunter (New York and London: Routledge, 2015), 79-94; Melanie Kloetzel, "Site-Specific Dance and Environmental Ethics: Relational Fields in the Anthropocene," in *(Re)Positioning Site Dance: Local Acts, Global Perspectives,* eds. Karen Barbour, Victoria Hunter, and Melanie Kloetzel (Bristol: Intellect Books, 2019), 217-46.

<sup>25</sup> Kloetzel, "Site-Specific Dance and Environmental Ethics," 217-46; Melanie Kloetzel, "Lend Me an Ear: Dialogism and the Vocalizing Site," in *(Re)Positioning Site Dance: Local Acts, Global Perspectives,* eds. Karen Barbour, Victoria Hunter, and Melanie Kloetzel (Bristol: Intellect Books, 2019), 157-82.

<sup>26</sup> Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham: Duke University Press, 2007).

<sup>27</sup> Krystallia Kamvasinou, "Notation Timelines and the Aesthetics of Disappearance." *The Journal of Architecture* 15, no. 4 (2010): 397-423, doi:10.1080/13602365.2010.507517.

<sup>28</sup> Regarding the concept of *adaptation* in site-specific dance, see Melanie Kloetzel, "Site and Re-Site: Early Efforts to Serialize Site-Specific Dance," *Dance Research Journal* 49:2 (2017): 6-23.

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# UNDERSTANDING ARCHITECTURAL HERITAGE COMPLEXITY: THE CASE OF DEVELOPING AN HBIM FOR THE TOMB COMPLEX OF "PROPHET EZEKIEL- AL KIFL" IN IRAQ

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### INTRODUCTION

The shrine of the Prophet Ezekiel, named locally (Al-Kifl or Dhul-Kifl) is located in Iraq within the Kifl area in the southwest of the center of Babylon Governorate (Babel). It is the reason behind the emergence of the historical complex and the growth of the town named after it, as complementary buildings were erected around it throughout the ages alongside the increase of the residential neighborhoods surrounding the center (Figure 1). The establishment of the Nukhailah Mosque in the medieval ages is one of the most important anomalies in this complex, as the mosque represented a new focus announcing the interest of Muslims in the shrine. This led to a tension between the Jewish and Muslim religious authorities as they took hold of its administration consecutively as per the historical circumstance. As a result, the site went through several stages of additions and demolitions resulting in a complicated historical, architectural and urban complex, which is still experiencing changes up to this time.



# Fig 1. Recent Aerial photo of the historical complex of the Al Kifl Shrine (illuminated) with surrounding residential fabric. © Authors

The research examines a practical experiment of the historic building information modelling (HBIM), along with its challenges, benefits, results, and limits applied to the historical complex of the shrine of the Prophet Ezekiel. It also assesses how the current HBIM processes and technologies allow for documenting the state of conservation, with which it aims to assist the stakeholders in establishing a scientific method in documenting and managing this center, and other urban heritage sites.

# 1 - THE HISRORICAL STAGES OF AI-KIFL CENTER AND ITS SUCCESSIVE ADMINISTRATIONS

Studies indicate that the history of the shrine dates back to the middle of the sixth century B.C. during the period of the Babylonian Chaldean state (604\_562 BC) and its captivity to the Jews at the hands of the king Nabuchadnessar<sup>1</sup>.

However, there is no clear information about whether there was any architectural construction done to the shrine at that time.

As stated by the Jewish traveler (Benjamin Al-Tatali) during his visit to the town of Al-Kifl in (561 AH, 1165 AD), the construction period of the prayer house and the conical dome appear to date back to the Seljuk period, 1037-1157 AD<sup>2</sup>. At the beginning of the fourteenth century, the Ilikhanid sultan (Uljaitu Muhammad Khadabandeh) (1280-1316 AD) ordered to reconstruct and renovate the shrine again, as well as the construction of the Nukheila Mosque (from which the ancient wall, minaret and towers remained) in the year (703 AH, 1304 AD), and he construction was completed in 1317 AD by his son after his death. This stage represented the Muslims taking over the administration of the historic complex<sup>3</sup>. (Figure 2)



Studies indicate that the end of the nineteenth century represented the return of the administration to the Jews under the influence of the Jewish millionaire (Menahim Ibn Daniel)<sup>4</sup> during the Ottoman

rule. In this period, and in subsequent stages, the shrine courtyard and the surrounding *Iwans* were built after the removal of the ancient wall of the mosque. Later, the *khans* (Khan Al-Saif, Al-Tamr, Quraysh), and the markets (Daniel and Araya) were also erected, some of them apparently were funded by the millionaire himself. Afterword, the administration of the center was entrusted to the Iraqi State Board of Antiquities and Heritage, several years after its establishment with the Iraqi Museum in1923, during the royal rule in Iraq<sup>5</sup>. In 2007, the Shiite Endowment Authority took over the management of the historic complex, and started extensive renovations, including rebuilding the ancient wall based on reports of the excavations conducted in 1978, which confirmed the existence of the old wall foundation extending between the two remaining towers and the minaret. The work started to uncover the remaining parts of the ancient wall, and also included the demolition of the *Khans* and parts of the minaret and the conical dome was conducted<sup>6</sup>.

Figure (3) shows the succession of administrations on the historical complex, and Figure (4) illustrates the architectural components of the historical complex before the recent renovations in 2007.



Fig 3. The succession of the authorities responsible for the Kifl shrine historically, by authors.



Fig4. Floor plan of the historical center of Kifl before the recent changes. Authors' addition on plan from (Al-Azzawi, 1984).

### Highlighting the research problem:

The recent renovations led to the destruction and loss of important parts which represent important historical layers of the Kifl center. The Shiite Endowment Authority is a religious body which maintains a sacred and revered view of the religious symbol. However, such a view requires the modernization and expansion of the related services in order to meet and encourage visitors to perform the rituals of religious pilgrimage, regardless of the historical value of what is ancient. This view is the same view expressed in actions of constructions by the previous administrations of the center before entrusting it with the Iraqi State Board of Antiquities and Heritage. The latter, considered it as a heritage complex which has to be conserved as per the international standards announced by the relevant international organizations. Therefore, starting the documentation process of the historical center in a contemporary scientific method which organizes its management and maintenance has become an urgent necessity, and this study emerged as a response to this task by relying on HIBM.

# 2- THE BUILDING INFORMATION MODELLING IN THE FIELD OF HISTORICAL BUILDINGS (HBIM)

Historic Building Information Modeling been defined as a system for modeling historical buildings from photogrammetric data and laser scanning using building information modeling (BIM) software<sup>7</sup>. The HBIM process includes a reverse engineering solution in which parametric components representing the architectural elements are identified through photogrammetry or laser scanning. These components are combined and set on photogrammetric data to create the entire model<sup>8</sup>.

It also has been categorized as "a new solution where interactive parametric objects are created representing architectural elements created from historical data, these elements are precisely set on a point cloud or image-based survey"<sup>9</sup>.

The use of digital technologies in surveying data and documenting the state of a building or site is very important, as digital technologies can greatly facilitate and speed up the documentation process, while ensuring accurate results and accurate output<sup>10</sup>.

Studies have shown an increase in the desire for data to be digitally scanned. (Bruzelius, 2017) demonstrated the important role it has in identifying evidence that was not previously visible or was inaccessible, and synthesizing and assigning reference data points geographically and chronologically with accurate database, and the possibility of merging information from secondary sources, which in turn generates new types of data, and therefore a proper analysis through the creation of twodimensional and three-dimensional models<sup>11</sup>. Furthermore, it is now possible through HBIM, to simulate and prevent risks, as well as develop simulations about the structural system and material properties<sup>12</sup>. HBIM can also be used in developing multiple options for intervention projects; detecting inconsistencies between the current building and proposed interventions; analyzing the historical phases of the building; organized integration of both engineering and non-engineering information (including tangible and intangible values) as well as external documents; providing a structured framework for collaborative business processes and coordinated data-sharing across a multidisciplinary team; the ability to integrate with other systems such as Geographic Information System (GIS) and Computer- Aided Facility Management (CAFM) and database<sup>13</sup>. (Giuseppina et al, 2018) explained the importance of integration between HBIM and GIS in the field of historical building management for further analysis at the urban level.

Hence, HBIM models are now regarded an efficient tool in documenting and managing historical or heritage sites and monuments, with expanding abilities to be expected in future.

## **3- BUILDING THE DIJITAL MODEL OF THE HISTORICAL COMPLEX**

Authors collected information on the components of the historical complex from its various sources, especially historical studies, and direct and indirect on-site surveys were conducted. The challenges of the project were to integrate objective, heterogeneous and overlapping information (such as architectural, historical, spatial, analytical, and time information) into one model that works as a digital repository that can be continuously fed with information and contributes to a better understanding and evaluation of the physical state of the historical complex and its specific characteristics, thus achieving efficient management of it.

HBIM was chosen to document the historic complex in two major temporal, the first is its status before the renovation in 2007, and the second, is the current status of the buildings. The aim is to maintain a reliable record for the historic complex management and support the interventions and future maintenance.

Figure (5) shows the structure used in the process of building the digital model for the historical complex HBIM, taking into consideration the following stages: data collection, data scanning, level of details, programs used and modeling process.



Fig 5. The methodology used in the process of digital construction of the historical complex(© authors)

### 3 – 1 Data Collection

Information about the historical complex was collected and classified based on the various available sources on two sides:

First: the historical study: to determine the time reference of the most important parts of the historical complex, as well as to identify some historical information that can be used as enriching information that appears in the digital model. The time reference of the architectural components of the historical complex was determined as per table (1).

Second: Study of the architectural components of the shrine and the surrounding buildings: to identify the architectural, historical, cultural and other related information. The various information has been classified into two basic categories according to their use whether in building the digital model or enriching it with information as follows:

1- Structural and descriptive information adopted in the process of digital construction of the model, which are collected using digital technologies in addition to the traditional methods of measurement when needed. As for the missing parts, historical sources of diagrams and images are used which describe these parts and clarify some of their dimensions.

2- Supplemental descriptive information which form additional inputs that appear in the digital model accompanying the drawing and serves to augment the model in providing details which the digital model fail to illustrate. They are represented by descriptive texts taken from reliable sources and documentary images.

	Architectural components of the historical complex	Temporal affiliation	Historical evidence	
1	The shrine and the hall of the graves of the Companions	Before Islam	No certain information	
2	Prayer house and conical dome	Seljuk rule in Iraq (twelfth century)	According to the text of the traveler (Benjamin Al- tatli Al-Nabari Al-Andalusi)	
3	Al-Nukheilah Mosque (the ancient wall, the minaret and towers(	The Ilkhanid rule in Iraq (early fourteenth century)	Sultan Al-Jaito Muhammed Khudabandeh ordered the architecture of the shrine and its construction, and the construction of the Nukheilah Mosque in (703 AH-1304 AD) <sup>14</sup> .	
4	The courtyard of the shrine and the <i>iwans</i> surrounding it	Late Ottoman rule in Iraq (nineteenth century(	Resources state the role of (Menachem Ibn Daniel) as an active donor and sponsor for maintenance work and construction	
5	khans	End of Ottoman rule in Iraq (end of the nineteenth century(	Resources state the role of (Menachem Ibn Daniel) as an active donor and sponsor for maintenance work and construction	
6	Markets	Ottoman period (early twentieth century(	Resources state the role of (Menachem Ibn Daniel) as an active donor and sponsor for maintenance work and construction	
7	The urban fabric surrounding the tomb	twentieth century	Sources indicate the growth of the urban fabric around the historical center during various stages of the twentieth century	
8	Current renovations	The beginning of the twenty-first century	Reports and actual works by the current administration of the shrine	

Table 1. the temporal affiliation of the architectural components of the historical complex.(by authors, based on several resources)

# 3 – 2 Data Scanning

Drone aerial photogrammetry technologies were provided for scanning the exterior structure, while laser scanning was identified necessary for the inside as poor lighting prevents the use of the photogrammetry method. Unfortunately, due to various difficulties, the researchers failed to provide the laser scanning device and the work was limited to scanning the data of the external structure of the historical complex, including the shrine and the architectural structures surrounding it (Figure 6), while traditional methods were used for the internal parts.



Fig 6. Photogrammetry result (point cloud) of the external structure of the Kifl historical center, with the Seljuk minaret detailed photo to the left (© authors).

# 3 - 3 Level of Details

The UK's BIM protocol for architecture, engineering, and construction specifies 6 levels for the LOD detail level as in (Table 2), and states that (LOD) refers only to the appearance of the component (architecture), not the amount of information associated with it. In the case of architecturally complex heritage or historical buildings, high levels of detail can be achieved with models. However, this can lead to adverse results in terms of file sizes and performance, as well as the required efforts and time inputs<sup>15</sup>.

Therefore, it is necessary to carefully define a clear level of details in order to avoid excessive modeling and balancing of the expected benefits (in terms of quality and completeness of information, visualization requirements, etc.), as compared to the model function, file restrictions, time effort and costs. Due to the limitation of time and technological and financial capabilities which were available for this research, LOD5 was specified for the general site model so that it is detailed and accurate and contains a level of three-dimensional details, dedicated to the requirements of construction and site components and time development and the size of the changes taking place in the site, in addition to managing the information of the historical complex and therefore the managing the complex in general.

LOD1	LOD2	LOD3	LOD4	LOD5	LOD6
Symbolic	Conceptual	Generic	Specific	Construction	As Built

Table 2. The levels of detail for the engineering digital model

### 3 – 4 Programs Used in the Modeling Process

Any BIM program would have provided the research with sufficient tools to conduct the modeling process in a very satisfactory manner, except for the ongoing difficulties in using applications which are originally designed for new architecture or its renewal but not for historical architecture. These difficulties are in the absence of families of parametric elements related to old buildings and

information sharing formats. In this paper, Autodesk® Revit is used for its versatility in managing and modeling complex models, it is an open source graphical programming program that provides a powerful option not only to create a graphical representation of complex architecture but to efficiently and automatically manage information flows between the BIM model and database.

## 3 – 5 The Modeling Process

Historical sources were adopted in terms of diagrams and images to model the missing parts of the historical complex. As for the current status of the buildings, traditional methods were adopted to document the internal parts, as explained above, and then modeling those parts and elements using Autodesk® Revit. As for the photogrammetry, it covered the external parts of the complex, where the cloud of the three-dimensional points obtained from the photogrammetry was imported into the modeling program, and the process of modeling the external structure was conducted in terms of the required graphic elements such as surfaces, curves, linear elements and others. Figure (7) shows the steps for creating a conical dome element model from the outside depending on the point cloud, and through these steps the entire structure of the historical center was constructed. Figure (8) illustrates the final digital model of the historical complex in two stages: the current state and the state before the last renovation work in 2007, with identifying colors to illustrate the time reference of the architectural components. Figur( 9) shows deviation in the documenting floor plan drawn in the 1980s according to traditional measuring methods, and the corrected drawing by means of new scanning with photogrammetry



Fig 7. stages of creating a conical dome element(Cauthors)



(© authors)

The final digital model of the Kifl historical complex is in its current state



The final model of the Kifl historical complex before the recent renovations in 2007, with color identification of the temporal affiliation of its architectural components. (© authors)



Matching the model to the points cloud Fig 8. the final digital model for the historic complex of the Kifl town (© authors)



(© authors) Fig 9. The deviation in the documenting floor plan of the historical complex

### **4- INFORMATION MANAGEMENT**

The organized digital information is produced and managed through a collaborative process which includes planning, managing component of historical value, preventive maintenance, documentation and research<sup>16</sup>. This is done through a multidisciplinary knowledge base, which, according to<sup>17</sup>, is necessary for the integration of tangible and intangible information. In this sense, documenting the comprehensive and growing knowledge of architectural heritage is a key activity for the development of HBIM.

After the structural descriptive information was modeled for the Kifl historical complex, the enriching descriptive information was entered and organized to arrive at a more comprehensive knowledge base. Google Drive cloud was chosen for data storing, team communication support, ease of access, and proficiency in analysis and management. In particular, enriching the historical minaret information was given much of care to be as a detailed example of an architectural component, then linking the data to the 3D digital model through the Autodesk® Revit graphical modeling program. The click on any of the building elements that make up the digital model and then click on the Edit Type button at the top left of the program window, a drop-down window related to the element would appear, giving a preliminary description and an internet link (URL) to navigate to the detailed descriptive metadata and the architectural component in the database (Fig 10).



Fig 10. Detailed description -in Arabic and English-of the (minaret) and the detailed information link (© authors)

The process of enriching the historical minaret with information represents a start point to documenting and augmenting the remaining architectural parts of the complex, to enable researchers and all concerned parties to conserve and manage this cultural heritage in a scientific manner that is efficient in planning and taking appropriate decisions in interventions and preventive maintenance.

### **5- HBIM & GIS INTEGRATION**

The integration of the two systems (HBIM and GIS), as many studies indicate, can be of great importance in building a platform capable of structuring and managing a wide range of digital data and information about urban heritage sites at the architectural and urban levels<sup>18</sup>.

The last stage of documenting and modeling The Kifl Complex involved converting the HBIM model of the complex with the town to ArcGIS for further analysis of the geographic information at the urban level. As the indicative info was added to the .xml file within the program, including: job,

category, creation date, description, and location. Adding these details allows the model to be used as an information system for heritage applications.

Based on the ortho-photo, with an average of ground sampling distance GSD (2.32 cm) resulting from the photogrammetry of the historic complex of Al-Kifl town (Fig. 11), three-dimensional models were produced of the architectural units that make up the urban fabric surrounding the shrine of the Prophet (PBUH) with the ability to determine the uses of each one (Fig. 12), and these operations were carried out through the ArcMap and ArcScene programs within the ArcGIS package. When it is possible to conduct photogrammetry of large areas of Al-Kifl town, the final digital model for the historical complex can be developed within a simplified three-dimensional model for the town, which provides the opportunity to conduct spatial analysis within the urban fabric (disaster management, training simulation and photography purposes).

### CONCLUSION

Preserving a site or landmark of historical significance depends on sound administrative decisions, and the difficulty of these decisions increases with the increase of the architectural and urban complexity and the accumulation of the historical layers as is the case of the historical center of Al-Kifl. It became clear that entrusting the building administration to the Shiite Endowment paralyzed the Iraqi State Board of Antiquities and Heritage from having the superiority in managing any work within the center, and turned them into an advisory body who have the right to stop what does not conform with the global conservation standards, without having an executive force to impose what is legal and correct. This condition highlights the seriousness of the opposition in the conservative principles of various administrations of the sacred religious which tends to the renewal, and the specialist professional which tends to conserve.

This research was concerned with documenting the Kifl Shrine complex as a landmark, relying on HBIM, in order to maintain a dynamic and accurate record of the historical complex buildings which allows updating the digital database with each intervention, change or discovery. In this regard, the research concluded the following:

The practical side of the research demonstrated that the use of digital technologies in data survey can significantly reduce the errors of traditional methods of documentation.

Due to the amount of enriching information of the historical complex, so providing a digital database related to the final model can make it easy to be circulated with all its information between the parties who are concerned with conserving and managing this cultural heritage.

There were some difficulties in integrating the final digital model of the historical center with its urban context within the platform (3D GIS), as this process required exporting the file from Autodesk Revit with the extension of IFC and then importing the file to the Sketch Up program and then exporting the file with the collada file, and through the program Arc GIS with Arc Toolbox, the Import 3D files tool within the Conversion tools is used to convert the collada file into a shape file extension that can be opened in Arc scene program. Such multi step process needs to be considered and reduced through enhancement of software programs and further applications.



Fig 11. orthoimages resulting from the photogrammetry. (© authors)



Fig 12. The urban fabric surrounding a tomb The Prophet (Ezekiel- Al Kifl) within the general context For the town.. (© authors)

### NOTES

<sup>1</sup> Sami S. Al-Ahmad, *History of Palestine (Tarikh Filastin)*, (Baghdad: Palestinian Studies Center, 1979), 244.

<sup>2</sup> His words are quoted in (Al-Karawi,2014) stating: "A building located on the Euphrates riverside, a massive building that contains compartments, each with a tower and the largest of compartments is mediate a minbar, Behind it, was the shrine of the Prophet Ezekiel bin Buzi, the priest, topped by a large dome, which is a well-constructed ... " (Aqeel J. Al-Karawi, *The shrine of the Prophet Dhul-Kifl, in traveler and media blogs (Marqad Annabi Dhul-Kifh fi Mudawanat Al-Rahala wal-lelam)*, Annajaf: The Secretariat of the shrine of prophet Dhul-Kifl , 2014), 56.

<sup>3</sup> Mohammed S. Al-Tureihi "Dhul-Kifl Ezekiel, his biography and shrine in Babylon" (Dhul-Kifl Ezekiel, Siratuh wa Mashhaduh fi Babil), Almawsim Journal no. 2-3(1989): 355.

<sup>4</sup> Born in Baghdad 1846, was elected a member of the Ottoman Parliament in Baghdad in 1877, to represent the Jews, and became a member of the Iraqi Senate in 1925 during the royal rule.

<sup>5</sup> Abdulsattar J. Al-Azzawi "Dhul-Kifl Excavation and Maintenance 1978-1981" (Dhu l-Kifl Alhafriaat walsiyana 1978-1981) *Sumar Journal, Volume 43*(1984): 217.

<sup>6</sup> As clarified in reports of (The Secretariat of the shrine of prophet Ezekiel) reviewed by the authors in2019.

<sup>7</sup> Maurice Murphy, Eugene Mcgovern, Sara Pavia "Historic building information (HBIM) " *Structural Survey Journal* (2009): 312.

<sup>8</sup> Conor Dore , Maurice Murphy "Integration of Historic Building Information Modeling (HBIM) and 3D GIS for recording and managing cultural heritage sites " In *18th International Conference on Virtual Systems and Multimedia* (2012): 370.

<sup>9</sup> Maurice Murphy, Eugene Mcgovern, Sara Pavia "Historic Building Information Modeling—Adding intelligence to laser and image based surveys of European classical architecture" *ISPRS J. Photogrammetry and Remote Sensing 76*(2013): 89.

<sup>10</sup> D Mezzino, L Chan, M Santana Quintero, M Esponda, S Lee, A Min, and M Pwint. "Built heritage documentation and management: an integrated conservation approach in Bagan." *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences 4* (2017): 143.

<sup>11</sup> Caroline Bruzelius "Digital Technologies and New Evidence of Architectural History" *The Society of Architectural Historians Jornal 76*(2017): 437.

<sup>12</sup> Di Yajing, Wu Cong "Research on the BIM of the Stone Building for Heritages Conservation With the outer south gate of the Ta Keo Temple as an example" In *Proceedings of the 2011 3rd International Conference on Education Technology and Computer* (2011).

<sup>13</sup> Historic England, *BIM for Heritage: Developing a Historic Building Information Model* (Swindon: Historic England, 2017), 4.

<sup>14</sup> Calligraphic inscription on the minaret, observed and documented by traveler Hartsfield

<sup>15</sup> Historic England, *BIM for Heritage: Developing a Historic Building Information Model* (Swindon: Historic England, 2017), 15.

<sup>16</sup> Historic England, *BIM for Heritage: Developing a Historic Building Information Model* (Swindon: Historic England, 2017), 16.

<sup>17</sup> Cristiane L. Canuto, Larissa R. Moura, and Mônica S. Salgado "Tecnologias digitais e preservação do patrimônio arquitetônico:Explorando alternativas" *PARC Pesqui Arquitetura Construção* (2016): 253.

<sup>18</sup> Giuseppina Vacca, Emanuela Quaquero, Davide Pili, and Mauro Brandolini "Gis-Hbim Integration for the Management of Historical Buildings" *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*(2018): 1131.

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# VR ETHNOGRAPHY: TRANSCULTURAL REIMAGINING OF WILLIAM FAULKNER'S TOPOGRAPHIES IN *THE SOUND* AND THE FURY

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### INTRODUCTION

Spatial imagination plays a significant role in the production of fiction. How writers navigate and inhabit imaginary spaces is reflected in the descriptions of material elements of fictional cultures, landscapes, objects, and people as well as in the maps drawn by or for them<sup>1</sup>.

Cartographic studies have expanded to include not only historic but also fictional maps, though the lines between representations of the real and invented are often blurry. Imaginary maps are paradoxically factual for they derive from a sense of reality and produce an effect of reality<sup>2</sup>. Maps, like those created by J.R.R. Tolkien or William Faulkner, are steeped in how their makers experience their physical surroundings<sup>3</sup>. Being placed in a fictional world feels real, though mental and emotional topographies are hard to observe. Their (re)construction from textual evidence is, nevertheless, worth scholarly attention to gain insight into how literary spaces correspond to and originated in the real world<sup>4</sup>.

The portrayal of the factual and material in literature is informed by socio-historical realities and specificities<sup>5</sup>. The factuality of imaginary topographies, however, changes in translation: something new or different comes into existing, while replacing or transforming what belonged in an author's vision. Literary cartography<sup>6</sup> is on the rise, but the phenomenology and ontology of subjective space in translation as critically oppositional to or different in other ways from the original text remain largely marginalized, even though a translator's imagination is as much anchored in specific contexts as the original text<sup>7</sup>.

The challenges of exploring and bringing to light those hidden topographies are many, some of which I will discuss in this article with reference to a case study of how the image of a barn in Faulkner's *The Sound and the Fury* is transculturated<sup>8</sup> in the Lithuanian translation, which is a part of the ongoing VR project<sup>9</sup>. I will argue that the contrastive 3D visualization of differences between the literary text and its translation offers possibilities to recontextualize translation as a document of ethnographic and anthropological significance.

### SPATIO-TEMPORALITY OF AUTHENTIC "ERROR"

The analysis of lexical repetitions found in Faulkner's novel *The Sound and the Fury* and its translations in several languages revealed a range of patterns<sup>10</sup>, the most interesting of which were the ones that contrasted in terms of spatio-temporal subjectivities. The factuality of a visual field in translation would change significantly vis-à-vis it original when the recurring words denoting concrete objects and places are translated inconsistently. Figure 1 features the semantic variants that the Lithuanian (LT), Russian (RU1 and RU2), Polish (POL1 and POL2), and Czech (CZ)<sup>11</sup> translators chose for the noun *house* in the final chapter narrated from the perspective of black servant Dilsey working for the Southern household of the decaying Compson family. The cluster dendrogram compares how one translator's choice relates to another translator osip Soroka used the noun "хибара" ("hovel"), Irina Gurova rendered it as "хижины" ("huts") into Russian.



Figure 1. Tabular representation of the repetitions of "house" and their equivalents in six translations.

In Soroka's translation (RU1), published during the Soviet times, the repetition of "house" was rendered with the variants "дом", "мазанка", "хибара", "трущоба", and "фасад", which back-translate as "house", "wattle and daub", "hovel", "slum", and "façade", respectively. Soroka uses the words meaning "hovel" and "slum" specifically in the passage that describes the area populated by black communities. By introducing the images of poverty, the translator as if seeks to establish semiotic justice by the explicit portrayal of racial inequalities imprinted on architecture in his fictional world. Whether the decision was made by the translator himself or his Soviet editor, these words, nevertheless, serve to make social commentary. His other choice "мазанка" denotes a sort of wattle and daub construction, typically built of stone, lime, and clay in the Ukraine. This regional reference relates to the fact that Soroka himself was of Ukrainian origin. This and other choices that convey the translator's viewpoint, grounded in specific settings, cause tectonic shifts in the ontology of the fictional American South as reimagined in the act of translating<sup>12</sup>.

Polish translator Anna Trzeciakowska-Przedepelska renders the noun *gate* in the first chapter narrated by Benjy, considered to be an unreliable character, with the words "brama" ("gate") and "furtka" ("wicket"). While there is nothing ideological about these choices, they signify two points of entry, which do not exist in the topography of the Compson estate as depicted by Faulkner. In phenomenological terms, the gate, along with other recurring motifs such as mirror, pasture, and door, signifies Benjy's passage from one memory to another. By imagining two entries, the translator produces two metaphors, while also weakening the symbolism of the gate image.

Another interesting example comes from the Lithuanian version of the Benjy chapter where "barn" is rendered with the words "klojimas" ("stackyard") and "arklių aptvaras" ("horse pad")<sup>13</sup>, none of

which are accurate in a strict sense. Neither in architectural nor functional terms, the Lithuanian "klojimas" is equivalent to the American barn. Historically, the klojimas was a place to store, dry, and thresh various crops, while the cattle were kept in the tvartas, which would be a more literal word for "barn" as used in the Faulknerian context.

From a prescriptive point of view, these cases could be interpreted as inconsistencies and errors overlooked by translators and their editors<sup>14</sup>. But perhaps these interpretative 'disloyalties' result from how memory, oblivion, and emotional situatedness structure a translator's experience and imagination of fictional worlds. The less edited the translation, the more authentic it is from a phenomenological perspective. Any degree of editing is a form of (self)censorship, including the demand to adapt a translation for the readership of a translating culture or to stay close to the original vision and wording.

### EXPERIENTIAL EPISTEMOLOGIES OF SAYING AND SHOWING

Textual data may seem deceptively easy to visualize. Yet, if we treat text as something experiential, it does not lend easily to two-dimensional representation. Figure 1 demonstrated that the tabular display of words as graphic entities does not reveal anything about what they might have conjured up in a translator's mind. The alluvial diagram in Figure 2, based on the same data as in Figure 1, shows how semantic choices from across six translations are connected as threads.



Figure 2. Alluvial diagram of the repetitions of "house" and their equivalents in translations.

While Figure 2 is rhetorically more compelling and compact than Figure 1 in emphasizing the contrast between translatorial variants, the hermeneutical and epistemological capacity of both visuals is limited. The first limitation concerns the medium of visual rhetoric. By comparing maps and verbal descriptions of directions, Eide (2016) argues that the two are not semiotically interchangeable and their boundaries cannot be removed<sup>15</sup>. This observation implies that texts are not visual enough or not visual in the same way as maps for the two to be mutually intelligible in full measure. Semiotic unintelligibility might be a genuine problem for textual hermeneutics, if we equate the concept of text with a medium. The medium of maps is not without its faults as well. Fictional spaces do not share the same hard borders with cartographic items that seek to capture mental shapes in visual ways, notes Piatti et al (2009)<sup>16</sup>.

Perhaps the roots of this semiotic unintelligibility between the verbal and the visual lie in the neuroanatomy of consciousness. That is, language is associated with the left hemisphere while spatial attention belongs to the right one. But even at the neuroanatomical level everything is far from being compartmentalized in a clear-cut way<sup>17</sup>. Sign languages, which involve the right hemisphere<sup>18</sup>, are suspended somewhere in between verbal and spatial media, on the other hand. Gestures are more

straightforward than written words in representing shape, location and direction linked to an object or an activity.

What challenges our representation of imaginary topographies is that place is a temporal construct. The idea of fixed and concrete space is deceptive since our perceptions of what may appear to be same place differ and change with time. It is also a matter of perspective, depending on who owns the narrative about a place. Our nostalgia and memories of places are ontological and phenomenological variants whose boundaries are hard to delineate and replicate for others to see.

The Wittgensteinian<sup>19</sup> opposition between saying and showing is a philosophical equivalent of the neuroanatomical distinction between the verbal and the spatial. It captures the tension between graphic representations of words and what they conjure up in imagination when we engage with texts. Figures 1 and 2 use word-images as indexes of word-experiences: the former say but do not show the latter. We need icons instead to explore what constitutes the visuospatial logic of writers, translators, and their readers. Only phenomenologically active visualization can place viewers in what data represents. Immersive technologies seem to be better equipped than flat 2D visualization to produce and appeal to a sense of being placed somewhere.

The emerging challenge is how to theorize the application of immersive technologies as a form of VR ethnography that would provide evidence for the modelling of how visuospatial thinking underlies literary imagination and its transculturation. To develop a conceptual framework for exploring and foregrounding alterity in fictional topographies across languages by means of 3D prototyping, I chose the word "barn"<sup>20</sup> and the Lithuanian choice "klojimas" because the architectural structures that they denote provide means for visual contrast. A selection of real-world models for building the visual equivalents of these two words, however, poses some practical and conceptual problems.

Led by John N. Wall, the Virtual Paul's Cross Project<sup>21</sup>, which is a digital reconstruction of John Donne's Gunpowder Day sermon delivered in London in 1622, draws on various historical sources, including visual, archaeological, and meteorological evidence, to materialize some conditions which might have been true on that day. By contrast, when it comes to the fictional spaces of Faulkner's barn and Tauragiene's klojimas, there is no one historical object to fixate on but many. Neither are there coordinates to begin with since, unlike St Paul's Cathedral or Churchyard, both literary images are polyphonic entities that derive their meaning from many loci and temporalities.

John N. Wall describes his reconstruction of the Gunpowder Day sermon as "visually compelling", "historically appropriate", and "representationally accurate"<sup>22</sup>. Both visual and auditory models create the conditions to evoke a sense of authenticity. But his acknowledgement that the result lacks "historic depth" and "authentic particularity" sheds light on technical limitations and the metaphysics of authenticity whereby models, digital twins, genetic clones, and other types of replicas cannot be expected to be what they duplicate or recreate.

While Faulkner's personal relation to his fictional Yoknapatawpha and people is widely explored<sup>23</sup>, the emotional and biographical identities of his translations are less than common subjects. The historicity of translation is by convention less prominent and significant, which affects how translators themselves relate to their work. Lithuanian translator Tauragienė, for example, cannot recall many details of her decisions from almost twenty years ago when she was working on Faulkner's novel<sup>24</sup>. Yet the rush of emotions that the novel triggered stands out clearly in her memory.

While historical and biographical authenticity matter, the primary task at hand is to show tectonic shifts in fictional topographies. And since we are dealing with ahistorical objects here, the 3D prototyping of Faulkner's barn and the translator's klojimas will have to be based on topological associations with many objects. Historical or regional typicality and symbolic representativeness are a few examples of such relations. The process of building visual equivalents of words is instrumental in

producing research questions to interrogate the historicity of translation. To convey the translator's perspective of otherness that derives from a prototypical cultural landscape and the sound of Lithuanian, the 3D models will be embedded visually and acoustically in Unity-generated content.

### CHRONOTOPES AND TOPOLOGIES OF BARN-KLOJIMAS

Our communication operates on shared definitions of words, though things also evoke personal and intimate senses. Prototype theory, for example, argues that people give different real-world examples to illustrate a certain concept, which is subject to geo-cultural diversity <sup>25</sup>. The 3D comparison of the barn and the klojimas may show rather than say that they belong in different mindscapes, yet ambiguities arising from the ahistorical materiality of these objects pose a challenge where to begin<sup>26</sup>. Fictional topographies are anthropomorphic because they reflect what their makers – writers, readers, translators, performers – envisage them to be. The chronotope<sup>27</sup> of the Faulkner's barn thus presents a vast field to explore. Faulkner gives very few details to tell his reader what the barn looks like<sup>28</sup>. Instead, he produces an emotional and symbolic space where the motifs of innocence, violence, sex, and life conflate. A search for architectonic details leads to discover a stunning variation in shape, material, and function found in rural barns across the American landscape<sup>29</sup>. The red paint seems to be a prominent archetype in artistic imagination<sup>30</sup>, as seen in Figure 3.



Figure 3. Mona Brown, Red Barn in Vermont, 16x20 inches, oil on Egyptian linen, 2016, [used by permission of Mona Brown at Westport River Gallery, Westport CT USA)<sup>31</sup>.

The American barn was embraced by urban development<sup>32</sup>, but the period and places where Faulkner lived and wrote are central to its exploratory (re)construction. Rowan Oak in Oxford, Lafayette County, Mississippi, is a fascinating place where Faulkner left his mark by restoring the estate, including its outbuildings<sup>33</sup>. *The Sound and the Fury* was published a year before Faulkner with his family moved there, yet Oxford, where he lived permanently since the age of five, remains a major ethnographic locus of details for the 3D model of the barn. Faulkner's maps of Yoknapatawpha provide a basis for the visualization of the boundaries and topology of the terrain where fictional lives unfold, which is transformed by visuospatial inconsistencies in translation<sup>34</sup>.

The chronotope of the klojimas amalgamates some features of the barn, as described by Faulkner, and the architectonic properties of the building typically found in Aukštaitija<sup>35</sup>, the largest ethnographic

region in eastern Lithuania. What image the translator had in mind remains a puzzle, hence regional references are a primary source for its immersive (re)construction.

Unlike the popular image of the American barn, the Lithuanian klojimas emerges invariably as an unpainted building with a half-hipped roof<sup>36</sup> and eaves wide enough to protect its walls from weather effects and to make room for storing logs or tools outdoors. The other feature that would accentuate the cultural otherness of the klojimas vis-à-vis the barn is its roof. Dry vegetation and wooden shingles were common building materials. A thatched roof, as in Figure 4, is a distinctive feature that localizes the translator's topography.





Figure 4. Clockwise from bottom: Juozas Timukas, Kluonas, Rukšenai, Utena, Lithuania, 1937<sup>37</sup>, M.K.
Čiurlionis Museum of Art; Juozas Timukas, Kluonas, Samninkai, Trakai, Lithuania, 1938, M.K.
Čiurlionis Museum of Art<sup>38</sup>; Klojimas, Antaviliai<sup>39</sup>, Vilnius [used by permission of Vidmantas Balkūnas)

The sound is probably the most fundamental topological difference between the barn and the klojimas. While the American barn was a space to keep cattle and store grain<sup>40</sup>, the ecologies of animal and plant cultivation were separated in the Lithuanian context. The klojimas was the domain of plants which were considered no less alive than humans or animals<sup>41</sup>. It thus evokes a different sound ecology of work performed under polyphonic singing, the recordings of which are vital for the reconstruction of the landscape before its radical transformation by forced labour on collective farms during the Soviet regime, which sought to suppress the awareness and expression of ethnicity in every way. *The Origins*, the movie directed by Gytis Lukšas in 1984, attempted to reimagine obliterated memoryscapes. It is a poetic rather than an archaeological reconstruction of the old Lithuanian countryside where the director himself walks around eye-witnessing the past. The Central Committee

of the Communist Party found the movie too ethnic and too suggestive of the bourgeois past. Despite the official ban from Moscow, the movie was secretly screened across the country for several years.

The klojimas is also a socio-cultural space in which labour performance evolved into a theatre genre that took its name from the building. The ontological restructuring of labour performance was unlikely to happen in livestock ecosystem. Manual threshing, for example, would take a group of people, each of them beating in succession to avoid clashes. To keep their movements in rhythm, each participant would chant some words. Ritualized labour thus elevated itself to an artistic form. The klojimas theatre has survived until nowadays, though largely recontextualized as an exotic token of rituals the essence of which was to sublimate labour machine into creative practice<sup>42</sup>.

The translation of textual data into immersive visuals comes with its own questions and limitations. It is not a reconstruction of the historical past as done in archaeology. It is not a typical cartographic practice. Nor is it a loose film adaptation or transmediation since it is concerned with visual equivalence between the imaginary and real, even though the film theory of gaze is relevant to show how visual principles underpin the verbal medium. Not being able to interview translators or translators not being able to recreate their textual encounters, on the other hand, offer an opportunity to take nonhuman centred approaches to the anthropos. Yet, specifically, research into biographical and cultural temporalities of the barn image brings to the forefront the role of nonhuman encounters as a technique of exposing human fragilities and insensitivities<sup>43</sup>, which is a theme less commonly discussed in the otherwise vast scholarship on Faulkner. From a broader perspective, the project presents a case to create a blueprint for exploring and visualizing cultural alterity as a situated response to foreign worldbuilding. On the epistemo-methodological level, VR ethnography of fictional topographies advances a phenomenological turn in textual data visualization.

### NOTES

<sup>1</sup> "The Writer's Map" edited by Huw Lewis-Jones (London: Thames & Hudson, 2018) offers a collection of intimate essays from renowned writers and illustrators reflecting on maps that they drew, studied, collected, or used as inspiration.

<sup>2</sup> Maps mediate the connection between the factual and fictional, reality and imagination. The typology of functions that these relations may serve is diverse, ranging from providing a structure to a narrative to creating a psychological need of belonging. For a comprehensive discussion of various functions of literary maps, see Jules Zanger, "Harbours Like Sonnets", 773-790. Tania Rossetto provides a good overview of the complex relationship between cartography and literature in "Theorizing maps with literature," 513-530. See also Röhl and Herbrik's "Mapping the Imaginary" on how cartography is used as a psychological means of self-realization in fantasy role-playing games.

<sup>3</sup> Faulkner was a writer with many visual and artistic skills. Gabriele Gutting who is a versed scholar in literary maps argues that Faulkner was a talented mapmaker in "The Mysteries of the Map-Maker: Faulkner, "If I Forget Thee, Jerusalem", and the Secret of a Map", 89. In the early days as a student, Faulkner showed his keen interest in architecture, which informed his narratives and maps of Yoknapatawpha counties, notes Hines, *William Faulkner and the Tangible Past*, 15. He also had a good hand for drawing, which he used to contribute his sketches along with early poems to the literary magazine titled *The Mississippian*.

<sup>4</sup> In addition to the 3D reconstruction of historical places, the recent attempts concern mapping imaginary topographies based on literary evidence. See the Chronotopic Cartographies project led by the University of Lancaster in collaboration with the Alan Turing Institute: <u>https://www.lancaster.ac.uk/chronotopic-cartographies/detail/</u>.

<sup>5</sup> Map-making is inherently political and manipulative. See Mark S. Monmonier's *How to Lie with Maps* for a classical discussion of how map makers contribute to the production of power relations and asymmetries. Imaginary maps are no less ideological. "Representations of the city, country, landscape, and the nation conceal a complex network of social relations and historical processes that impact how readers imagine the world inside and outside the novel", notes Bulson in *Novels, Maps, Modernity: The Spatial Imagination, 1850–2000,* 19, who offers a comprehensive discussion of the traditions of literary mapping from the 19<sup>th</sup> c. until the present day.

<sup>6</sup> See Anders Engberg-Pedersen's edited book *Literature and Cartography: Theories, Histories, Genres* on how literature and cartography intersect in producing new areas and perspectives on the role of spatial imagination and its cultural situatedness.

<sup>7</sup> The issue of translator's invisibility has been widely discussed in Translation Studies. Yet in "The Figure of the Translator," 301, Susan Bassnett argues that asymmetries between the original literature and translation persist in academia due to its "artificially constructed disciplinary boundaries, so often linked to nationalist rhetoric" (Bassnett 2016, 301). In "The Translator's Biography and the Politics of Representation", 51, Brian J. Baer aptly notices that a translator's right to have the biography has not been recognized as a legitimate subject of literary criticism until recently.

<sup>8</sup> In this study, "transculturation" is used to encompass the notions of both Cuban anthropologist Ortiz and British ethnographer Malinowski to embrace a wide range of forms of cultural reception and reaction produced in distance and close proximity to the colonial. On the one hand, Soviet society positioned itself in a polemic relationship with the West as a permanent threat in geo-political, cultural, and intellectual terms. Literary translation mediated this logic of outside threat. On the other hand, ethnic discrimination of minorities and the linguistic colonialism of Russian as a *lingua franca* took place right within the Soviet society. Reginal references that appeared in Soviet translation are suggestive of suppressed ethnic localization.

<sup>9</sup> The current article considers some conceptual challenges of 3D modelling based on textual evidence by drawing on the ongoing project "VR Ethnography across Languages: Transculturation of Spatial Imagination in Fiction", funded by King's Innovation grant (<u>https://vr-ell.com/</u>). The 3D modelling of the barn, as presented in Faulkner's *The Sound and the Fury*, and its Lithuanian translation as "klojimas" serves to create a conceptual and practical blueprint for further excavation of how the material culture of Faulkner's imaginary county of Yoknapatawpha is transculturated and incorporated into the alternative imaginary mindscapes.

<sup>10</sup> How translators deal with lexical repetitions found in Faulkner's *The Sound and the Fury*, see Salciute Civiliene, "Relative and dynamic aspects of variation", 2016. This PhD research is an exploratory case study challenging the epistemo-methodological problems of how translatorial style has been quantified. It shows in

diagrammatic ways individual variation in how five translators deal with lexical repetition and offers some visual principles of textual hermeneutics for cross-linguistic analysis of fiction. See Salciute Civiliene et al., "Distant Reading across Languages", for how some of those principles were implemented in the DRaL project developed in collaboration with King's Digital Lab as a web application: <u>https://dral.kdl.kcl.ac.uk/</u>.

<sup>11</sup> The Lithuanian translation *The Sound and the Fury* done by Violeta Tauragienė was published in 2003. The novel was translated twice into Russian and Polish. Both Russian translations are believed to have been completed around the same time during the Soviet period, yet Osip Soroka's version was first published in two issues of the magazine *Inostrannaya literatura* (Foreign Literature) in 1973, while Irina Gurova's vtranslation came out in print only in 2001. The Polish translations also belong to different periods. Anna Trzeciakowska-Przedepelska's version came out in 1973, while Polak's version was published in 1993. The Czech version, published for the first time in 1997, was translated by Luba Pellarová and Rudolf Pellar.

<sup>12</sup> Spatio-temporal situatedness affected Soroka's interpretation of Faulkner's novel in various ways. For example, the repetitions of religious words or references to Russia disappear from his version due to ideological pressures of the Soviet period. His affiliation with the theatre also left a trace in the passage where he chose to translate the noun *spotlight* with the word *ionumep*, which derives from the brand name *Jupyter*, used specifically in the Soviet theatre.

<sup>13</sup> Both Polish translators also create functionally distinct places by using *stajnia* ("stable") and *obory* ("cowshed") to translate the word *barn*, which corresponds with the French choices *écurie* ("stable") and *étable* ("barn") made in the very first ever translation of the novel.

<sup>14</sup> A translator's choices might be treated as inconsistencies resulting from linguistic or cultural incompetence, but, whatever their treatment from an editorial perspective, they are significant in a semiotic sense since they produce new meanings and alternative narratives. The noun *fire*, for example, becomes "fire", "flame", "hearth", and "oven" in the Lithuanian version by Violeta Tauragienė. The original symbol of fire loses its metaphysic sense by being broken into visual cues of the mundane aspects of life. From a phenomenological perspective, a translator's inconsistencies are also indicative of how her situated knowledge is entangled with a visuospatial sense.

<sup>15</sup> *In "Sand in the Mapmaking Machinery", Eide* argues that "[d]ifferent media can be mixed, and various forms of crossover and hybrid works push against and question media differences, but the borders are still there. They are strongly connected to the different sign systems used in visual and verbal expressions" (2016).

<sup>16</sup> See Piatti et al., "Mapping Literature," 184.

<sup>17</sup> See Blumenfeld, "Neuroanatomical Basis", 3-29.

<sup>18</sup> See Struiksma and Postma, "Tell me Where to Go", 197-230.

<sup>19</sup> See McGinn, "Saying and Showing", 24-36; Moore, "On Saying and Showing", 473-497.

<sup>20</sup> The barn is a significant symbol recurring in Faulkner's other literary works such as *Barn Burning*, *Light in August*, and *As I Lay Dying*. See Aiken, "Faulkner and the Passing", 3-19, for a detailed discussion of the significance of mule barns to the material culture of the rural American South.

<sup>21</sup> See Wall's conceptualization of the making of the project in "Gazing into Imaginary Spaces". The project's website is available here: <u>https://vpcp.chass.ncsu.edu/</u>.

<sup>22</sup> See Wall, "Gazing", 298-299.

<sup>23</sup> See André Bleikasten's *William Faulkner: A Life through Novels*, trans. Miriam Watchorn (Bloomington and Indianapolis: Indiana University Press, 2017) for an excellent account of Faulkner's life based on a wealth of archival evidence. In *Children of the Dark House* (Jackson: University Press of Mississippi, 1998), Noel Polk, another prominent scholar and editor of Faulkner, offers an exemplary model of connecting the life with literature through the analysis of Freudian themes in Faulkner's novels. See also James Watson's *William Faulkner: Self-presentation and Performance* (Austin: University of Texas Press, 2000) for a further analysis of biographical and auto-fictioning features of Faulkner's novels.

<sup>24</sup> Violeta Tauragiene, email message to author, June 11, 2020.

<sup>25</sup> The empirical findings of prototype theory show that people give different examples to illustrate what represents linguistic categories. For example, a robin tends to be the most frequent example of the bird category among Americans. A robin is thus a more prototypical bird example than a crow, which differs across cultures and regions. See Taylor, *Linguistic Categorization*, especially chapters three and four, for an explanation of cognitive principles of how we see linguistic categories.

<sup>26</sup> Since historical ambiguity is one of the issues to tackle when building virtual heritage, Anna Bentkowska-Kafel, "Processual *Scholia*", emphasizes that the greatest epistemological value of researching and representing cultural heritage in the virtual medium is constituted in the process of making rather than the product. (248) <sup>27</sup> The term *chronotope*, elaborated by Russian literary theorist Mikhail Bakhtin, refers to a specific configuration of time and space invoked by a narrative.

<sup>28</sup> Some scarce details of the decaying physical appearance of the barn are available in the Benjy chapter. For example, the image of "slanting holes were full of spinning yellow" (Faulkner, 12) refers to the holes in the rooftop and the sunlight pouring inside the barn.

<sup>29</sup> See a comprehensive compilation of resources showcasing the regional variation of the American barn with plenty of illustrations of architectural details and construction plans. The compilation was part of the digitization project by Cornell University Library carried out in 2008: https://archive.org/details/cu31924015223765.

<sup>30</sup> Bouland notices in *Barns across America* that painted barns were not common until the 20<sup>th</sup> c. since "[p]ainting was considered extravagant, vulgar, and showy, and many farmers couldn't afford it." (120) Red barns are also more common in the north eastern parts of the U.S. than its south.

<sup>31</sup> The famous portrayals of the red barn include Edward Hopper's *Cobb's Barns, South Truro*, 1930-1933, at the Whitney Museum of American Art (<u>https://whitney.org/collection/works/5865</u>) and Kenjiro Nomura's *The Farm*, 1934, at the Smithsonian American Art Museum (<u>https://americanart.si.edu/artwork/the-farm-18775</u>).

<sup>32</sup> See the Tedx talk "The Barn: Archetype to Prototype" by designer Jerry van Eyck on how his firm *!Melk* sought references in the agricultural history of West Sacramento and used the architectonic and metaphorical features of a traditional barn to revitalize the Bridge District.

<sup>33</sup> In 1930 Faulkner purchased "The Baily Place", renamed it "Rowan Oak" and gradually restored it over years, including the two barns which were of his making, as reported in Urgo, "Introduction", xiv.

<sup>34</sup> See Aiken, ""Faulkner's Yoknapatawpha County", 1977; Aiken, "Faulkner's Yoknapatawpha County", 1979, for a detailed discussion of how Faulkner's maps came into being by drawing parallels between his charts and real geographical sites.

<sup>35</sup> *Klojimas* marks the east-west division: it is specific to the eastern regions of Lithuania, while the western parts used to build *skūnia*. The more generic word would be *kluonas*, while *daržiné and šieniné* are smaller constructions, usually incorporated as parts of larger buildings or annexes. There were also specialized areas such as *jauja* for processing flax. *Jauja* might have been an area inside *klojimas* or built as a separate outbuilding. The major outbuildings used for storing and cultivating crops varied regionally in terms of size, form, materials and other architectonic properties. For example, although typically of a rectangular shape, the L-shaped constructions are encountered in the west.

<sup>36</sup> Gable roofs of this type of building are more common in the southern parts of Lithuania.

<sup>37</sup> See <u>https://cdm.limis.lt/paieska/perziura/-</u>

/exhibit/preview/50000001864863?s\_id=DB1ZMquEdEOyKLDD&s\_ind=29&valuable\_type=EKSPONATAS; <sup>38</sup> See <u>https://cdm.limis.lt/paieska/perziura/-</u>

/exhibit/preview/50000009178912?s\_id=Q7k9PIR3QV8F1tCi&s\_ind=16&valuable\_type=EKSPONATAS.

<sup>39</sup> The use of slates made of asbestos cement for roofs, as seen in the picture of the Antaviliai manor's klojimas in Figure 4, became a widespread material during the Soviet period.

<sup>40</sup> In the first chapter of *The Sound and the Fury*, Faulkner's barn is filled with the sounds of cows and horses as in "The big cow and the little one were standing in the door, and we could hear Prince and Queenie and Fancy stomping inside the barn", "Roskus was milking at the barn" or "Some birds sat on the barn door and watched him".

<sup>41</sup> The metaphor of suffering was not uncommon in work songs and folklore featuring the natural world and resources. For example, *lino kančia* ("suffering of flax") marks a separate genre of work songs, as noted by Kensminienė, "Lino kančios motyvai", 226.

<sup>42</sup> See Roberta Pikturnaitė, "Lietuvos klojimo teatras", for a brief overview of how the klojimas theatre survived and changed in the 21<sup>st</sup> century.

<sup>43</sup> Colvin, "His Guts Are All out of Him", posits that "[b]y attending to the diverse and complex functions of animals in Faulkner's work, including their portrayal as embodied creatures, literary animal studies can help overcome the critical tendency to read animals on a strictly abstract or metaphorical level." (96)

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# ABSTRACTION AND THE GOTHIC CATHEDRAL

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### INTRODUCTION

This paper investigates the parallels between the Gothic cathedral and abstraction in our cultural sphere, a so-called Latin West, exploring an approach to abstraction that existed long before the construction of space during the Renaissance, and 17th century scientific practice.<sup>1</sup> The desire to abstract is a tendency that accords with the concepts of *longue durée*<sup>2</sup> – the French *Annales* school's understanding that some historical tendencies have a long duration – and of cultural memory, that ideas can be deeply embedded in the images associated with a culture's *unthought known*.<sup>3</sup> As a concept that has existed since Pythagoras and Plato, the desire to abstract was intensified with the onset of Christendom, combined with a will to refrain from material confinements. This paper explores how tendencies in abstraction have played out over time, from the era of the Gothic Cathedral to the present day.

According to Vilém Flusser, abstraction is a "phenomenological reduction." <sup>4</sup> It is a two-sided process. On the one hand, we abstract from what is concretely given, seeking the common in the diverse; to identify those traits shared between many different phenomena. This is our conventional understanding of abstraction: to 'abstract' without changing the phenomenon itself. On the other hand, abstraction can go beyond that – it can shape existing, and even create new realities. Here, too, a phenomenological reduction takes place, albeit of an active, reality-moulding kind. Abstraction, David Summers states in *Real Spaces*, is not only the process of drawing away *from* something (the conventional connotation), but also of drawing *upon* a surface, to create something new. This process takes place after the conception of an idea, or indeed, the "mind's active grasp of form".<sup>5</sup> In such a way, new realities are created and organised in new ways.

This is important for architecture, and the respective world-views or mind-sets that influence it. We ought to understand architecture not only in its conventional terms, as a visible, physically built space, but also as an architecture of organisation in general, as something that is also organised in invisible terms – take for instance the organisation of an international holding company, which influences and shapes many lives, despite not being directly visible. In the Latin West, this architecture of abstraction was first evident in the Gothic cathedral.



Figure 1. Abstract space as a functional cosmos<sup>6</sup>

# THE GOTHIC CATHEDRAL (AND ITS RELATIVES)

Abstracting from the real, from a world 'as it is' – to use a mythological term – also involves a third component: a metaphysical one. It is rooted in a desire to overcome the given reality 'as it is', the immense variety of beings and forms that exist in the world as *mysterium tremendum et fascinans*.<sup>7</sup> In line with the Christian tradition, history too has to be transformed, away from contingency, and towards a direction, a meaning. Therefore, if we consider abstraction as a *longue durée* that has existed since Plato, one has to refrain, or abstract, from an overwhelming variety of phenomena (objects, people...), towards a few specific forms and destinations. It is about redemption from our entanglements with 'the real', about an eschatological search that relates to utopia: to find a place that is not here, in the given moment, an *ou-topos* or non-place, but one which will come to relieve humankind. In architectural terms, new modes of organisation have to be established.

What started with the cathedral later led to modernity, to a new secularised mythology that again looked towards the *eschaton*, the end of time. However, opposed to the Christian belief in the times of the cathedral, this did not lead to redemption afterlife, but to a 'white eschatology' of modernist architecture, "leaving humans alone under a sky absolutely empty." <sup>8</sup> The heritage of the cathedral is a longing for transcendence in secularised terms.



Figure 2. The dream of modernity<sup>9</sup>

After modernity, this longing was completed with the advent of digital spaces, which are in fact no longer *spaces*, but mere systems of algorithms. As a *type*, these 'spaces' resemble an *organisation*-space that is independent of the individual, concrete circumstances of a real physical world, now characterised as an 'old' world 1.0. The new world, the 2.0- or improved version, is immaterial; according to one of its pioneers, it is the new Heavenly Jerusalem of a virtual world that offers freedom for virtual communities.<sup>10</sup> This type of organisation is no longer *ou*-topian; rather, it is essentially a-topian or placeless. Systematically applied for the first time in the Gothic cathedral, the reign of the algorithm enabled the development of the modern world.<sup>11</sup>

# THE CATHEDRAL ITSELF

Such an "architecture of salvation" was already present in the Gothic cathedral.<sup>12</sup> As a building, the cathedral is constructed like a cybernetic system, an order of forces and counterforces in equilibrium. Similar to the modern image of an *organism*,<sup>13</sup> which is not a living being but an abstraction from it, namely a technical system of forces and functionalities, the Gothic cathedral resembles an order of functional dynamics, frozen into stone. This kind of 'organismic' system became a principle idea in the modernist mind-set. For example, the new 19<sup>th</sup> century-Paris constructed by Baron Haussmann was a "technical but nevertheless living organism" (the later cyborg or *cybernetic organism*), a *unified* space for all.<sup>14</sup>

Upon entering the cathedral, we realise that we are not just confronted with stones. The whole building follows a system of fractal geometry, using basic, repeating forms; it is a digital construction of a procedural, code-dependent logic.<sup>15</sup> Just like God is present in everything he has created, the small forms in the cathedral are reflected in the large, and vice versa. Every form serves a purpose, and is inextricably related to other similar forms. The world is like a book written by God (the postmodern analogy of a world as text shines up), and the book's language is geometry, according to Alain de Lille of the 12<sup>th</sup> century. The world has been *coded*, and this took place long before that word became an integral part of today's language. The task of man is to decipher this language, and to read the book. One can already see the modern 'natural' sciences emerging.



Figure 3. Digital logic 16

Moreover, the entire building is a *system*-space, in which the individual forms seem to *flow*; space becomes fluid, dynamic, non-solid and ungraspable. As a "symbolic embodiment of a mental reality", the cathedral is an *anagogical* architecture, leading *upwards* to another world, to the final city at the end of history, the Heavenly Jerusalem or City of God. As in the case of the digital spaces of today, it requires neither sun nor moon; as St. John explains in his Revelation, the Heavenly City is illuminated solely by the light of God. When entering the cathedral, our attention is directed forwards and upwards; the line between earth and heaven is surrendered, and we gain a better idea of what it could mean to face God. As in the secularised urban world created by Baron Haussmann, the cathedral is *one unified* space, one unified movement<sup>17</sup>. The fractal geometries give form to the formless, ordering God's abundance into an architectural canon, into a building full of light.



Figure 4. God is light 18

The Gothic cathedral, according to Georges Duby, is "geometry woven in light."<sup>19</sup> God does not only write the book of the world in geometrical terms; he himself is light. God, pure Being beyond all Beings, manifests himself as light streaming through everything, from the angels to bare matter, in different hierarchical levels and intensities. Although light is immaterial, it gives things form.

The Gothic cathedral is a *type*. St. Paul defines a type as an entity that really exists, such as paradise, but which anticipates at the same time, an existence in the future.<sup>20</sup> As such, the cathedral is neither tied to its concrete manifestations nor its physical features as an individual building. Rather, it relates to the *correct* order or indeed, the right mode of *organisation*. That mode is independent of real, specific places. The real cathedral is always invisible; what you see is simply one symbolic manifestation, the building shown in a particular way at that particular place. The real cathedral is the *ou-topos* of the right organisation, not just what you see. It is the Godly *organisation* that counts, not its visible physics. From a Christian perspective, the right organisation guarantees meaning, having the cathedral as its representative, symbolising the final state of a redeemed human kind.

This trope of redemption was later on translated into the most diverse eu-topias, 'ideal' societies and models for a directed social evolution. Here too, history became more than just the contingent accumulation of moments, but gained a meaning: from an initial paradisiacal, 'natural' state of being – the first paradise, an ideal artefact of God – human history moved through a middle age, namely history as we know it, towards a final end state, the second and final paradise, the last ideal artefact made by God.<sup>21</sup> Portrayed as a basic figure in modern anthropologies, this overarching movement marks a shift from nature to culture to final independence from physical and social confinements, which is a kind of secularised 'redemption'. This is the meta-history<sup>22</sup> behind all systemic entanglements in the moment, with its respective derivatives in modern times, from utopian movements to Marxism, to a recent, progress-oriented neoliberal capitalism claiming to be 'natural'.<sup>23</sup>



Figure 5. Meta-History 24

#### THE MODERN AGE

The 'architecture of salvation' represented by the Gothic cathedral has been inherited across generations. Enlightenment Age-thinkers of the 17th and 18th centuries replicated the Christian mentality of bettering the world by 'overcoming' hurdles and striving for improvement. Their modern mind-set resembled an attempt by man to overcome history 'as it is', in search for a better and final one – a modern-day paradise regained at the end of all days. In search of practical, worldly solutions and spaces that were suited for the *human* condition – defined and constructed by man rather than pregiven or reliant on divine intervention –, man's wholehearted faith in the will of God shifted towards a belief in the will of *man*. As Immanuel Kant once described, a revived interest in natural science, political economy and reason would enable man to 'emerg[e] from his self-imposed nonage', from his inability to act in accordance with his own will.<sup>25</sup> And so, the Christian myth of progress was transformed: from the immaterial heavenly domain of the Gothic cathedral, into a material domain rooted in scientific, technological and sociocultural reform.

A century later, the spiritual emblem of the Gothic cathedral was once again propelled further into the modern day, where, in keeping with the aforementioned tradition of 'white eschatology', it was symbolically 'rebuilt' by the founders of the Bauhaus School. Lyonel Feininger's woodcut *Cathedral* adorned the cover of the Bauhaus Manifesto in 1919; it was an image deliberately chosen to represent the utopian, spiritual vision of this modern German Arts and Crafts school. Feininger had indeed 'abstracted' the traditional form of the cathedral, transforming it into a play of geometric forms, and in doing so, reflecting the aura of medievalism that influenced the initial phase of the Bauhaus and its crafts-based teaching system.<sup>26</sup> The woodcut, itself an old-fashioned medium, epitomised the intrinsic, historic link between abstraction and the cathedral, which became associated with the forward-thinking values of dynamism, rebuilding and social vision embraced by the Bauhaus.



Figure 6. Lyonel Feininger, The new cathedral<sup>27</sup>

German modernist architect Bruno Taut's 1917-18 *Alpine Drawings* give further reference to the cathedral and Heavenly Jerusalem – the second and final paradise to come. The spiritual glass structures depicted in his work stand for a utopian force and symbol for a better future; they assert the mystical quality of nature over the harsh materiality of modern, urban existence. Taut communicates, in particular, the liberation of mankind from the chaos of the First World War, with the glass cathedral-like buildings gesturing upwards towards the Heavens; they symbolise an escape from the confines of the moment and establish a bridge between material and immaterial realms.



Figure 7. Bruno Taut, The new Heavenly Jerusalem<sup>28</sup>

Similar to the Enlightenment thinkers, Taut and the *Neues Bauen* architects strived towards a better or 'ideal' world in the 1920s, one built by man rather than naturally grown or pre-given by God.<sup>29</sup> The *Hufeisensiedlung* (Horseshoe Estate), a housing estate designed by Taut between 1925 and 1933, is a clear example of man acting upon this new, rational mind-set of the modern age, by responding to a growing need for housing to support the rapid increase in population in Berlin.<sup>30</sup> Rather than overcoming the *confinements* of materiality in the search for a better world, *Neues Bauen* architects tapped into the creative potential of new modern materials. Glass, cement and steel – the output of advanced industrialisation in 1920s Germany – refined what architecture could do for society, both in terms of new material benefits, and spiritual values, as explored by Taut in his earlier *Alpine Drawings*.

The utopia envisioned by modernist architects in the 1920s also resembles the dreams of liberation that underlie the early days of the Internet. It seems that our cultural memory of paradise has been 'stored away' in symbolic imagery that recurs over time, and has, as a result of this constant process of 'storing' and rediscovery, been translated into the cyberspaces of the Digital Age.<sup>31</sup> For example, the circular formation of Taut's *Hufeisensiedlung* is very closely linked to the new Headquarters of the technology company Apple, known as Apple Park, in Cupertino, California, which is curved all the way round with a large central courtyard. Garden features – a large pond and trees – were placed at the centre of both the Apple Park and Taut's *Hufeisensiedlung*, just like in Christian cloister gardens or the first paradise, the Garden of Eden. These symbols, first embedded in the Christian concept of the cathedral, have been reiterated centuries later.



Figure 8. Bruno Taut, Hufeisensiedlung<sup>32</sup>



Figure 9. Apple Park, Cupertino<sup>33</sup>

# THE DIGITAL AGE

Despite the apparent differences between the times of the Gothic cathedral and today's abstract spaces and modern network ideas, there are several common denominators, as pointed out by Ed Finn.<sup>34</sup> The birth of the Digital Age is inextricably linked to traditional Christian dreams of liberation. Cyberspace, the virtual computer world that facilitates online communication, provides spiritual spaces of empowerment and agency to individuals and communities. Its invisibility, intangibility and ever-expanding presence give humankind the opportunity to overcome the confinements of materiality. Howard Rheingold similarly prophesied about the future of cyberspace, suggesting that "people will use it to navigate through the dangerous complexities of the twenty-first century".<sup>35</sup> Here Rheingold describes a conceptual space, bound to deliver fantastic opportunities for each individual, a *cyberparadise* that presents a new space for human self-discovery, or indeed, a New Jerusalem.
We have certainly formed the same faith-based relationship with algorithm and cyberspace as Christians did with the Gothic cathedral. The cathedral continues to act as a "pervasive metaphor", in that "it offers an ordering logic, a superstructure or ontology" for how we create meaning in our lives, just like the Internet and contemporary computational systems present a unified vision of the world through "slick user interfaces and carefully curated data."<sup>36</sup> As Ed Finn points out, "everything you might want to know [is] now "available as an app".<sup>37</sup> It seems that humankind's desperate longing for a second and final artefact at the end of history has gone so far that it has turned into a secularised, utopian version of this end, digital space being an abstract version of the Christian paradise, the modern-day Jerusalem that started with the Gothic cathedral; in doing so, we have kept the Christian tradition very much alive.

Man's desire to find liberation has, for example, resulted in a capitalist eschatology, inspiring and driving a community of *seasteaders*, interested in creating permanent dwellings at sea, outside territory claimed by any government. Seasteading is led on the whole by entrepreneurs and venture capitalists, such as the co-founder of PayPal Peter Thiel. It has arguably become a human mechanism adopted to avoid the messy cultural spaces that companies such as Apple and Google try to compute. Through building yet another lucrative 'algorithm' for an entirely new island colony and worldview that masters nature itself, man has prioritised a utopian system that is both capitalist and secular.



Figure 10. Seasteading<sup>38</sup>

Thiel wrote in 2009 that "between cyberspace and outer space lies the possibility of settling the oceans."<sup>39</sup> He references a future immaterial world of possibility that is firmly embedded in our cultural memory of utopia. There is a profound connection between Thiel's free-floating islands and the Christian desire for immaterialisation, first represented by Saint Brendan in the 6th Century A.C., who voyaged overseas to the Promised Land of the Saints.<sup>40</sup> Once again, we see the recurring tradition of man wanting to 'settle' the world by overcoming and improving it. In each case, neither man feels bound to a physical space but makes paradise where he so desires; the island becomes symbolic of this freedom and immaterial paradise.



Figure 11. Ilhas Fantasticas 41

#### CONCLUSION

Mankind is clearly a community of believers, who long for a space more radical and abstracted from everyday life than has ever been achieved. Ultimately, it is the domain of myth; and the myth of paradise is one of the most prominent myths in our cultural realm, the Latin West.<sup>42</sup> According to Blumenberg, as long as this myth is believed in, every epoch will bring about new versions of paradise, in an attempt to realise its final version.

The search for paradise in the Latin West with means of constructive abstraction, which began with the Gothic cathedral, appears to have become more pronounced as time has gone by. There seems to be no conclusion to this ongoing process of abstraction. We live in a world that is constantly developing new algorithms, networks and models. Where might this lead us in the future – to new paradises?

#### NOTES

<sup>1</sup>To the notion of a *Latin West*, the occidental cultural realm after Antiquity, see Urban Kressin, "Geistliches Erbe. Theologie von Abstammung und Besitz im Frühmittelalter", in *Erbe. Übertragungskonzepte zwischen Natur und Kultur*, ed. Stefan Willer et al. (Berlin: Suhrkamp, 2013), 68. To the Renaissance and its abstracted linear perspective, with origins cf. Hubert Damisch, *Der Ursprung der Perspektive* (Zürich: Diaphanes, 2010), 77, 83, 85f. To the 17<sup>th</sup> century and its historical and epistemological contexts see for instance Stephen Shapin, *The Scientific Revolution* (Chicago/London: Univ. of Chicago Press, 1996).

<sup>2</sup> Cf. Peter Burke, *Die Geschichte der ,Annales'. Die Entstehung der neuen Geschichtsschreibung* (Berlin: Wagenbach, 2004), 153.

<sup>3</sup> To *cultural memory*, a concept first developed by C.G. Jung, see Jan Assmann, *Das kulturelle Gedächtnis. Schrift, Erinnerung und politische Identität in frühen Hochkulturen* (München: C.H.Beck, 1997), 52. To the unthought known see Christopher Bollas, *The Shadow of the Object – Psychoanalysis of the Unthought Known* (London: Free Association Books, 1987), 287-288.

<sup>4</sup> Cited in Stephan Günzel, *Raumbild. Zur Logik des Medialen* (Berlin: Kadmos, 2012), 83. And Ernst Cassirer, *Philosophie der symbolischen Formen. Teil II: Das mythische Denken* (Darmstadt: wbg, 1973), 88, to the conventional understanding of abstraction.

<sup>5</sup> David Summers, *Real Spaces: World Art History and the Rise of Western Modernism* (New York: Phaidon, 2003), 260.

<sup>6</sup> Metroplan Moscow, photo by U. Gehmann.

<sup>7</sup> To both terms see Hans Blumenberg, Arbeit am Mythos (Frankfurt/Main: Suhrkamp, 1996), 16, 20-21.

<sup>8</sup> Giorgio Agamben, *Ausnahmezustand* (Hamburg: Rowohlt, 2004), 69.

<sup>9</sup> EUR, Rome: INPS complex; photo by U. Gehmann.

<sup>10</sup> Howard Rheingold, *The Virtual Community. Homesteading on the Electronic Frontier* (Cambridge, Mass./London: MIT Press, 2000).

<sup>11</sup> David Berlinsky in Ed Finn, *What Algorithms Want. Imagination in the Age of Computing* (Cambridge, Mass./London: MIT Press, 2017), 9.

<sup>12</sup> Johann H. Claussen, *Gottes Häuser oder Die Kunst, Kirchen zu bauen und zu verstehen* (München: C.H. Beck, 2010), 133.

<sup>13</sup> The word organism derives from the Greek organon, instrument, tool, i.e. from a *technical* and not lively entity.

<sup>14</sup> To the cathedral as cybernetic system and organism see Martin Burckhardt, *Metamorphosen von Raum und Zeit. Eine Geschichte der Wahrnehmung* (Frankfurt/Main: Campus, 1994), 33, 35-36. Haussmann cited in Stephen Graham and Simon Marvin, *Splintering Urbanism: Networked Infrastructure, Technological Mobilities and the Urban Condition* (London/New York: Routledge, 2001), 55. To cybernetics in these respects see also Ulrich Gehmann and Martin Reiche, "Cybernetics of Augmentation", in *Leonardo Electronic Almanac* 22, *no.* 2, ed, Lanfranco Aceti et al. (Cambridge, MA: LEA/MIT Press, 2017).

<sup>15</sup> Lars Spuybroek, "The Digital Nature of Gothic", in *ResearchGate* (2011), 12, 16. To the geometry of the gothic cathedral see Robert Bork, *The Geometry of Creation. Architectural Drawing and the Dynamics of Gothic Design* (Aldershot: Ashgate, 2011). To Alain de Lille see Émile Mâle, *Die Gotik. Die französische Kathedrale als Gesamtkunstwerk* (Stuttgart/Zürich: Belser, 1994), 21.

<sup>16</sup> Reims cathedral, section of the main and side nave with the system of repetitive *travées*, of yolkes. Photo by U. Gehmann. The windows are white here – which is a modern, uncoloured light, opposed to the original light in the cathedral. Albeit the 'modern' light (due to the loss of original, coloured windows) helps to line out the logic of construction inherent to the entire building.

<sup>17</sup> Claussen (op. cit.): 133; Burckhardt (op. cit.): 30, to the cathedral as the model of the One; and St. John's Revelation, cap. XXI.

<sup>18</sup> Reims cathedral, upper part of central nave (Andreas Siess/U. Gehmann). Standstill from the Exhibition "*Ideal Spaces*", Ideal Spaces Working Group, Venice Biennale for Architecture 2016.

<sup>19</sup> Georges Duby, *Die Zeit der Kathedralen* (Frankfurt/Main: Suhrkamp, 1984), 178, 255. It is a conception going back to Dionysios Aeropagita.

<sup>20</sup> Alessandro Scafi, *Mapping Paradise: A History of Heaven on Earth* (London: The British Library, 2006), 63.

<sup>21</sup> To the notion of the ideal artifact see Ulrich Gehmann, Welt als ideales Artefakt (forthcoming).

<sup>22</sup> To the notion of a meta-history and its mythological connotations see Hayden White, *Tropics of Discourse*. *Essays in Cultural Criticism* (Baltimore/London: John Hopkins Univ. Press, 1978), 103-104.

<sup>23</sup> To a recent neo-liberal capitalism as a "redemption through consume" see Irus Braverman, "Zootopia: Utopia and Dystopia in the Zoological Garden", in *Earth Perfect? Nature, Utopia, and the Garden,* ed. Annette Giesecke and Naomi Jacobs (London: Black Dog Publishing, 2012), 255.

<sup>24</sup> Münster Strasbourg, main portal. Photo by U. Gehmann.

<sup>25</sup> Immanuel Kant, "158. What is Enlightenment? (1784)," in *Freedom of Religion*, ed. Stephen A. Smith (Oxford/ Cambridge/Fayetteville: Oxbridge Research Associates, 2017), 330.

<sup>26</sup> Richard Weston, *Modernism* (London: Phaidon Press, 2005), 119.

<sup>27</sup> Lyonel Feininger, *Cathedral (Kathedrale)*, 1919, woodcut. Photo by MoMA. "Art and Artists: Lyonel Feininger." Accessed July 28, 2020. https://images.app.goo.gl/gebMnTRKz3k1sUUD7.

<sup>28</sup> Bruno Taut, *Alpine Architecture drawings. Allegory of the Heavenly Jerusalem, 1917-18.* Photo: in Paul Scheerbart, Bruno Taut, Dennis Sharp, *Glass Architecture* (New York: Praeger Publishers, 1972), 17.

<sup>29</sup> Neues Bauen architects produced buildings that gave form to the dynamic process of their construction, made apparent by visible structural elements and materials.

<sup>30</sup> The *Hufeisensiedlung* consists of 25 housing units joined together in a ring-like formation around a pond. The three-storey buildings are aligned with the street, and each house has a garden and small terrace.

<sup>31</sup> Jan Assmann, "Communicative and Cultural Memory," in *Cultural Memory Studies. An International and Interdisciplinary Handbook*, edited by Astrid Erll, Ansgar Nünning (Berlin; New York: Walter de Gruyter, 2008), 109-110.

<sup>32</sup> *Hufeisensiedlung* (Horseshoe Estate), Berlin, 1925-33. Photo by A. Savin. Greyscale."Berlin: A Magnificent Architectural Journal – Greyscape." Accessed July 28, 2020. https://images.app.goo.gl/84eY9fQ8m8UoMjTp9.

<sup>33</sup> Apple Park, California, United States, Designed by Norman Foster. Photo by Shutterstock. "Circular headquarters is a '100-year testimony to Jony Ive's design'." Accessed July 28, 2020. https://images.app.goo.gl/LWuf9ReR7DpMj1V59.

<sup>34</sup> Ed Finn. *What Algorithms Want. Imagination in the Age of Computing* (Cambridge, Mass./London: MIT Press, 2017).

<sup>35</sup> Howard Rheingold, cited in Michael Nitsche, "Chapter 10. Growing Game Worlds. Cyberspace Mindspace," in *Computer Games and New Media Cultures: A Handbook of Digital Games Studies*, edited by Johannes Fromme and Alexander Unger (New York: Springer, 2012), 161.

<sup>36</sup> Einn, What Algorithms Want (2017), 8.

<sup>37</sup>lbid.

<sup>38</sup> Seasteading. Photo by Waterworld 2. Bloomberg CityLab. "The Floating City, Long a Libertarian Dream, Faces Rough Seas." Accessed July 28, 2020. https://images.app.goo.gl/ZdFhUYrtez38RYVT8.

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<sup>41</sup> Seychelles, Indian Ocean. Photo by U. Gehmann. The term *Ilhas fantasticas* or fantastic islands refers to the Portuguese discoverers of the 15th and 16th centuries.

<sup>42</sup> Other cultures also had conceptions about paradise, but not as pronounced as in Islam and Christendom, which go back to a Judaeo-Christian imagery: Heinrich Krauss, *Das Paradies. Eine kleine Kulturgeschichte* (München: C.H. Beck, 2004), 9f. And Blumenberg (op. cit.), 60.

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# EVALUATION OF DUST ACCUMULATION ON SHELTERED ARCHAEOLOGICAL REMAINS BY COLORIMETRY

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#### INTRODUCTION

Archaeological excavations imply exposing the historic and artistic remains from past cultures to a new environment, different to the one they had have while buried during such amount of time. The great majority of these remains correspond to architectonical structures but also delicate decorative programmes. Mural paintings and mosaics are among the most vulnerable type of immovable heritage that can be found exposed in situ. The action of water in the porous materials and in the layered structures is the most frequently mentioned decay factor in form of hygric, freezing or salt crystallization pressures, but thermal variation, and biological factors can also lead to disaggregation, exfoliation, and fracturing.<sup>1</sup>

Shelters have been extensively considered preventive conservation measures for archaeological sites after unearthing because they act as a barrier against sun and rain and thus prevent further damage. They can even modify the micro environmental conditions inside to produce a more favourable environment for the preservation of the site regarding humidity, temperature and air quality.<sup>2</sup> In addition, the preservation of a site can have positive effect in the local community if considered a touristic attraction, for instance.

A long-term debate in the conservation field is the repercussion of sheltering the remains.<sup>3</sup> In the literature, it is possible to find numerous cases of shelters that are not protecting the site or that are introducing decay factors not present before. A significant case is the Fishbourne Roman Palace (United Kingdom) where an enclosed and partially transparent shelter induced salt crystallisation on the mosaics.<sup>4</sup> From another point of view, shelters may affect the visitor's experience. The disruption in the archaeological landscape is a very negative aspect because shelters may change the relation of the site with its context.<sup>5</sup> It is important to mention that archaeological remains are not only appreciated for its historic and documentary values, and as source of knowledge and archaeological research. They also contain aesthetic and artistic attributes, primarily associated with the decorative elements, which are also part of the archaeological complex.<sup>6</sup> Therefore, the protective role of shelters

needs to be guaranteed so the other negative aspects of its construction are justified. In this sense, a continuous monitoring programme to assess their effectiveness is pivotal.<sup>7</sup>

One of the factors that must be taken into account in the decision of covering a site is the accumulation of particulate matter (PM) on sheltered archaeological remains.<sup>8,9,10</sup> PM is deposited during the dry phase and the process is favoured by the absence of rain and the changes in wind behaviour inside the cover.<sup>11</sup>

The deposition of PM implies both visual changes and chemical weathering. The accumulation of coarse particles is likely to alter the appearance of remains and make visitors have a negative impression of the place, associating it with neglect.<sup>12,13,14</sup> In addition, the chemical interaction of the most reactive particles with the historic surfaces usually leads to soiling, which enhances, as a consequence, physical decay and darkening or discolouring mainly in highly polluted areas.<sup>15</sup>

The great majority of studies related to the quantification and effects of PM deposition in indoor environments has focuses on museums, libraries, and historic houses. For example, the National Tile Museum in Lisbon,<sup>16</sup> The Old Library of Trinity College in Dublin,<sup>17</sup> the Museum of Scotland,<sup>18</sup> and the National Library in Prague.<sup>19</sup> However, archaeological remains are especially susceptible to the effects of dust accumulation and soiling in contrast to artefacts in museums, which counts with controlled environments with filtration systems. In the case of archaeological sites, the higher risk is found in those located outside city centres or in their periphery due to the greater levels of pollution.<sup>20</sup>

The Service for Conservation, Restoration and Scientific Studies of Archaeological Heritage at Universidad Autónoma de Madrid and the Applied Optics Group from Universidad Complutense de Madrid have proposed a methodology to evaluate dust accumulation on sheltered archaeological sites. For that purpose, two studies were carried out at one of the most important archaeological sites in Spain: Complutum, which is located in the modern city of Alcalá de Henares (Spain).

The first study was based on light transmittance to compare the amount of PM deposited inside the shelters and estimate the areas of major affection, while the other one used reflectance, colour and lightness (CIE L\*ab) to assess the efficacy of different cleaning systems.

The application of the study on these variables to the preventive conservation of archaeological sites is a cutting-edge approach, which allows evaluating the risks for dust accumulation on the remains without using invasive and destructive technologies. In addition, there is the possibility of making use of low-cost means, and as a result, a wider range of sites can be benefited.

#### THE CASE STUDY

Complutum (40° 28' 26.146" N, 3° 23' 16.49" W) is a Roman city built by Emperor Augustus in the 1st century A.D. The site has the highest protection category of the Spanish legislation since 1992, which is the result of its relevant significance, but it imposes limitations in terms of restoration interventions. Currently, the site is located in the periphery of the urban precinct of Alcalá de Henares (Figure 1), a semi-arid area according to the Köppen climate classification.



Figure 3: Aaerial view of Complutum

An exceptional decorative programme covers the architectonical remains, mainly made of rammed earth, masonry and brick. To protect these ornamental elements from weathering, those areas of the site were covered. The shelter at the House of Hippolytus, constructed in 1999, can be described as a partially enclosed design (Figure 2), which allows some air exchange through the lateral cladding.<sup>21</sup> The shelter at the House of the Griffins (Figure 2), of approximately the same covering area, was built in 2011 with a dome-shape steel structure classified as a partially-open shelter.<sup>22</sup> The mosaics concentrates on the House of Hippolytus while the House of the Griffins is recognised by the mural paintings.

The site is taken care of regularly and the maintenance programme includes periodic dry cleaning and exceptionally wet cleaning of the surfaces. A recent environmental monitoring of the shelters has showed that both shelters protect the archaeological remains from the outer damaging hazards such as the summer extreme temperatures.<sup>23</sup> However, it was found an excessive dust accumulation on the horizontal surfaces inside the shelters, especially visible on the mosaics.



Figure 4: The shelters at the House of Hippolytus (left) and the House of the Griffins (right) viewed from inside

## LIGHT TRANSMITTANCE TO DETERMINE AMOUNT OF DEPOSITION

The amount of particulate matter deposited inside the shelters at Complutum and its variability with time were evaluated by studying the percentage of light transmitted through transparent and sticky film samples exposed passively at different areas within the site. This allowed estimating the areas of major affection within the site so decisions about its regular care can be objectively taken. In addition,

this methodology permits determining the effect of the different types of shelters in the dust accumulation phenomenon, which is a clear contribution for the shelter design criteria.

#### Methodology

Dust collectors were made of self-adhesive film samplers (10 x 10 cm) similarly to the methodology used for English historic properties<sup>24</sup> and the National Tile Museum in Lisbon.<sup>25</sup> This system allowed collecting a representative sample of the particulates systematically deposited over the archaeological ruins without affecting the contemplation of visitors and reducing the possibility of sample loss due to manipulation. In addition, a passive sampling system makes it highly suitable for low-budget sites.

In previous studies, the quantification of the particles was undertaken visually using microscopes of high magnification,<sup>26</sup> or by automated image analysis prior converting the pictures to binary format<sup>27</sup>. Instead, the use of light transmittance in this study significantly reduces the processing time and has into consideration all particles not only the dark ones.

Dust collectors were made of transparent PVC film with UV protection, coated with a polyacrylate adhesive (ORAGUARD® 210). Twelve of them were exposed horizontally for 1 month (from 17th June to 22nd July 2018) and another twelve for 3 months (from 17th April to 22nd July 2018). The samplers were distributed, in sets of three, at different positions inside and outside the shelters, so it was possible to obtain a wider representation of the site.

After exposure, the changes in the light transmittance were spectrally characterized in laboratory conditions by lighting the samples with a collimated light source, and then by measuring the total spectral transmittance  $T(\lambda)$  and transmitted spectral energy  $E(\lambda)$  by means of an IS6 6" integrating sphere and with a Stellar-Net® spectroradiometer. The light source  $S(\lambda)$  was an incandescent light similar to an illuminant A (Figure 3).



Figure 5: Diagram of the assembly carried out in the laboratory for undertaking the spectral transmittance measurements of the samplers placed at the House of Hippolytus and House of the Griffins. The Stellar-Net® spectroradiometer has a spectral range from 200 to 1000 nm and was connected with a shielded optical fibre cable (F400-VISNIR) to the integrating sphere. (1) Light source lamp, (2) Collimator lens, (3) Self-adhesive film patches, (4) Integrating sphere, (5) Optical fibre cable, (6) Spectroradiometer, (7) Computer

The percentage of transmitted light (%) was calculated by the following equation taking into account the normalized spectral energy distribution of a blank sample E100 ( $\lambda$ ) used as reference, and each collector after exposure Ei ( $\lambda$ ), being (i) the different collectors, located at the areas mentioned above:  $T_i(\lambda) = (E_i(\lambda))/(E_{100}(\lambda)) \times 100$  (1)

#### Results

The amount of transmitted light, which depends on the PM coverage, was used to obtain an objective value, from the spectral point of view, of the quantity of the light perceived by visitors after exposure. Lower light transmittance values (%) relate to greater dust accumulation.

The study at Complum demonstrated that, as expected, the amount of deposits increases with time (Figure 4). In addition, the dust coverage was greater outside, which can be related to a low precipitation rate during the monitoring time. However, after 3 months, the dust inside the shelters also resulted significant, and the amount of deposits accumulated inside the House of the Griffins was more variable in comparison with the other shelter.



Figure 6: Mean light transmittance values (%) inside and outside the House of Hippolytus and the House of the Griffins after 1 and 3 months

The least affected were the dust collectors located under the central part of the shelters, which showed a decrease in light transmittance of 7.52% at the House of Hippolytus and 10.27% at the House of the Griffins after 3 months. On the contrary, the periphery of the House of the Griffins was more affected than in the other shelter. The reduction in light transmittance reached 16.43% in comparison with the 12.85% at the House of Hippolytus. This presumes that the observation of the remains will be very much compromised in a relatively short period of time.

# COLOUR AND REFLECTANCE TO DETERMINE VISUAL CHANGES AND DECIDE THE CLEANING METHOD

The other project looked into the consequences of sheltering for the contemplation of mosaics, horizontal archaeological surfaces with high aesthetic impact. For that reason, reflectance, colour and lightness changes due to the presence of deposits on the central mosaic at the House of Hippolytus were studied.

The mosaic, from the 3<sup>rd</sup> century, has a high artistic value. The main scene follows a North African tradition representing three Cupids fishing on a bout surrounded by Mediterranean fauna. It also holds important documentary information as the name of Hippolytus, presumably the master of the villa, appears on of the sides of the central motif.

The cleaning method is utterly important for the future preservation of the archaeological site as water is one of the most relevant decay factors for inorganic porous materials. The effects of too frequent cleanings can be underestimated and this could be taken place by periodic routine unnecessarily. Therefore, visual changes after any type of cleaning should be objectively evaluated so a decision can be taken regarding appearance and decay risks. In this study, the overall reflectance of the mosaic after a dry and wet cleaning was evaluated.

#### Methodology

A LumiCam® camera (Instrument Systems GmbH) was used for determining overall lightness, chroma and hue angle when the deposits laid on the surface of the mosaic (Figure 5). The measurements were taken on a surface with a deposition corresponding to 6 weeks of exposure (from 23rd of April to 5th May, 2019), and compared with the same surface once cleaned, first by dry means and then by wet cleaning. For calibration purposes, it was used a white reference target with a 75% reflectance (Spectralon® by Labsphere) and a X-Rite Colorchecker® panel, both placed in the same plane of the mosaic.

In addition, a Konica Minolta® spectrometer was used to measure the reflectance of specific areas of the mosaic. For this purpose, six tessera of three different colours (red, black and white) were selected (two by colour). The measurements were taken in the most prominent part of the mosaic, especially rich for its decorative components, and only taking into account the visible range (360-740 nm).



Figure 5: Main scene of the mosaic at the House of Hippolytus before being cleaned and during the calibration process of the LumiCam® camera with a reference target

#### Results

After six weeks of exposure, there were noticeable visual changes. The deposits make the colours less sharp and the volumes of the figures less defined (Figure 6).



Figure 6: Detail of the mosaic at the House of Hippolytus before being cleaned (left) and after a wet cleaning (right)

Providing that a reduction in reflectance of 10% is estimated to be a consistent threshold for cleaning,<sup>28</sup> the deposition on the black tesserae can be considered inadequate (Table 1). In addition, these tesserae were prone to a higher visual disruption as in this case, the dust tended to be light in colour.

	White tesserae	Black tesserae
uncleaned vs. dry cleaned	2.9%	9.13%
uncleaned vs. wet cleaned	16%	11.89%

 Table 1: Mean difference in reflectance between uncleaned and dry cleaned and between uncleaned and after wet cleaned white and black tesserae

After cleaning, all the tesserae became closer to their expected spectral characteristics. The reflectance highly increased in the white areas, which were perceived as lighter. The main difference was obtained after the wet cleaning. This would be the most suitable cleaning process for obtaining significant results in spite of the risk that water implies for the conservation of the mosaic.

## DISCUSSION AND CONCLUSION

The quantification of PM by light transmittance measurements implies a new method for measuring indoor dust coverage, which allow comparing different areas of the site and different sites. Another advantage of the system lays on a reduction in the processing time and that it can also help establishing the frequency of cleaning if repeated over time. However, the different angles of observation and the specific light source at the site needs to be taken into account if the intention is to better understand the repercussion of dust coverage for the visitors.

Additionally, reflectance, lightness and colour changes, measured by a spectrophotometer, have proven to be very effective in order to assess how the colours of the artistic surfaces are affected by dust and determine the best cleaning system. Spectral and colorimetric characterizations has been used extensively in the field of cultural heritage<sup>29</sup> even for support restoration criteria,<sup>30</sup> but the application to this specific area is still underused. A further investigation on public perception of dirtiness would be necessary to complete the results.

To conclude, the research undertaken at Complutum provides valuable information about deterioration factors affecting archaeological sites, and a further step on understating the effects of shelters. In addition, this project has proposed a straightforward methodology to evaluate the risk of soiling on sheltered remains that can support site management decisions and be extensively applied to other archaeological sites. The application of materials and methods typical of the Optics field to resolve problems in the area of conservation and musealization of archaeological sites is a promising field of study.

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#### NOTES

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# A SCIENTIFIC STUDY OF JEAN AUGUSTE DOMINIQUE INGRES' LA SOURCE

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#### INTRODUCTION

Accuracy is a characteristic of Western classic painting. In the depiction of scenes, especially ones including architecture, the application of calculable scientific approaches such as perspective and geometry are ubiquitous for both artists and their critics. Consequently, accuracy has become an important standard for evaluating the quality of a work of art, for which a scientific verification method is essential.

This study is an attempt to apply Non-uniform Rational B-spline (NURBS) and Computational Fluid Dynamics (CFD) to the appreciation of realistic art in order to demonstrate their potential impact in art criticism. The approach has the potential to open up a new scientific channel to study classic art. Although the application of science in art has been studied over the centuries, new methods emerge with the development of modern technology. It is not uncommon for flowing water to be found in scenes in classic art; previous evaluations of water flow, however, were made based on individual experience and subjective feelings and not scientifically. This paper introduces an analysis of the famous oil painting *La Source*<sup>1</sup> by Jean Auguste Dominique Ingres using a scientific approach to verify the painting's accuracy. This evaluation contributes to the debate on Ingres's artistic process, and presents the possibility of using CFD and Computer-Aided Design (CAD) to produce highly accurate scenes with flowing water based on mathematics and physics.

Before detailing the method and results of the study, however, it is necessary to establish some of the contexts for both the technical computer-based elements, as well as the painting under consideration.

#### THE SCIENTIFIC STUDY OF ART

In art, "whether we are discussing how materials combine or resist, how and why colours interact, or how structures assume their shape and structural integrity, we are engaging some aspect of physics, maths, or engineering".<sup>2</sup> The appreciation of classic art includes several aspects, one of which is the element of physical representation. In European art, an emphasis on representational accuracy started to become dominant in the art workshops in the 15th century,<sup>3</sup> during which the artists paid increasing attention to the physical sciences in the process of creating beauty – a focus that would remain central until the time of Monet.<sup>4</sup>

Painting and sketching became accurate because of the rise of academic approaches such as perspective and, before that, pinhole imaging. Until the late fifteenth-century in Florence, drawing was taught almost exclusively in the tradition of workshop training, in which young artists studied theoretical subjects called "academies" "such as anatomy, perspective, proportion and architecture" to ensure their sketching was accurate.<sup>5</sup> The increasing importance of academic approaches is also evidenced in architectural and engineering diagrams of the time, for instance in the work of Leonardo da Vinci<sup>6</sup> and Giotto.<sup>7</sup> More importantly for present purposes, there was also the study of many sorts of flow in artworks, including the flow of air, water, oil, blood and other fluids, as well as the vitality and movement of life itself. In Martin Kemp's study of Leonardo da Vinci's "innovative experimental models for the motion of water and blood", he points out that among "the vast range of phenomena that Leonardo explored and depicted was the behaviour of liquids".<sup>8</sup>

Leonardo's model of the motion of blood in the human body has been constructed and verified by fluid-dynamics specialist Morteza Gharib, who, as Kemp phrases it "used modern imaging techniques" to do so.<sup>9</sup> CFD, the method used by Gharib, provides numerical methods and algorithms to solve and analyse fluid flow, heat transfer, and related phenomena through computer-based simulation. His work opened up a new approach to evaluating the accuracy of representations. Although "Art and CFD are such distinctly different metiers that one would not naturally see a connection between the two subjects", Gharib's work makes it clear that some common features do exist between them in the uses of "colour and shape".<sup>10</sup>

It is likely that NURBS was utilised in Gharib's study when modelling for CFD simulation. In the modern world, NURBS has played a significant role in the fields of computer modelling and design, in which it has become the standard curve and surface description.<sup>11</sup> The curve of NURBS changes according to alterations in its key points, and with lines being made of dots and bodies being made of lines, people can change the NURBS curve easily by changing the location of the key points with software. This increases the possibilities for building and modifying a model. It also enables the creation of almost any model by using NURBS. NURBS not only has high controllability, but is also likely to obtain better surfaces as it benefits the generation of numerical grids, usually the most labour intensive part of any CFD application.<sup>12</sup> Meshing, this process of grid generation, is an important step in computational simulation and time can be saved by using NURBS when modelling before gridding. This makes CFD simulation more reliable – to the extent of it being used to model blood flow.<sup>13</sup>

Despite having a broad applicability in art, CAD and CFD have not been applied together to the evaluation of Neoclassical paintings, of which Ingres, the focus of this study, was a master. In the nineteenth century, he was one of the finest painters of the female nude. His forte, in particular, is "the arrangement", the selection and balancing of elements within the painting. "His best works are exciting plastic units in which line, space, and mass are perfectly balanced, and the colour is subtly used to reinforce linear effects and to delineate forms".<sup>14</sup> Ingres' artworks are a symbol of his time and a model of realistic paintings.

*La Source* is one of Ingres' most famous works. The painting was begun in Florence around 1820 and not completed until 1856, in Paris. Sir Kenneth Clark notes that *La Source* "was immediately popular and has been called the most beautiful figure in French painting".<sup>15</sup> *La Source* reflected Ingres' "Raphaelesque obsession, his scale, and his larger sense of form".<sup>16</sup> Unlike most representations of the female nude, in *La Source* "the male viewer is not the centre of the work. The figures in these paintings attend to the sights and sounds of their own world; they are intent on their own pleasures".<sup>17</sup> Most of the previous research on this painting revolves around the figure of the nude, but there is no

research on the pitcher and the water flow. Most of the arguments are related to statics, and people usually judge the accuracy of the painting according to the structure of the objects within it, but there is little attention to fluid dynamics.

Ingres' *La Source*, then, is an exemplary instance of realistic painting, epitomising Ingres' quest for accuracy and often praised for its successful realism. It is, therefore, the perfect test case to answer a few key questions. First, although NURBS, CAD, and CFD are widely used in modelling, computer simulation, and the creation of modern art, they are not deployed in art criticism; what is the feasibility of utilising these approaches in the field of classic art appreciation? Second, for all its praise, how accurate is Ingres' *La Source*, and what are the possible implications of it being highly accurate? Finally, by extension, could the average person and the beginner in art draw an accurate scene with fluid elements via the combined application of CAD and CFD?

#### **METHODOLOGY**

As detailed above, this paper explores the possibilities and specific methods of utilising mathematical and computational fluid dynamics in the appreciation of *La Source* (see Fig. 1). While other paintings could have been selected, Ingres's work was chosen as a sample for several reasons. As a painter within the realist movement, the emphasis on accurate representation is central. Furthermore, as a neo-classical painter his work can suggest implications for paintings beyond the Realism movement. Most crucially, however, *La Source* provides an example of water flow that is both limited in quantity and controlled, as it flows from the pitcher – compared to, for instance, the sea in Alexandre Cabanel's *The Birth of Venus*.<sup>18</sup> As such, *La Source* serves as an excellent test case for this approach.



Figure 1. La Source.

The study involves numerical modelling of the water jar and simulation of the water flowing out of the jar. First, the 2D pitcher in the painting is converted into a 3D model based on perspective

projection and CAD. Next, water flowing out of the pitcher is simulated using the volume of fluid (VoF) method and CFD. The NURBS model of the pitcher is used as the boundary.

#### Using perspective to model the pitcher

Through the method of Perspective and Trigonometric Functions, the key sizes of the pitcher can be calculated, including the length of the pitcher as a whole, the length of the bottleneck, the size of the opening, the diameters and the slope.

First, computer software can provide a more accurate measure of specific size than that taken by hand. The pitcher was put in a digital grid graph in Photoshop, so the length could be measured more easily. Based on this method, all the key points of the pitcher were located and the whole length and width measured in the grid graph including points F, G, H, I, J and so on (see Fig. 2). Having measured within the painting, we had an approximate proportion between the length and width of the pitcher. Taking the length of each square to be 'a', the length and width of the opening are around 3.45a and 5.00a respectively.



Figure 2. The pitcher in a digital grid graph

Second, based on the proportions above, the slope of the pitcher was calculated to be 44 degrees via the Trigonometric function. Here the opening of the pitcher should be a circle and the width should be the diameter. If the width is 5.00a and the length is 3.45a, by Trigonometric function the width = the diameter = BC = DE = 5.00a. The length = AB = 3.45a. So, Sin $\angle$  ACB=3.45a/5.00a=0.69 (see Fig. 3). By the Trigonometrical ratios table of Sin, it is clear that  $\angle$  ACB is around 44 degrees.



Figure 3. The schematic diagram of the opening

Following the geometric rules of perspective, all the key proportions could then be known and the digital modelling built through UG NX, the CAD software used in this case.

#### Using NURBS to fit the outline of the pitcher and build the model via CAD

NURBS, as has been explained, is often used in industrial design, especially in sketching. Generally, product designers use Quadratic NURBS, Cubic NURBS, Quartic NURBS and Quintic NURBS to draw the profile of the object being designed. Undeniably, there are many functions and curves that can fit an outline or the profile of an object, but the NURBS function (see Equation 1) can tackle the task much more easily. It is also the reason why NURBS is often used in digital design, product design and reversing modelling.

$$C(u) = \sum_{i=1}^{k} \frac{N_{i,n} w_i}{\sum_{j=1}^{k} N_{j,n} w_j} P_i = \frac{\sum_{i=1}^{k} N_{i,n} w_i P_i}{\sum_{i=1}^{k} N_{i,n} w_i}$$
(1)

In *La Source*, the pitcher can be seen as a combination of cone and cylinder. "In order to represent circles, cylinders and spheres, rational polynomials of at least quadratic order are necessary".<sup>19</sup> This means that fitting the curve of the pitcher by NURBS is both possible and preferable. If the outer contour of the pitcher is fitted with a quadratic NURBS, a cubic NURBS, a quartic NURBS, and a quintic NURBS, different degrees of alignment are obtained (see Figs 4a-4d).



Figure 4a. The outline fitted by quadratic NURBS.



Figure 4b. The outline fitted by cubic NURBS.



Figure 4c. The outline fitted by quartic NURBS.



Figure 4d. The outline fitted by quintic NURBS.

By controlling the position of the key points, it became clear that the outline of the pitcher is best fitted by cubic NURBS and the model could be built via UG NX (see Fig. 5).



Figure 5. The digital model of the pitcher

## Using CFD to simulate the water flow

In CFD, the volume of fluid (VoF) method is a free-surface modelling technique, i.e. a numerical technique for tracking and locating the surface of the water. VoF takes various forms in what is termed two-phase flow: (1) Gas-liquid two-phase flow, such as the flow of air and water within a closed drainage pipe; (2) Gas-solid two-phase flow, such as airflow carrying powder or dust through the atmosphere; (3) Liquid-solid two-phase flow, such as sandy water flowing in natural river channels.<sup>20</sup> In this scene, the water flow fits the air-water two-phase flow, as just two sorts of fluid are considered, the air and the water flowing out of the pitcher. Consequently, it is suitable for the VoF

simulation method in Ansys software. Having simulated via CFD, the water flow can be shown (see Figs. 6a and 6b).



Figure 6a. The start of the water flow.



Figure 6b. The end of the water flow.

#### RESULTS

NURBSs of different orders were tested to ascertain which of them fit the profile of the 3D pitcher model the best, showing that it most accurately matches the cubic NURBS model, which is also the easiest curve to create. Since the quadratic NURBS have G1 and Cubic NURBS have G2 (that is, different orders of the functions which create the curves connecting the key points of the pitcher), it directly affects the profile of the pitcher and the shifts between light and dark on its surface (see Fig. 7a and 7b). In this case, it is clear that the Cubic NURBS is more suitable for fitting the pitcher from Ingres' painting.

Secondly, from the digital representation of the scene in ANSYS and the water simulation with CFD, it was found that the projectile motion of the water from the pitcher matches the numerical simulation precisely – that is, the simulation, which represents the flow of water from its start until its end when the pitcher is empty, contains within it the flow depicted in the painting. Ingres, in short, has very accurately captured one moment in the water's flow. As the water jar is positioned at a delicate angle to enable the water to flow out of the pitcher smoothly, without hindrance or choking, we would expect the water's fall to look gentle and comfortable, which is precisely what is does.



Figure 7a. The model built by quadratic NURBS.



Figure 7b. The model built by cubic NURBS.

#### **EXTENSIONS AND IMPLICATIONS**

This study has verified the accuracy of Ingres' painting and the usefulness of the method introduced. It has shown that Ingres' representation of the flow of water out of the pitcher corresponds precisely to the results of the scientific analysis. As such, it has also demonstrated that the combination of NURBS, CAD and CFD is a powerful tool for analysing artworks. It is also possible to extend the application of this approach and to state that so long as a painting – whether realistic or fantastic – aspires to give an effect of mimesis, the approach used in this paper can be applied to evaluate the accuracy of the flow of any fluids within it.

The accuracy of Ingres' painting, however, presents certain implications. One thing this study has not verified is how Ingres created *La Source*. Ingres and his students may have finished the painting through repeated practice in still life drawing. The accuracy of the water flow, in this case, would be evidence of their profound talents in observation. Alternatively, they could have copied from a photo, as Ingres is suspected to have used a camera in other works. As Martin Kemp notes, there is an "intuition" that "Ingres used a camera lucida to facilitate the making of drawn likenesses of visitors to Rome in the second decade of the nineteenth century".<sup>21</sup> The use of a camera for this painting would make this achievement of accuracy more feasible, though arguably less impressive. Without evidence either way, it is difficult to say for certain, though the incredible accuracy of the water flow could lend weight to arguments for a camera having been used. Further study is required to draw more decisive conclusions.

In addition to the value of this approach in the evaluation of artworks, it is clear that the approach can be used in the creation of art. In creating paintings without natural references, e.g. in fantastic or religious art, artists can utilise scientific calculations and simulations similar to the method above. Especially when describing a scene with water flow, or other fluids, people can simulate the scene via CFD and then use the simulation results as a reliable reference for creation. It is a method that could thus potentially influence the future development of art.

#### ACKNOWLEDGMENTS

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#### NOTES

<sup>1</sup> Jean Auguste Dominique Ingres, *The Spring*, 1820-1856, Oil on canvas, H. 163; W. 80 cm., Paris, Musée d'Orsay.

<sup>2</sup> Irene Plonczak and Susan Goetz Zwirn, "Understanding the Art in Science and the Science in Art through Crosscutting Concepts," *Science Scope* 38, no.7 (2015): 58.

<sup>3</sup> Bruce Cole and Adelheid M. Gealt, *Art of the Western World: From Ancient Greece to Post Modernism* (New York: Simon and Schuster, 1991), 100.

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<sup>5</sup> Clive Ashwin. *Encyclopaedia of Drawing: Materials, Technique and Style*, (London: B.T. Batsford, 1982), 15.

<sup>6</sup> Ashwin. *Encyclopaedia of Drawing*, 22.

<sup>7</sup> Martin Kemp, *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat.* (London: Yale University Press, 1990), 9.

<sup>8</sup> Martin Kemp, "Leonardo Da Vinci's Laboratory: Studies in Flow," Nature 571 (2019): 322, https://doi.org/10.1038/d41586-019-02144-z.

<sup>9</sup> Kemp, "Leonardo Da Vinci's Laboratory," 323.

<sup>10</sup> Carola S. König, "Correlations between Art and CFD through Colour and Shape," *Optics and Laser Technology* 43, no. 2 (2011): 354, https://doi.org/10.1016/j.optlastec.2009.08.022.

<sup>11</sup> Chikit K. Au and Matthew Ming-Fai Yuen, "Unified Approach to NURBS Curve Shape Modification," *Computer-Aided Design* 27, no. 2 (February 1995): 85, https://doi.org/10.1016/0010-4485(95)92148-L.

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<sup>13</sup> Yongjie Zhang, Yuri Bazilevs, Samrat Goswami, Chandrajit L. Bajaj and Thomas J.R. Hughes, "Patient-Specific Vascular NURBS Modeling for Isogeometric Analysis of Blood Flow," *Computer Methods in Applied Mechanics and Engineering* 196, no. 29 (2007): 2946, https://doi.org/10.1016/j.cma.2007.02.009.

<sup>14</sup> Alfred Werner, "Monsieur Ingres – Magnificent Reactionary," *The Antioch Review* 26, no. 4 (Winter 1966): 497, https://doi.org/10.2307/4610805.

<sup>15</sup> Kenneth Clarke cited in Henry A. Strobel, *Reflections: Personal Essays* (Thomson-Shore, 1999), 62.

<sup>16</sup> C. H. Collins Baker, "Reflections on the Ingres Exhibition," *The Burlington Magazine for Connoisseurs* 39, no. 220 (1921): 41, www.jstor.org/stable/861323.

<sup>17</sup>Wendy Leeks, "Ingres Other-Wise," Oxford Art Journal 9, no. 1 (1986): 31. www.jstor.org/stable/1360370.

<sup>18</sup> Alexandre Cabanel, *The Birth of Venus*, 1820-1856, Oil on canvas, H. 130; W. 225 cm., Paris, Musée d'Orsay.
 <sup>19</sup> Zhang, "NURBS Modeling for Isogeometric Analysis of Blood Flow", 2949.

<sup>20</sup> Clement Kleinstreuer, *Two-Phase Flow: Theory and Applications* (London: Taylor and Francis, 2003), 77-79.

<sup>21</sup> Martin Kemp, "Lucid Looking: David Hockney's Drawings Using the Camera Lucida," *Nature* 400 (1999): 524.

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# A CASE IN PRINTING INDUSTRY: PRINTED MATERIALS AS SUPPORT FOR THE DIGITAL

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#### INTRODUCTION

The printing industry, since its emergence in the 15th century, following the improvement of the press by Johannes Gutenberg (1400 - 1468 AD), has always been in constant technological evolution. But if for 5 centuries, technological changes in this field have caused transformations only (although profound) in productive practices, in the last decades they have been threating the very existence of the sector. Although communication via printed material has been decisive for the evolution of an entire society, it is becoming increasingly secondary in the current world, immersed in a fast, efficient and multi-based digital culture. In this context, the demand for graphic products has been dropping precipitously and printing companies from all over the world, with different profiles and technologies (offset, screen printing, rotogravure, flexography, etc.), have been trying to adapt to survive, offering a differentiation for offline communication and even online.

The purpose of this article is to present the case of Holográfica, an award-winning offset printing company located in the city of Rio de Janeiro, Brazil, which has been developing works that offer augmented reality technology in print material, mixing analog and digital. A case study is relevant in situations where "[...] the focus is on contemporary phenomena inserted in some context of real life"<sup>i</sup>, like this example. The company has been successful in this new venture as its customers realize the communication potential for their business. Therefore, as in any moment of a paradigm shift, there are many threats to an industry, but also business opportunities for those who can adapt.

Firstly, based on a bibliographic survey, it will be presented the main changes that occurred in the graphic sector throughout its existence and the impact of the digital revolution in this industry, and then it will be addressed the case study, whose data were collected through visits to Holográfica, analysis of its portfolio and an interview with current owner, Ivo Daflon.

#### A BRIEF HISTORY OF GRAPHIC SECTOR

The graphic sector has developed, in five centuries, different technologies, and many of them coexist today (typography, offset, flexography, gravure, silkscreen, digital, etc.). For this reason, this brief review does not intend to exhaust the subject, but to outline the main changes that have occurred in the area in order to understand how this sector is used to technological changes, extremely adaptable to adversities and eager for technical improvement that allows greater productivity.

In its emergence, the improvement of the press, in the 15th century in Europe, made possible a better reproduction of copies and promoted a huge impact in Society. The Gutenberg bible is considered the starting point of typography technology and represents the first good produced in scale on an assembly line system, replacing the manuscript copies made by copyists in monasteries that took years to make. The process consisted of the manual organization of movable types – letters engraved in embossed metal – in lines, and the composition of these lines in the form of a page. These metal letters were inked and stamped in many pages as needed. The great advantage is that the matrix could be undone and the types reused for making another matrix. McLuhan, in his book *The Gutenberg Galaxy: the making of typographic man* (1962), showed that in this time there was an increase in the transmission of information, and an increase in literacy levels. This transformation was exponentialized by the invention of the linotype in 1884.

The linotype was a process of mechanical text composition, different from the manual composition of typography. The text was typed in a machine and the movable types were organized according to that typing, producing a line. This allowed to reverse the logic of minutes per line by lines per minute, as said by Glenn Ledoux in *Linotype: the film* (1992). Thus, the communication boom at the turn of the 19th to the 20th century was largely due to this invention which spread throughout the world. But as in every phase of intense technological change, there was a turnaround in the sector: the typographers' knowledge became obsolete and many became unemployed.

In the 20th century, the printing industry started to suffer competition from other media that emerged at that time. It began to share the dissemination of information with radio and TV systems, losing part of the market. In addition, photocomposition, which emerged between the 1950s and 1980s, once again changed the logic of production, by replacing hot composition (typography and linotype) with cold composition. Also in the 1980s, the personal computer Macintosh and desktop publishing were created, making composition digital and not mechanical anymore. Now it was the linotypists who saw their knowledge replaced.

The turn of the 20th century to the 21st was a period of great changes for the printing industry. Computers were definitely transforming the way many professionals work, because until then manual technical expertise was an important and valued attribute in the world of graphic arts. The professionals who worked with the prepress stage, that is, with the assembly of the matrix for serial reproduction, needed to be skilled in a light table, with several instruments, in order to assemble quality photoliths that would generate the matrices required for the type of printing process chosen. With the advent of the computer, in the 1980s, the control of the composition of the page shifted definitively to the designer. If, since the 15th century, the composition was made in the printing shop, now it was part of the work of the graphic designer who delivers the file with the intention that the printer only makes the reproduction. This change also impacted the workforce of the printing field, which saw its artistic skill being scrapped.

Synthesizing the changes in the industry, we can see four major revolutions in typographic technology<sup>2</sup>: 1) the impact of typography promoted by Gutenberg in the middle of the 15th century; 2) the industrial revolution caused by the creation of the linotype at the end of the 18th century; 3) the change to photocomposition between the 1950s and 1980s; 4) the digital revolution, which began in the 1970s-1980s, which allowed the composition, now digital, to be definitively under the control of the designer.

We can see differences between these revolutions. The first three (typography, linotype and photocomposition) deal more with the typesetting processes than the printing processes themselves, in the sense of passing information from a matrix (or no matrix, in the current digital printing) to a medium (mostly paper). The digital revolution, on the other hand, in addition to impacting the way the

composition was done (transferring the control of the composition to the designer), also changed communication around the world. The result: the printing industry definitely lost its role as one of the main media of mass communication. Until the end of the 20th century, practically all publications were analogue, and communication was distributed between printing, broadcasting and radio. Among these, printing was the most long-lived medium and the demand for paper was until then constantly strong and stable.

The last 20 years have seen the arrival of digital technologies. An increasing proportion of communications is now digital, not analogical, decreasing the importance of materiality in this process. According to McLuhan<sup>3</sup>, we have been experiencing, since the 19th century, the transition from the press era to the electronic era. The great revolution that has changed the paradigms of the printing industry in the world was the advent of the internet and its leading role as a source of information in mass communication. As stated by Azevedo<sup>4</sup> "The segment is going through a transition period to adapt to the new configurations of the market and to a new public profile, deeply influenced by cyberculture".

In 2014, Drupa, the world's largest printing fair, published the report "The Impact of the Internet on Print", in which is shown that in that year the increasing proportion of digital communications instead of analogical. In the US, demand for newsprint fell 62% between 1999 and 2012, while print advertising fell 60%, being overtaken in 2012 by online advertising. Bann<sup>5</sup> states that "Most forms of printing were affected". This process could not be different in Brazil. With a relatively recent printing industry – the printing industry was not allowed to operate in the country until 1808, when the royal family came to Brazil as a result of the Napoleonic war, ending the colonial pact –, the sector prospered in the 1940-1950s with federal government incentives. According to ABIGRAF – The Brazilian Association of the Graphic Industry, in a 2020 report, the graphic sector has a predominance of 81.2% of micro-companies (against 15.9% of small companies, 2.5% of medium-sized companies and 0.4% large).

But it is not just micro-businessmen who have suffered losses. The group of OGlobo Journal, for example, one of the biggest in the country, invested 180 million dollars in the creation of a Graphic Park in 1999, which became the largest and most modern in Latin America. It occupies an area of 175 thousand square meters and its machines have the capacity to print 800 thousand copies on weekdays and two million on Sundays. However, with the competition from the Internet, which is more agile and quick to present the news, newspaper companies have seen their number of subscribers to the printed version drop vertiginously. Currently the Graphic Park prints newspapers from other partners in order to survive in the market.

But if the impact was huge in the graphic sector linked to newspapers, some sectors were not so affected, such as packaging and large format digital printing, that still need the materiality to communicate (although large format printing may be replaced by large led billboards as they already occur in big cities like Tokyo). In the case of packaging, most companies have migrated to this area, seeing the possibility of working with paper and other materials in this niche (currently 49% of the sector in 2020 is focused on this product in Brazil), since packaging cannot be replaced digitally. But how can small companies with offset printing aimed at the promotional market reinvent themselves and adapt to new digital technologies? Are we close to the end of print and paper, as some prophesy? Holográfica's owner doesn't think so.

#### THE CASE HOLOGRÁFICA

Holográfica was founded in 1994 by Ivo Daflon and his partner Alfredo Bedran Calil, out of a dream of creating a company founded on ethical values. Daflon was a supplier of inputs for the printing industry and Calil was a partner of Minister, a traditional printing company in Brazil. Both wanted to set up a different firm in terms of profile, with a lot of investment in training, information and education to get out of what was traditionally done in Brazilian printers: they were proposing to create a clean graphic, with motivated and trained staff to deal greatly with the client and who would never stop looking for new alternatives. As a mission, the partners defined that Holográfica should: do graphic service with care, innovation, boldness, responsibility and respect for providers, in a sustainable way. Since then, the company has been investing in technology in order to remain active in the market, generating value for its client. And this work has been receiving recognition.

Holográfica has already won several Werner Klatt awards, one of the main awards for excellence in the Brazilian printing industry. In addition, it received from L'Oreal an Award for Quality and Best Supplier of the Year and also an award for Sustainability. One of the printing company's natural paths was the investment in differentiated packaging, an area where printing on paper is not replaceable, as said before. We can see below images of printed materials as bags, packaging with cradles for products and packaging with analogical interaction design.



Figure 1. Maybelline's bag, Werner Klatt winner, 2012



Figure 2. Packaging with cradle for Roger & Gallet



Figure 3. Inneov's packaging, Werner Klatt winner, 2012

In this case, the package sells a product to treat seborrheic dermatitis through an interaction design: with the box closed, the white dots printed on the acetate look on the hair, but when opened, the hair is free of dandruff.



Figure 4. Packaging with a "bomb", Werner Klatt winner, 2016

In this other case, a promotional material, there is a packaging structure, in which the customers receive a "bomb" with a countdown (the numbers change when opening the box) and they must dismantle it. As we can see, Holográfica has been focusing on projects that are not merely packaging, but promote some experience for the consumer, like boxes that open and play music or turn on lights. However, it is precisely in the union of print with digital technology, that Holográfica has been differentiating itself, offering augmented reality solutions. At a congress, Holográfica took knowledge of this technology and made contact with a supplier in southern Brazil, with whom it established an exclusive contract for the states of Rio de Janeiro and Espírito Santo. With augmented reality, there is an overlap between the real and the virtual world, i.e. virtual elements or information are integrated into real-world visualizations through a camera. With the application (XPTO) installed on some gadget, the print comes to life, communicating the previously static content in an audiovisual way. In the example below, taken from the holographic portfolio, we can see the static prospect and some frames of the visualization that takes place on the screen. The first example is a fashion lookbook that can be made more complete by inserting videos. The customer can see the clothes from all angles and different combinations of them while listening to music.



Figure 5. Augmented reality for a printed lookbook



Figure 6. Lookbook frames

The next example is a way to transform a user manual into a 3D video, facilitating the life of the user. We can see the machine from different angles.



Figure 7. Augmented reality for a printed manual



Figure 8. Manual frames

The following example proposes the use of augmented reality in a menu in order to delight the eyes and awake gluttony. And not only that: the sound also creates an environment for the restaurant's proposal with a French music mood. Nowadays we have seen an increasing use of tablets in restaurants with images of the dishes. This would be an interesting solution for printed material.



Figure 9. Augmented reality for a printed menu



Figure 10. Menu frames

The last example shows how augmented reality can be interesting for prospects in the field of real state, when showing an apartment in 3d, in perspective and not just in the plan.


Figure 11. Augmented reality for a real estate folder



Figure 12. Folder frames

Daflon, in interview, said that the augmented reality associated with a quality print impacts and amazes the customer. Holográfica's owner prospects continuously and realizes that a large part of the Brazilian public still does not know this technology and is surprised by the possibilities open to their business.

Holográfica offers all the support: the client is guided and produces video through its advertising agencies or, if necessary, Holográficas's partner can produce 3D content. The customers maintain a value to have their online account active during the time of the campaign and the content is hosted in the cloud. In the state of Rio de Janeiro, no other printing company was able to present a satisfactory work with augmented reality. Daflon argues that working with augmented reality requires high investment which a long-term return. But his investment has been paying off quickly.

In 2018, Holográfica was the only printing company to participate in the L'Oréal Innovation Fair to present its Augmented Reality portfolio and 360 Virtual Reality glasses. In addition to L'Oreal, its main customers are in the cosmetics area, which usually invest in videos of influential personalities; pharmaceutical laboratories, which present audiovisual content quickly and efficiently to an audience composed of doctors and health professionals who have little free time; and education. But the owner of Holográfica understands that any business can benefit from augmented reality, as it gives an air of reality and promotes an experience for the customer. It is important to realize that we must not only understand augmented reality technology as a way to "save" the print. In fact, there is also a great gain for digital technologies in the use of quality print materials.

In today's world, populated by virtual communication, it is very easy to ignore messages via whatsapp, email marketing, among others. The digital message has no effect if it is not accessed. However, a printed material that promotes a differentiated experience for a client becomes

memorable. The printed material that causes such a reaction is usually kept with the client – this has been perceived by the owner of the Holográfica. It is the brand of the product that stays daily at the client's home and office.

In addition, the print awakens other senses besides sight, such as touch and smell, in the case of prints with odor. This complete sensory experience, as shown by Martin Lindstrom in his book *Brandsense* (2007), brings emotion that fixes memory. Therefore, in this moment of great paradigm shift, we must not only reflect on how digital technologies contribute to the different fields of knowledge, but on the other hand we must also understand how the senses and analogical technologies can contribute to virtual technologies.

# CONCLUSION:

The use of augmented reality and the investment in differentiated packaging point to a new understanding of the use of paper and print in current communication. We saw how powerful it is when the graphic sector dialogues with digital media and how communication can be enhanced through this interrelation.

To the prophets who forsee the end of paper and printed materials, Daflon argues that the quarantine experience imposed by the spread of Covid-19 has caused a great saturation of people in general to digital media because of visual fatigue in front of computers, phones and tablets. A movement to be observed in the coming years is precisely if the consumer will be looking for more physical books to read, instead of virtual ones, and if there is a return to print as a way of reducing such saturation. The future will show us the direction that the printing industry and society will take from the contingencies imposed and the personal choices to deal with them.

Above all, for the owner of Holográfica, more important than the technologies are the people who are behind or who use them. As McLuhan<sup>vi</sup> stated technologies are extensions of man and not the other way around. Daflon understands that there is no point in cutting-edge technology with unhappy employees behind the machines. It is not the technologies that define the present and the future, but it is the people who create and open new fronts, avoiding risk and taking advantage of opportunities.

The case of Holográfica shows the possibility of the printed paper becoming a real support of a virtual world, reinserting the materiality of the printing industry as a vital part of the information and shows that it is in the relationship between digital and graphic that alternatives are promoted to rethink communication.

#### NOTES

<sup>1</sup> Robert K. Yin, *Estudo de caso: planejamento e métodos* (Porto Alegre: Bookman, 2005), 19.

<sup>2</sup> "A Brief History of Type", Thomas W. Phinney, accessed May 3, 2020, http://www.graphic-design.com/typography/design/brief-history-typography.

<sup>3</sup> Marshall McLuhan, *The Gutenberg Galaxy: the making of typographic man* (Toronto: University of Toronto press, 1962).

<sup>4</sup> Dúnya Azevedo, "A evolução técnica e as transformações gráficas nos jornais brasileiros". Mediação (2009): 96.

<sup>5</sup> David Bann, *Novo manual de produção gráfica* (Porto Alegre: Bookman, 2012), 20.

<sup>6</sup> Marshall McLuhan, *The Gutenberg Galaxy: the making of typographic man* (Toronto: University of Toronto press, 1962).

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# THE USE OF VIRTUAL REALITY IN EXPLORING THE NON-LINEAR INTERPRETATIONS OF THE LITERARY ARCHITECTURE – A CASE STUDY

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### INTRODUCTION

From paintings describing ancient Greek mythology, to the frescos in the grottoes in Dunhuang telling Buddhist stories, these images create a virtual world transporting us to ancient worlds. However, with the passing of time, each generation reinterprets the text in from their contemporary standpoint, the original meaning is covered with multiple layers, and this process will not stop for it will continue to be reinterpreted in later times. This is also true when depicting architectural space based on literature. For example, a Duke's revenge story from the 6<sup>th</sup> century BC, *Duke Wen of Jin Recovering His State*, was depicted in a painting featuring architectural styles from the 10<sup>th</sup> century.<sup>1</sup> The artist interpreted the text to the people using their contemporary setting, which gives an "afterlife"<sup>2</sup> to the ancient words in a new context, see Figure 7.



Figure 7. Duke Wen of Jin Recovering His State

As virtual reality (VR) technology has been widely used in various areas such as architecture design and game development, the method of interpreting texts into visual forms has found new directions. The level of immersion and engagement when exploring interpretations of an architectural space described in literature in a virtual environment (VE) is potentially increased in comparison with previous digital and analogue tools.

This ongoing research aims to investigate how a piece of text can be interpreted into a VR environment. As opposed to transporting the users to a pre-existing environment, the users can create

and customize tier surroundings in the VE to "build" the literary world. This paper focuses on the establishment of a workflow on a theoretical basis and implements this through a case study as proof of concept.

## TEXT AS VIRTUAL REALITY

According to Eco, interpretation of a text is not infinite<sup>3</sup>. He asserted that looking for an ultimate meaning of a text is pointless because it could fall into an endless search. However, reader-oriented interpretation has criteria to limit it. Eco emphasizes the difference between the intention of the text, the author, and the reader, which limits the interpretation. Interpreting a text as a reader in an "economical" way requires respect to the text's background including the cultural frameworks and the author's background.<sup>4</sup> Ryan shares a similar viewpoint that she defined "possible worlds," which extends the text to a larger but relevant context.<sup>5</sup>

However, Miller highlights the agnosticism of the textual world, that text is always covered with a sort of "integument," which suggests a space for interpretation behind this oddness. Accordingly, "any way of interpreting literature would need to account for that oddness."<sup>6</sup> He noted that the textual world has already existed before the text,<sup>7</sup> it hides its secrets from the reader's knowledge,<sup>8</sup> but it is "virtually real" and waits to be found by the readers.<sup>9</sup> Ryan has outlined a process of how a reader can get immersed in reading progress, from "transportation"<sup>10</sup> to "entrancement",<sup>11</sup> the textual world as "virtual reality" is being experienced by readers from different backgrounds.<sup>12</sup> This requires immersion and interactivity between the reader and the text.

New textual genres such as hypertext, interactive movies and role-playing games have applied and enhanced this concept to enable people to understand a story in a non-linear way. Thus, the text will not always be the starting point of interpretation. From the point of view of interpreting destroyed architecture, when a visualized heritage site is provided to people, the "re-presentation of the past becomes the memory of the future."<sup>13</sup> According to which, the visualization of the text has a motivation that it calls the readers back to the text. However, it will never be the original text because our mind has been enhanced and transformed by the influences of present.<sup>14</sup>

#### AIMS AND OBJECTIVES

The aim of this paper is to create workflow which expresses how architectural space in text is translated into VR-based interpretations. A pilot case study is employed to implement the early stages of the workflow and test if the tools are suitable to translate the interpretations in mind to a VR version, and consequently refine the structure of the workflow. Following this, a second comprehensive case study will apply the refined workflow based on lessons learned from the pilot case study in interpreting the architectural space in a literary work.

Participants will give their feedback after experiencing the VE, and according to the feedback, the workflow will return to previous stages to refine the content. Thus, a circular structure is established, which allows the workflow to integrate new information at any point. That is to say, users can engage or disengage at any stage in the workflow to get involved with the interpretation process.

Accordingly, the objectives are:

• To use available tools to test and refine the analogue text to digital VE process through a pilot case study.

• To collect feedback from the pilot study to investigate possible directions for refining the workflow.

• To create a circular workflow according to the results of the pilot case study and develop the VE

in the second case study.

• To test the workflow and draw conclusions.

# PROTOTYPE – PILOT CASE STUDY Case selection strategy

The initial purpose of the pilot case study was to investigate how to collaborate with multiple tools and create a linear prototype of the workflow. At this stage, the strategy for selecting the case is to narrow down the range of interpretations because it does not require a large amount of data which could lead to repetitive work. Ideally, two or three kinds of interpretations of a piece of object in the text are workable. Therefore, it is essential to identify what factors influence the diversity of interpretations, and *Table 2* shows that these can be limited in a finite range by filtering the factors.

Familiarity to the text		Cultural background		Level of experience	
Y	Ν	More different	More similar	More different	More similar
Age		Region		Occupation	
More different	More similar	More different	More similar	More different	More similar

Table 2. Factors that can influence the interpretation

### Collective memory as text

Based on the previous strategy, an unconventional text-oriented interpretation draws our attention: recreating a demolished home based on collective memory. Although the starting point is not a published narration, a piece of memory does exist yet to be recorded in written form. More than three generations lived in that place during the 1950s to 1990s, it is part of the lost history of a city, and this collective memory constitutes a faceted interpretation of the destroyed place.

In *Voices from Chernobyl*, Alexievich interviewed more than five hundred eyewitnesses to regenerate the disaster from different perspectives.<sup>15</sup> This collective memory as text re-creates Chernobyl, which only exists in the survivors' minds, which will not be disclosed without the author's compiling. Similarly, this case also reveals that a demolished place still exists before the text is written, it is a virtual world which awaits to be found by the writer who can also be the reader.

Accordingly, this case initially invited family members who used to live in the house to describe it in written form as a kind of embodiment of the memories, based on which the workflow can translate the text to a virtual world.

# Design and implementation of the workflow

This section is to describe the workflow and its implement briefly. The structure of the workflow is shown in Figure 8.



Figure 8. Workflow of the pilot case study

# Data collection

Initially, the family members described their time in the home as a short text. In the form of answering a questionnaire, they were provided with a series of existing photos of the house and linked them spatially to create a storyboard. The result of the participation is multiple narrative journeys through this place at different times. It also reveals that sketching is an effective tool to deliver spatial cognition, even though not all participants are good at drawing, see Figure 9.



Figure 9. A sketch of the interior furnishing according to memory

#### Database

The collected information could be categorized in visual, aural, olfactory, haptic feelings and emotions, see Figure 10. The purpose of categorizing the collected data is to find corresponding embodiments. For example, visual details can be represented by a digital model; the mentioned sounds can be re-created using a mixture of multiple sound samples.



Figure 10. The description (left) and the categorized expressions (right)

# Translation

This stage uses multiple tools to build the VE, see *Table 3*. Although the questionnaire attempted to ask questions as clear and specific as possible, it is inevitable that the data has considerable space for interpretation. Lack of details or ambiguity in the text brings indeterminacy to the build of VE. As a result, we need to return to the subjects to test to what extent the VE is like their conceptual architecture and how the workflow uses the feedback to refine the VE.

Type of description	Content of the description	Digital translation	Software
Visual	The entity of objects, including architecture with details, infrastructure, interior objects, etc.	Full-scale digital models, with embedded material	SketchUp, Rhinoceros, Unity3D
	Natural objects – plants, mountain, rocks, terrain, water, etc.	Digital models	Unity3D
	Material, texture of the object	Texture, Material, shader system	Unity3D
	Weather	HDR (High Dynamic Range imaging) skybox, particle system	Unity3D
	Artificial light	Lighting system	Unity3D
Aural	A variety of sounds	A mixture of audio system	Unity3D
Haptic	The collision (avoid walking through the object)	Collision system (rigid body)	Unity3D
Olfactory	The mixed smell	An installation or a room to ventilate the imitated smell?	HTC Vive and external installation
Locomotion	A map/description of a path through different places	Character controller (first- person or third-person player); change of	Unity3D; HTC Vive

		viewpoints	
Interaction	Actions/interaction with the object	UI (User Interface),	Unity3D
	Actions/interaction with the object	animation system	
Emotions	Atmosphere of the architectural	The simulation the VR can	
		provide – multi-sensory	Unity3D
	space, family members emotions	experience	

Table 3. The relationships between the description types and their embodiment in VE

# Test and refinement

As the VE was created as a screen-based VR environment and presented to the family members, they could quickly notice the incorrect details or some oddity in the VE; sometimes the VE is way far from their memory due to the absence of information previously given. With the feedback, the workflow re-collects more information to add to or refine the VE. Additionally, the utilization of tools also can be developed; for instance, using UV texture mapping can significantly improve the quality and textures of the environment, see Figure 11.



Figure 11. The model with UV texture mapping in Rhinoceros 6.

To sum up, this pilot case study has created a prototype of the workflow which uses VR technology to visualize the conceptual architecture from the text. However, because of the interpretation of the data, the VE requires further refinement after being experienced by the users, to narrow down the space for interpretation and approach to the user's recollections. Therefore, the workflow's structure should be circular: the feedback initiates another round of data collection and data translation to refine itself. With this developed structure, the workflow is to be implemented in the full case study: the multiple interpretations of Umberto Eco's *The Name of the Rose*.

#### MAIN CASE STUDY - DEVELOPMENT OF THE WORKFLOW

Eco's novel is set in a medieval abbey in which a series of murders take place. Two main characters, William and Adso, detect the crimes and find the unknown secret of this place. At the night of the second day, they entered the library, which is a taboo place that "defends itself, immeasurable as the truth it houses, deceitful as the falsehood it preserves. A spiritual labyrinth, it is also a terrestrial labyrinth."<sup>16</sup> In this chapter, the author describes the library in detail: it's shape, architectural elements, materials, and spatial sequences. However, William and Adso get lost in the library because of the labyrinthine space. This piece of narration shows its potential of reading between the lines: fundamental details, word puzzles and space for speculation.

### Workflow refinement

The new structure of the workflow is shown in Figure 12.



Figure 12. Circular workflow of the case study.

Compared to the pilot study, the purpose of constructing a circulation is not only to fill in the gap between imagination and visualization but also to continually expanding the database and therefore to provide more freedom to the users. As opposed to collective memory, this case study does not require the reader to be familiar with the text, and therefore unfamiliar readers' interpretations of the textual architecture can be extensively diverse. A VE in which the users can create objects to "build their imaginary world" enables more interpretations than transporting the readers to a pre-built environment in which they cannot interact with it.

Therefore, the refinement of the workflow has new requirements to meet:

1. The text needs to be deconstructed to translatable elements, such as architecture components, furniture, material, sound, light, and external environment. These modular elements can be chosen and created in the VE.

2. To add UI (user interface) and interaction system into the VE, by which the users can create interpretations.

Next section will briefly introduce the implementation of the workflow.

## Building the textual architecture

## Data collection

Architectural students (year 1 and 2) were invited to read the text and give their interpretations. In future use, participants without an architecture background may be the subjects too. In the form of a workshop, the readers were given the same excerpt of text. They performed a basic analysis of the text: categorizing it with different colors: architectural space, contents in the room, sound and emotions. Sketching was also highly recommended as a form of interpretation. The students were given a questionnaire in which they could sketch (with added notes as necessary) to visualize how they understand the space according to their analysis of the text. The expected contents are a plan of (part of) the library, sketches of the room with details, a sketch of the window mentioned in the text and other interior contents.

#### Database

Using a statistically based method<sup>17</sup> can help us to understand the data. In the 44 valid questionnaires, almost all of the students are unfamiliar with the text (99%). As they all have a similar level of experience (year 1 or 2), the collected data suggest that cultural background dominates how they interpret the space. The students can roughly be divided into two groups: European (80%) and non-European readers (20%). Although no clue of architectural style was provided to the readers, almost forth percent of the European students (38.6%) depicted the space in a "medieval atmosphere," less students (13.6%) used modern elements such as concrete material, about half of answers (47.7%) are in unrecognizable styles or unfinished. As for the non-European students, it can be seen that one third of them (33.3%) sensed that it is about a medieval building, while they used their existing knowledge to express the space, even though sometimes it looked strange. Only one answer showed that the student used a traditional Chinese pattern (leak window) to sketch how the window looks, see Table 4. This is only a primitive deduction due to the volume of database; it still indicates that the seemed "irrelevant" or "wrong" interpretations exist, but they can be fixed due to external influences (watch adaptations or other visual forms). In this research, they are considered as the edge of interpretation, a phase close to Ryan's "impossible worlds" or Eco's "over-interpretation," which is not invalid data. In contrast, the translation stage includes them to keep an openness to the readers and diversity of interpretations.





Table 4. Two Chinese students' depictions of the window: a. the window in questionnaire 16; b. the ornament with a cartouche in Percier and Fontaine's Recueil de Decorations Intérieures, plate 66; c. the window in the questionnaire 17; the "leak window" in Mountain Villa with Embracing Beauty in Suzhou, China.

# Translation

Using modelling tools and a games engine, the database is translated into tangible and intangible forms, see Figure 13. Rather than a pre-built space, the VE encourages the users to interact with the system to build a place by choosing the modular parts. For example, they can choose from three kinds of walls with/without the window or a doorway, and it depends on how the user understands the text. Thus, the users can combine the modular components with building their imagined place. As more readers participate in the process, this module library will continue expanding for more possibilities. This is the response to requirement one.



Figure 13. The categorized elements in the VE

# Build of VE

The previous stage has proposed a type of interaction in the VE. Therefore, this stage uses three types of interaction:

- 1. Construction system. This system allows the users to choose the modules and build in the VE.
- 2. Control system. It enables the users to transform the created objects.

3. Note system. This is an information indicator by which the users can acquire more information such as the background story or the original text.

These three systems establish the mechanism of how the users can build their interpretations of the textual architecture in a VR environment. Regarding the UI, users can choose components from a menu. In the building mode, the UI is not complex to make the manipulation more intuitive. Using the first-person view can enhance the level of immersion, which helps the users to grasp the sense of scale and depth of space. This is the response to requirement two.

The next step will be the integration of the systems in VE and test the workflow. In this case study, this is not the final stage but to initiate further data collection and runs the workflow circularly. In other words, people can take part in this process at any stage. For example, the users can experience the VE (in which they can read the text as well) first and add more types of modules into the system. As an ongoing research project, these tasks are still to be completed.

### CONCLUSION

This paper has established workflow of how literary architecture can be visualized in VR-based interpretations through two linked case studies. The first, a pilot to test data collection, interpretation and revision, and the second, the main case which further builds on this and specifically tests multiple interpretations from fictional architecture as described in literature. The linear workflow is optimized as a circular structure to encourage continuous refinement. In the future, this workflow will be implemented in other literary works among people from broader backgrounds. More data can be analysed statistically and help us to explore the borders of interpretation. Moreover, this workflow also shows its potential as a designing tool for people without an architectural background. And an intuitive VR construct tool could be an effective way for the clients to express the conceptual building to the architects, even though it may not replace conventional approaches.

#### NOTES

<sup>1</sup> The story is described in an ancient Chinese narrative history, *Zuozhuan (or "Zuo's commentary"*), book V., Duke Xi. Its reinterpretation is a handscroll painting, *Duke Wen of Jin Recovering His State*, mid-12<sup>th</sup> century, attributed to Li Tang (Chinese, ca. 1070s–ca. 1150s). Image resource: collection of The Metropolitan Museum of Art, United States. URL: https://www.metmuseum.org/art/collection/search/40051

<sup>2</sup> Walter Benjamin, "The Task of the Translator," in *Illuminations* (London: The Bodley Head, 2015), 71-72.

<sup>3</sup> Umberto Eco and Stefan Collini, *Interpretation and Overinterpretation* (Cambridge University Press, 1992), Nonfiction.

<sup>4</sup> Ibid.

<sup>5</sup> Marie-Laure Ryan, *Possible Worlds, Artificial Intelligence, and Narrative Theory* (Bloomington & Indianapolis: Indiana University Press, 1991).

<sup>6</sup> J. Hillis Miller, *Fiction and Repetition : Seven English Novels* (Basil Blackwell, 1982), Non-fiction, 18.

<sup>7</sup> *Topographies* (Stanford, California: Stanford University Press, 1995), 302.

<sup>8</sup> On Literature (London: Routledge, 2002), 40.

<sup>9</sup> Kurt Fosso and Jerry Harp, "J. Hillis Miller's Virtual Reality of Reading," *College English* 75, no. 1 (2012): 91-92. <sup>10</sup> Richard J. Gerrig, *Experiencing Narrative Worlds: On the Psychological Activities of Reading* (New Haven, CT: Yale University Press, 1993), 13.

<sup>11</sup> Victor Nell, *Lost in a Book : The Psychology of Reading for Pleasure* (New Haven, Conn. ; London: Yale University Press, 1988), 2.

<sup>12</sup> Marie-Laure Ryan, *Narrative as Virtual Reality : Immersion and Interactivity in Literature and Electronic Media* (Johns Hopkins University Press, 2003).

<sup>13</sup> David Uzzell, "Interpreting Our Heritage: A Theoretical Interpretation," *Contemporary issues in heritage and environmental interpretation. London: The Stationary Office* (1998): 5.

<sup>14</sup> David Middleton and Derek Edwards, *Collective Remembering*, Sage Inquiries in Social Construction Series (Sage, 1990), Non-fiction.

<sup>15</sup> S. Aleksievich, S. Alexiévich, and K. Gessen, Voices from Chernobyl (Dalkey Archive Press, 2005).

<sup>16</sup> Umberto Eco, *The Name of the Rose*, Vintage Classics (Vintage, 2004), 48.

<sup>17</sup> In Lothar von Falkenhausen's *Chinese Society in the Age of Confucius*, he used statistically based method to systematically analyse the ancient Chinese tombs, aiming to restore the social aspects and distinct funeral customs between nations. With large bodies of data, the result could lead to an interpretation which is opposite to the record on historical documents. Although the datasets collected in the workshops are not large enough to represent a full image of what background-based factors can affect the interpretations, some factors are evident enough. See also: Lothar Von Falkenhausen, *Chinese Society in the Age of Confucius (1000-250 Bc), the Archaeological Evidence* (Cotsen Institute of Archaeology Press at UCLA, 2006), 127-66.

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# THE DIALOGUE

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#### INTRODUCTION

This study aims to examine the interdisciplinary perspective of architecture and photography. Photography, as a medium of communication, enables architects to capture these multifaceted discourses. It can be utilized in the process of 'constructing' a new space — that we can call 'narrative space' — from an existing spatial body<sup>1</sup>. An experimental academic method of understanding to investigate the city's historical urban expansion is restructured. Therefore, new ease of access to technology has generated unprecedented avenues to observe, study, and communicate its urban development. The city under observation for this study is Lahore (Pakistan).

Lahore, Urdu Lāhawr, is considered the second-largest city of Pakistan situated in the province of Punjab. Other than architectural monuments, gardens, and shrines of renowned Sufi saints, Lahore is additionally well-known for its historic walled city, complemented by its streets and roofs. The streets consist of different architectural elements combined to form a space that creates a platform to generate a dialogue between the inhabitants and the architecture, carrying a flow of activities that promote social interaction through the architectural envelope. Most of the Walled City streets have multiple functions to address throughout the day and night, even though they are tightly packed. Over the centuries, the reason and the progression of activities lived through these streets. The Walled City streets generally comprise common architectural elements such as balconies, windows, extended doorways and *tharras*<sup>2</sup> (Urdu for 'pavements alongside the doors'). Commonly, someone from the neighborhood, mostly an older person, sits on these *tharras* observing and interacting with the street life, formulating "the eye in the street". Lahore's complex assemblage of streets and neighborhoods and the often-abrupt transitions between them are a source of familiarity and pleasure to some of the city's residents. Literary critic Sara Suleri Goodyear, who grew up in the city, wrote: "Lahore's streets wind absent-mindedly between centuries, slapping an edifice of crude modernity against a medieval gate, forgetting and remembering beauty in pockets of merciful respite."<sup>3</sup> The layout of streets develops in a way that the observer or the vagabond is persistently in the condition of an excursion brimming with curiosity. These streets out of nowhere change into a bazaar and afterward into a narrower street, prompting a courtyard that fills in as an intersection, buffer zone, or a congregational space where the fundamental mutual activities occur.

By de-layering the role of architecture and communal living, we find another critical architectural element: the "roof" of the walled city. Rooftops have consistently served individuals as their fundamental need for sanctuary. However, in the Walled City, rooftops fill in as an origin of

numerous social activities and cultures, suggesting the community's urban behavior. In the Walled City setting, a rooftop is the second-most important place after streets that changes its role throughout the day, just like streets do.

The term 'dialogue' refers to the relation of both these elements: the streets and the roofs. Both the elements combine to form a spatial stage that formulates a flow of events generating diverse dialogues. This research analyzes how changes in the scale, context, and culture in one element resonates with the transformation of similar conditions on the other element.

Lahore's urban fabric evolution can be traced by studying these two architectural elements' communal culture in combination. The research outlines a method of photography where the transformation of the city's urban fabric over the centuries can be documented and analyzed based on the importance of these two elements. The city has been documented using drone cameras and stitched in a panoramic format as it is unrealistic to look at a city on a large scale in a solitary casing. The research also concentrates on how cultural and economic changes all over the city influenced the urban network and design practices.

#### METHODOLOGY

For documentation, it was crucial to develop a photography method that captures the co-existence and translates the conditions that form them. The purpose is to develop a visual to understand the effect of the function, economics, scale and culture over the city's varying zonal contexts. Initially, the photographs obtained were in isolation. Later, different shots were taken from higher points such as towers, minarets, buildings, etc. to study both elements in a single frame but they were not that communicative. The interconnection of streets with roofs was essential to record in a visual manner featuring its characteristics. Finally, with a drone camera, the experience of streets adjacent to roofs was recorded successfully. The procedure of using a drone was technical and challenging to control in congested areas, but it was the only possible way. Video shots and still images were taken and stitched together by using a computer software. After doing so, a panorama was generated in which the spatial juncture of these elements can be examined.



Figure 1



Figure 2 (Final Panorama)

Figure 1 (Uncha Chait Raam Rd, Shahi Mohallah, Walled City of Lahore) are the shots taken from the drone footage and stitched as a panorama in Figure 5. The first location is the historic Walled City of Lahore. The assembly of images into panorama distorts the perspective but was helpful. The language of the urbanscape starts revealing the juxtaposed nature of streets and the roofs. The chaos present in the city's morphology shows an ambiguous order/pattern leading to more than one reason for these urban conditions. This method of documentation was extended over other parts of the city.

# ZONES

Over the past fifty years, Lahore's urban expansion took place indiscriminately (Figure 6 & 7), not considering its effects over the future. For further analysis, the research was extended to different city zones, depending upon their demo-graphs (Figure 8). These zones are selected based on economic conditions, history, context, and building typologies.

- The Walled City (1000CE)
- Model Town (1921)
- Gulberg (1930s)
- Askari Housing (1970s)
- Defence Housing Authority (DHA)(1980s)



Figure 3 (left Map of Lahore  $(1950)^4$ )(center Map of Lahore  $(1970)^5$ )( right Google View of Lahore  $(2019)^6$ )

# The walled city

The Walled City of Lahore is also known as Old City or Inner City (Andron Shaher), located in the North of present-day Lahore. Historically, the city building may have taken place in 2000 B.C.E, but a noticeable impact on the Walled City architecture came after the Mughal invasion<sup>7</sup>. They established the reputation of the foremost royal architects and builders in world history. A massive wall fortified the city during the Mughal era for defense and later destroyed by the British after they annexed Punjab in 1849, replacing them with gardens, some of which exist today. The Walled City of Lahore covers an area of 2.56 sq. km with a population of 200,000<sup>8</sup>.

"The convoluted and picturesque streets of the inner city remain almost intact, but the rapid demolition and frequently illegal rebuilding have been destroying the city's historical setting. Some historic buildings have been encroached upon. The few old houses one can still see in the city usually stand two or three stories, with brick facades, flat roofs, and richly carved wooden balconies and overhanging windows."<sup>9</sup>

As a civic structure, the Old City of Lahore is a remarkable study in planning efficiency; 260,000 people live in one square mile or approximately 400 inhabitants per acre. There are some 38,000 households in some 20,000 premises or approximately 58 dwelling units per acre. The Walled City dwellings are flexible as it is tightly packed, conducting both residential and commercial activities simultaneously. The Walled City has a culture of praising the yearly Punjabi spring celebration of Basant, which has now been banned by the administration. During Basant, the sky would fill up with innumerable kites. Individuals would go up to their rooftops observing and celebrating the kite-flying festival<sup>10</sup>.

The Walled City grid developed organically over the years and has a very condensed, densely-knit urban fabric. Understanding the correlation between streets and roof-selective areas is documented based on commercial and residential occupancy. Following panoramas of the Walled City are developed.<sup>11</sup>



Figure 4 Daulat Javed Street Panorama (Walled City of Lahore)

The blurred boundaries of the roofs and the fluidity in the streets can be seen in these panoramas. The integration of residential and commercial areas in the streets enhances the life of the neighborhood. The skyline from this area shares historical monuments, religious buildings, telecom towers, greenery, and much more. People living in these areas are well-aware of their neighborhood and look after each other in need. They believe in sharing space, accommodating the need for a spatial extension temporarily on multiple occasions like Basant, Eid, weddings, funerals, etc.

# Model town

The British Raj planned the Model Town in 1924 in contrast to the Walled City and developed it as a garden city, allocating major areas to public parks, nurseries, and playgrounds. The Model Town is the only successfully planned society in Lahore encompassed around a large circular park depicting an aspect of an ideal society similar to the Ledoux's Utopian City of Chaux<sup>12</sup>. It also typified vast numbers of the arranging thoughts created by Ebenezer Howard in his book 'Garden Cities of Tomorrow'<sup>13</sup>. Initially, it was made for the wealthy businessmen, retired judges, and bureaucrats, so it was designed to facilitate them.

In comparison to the Walled City, Model Town's urban fabric is entirely different. It covers almost 5.9 km2 of an area with broader streets and boulevards. Its commercial sector lies on the circumference of the great park that lies at the center of it. The area for houses is large and vary from 2000sqft to 20000sqft as they were proposed as a farming unit with the buildings of two-floor levels and a lawn commonly. The Model Town is considered more civilized as there are no encroachments and violations of city authorities by-laws. Pedestrian traffic and various activities can be observed in the park and the commercial zones in the morning and evening. Residents of Model Town occasionally spend evening time out of their homes to socialize and hold the sense of community and harmony. In

terms of discussing the characteristics of rooftops, they do not play any vital role here. Most of them are not accessible, and those which are accessible are not commonly used throughout the year. Due to peripheral buildings set back by the houses and bungalows' laws, rooftops cannot be shared. Therefore, the experience of the communal shared space among them is absent. The town's planned order has similar street experiences in its different zones as there are no such regular street activities apart from the parked vehicles and nurseries around the corner. Generally, household staff occupies the streets and spends most of their time there. Therefore, a random street was selected to document the Model Town setting. The following are the panoramas.<sup>14</sup>



Figure 5 Panorama (B Block Model Town)

Significantly the density of the greenscape of the Model Town is higher than the Walled City. It also clarifies why the rooftops' character is not all that dynamic as houses here have terraces, which invalidates the former's role. The streets are quite due to green buffer zones, and there are not many pedestrian activities around. Likewise, these panoramas portray the nonappearance of the shared roof or street space, which unmistakably lacks in this zone as everybody living here is confined to their premises.

# Gulberg

Gulberg is the urban neighborhood of Lahore. It contours many municipals of the Lahore district. It is likely to be called the heart of the city as it is a central business hub and engulfs various hierarchical activities during the day and night that serve leisure and corporate activities, becoming a pressure point as all the main roads intersect in this location. Gulberg's high density of commercial buildings makes it more charged than the Model Town, yet has broader boulevards, each comprising its service lanes. The city skyline in Gulberg is higher than any other part of the city. Also, the encroachment of urban public voids can be found.

Initially, it was a residential zone, but the city expanded and got exposed to modern commercialization as time passed. Now residential and commercial zones are intermixed but are in a

significant order like the main commercial buildings are situated on the central boulevards with the houses behind them in smaller sections and confined areas. The houses' area is extensive, and their height varies; therefore, this part of the Lahore belongs to the city's elites. In the last decade, converting residential buildings for commercial use penetrated dedicated residential areas to generate income and sell the land at a much higher price. In terms of the functionality of the concerned architectural elements, the character of streets varies from sector to sector. Streets are designed to serve the vehicular purpose and are covered by the vehicles mostly. Streets near residential sectors are mostly empty, whereas the commercial zone remains busy all over the day. As the streets are broader and vehicular movement can be seen throughout the day, pedestrian activities are limited except in some areas. The roofs' occupancy is non-existent in residential areas, although commercial zones cater to the services unit, yet they are accessible.<sup>15</sup>



Figure 6 Residential Street Panorama (Gulberg)

Gulberg's panoramas show an independent lifestyle, and the role of streets and roofs is evident in these pictures. Patches of greenery can be seen over Gulberg's skyline, but their density may vary in different zones depending on the property commercialization.

# Askari Housing

Askari Housing Society is a semi-private gated society initiated in the mid-1970s aimed to accommodate the retired personnel of the Pakistan Army. Later, the restriction for civilians was lifted. Initially, only one sector of the Askari Housing Authority was developed in the main Cantonment of Lahore, consisted of modular apartments and residential blocks situated around a park known as the Askari 1. Today, eleven sectors of Askari Housing Society exist in Lahore. After Model Town, Askari Housing is considered the second planned housing society of Lahore. It was proposed as a gated

community with one point of entry and exit. It also promoted the development of modular housing in Lahore. Sectors of Askari Housing consist of apartments and semi-detached houses<sup>16</sup>.

The layout of residential blocks in Askari is almost similar all across the sectors. The designated areas for commercial activities in the master plan are separated from the residential blocks, and no encroachment can be found. In residential parts of the society, parks act as the main congregational space for the community. The residential zone is along the main boulevards, and the size of the street and boulevards varies to formulate street activities without getting disturbed by excessive vehicular traffic. The streets play a vital role, whereas rooftops are either not accessible or shared in the apartment buildings, but communal interaction exists through terraces and the balconies. Due to its one-point entry and exit, a sense of security can be observed here, commencing neighborhood as pedestrian-friendly. Due to its modular nature and order, it has a planned urban layout. As all the Askari sectors have almost the same layout making them monotonous experientially, they were shortlisted for the comparison. The panoramas developed are from Askari 1, 5 and 10.<sup>17</sup>



Figure 7 (Askari 1)

The above panoramas demonstrate how the balconies, windows, and gates of each house and apartment buildings open in front of each other, indirectly creating an opportunity for the residents to communicate.

# **Defence Housing Authority (DHA)**

The Defence Housing Authority (DHA) was initiated in the 1980s, located on Lahore's outskirts. Like Askari Housing, it was built initially for Army and Defence Services Officers and later considered Lahore Cantonment Cooperative Housing Society – LCCHS. The DHA comprises eleven phases, in which Phase 1 to Phase 6 are currently operational, and others are still under development. The DHA runs under a semi-government organization and has separate by-laws. It is also a planned society built on the rural areas around the central Lahore city<sup>18</sup>.

The DHA aims to provides several amenities to its residents including golf courses, hotels, clubs, community centers, malls, schools, and offices. Each phase has its dedicated commercial zone attached to the residential zone. Its urban layout was proposed with the vision of the next fifty-year plan and precautionary measures. In Phase 6 and Phase 7, the commercial zone is planned as a hub along the main boulevards to keep the streets' main traffic flow.

In terms of the functions of streets and roofs, the DHA acts differently. Its layout consists of the iron grid elements due to which no pedestrian activities are observed on the streets. In some areas, parks are situated at distances that the residents have to use vehicles. The plot sizes here vary from 1000sqft to 30000sqft; most of the residents have lawns, swimming pool, and tracks in their own houses due to which they do not have much of a street life. Due to strict by-laws, the majority of the houses do not have access to the roof. Only water tanks are allowed to be built on the roof. The following panoramas are developed of selective phases<sup>19</sup>.



Figure 8 Panorama (DHA Phase 7)

As it is situated on different outskirts of Lahore, every phase has its own spatial experience. Due to its urban layout and scale of properties, many residents are unaware of their neighborhood. Street life in the DHA is limited to commercial areas. The green zones and belts are allocated thoughtfully, covering 15% of the land in every phase.

#### ANALOGIZING THE ZONES

All of the above documentation portrays a diverse spectrum of cultures and urban settings comprised of streets and roofs, and they all combine to form the city's urban fabric. Here the question arises: why don't these selected elements of the city have similar experience or usage all across the city? Moreover, what are the factors that define the functionality of streets and roofs?

If we compare the Walled City and the Askari Housing Society, both generate the flow of pedestrian activities, allow social interactions, although the culture and settlements are not similar. Some of the similarities in Askari and the Walled City are that the streets, buffer zones, and green areas belong to the community. The occupancy of streets and the roofs form the relation with habitants that formulates the dialogue. The architecture serves as a catalyst/conciliator. In the Walled City, architecture has more dominance over the people, allowing people to interact, occupy and utilize these elements' purpose, whereas, in DHA or Gulberg, people have more dominance over architecture due to which these elements are being neglected and serves no purpose for the community and exist as a formality.

If we compare the Walled City with the other zones, we can see that the streets are narrower, and the houses are tightly packed because the streets own the houses and generate multiple activities in them. The same goes for the roofs. Whereas in the other three zones, the scale is grander; therefore, houses own the streets.



Figure 9 (left Section of the Walled City) (right General Section of all the other Zones)

As the city evolves, the unplanned urban sprawl reflects that everyone wants to live according to their desire. The variable of desire instigates a new dialogue between the streets and the roofs. The Walled City was not developed based on a grid; it grew by having desires to create a neighborhood. As it was a community and community cannot be designed, it always evolves<sup>20</sup>. The desire may sacrifice an ideal sympathetic neighborhood leading to have an isolated personal villa. As the urban fabric of Lahore is organic, the streets with roofs create multiple indirect dialogues with other variables of the city.

# **RE-IMAGINING THE URBAN FABRIC OF LAHORE**

The pursuit of finding the perfect panorama in the city where streets and roofs can be found in harmony, fulfilling all desires, lead to an experimental hybrid panorama. All of the above-produced panoramas are artificially merged to visualize the Lahore's ideal dialogue. Each zone's pragmatic factors were extracted from the panoramas and stitched together in pairs using the same technique as used before. The resultant panoramas are following<sup>21</sup>.

These hybrid panoramas portray these different zones; significantly, the whole context has changed, resulting in a much richer urban setting than any city's isolated settlement. These elements' functionality is more exaggerated than the Walled City alone, and the spatial stage can be visualized at the urban level.

These hybrids lead to another investigation that if by combining only the impactful characters of these zones produces various kinds of urban conditions, what would the current situation of existing panoramas look like? Would it be possible to imagine and create an assemblage? Considering these questions, all the panoramas of each zone were first stitched together to produce a single panorama. Then all of these panoramas were composed in a different order to obtain a visual for the whole city of Lahore (Figure 10).



Figure 10 (Hybrid Panoramas of Lahore)

The above panoramas portray the possible outcomes of the urban fabric of Lahore. These are projected in a manner that, if they are seen from the bottom, a contextual shift from the Walled City to DHA can be observed. A thin margin line can be seen at the centre of these visuals; this thin line acts as a delusional line, which somehow satisfies the urban planners and the authorities that the city is being planned and constructed well and as they predicted, but it is not.

# CONCLUSION

This research originates a new spectrum of visualizing a city and provides an opportunity for the architects, urban planners, and historians to look at the city from a distinct perspective and learn from the carefully recorded patterns of the spatial behaviors developed based on the explicit by-laws and societal interventions. Today, 3d building models are first made using computer-aided software to analyze and visualize in each perspective. Similarly, this method can allow us to study a city parallel to urban transect onto a single frame. It furthermore highlights the primary factors upon which the economics, demo-graphs, and the city's fabric changes to predict the possible outcomes. It also goes to the hypothesis that one can perceive different parts and factors that genuinely were pre-picked and similarly feature bits of the variables when people and networks started changing space by their necessities.

It is a critical case study of architectural neoliberalism of how development has taken place throughout the city. It concludes that how the dimensionality of space affects the architectural characters, and their functionality differs from the context — moving from Walled City to DHA, the

scale increase due to which the requirement of functions and the character of elements changes, reforming the dialogue. This whole phenomenon acts psychologically, dividing the community and restraining them to their respective spaces caused by neoliberalism. Chaos can be observed in the generated panoramas of the Walled City as compared to the other zones, yet it is spatial dynamics are more experientially charged but connected through different means, and each architectural element is being celebrated in various ways. From this, it can be derived that the complete chaos without the hint of connections is not pleasurable.

Another aspect observed is that the conventional streets are dead, and the new excite of urban spaces are not social but rather visual. The exercise of documentation points out how the individuals' desire in other city zones creates the dichotomy and has overpowered the city's romance due to which the spatial experience observed in the Walled City fades away, resulting in the change of dialects and formulates different cultural ideologies within a city's zones.

# NOTES

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# INTERLACE OF TIME AND SPACE RENOVATION OF HOTEL JULIŠ - A CASE STUDY BY MEANS OF MODELLING

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# ABSTRACT

This paper will explore the design techniques of Czech Architect Pavel Janák, taking Hotel Juliš of Prague as a study case, of which the restoration work had lasted almost two decades between wars. As a protagonist of Czech Cubist, Janák had incorporated the multidimensional space-time concept as his creed during his exploring for the modern architecture design principle. In this multi-functional building, blocks which were constructed in different epoch hover on the top of each other, forming an expressive "interlaced" space with high accessibility and inclusive hybridity.

The aim of research is to explore the design principle of Janák in the work of renovation to achieve the central issues in his concern of hybrid and linkage which was reinstated through the whole process of this large time spanned project. Instead of following the conventional way of adding layers or extending floors, Janák tended to interlace the already exist space together by breaking the separators, turning the isolation into connectivity.

The method of study is to demonstrate the design principle by remodelling the whole renovation process on the base of a rich archive-drawing collection which contains large amount of section drawings. From that we can tell the architect instead of designing floor plans in a conventional way, had developed the project by progressively inserting the vertical excavations in the section in order to not only link spaces but also combine the ornament elements of different epoch. Eventually he had managed to rule the space with a fusion of style that span over the time with harmony. Using the methodology of modelling, the passage through time and a visual narration of the process are expressed, following that, the critical analysis is presupposed.

# **KEYWORDS:**

Hotel Juliš, Pavel Janák, Czech Cubism, 20th century architecture, Modernist design techniques, Renovation project, Spatial reconstruction, Spatial iconic, Remodelling, Recreation of design process.

# INTRODUCTION

The paper is related to the renovation work of Hotel Juliš designed by Czech architect Pavel Janák between wars. Janák was known for being the protagonist of Cubist style architecture. The renovation work had crossed decades at the beginning of the 20th century when the Modernist movement was in

full swing. The purpose of this article is to elaborate the influence of Cubist art on Czech Modernist architecture from an aesthetic point of view against the extreme functionalism, with which, the decorativeness of the style was gradually transmitted from the physical surface to the spatial content, projected on the formal composition, demonstrating a purity of form almost minimalist. The abstract expression and geometric purity, for Janák this was the essence of Baroque past of Prague and of Czech Cubism in the present.

The following research is supported by a rich archive collection thanks to the National Technic Museum of Prague where most of original plan drawings and manuscripts were collected. The research includes three parts: Design Stages Narration, Renovation Process Recreating, and Techniques Analysing. The stages narration part was mainly for the reason of the long duration of the project and its fragmented process which led the research to a collection work of piecemeal floor plan drawings lack of narrative drive. From an objective narrative perspective, the research work aims to reconstruct a phase statement of the renovation progress by piecing the fragmented manuscripts together in order to get a complete picture of the building in different renovation stage. The second part is to recreate the renovation process in order to approach the architect's design intention, in which, the renovation progress was not a simple stacking of functional rooms, but an entire interior spatial rearrangement with global consideration trying to create an orderly, rich and pleasant connection between layers. It is achieved by means of redrawing a series of longitudinal sections in chronological order and focusing the analyse on the circulation system and the linkages between spaces. Finally, the research will try to extract and analyse Janák's architectural design skills of different design stages in the context of architect's self-reflection recorded in his personal journal and other related theoretical work.

The ambition of the research is not only on renovation project itself but also put it into the historical context of the region of modern era. The up to 20-year renovation project had witnessed Janák's changing period styles in the same time had them collected as a museum. On this score, the project had exhibited the changes of functional requirements and design concept under the background of post-war modernism movement at the same time interacted with the architect's design intention, of which, the research paper will unfold as Janák's self-reflection of the potential, fulfilled or otherwise, of its methodology.

#### **DESIGN STAGES NARRATIVE**

Looking back at the development of Czech modernist architecture, we'll find a great conceptual coherence in Cubist art, which was underestimated once by the extreme functionalists, they saw Cubist architecture an aesthetic misunderstanding of the fundamental and specific postulates of architecture. They accused that the decorative style architecture would only comprehend the principle of cubist art superficially. [Teige 1929] By analysing the reconstruct project of Hotel Juliš, we would find architect's design techniques highly related to the cubist principles as the geometric truth of Cézanne and interlaced time and space shown in cubist paintings.

According to the collection of the Archives of National Technical Museum of Prague, the reconstruction of Hotel Juliš was carried out between 1918 and 1937. It was originally a late Baroque style. It was previously a three-story apartment building, then it had gone through two renovation stages: the first one was from 1918 to 1925, of which the design style was under the rule of an overwhelming post-war Nationalist tide with a visible rondo-Cubism tendency, then the second one started from 1928 with a more minimalist look and was finalized in the 1930s.

Originally, the building was a three-story apartment store with a late Baroque style exterior appearance and a mediaeval interior structure. It is located in a prominent position between the

Wenceslas Square and the Franciscan Garden and was bought by Karel Juliš at the end of the first World War with the purpose of turning into a candy shop. But the original internal spatial structure was not inadequate, thus called for a reconstruction.

In 1918, Pavel Janák was firstly required to start some initial rearrangement for the entrance floor. Instead of a large-scale alternation, he saw the possibility of preserving the Baroque character in the first 1919 proposal, so that it can be kept as one of the last remnants of the old Wenceslas Square. Based on the conservative thoughts Janák was with no thought of creating new building and had only rearranged the entrance and some rooms as asked. A confectionary store and a café were set in a Rondo-Cubist style. The oversize staircase was thrown from inside out of the building within a reasonable size in order to gain more room for entrance hall. In the hall, he used a baroque feeling spiral stair to connect the courtyard which is lower than the street level, in the same time, the generous height between floors was tighten by inserting of a mezzanine in the transition area. Such a conservative design because Janák believed that the old Prague houses could and should be adapted to a new life, that antiquity might not be a burden, but reusable. [fig.1,2] [Janák 1920]

Until 1920, the interior space of renovated building turned out still insufficient, especially the service area (kitchens, preparation rooms). However, the expansion work was constrained in width due to the long and narrow slot site. To avoid the cramped and crowded feeling of interior space caused by adding volumes, Janák had created a series of spectacular connection in between the functional spaces. He had proposed an extension by nibbling the courtyard where a cafeteria was housed with a double stories' high excavation in the middle as a gallery. Soon after, another expansion was achieved by developing the basement: a cinema with a mezzanine was inserted underground in the centre part of the slot site. The two existed basements parts were connected by the naturally descending slope of the cinema auditorium. The profile of the underground space was rendered more dynamic. The underground cinema was connected directly to the Franciscan Garden with an independent access. Facing the garden, a receding roof garden was proposed with the hotel rooms rising upon behind a rondo cubist style façade. This appearance of a distinct Nationalist plot of that epoch has been preserved till today. [fig.3,4,7]

Due to the growing operating demands, the owner of the building applied for a demolition permit in 1928. Pavel Janák was again entrusted with the second phase reconstruction of the building. For this time, he endowed a reinforced concrete structure to medieval based the building. On the spatial arrangement he had enhanced the continuity of transit space towards the Franciscans garden by defining a corridor with the glass partitions and adjusting the position and direction of the stairs. The receding upper floor strengthened the constructivist feature of glass and steel. The hanging suspended steel frame enabled maximum of lighting. The final appearance of the six-story building represents a very functionalist appearance characterized by the long-striped windows of opal glass, facing the renowned Wenceslas square as a landmark. [fig.5,6]

In each design stage, Janák's purpose was not simply adding functions or expanding the area as required, but to reorganize the spatial structure. His interest was particularly focused on the buffer space which contains the main circulation system of the building complex. By adjusting the stair cases and inserting excavation between spatial layers, as the components of the building increased, the interior part became comprehensive complex in the sense of both functional and spatial, however the structure of the space remained clear and efficient.

#### **RENOVATION PROCESS RECREATING**

Architecture represents not only the physical space in its immanent and tangible presence but also the spatial and temporal events established by humans with which it is the carrier. To recreate the renovation process of the Hotel Juliš, the architectural digital model was used as the mediator between architect's intellect and the tangible reality. In this case, by using the longitudinal section drawings of different periods of the hotel as a timeline index, the model takes the form of a digital replica of the observable phenomenal reality that occurred in the long-time-span creative process of the Hotel Juliš including its history and the evolution passages through time. Presupposition of this methodology for historical analysis, a careful architectural survey was carried out based on the visual narration reproduced with the figurative language previously, the critical analysis was obtained by recreating then interpreting the digital model.

As seen in the recreated model, the final renovated building on shapes can be divided into 4 blocks, included the two higher part – the block facing the Wenceslas Square, the block facing the Franciscan Garden, the lower part in between as the connector in the middle, and the 2 stories basement fulfilling the slot site. The hotel rooms were set in the higher parts of the building; the entrance floor together with the connector in the middle housed the main public space, including the patisserie, cafe, restaurant, and the circulation system, underground there was a cinema with a bar. The functional spaces added at different times are highly integrated. As we can read in the sequence of the longitudinal sections, the building complex had taken its shape after the last renovation work in 1934: the famous patisserie and hotel lobby on the entrance floor had their original shape in the year of 1919; the terrace on the second floor with a view of Franciscan Garden was first put in plan since 1921; on the upper floors, there were a dancing hall, the hotel reception, connected to the hotel rooms and were designed in the year of 1925; the basement with a mezzanine, which contains the famous Paris Cinema had taken its final shape in the 1930s. The long creative process did not result in scramble and crowded space, Janák performed an overall structurally control by rearranging the buffer space especially the circulation system. By drawing longitudinal sections and perspectives, which can be found plenty in the archived manuscripts, he had managed to trace the relationship between rooms and reorganize the transit space. [fig. 8]

As the leading theoretician of Czech Cubism, Janák identified the objective reality as the ultimate pursue in architectural design, that "architecture concerns the substance of space and its creative laws."[Janák 1911-1912] His theoretical efforts culminated in the essay "The Prism and the Pyramid" in which he differentiated between two types of architectural design principles: one was the natural way of building, which meant that the construction elements as architrave and pillar were built up maintaining their physical characteristic following the natural law of gravity; in contrast, the other one proceeded "from the secular building to a supernatural beauty" to the overcoming of substance by spirit and abstraction. Janák assigned the architecture of modern time to the materialistic natural style while criticized its avoidance of the supra-material and spiritual form. Janák also discussed the laws of inorganic nature, in which geometrically more complex shapes were created with the collaboration of a third force as in crystallization. [Janák 1911-1912]

Hotel Juliš was on a narrow and long site requiring an economical layout for a café hotels and facilities, which had to be separated from each other yet be easily accessible and organically interlaced. As the number of the floors increasing the main staircases were moved to the center of the hotel block to make the vertical connection convenient. As the floor plan was extended fulfilling the entire site, the previous partial circulation distributed in the two separate blocks became an entire linear connection between the Wenceslas square and the Franciscan garden. To make sure this connection is fluent and efficiency, some straight stairs following the traffic flow together with a

series excavation were inserted between layers. For Janák, the vertical and horizontal planes represent the monotony of form. "In comparison to natural building, architecture is a superior activity. Generally, it combines two activities: technical, prismatic bi-planar construction and the abstract reconstitution of matter in a tri-planar system, be it oblique or curvilinear. The more dominant of the architectural impulses also creates the building's overall character." Janák reflected on these theoretical considerations in the case of Hotel Juliš. His intention was to break the space of bi-planar, those long and flat slices cut by the horizontal floors, and to bring up a more dramatic spatial experience. It thus follows that if inanimate matter is to be plastically re-created and animated so that something might change within it, this must occur through intervention of a third plane, which joins the natural bi-plane. Therefore, by inserting oblique shapes which were caused by a more complex concentration of forces instead of gravity, the plain prismatic form would transform to the noblest shape of spiritually abstracted matter as pyramid. Janák proposed the space spanning multiple floors using the techniques as excavating and staggering to achieve the goal of spiritualizing. All those vertical connections act as oblique planes caused by a third unseen diagonal force. This force would come from inside the building through the active intervention of the architect's creative intent leading to a dynamic interplay of space, form and matter.

### SPATIAL RECORDING OF LIFE

The process of the renovation work represents the course of functional hyperplasia, as changing the requirements of the client as well as the spirit of the era. In this sense, this project explains well the concept "Spatial recording of life" in which time and space by means of the reconstruction activity were interlaced together [Janák, 1912]. The spatial complexity achieved in the end was not the result of functional demands of one single design approach but the record of multi creative processes.

During the renovation process, the composition of space was constantly changing when new parts added, however, by rearranging the buffer space, keeping the transit and circulation system under a certain logic, the complex became iconic and had overcome the monotony. The spaces were interlaced together by breaking the separators, turning the isolation into connectivity, inserting the mezzanine and vertical interpenetrations, changing heights of passages and floors. The reinforced concrete piers were placed so that a free ground-plan achieved. The long narrow site had limited the possibility of spatial expansion and connection. However, being a linear-form element as its essential characteristic, it implies a hint of direction, beginning and end, dynamics, movement, and experience of time.

#### CONCLUSION

The building of Hotel Juliš represents a shining example of the 1920s-1930s Constructivist architecture. In the whole design process, Janák tried to defend for a good spatial development and fought against the over-radical influence in the new ethos or of quick-profit-mode temptations at that time after the first world war. Which made Pavel Janák distinct from other contemporary followers of modernism, is that he underscores the difference between a materialistically generated building and one created from artistic intention and form. Janák had been defending the priority of "space and plastic form" over materialism and practicality. He believed that the spirituality would be preserved when architect's artist's will, or kunstwollen, overcome the bi-planar form with oblique shapes and represent a spatial dynamic. The Cubism in his hand was gradually liberated from the decorative barrier, in the end led to the purity in form. The Prague city, where the architectural gems from the Gothic, Renaissance and Baroque era remain intact after the overwhelming Austro-Hungarian Empire, offered an opportunity for Janák to unpack the cliché of Beaux arts which he had received in the

university of Prague and Vienna. It had not only facilitated him as an avant-courier of Cubist Architecture, but also motivated Janák's dissatisfaction of the materialistic functionalism between wars. The "bi-plane" represented the horizontal and vertical, while animated life overcame this stasis with "the third plane". Hence the "oblique" symbolized active nature and the creative will at once. Instead of thinking about the question what is architecture's substance, Janák was more interested on the problem of language in which the building was created. What he valued most was the semantics the language tried to convey and the "artistic will" of creators that was transferred. In Janák's cognition of aesthetic, the humanistic spirit that influence by the celebrities of Renaissance humanistic was over the machine aesthetic which were popular at that time. In his personal journal he repeatedly mentioned the work of Ruskin's "The stones of Venice's" which had risen the spirituality of Gothic architecture onto a height of cult. Pavel Janák after Cubism, had created a so-called national style which was based on Cubist morphology later was recognized as rondo-Cubist style. However, he realized that clinging too much on domestic traditions would kill the broader symbolic meaning in the architectural form. In order to keep up with the times in a good way, smoothly he made a "transition" to functionalism, which is evidently embodied in the reconstruction design of Juliš Hotel on Wenceslas Square at the turn of the 1920s and 1930s. It explains the kinship between cubism and modernism in an architectural language. Unlike extreme functionalism, his modernist language retains its noble insistence on beauty. Form following function is not the ultimate goal, but to reflect the logical beauty of the connotation in function.



Fig.1 Floor plans after adjustment in 1919



Fig.2 Historical photot of the original Façade facing the Wenceslas Square before 1921, ATM

Fig.3 Historical photo of the façade facing the Wenceslas Square in 1925, ATM



Fig.4 Floor palns in two differnet versions after the first stage renovation of 1921


Fig.5 Floor plans after the second renovation stage of 1933



Fig.6 Photo of the façade in the rondo-cubist style facing the Franciskans gardern Fig.7 Façade facing the Wenceslas Square, 1933

# CONNECTIONS: EXPLORING HERITAGE, ARCHITECTURE, CITIES, ART, MEDIA



Fig. 8 The evolution of the longitudinal sections from 1919 to 1934



Fig 9. the split axonometric view of the hotel complex in the year of 1934.

#### NOTES

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# REIMAGINING HERITAGE BUILDINGS AS TECHNOLOGICAL SPACES

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# INTRODUCTION

In the course of two immersive projects, *Digital Ghost Hunt* (UKRI/AHRC) and *XR*<sup>3</sup> (UKRI/AHRC; in process), we have developed a framework for temporarily reconfiguring heritage buildings as technological performance spaces for roaming audiences, without the need for making any permanent changes to the fabric of the buildings. The performances produced within this framework are designed as participatory, 'storified' encounters with heritage buildings and their history, utilising a range of simple hand-held sensor devices (SEEK detectors, designed and built for the project), the heritage building itself, and a custom 'ghost story' that allows participants to uncover the history of the building. At the immediate level, our framework builds new young and young adult audiences to engage with heritage and enter the technological design process as collaborative makers and performers. Beyond this immediate level, our approach superimposes a technological space onto an architectural heritage space, emphasising its potential as an 'experience machine' that is animated by our movements, perceptions and actions. Reconfiguring and combining technological spaces and heritage spaces, or aim is to create a subject position that is located where they intersect, inviting participation as agents that connect and 'caretake'.

#### The relationship between audiences and buildings

# Framing audiences

*Digital Ghost Hunt* and *XR*<sup>3</sup> performances frame participating audiences as the driving force within two-part experiential spaces, with technology as one, only partially complete aspect of the fully scripted experience and the hidden story of heritage buildings the other. Complementing these already designed or scripted parts, the audience brings conclusion to the experience through discovering and collaboratively resolving the quest that keeps the ghost trapped.<sup>1</sup> We position audience agency as central,<sup>2</sup> shifting subtly away from the idea of narrow affordances towards accommodating a broader desire for exploration and expansion of the experience horizon. The ghost story, which is adapted for each site, is built around the idea of discovery and is interlaced with the local heritage and history of the building, configured so as to come to life through the explorations and interventions of participants. Through framing audiences as collaborators with the ghost in the story, we humanise the character and their quest. The building and its heritage thus become both frame and experience machine, within which the audience and ghost communicate across time.

#### Inverting the technological gaze: entering the box

Our mixed reality model posits tacit questions around virtuality and embodiment in technological and aesthetic experience and offers the opportunity to participating audiences and researchers alike to closely trace the outline of agency in the suspension of disbelief. In a successful rendition, the design team and the audience 'meet' across this outline, mediated by the interface. Approaching heritage buildings as experience machines, meshed with technologically aided designed experience has broadened our initial objectives for Digital Ghost Hunt. At first, we wanted to crack open the 'black box' of media technologies for young audiences to enter and build agency-led relationships with technology and design through storytelling. Beyond this objective, and with several successful renditions of Digital Ghost Hunt behind us, our research has become more focused on using the architecture and heritage of spaces as vehicles for storytelling, towards creating new and sustainable ways of interacting with heritage spaces and architecture. These perspectives come together in the idea of buildings as technology; 'machines' for aesthetic experience. In the present moment it seems more than apt, and perhaps essential to explore navigation of the complex interactions between physical and digital spaces. The 'bleed' between machine and human cognitive assemblages in our everyday interactions with distributed and embedded computational networks forms a computational unconscious<sup>3</sup> that draws on a human nonconscious.<sup>4</sup> Interaction through such technological-cognitive assemblages is closely instrumentalised, monitored and monetised, making its relative opacity problematic in several dimensions. Articulating the role of human participants in such assemblages – providing the inquisitive and connective agency and interpretative effort that animate them – serves as a timely reminder for a generation that will soon need to address the socio-economic and political consequences of pervasive computation and will need to draw on history to understand the moving present.

#### Heritage architecture as technological spaces for 'troubled play'

Regarding buildings as a form of technology or 'experience machines' that are activated by and through movement and shifting perspectives within them positions embodiment as central to designed experience. It allows for complicated or even troubled forms of play; "the processes that make and unmake objects, whether these are natural objects, manufactured objects or those objects that live and experience".<sup>5</sup> With this understanding that the lived aspect of experience is embodied as it occurs in time and space,<sup>6</sup> the audience become vehicles for meaning-making; adventuring co-creators, invited and challenged by the designer. The designer of 'troubled play' thus operates with the emergent tensions between sensate and cognisant aspects of embodied experience. This tension can be employed in design to generate experience potential where physical spaces are either limited, or where interaction must be limited for conservation purposes or health and safety. These limitations can instead become useful storytelling devices to vary audience flow and experience, such as using smaller spaces to temporarily separate younger participants from their parents and foreground their own independent agency. Our chosen approach with primarily young audiences has been to ground and embed the already 'ghostly' digital imagination within the more concrete counterpart of heritage experience, positioning the former not as a transcendent, omniscient and inscrutable agency, but a set of fallible tools for the human hand and cognition. The endless variety of ghost stories allow audiences to approach the experience with a fluid set of expectations, facilitating engagement with different emotional registers through the vehicle of the localised ghost character. Although in the course of solving the riddle presented to them, audiences take on a more senior or 'caretaker' role in relation to the technology that is used in the performances, experiences have used that same technology for humour, pathos, and dread, depending on the ghost as well as the heritage mystery that is revealed through its story. Through this superimposition of spaces, young audiences can access an embodied experience of not only their own agency in relation to technology, but also the aesthetic and emotional dimension of heritage architecture.

# OUR PROJECTS: FROM *DIGITAL GHOST HUNT* TO *XR*<sup>3</sup> The Digital Ghost Hunt

The first rendition of Digital Ghost Hunt took a Keystage 2 class from classroom to the Battersea Art Centre in an experience that stretched over a month. The classroom facilitators inducted the school children as 'ghost hunters' through a range of exercises to embed the narrative and produce SEEK devices, later to be used at the heritage venue. This type of collaboration between local partners with the heritage venue is replicable and adaptable to different audiences, which is a feature we will develop with  $XR^3$ . For the purpose of this, first rendition, we collaborated with the school to embed coding skills into the curriculum. Subsequent renditions at the Theatre Royal in York and London's Garden Museum did not incorporate a classroom experience and allowed us to adapt the induction process to circumstances when this was not feasible. Our team found that trusted adults, whether facilitators attached to the designed experience at heritage sites, teachers 'cast' as collaborators with the designed experience, or parents/guardians who acted as facilitators, were critical to the capacity of young audiences to 'self-abduct' and enter into negotiated immersion. The nature of the performance necessitated a flexible degree of support from trusted adults, in response to the level of suspense. Young audience members utilised this facility to engage more freely in the suspension of disbelief, extend interrogation further, sustain a greater degree of suspense and, afterwards, recount their discoveries. Our collaborative relationships with, in particular, Battersea Art Centre and London's Garden Museum will continue, given resources, as we take some key aspects from Digital Ghost Hunt forward in the development of  $XR^3$ .

# XR<sup>3</sup>

Drawing on our experience with Digital Ghost Hunt, but seeking to scale the story-making framework, we conceptualised  $XR^3$  as an experience design framework that is open to a) diverse heritage venues and local researchers, b) diverse production teams, and c) diverse audiences. The knowledge base provided by  $XR^3$ , which we are currently developing, comprises technological resources (from devices to code libraries), narrative resources (an adaptable story framework that is open to local lore and legacies), and an organisational framework that facilitates project, production and copyright management. To ensure that the framework is fit for purpose as a replicable formula that is applicable as intended to a wide range of heritage sites, different audiences and local production teams, we will stress-test it at several heritage venues, with different production and research teams to produce a model for heritage experience design that can be localised and adapted. To do so, we aim to continue working with two of our heritage partners from Digital Ghost Hunt and add two more sites; Bournemouth's Russell-Cotes House and Gardens, and Leigh Spinning Mill. These sites present entirely different environments, and we will work with local partners (Bournemouth University and Manchester Royal Exchange) to develop custom experiences, engaging local production teams in their realisation. At the end of the project, we will offer a standalone framework that supports the sustainable development of localised and curated immersive performances for diverse heritage audiences.

#### THE INTERFACE: BALANCING SPACE AND PLACE

Within the notion of designed experience, a perspective on architecture as interface, or rather metainterface<sup>7</sup> allows an understanding of enactment as a mode of not just experience, but realisation of the aesthetic vision. Design that incorporates the agency of its audience raises important questions around how designers may shape experience within spaces that present both opportunities and limitations in non-linear encounters. Intuitive in architecture, the resulting idea; a field of opportunities that is focused not on lines but interchanges, echoes Christopher Alexander's romanticised second theory of architecture<sup>8</sup> and is of more critical interest to digital interactive milieus. Challenges associated with the creation of experiential space within technological milieus which rest on digital infrastructures include the escalation of fragility as the audience journey becomes more open-ended. Designed experience in heritage environments face similar challenges, albeit with potential risk and consequences for collections rather than infrastructures. Curated experience design for heritage buildings also comes with the compound risk of inelegance as a result of oversimplification, inaccuracy, and of the audience labouring under stifling legacies. Addressing these problems,  $XR^3$  – our design framework, looking forward – incorporates research collaboration with local historians and curators as a key part of the framework, and proposes remedial dramatic devices that we developed with Digital Ghost Hunt. These leverage the fallibility of technological representation to generate opportunities for the audience to enter into the 'systemic play' that is a function of challenge and the drive to resolve and conclude.<sup>9</sup> Opening up the texture of such challenge as part of the experience allows us to frame audiences as caretakers in relation to both the technological and the heritage environment and invites them to embody this role in movement through space and time, oscillating between what is and what could be, configuring their role as a form of systemic play.

#### The shape of experience

Interactive spaces not just invite but require the commitment of audience agency to their completion and the realisation of the aesthetic vision that guide their creation. Rey Chow discusses the artwork as a trap,<sup>10</sup> designed for audiences to 'self-capture' and perform its completion, finalising the design. This perspective on audiences holds for an artwork in a gallery, a theatrical experience or the embodied experience of architecture, and underscores the idea of 'troubled play' as an expression of agency. The suspension of disbelief of participatory audiences that allow them to enter into complicity with the completion of the artwork is voluntary, and act of self-capture. Such complicity with entrapment forms a compact, and as such, it is a prerequisite for the type of immersive experience sought by our heritage clients and collaborators. It invites ongoing negotiation, supported by trusted facilitators, particularly when audiences are young, and allows for the negotiation of space and place, license and limitation. In Digital Ghost Hunt, we overlaid heritage sites with a 'story trap' that left no imprint on the fabric of the building and we are taking this concept forward with the  $XR^3$  framework, which formulates experience design for heritage buildings as a composite of the aesthetic 'trap' presented by the building itself and the designed entrapment of the mystery story. The composite experience casts the audience as voluntary captives and historical researchers, and a critical moving part in a clockwork that comprises the architecture and the designed experience.

#### Interpretation gaps

Building a design scheme around interchanges, possibilities and emergence requires attention to gaps or affordances, into which the agency of the audience may flow. These designed affordances form the interface; a permeable membrane between the intent of the designer and the agency of the audience.

The interface itself must, even when it is manifest only or primarily as affordances, virtual conduits or interpretation gaps within the designed experience,<sup>11</sup> be stable in order to preserve the design, particularly so in historic buildings, where alterations to the fabric of the building or the collections held within are not possible or allowed. The gaps into which investigating audiences may enter to safely and creatively explore the design shape the experience, and it is here that we may expand experience potential by leveraging the possibility of failure and destabilise the hierarchy of agencies. In order to do so and still maintain the integrity of the designed experience and the heritage site, the whole can be regarded as a nested set of frames, including the site and its architecture, the performance duration and theme, the aesthetic vision, environmental considerations ranging from health and safety to preservation and the gaps or possibility spaces within which the audience agency can be expressed. The integration of these frames within a coherent design scheme that manages space, or expansion of experience potential, and place, or containment, is the interface; a connective tissue between the designer and the audience. It is both immaterial and material and resolves in the understanding that the interface is "the site and condition of dynamic behaviour" and "draws upon the force or energy supplied by the bodies that are aligned against it".<sup>12</sup> Much like a connective tissue, its function is to hold and balance movements, adaptations and tensions that emerge between the exploratory activities and desires of audiences and the structure of the site and the designed experience.<sup>13</sup>

# OPPORTUNITIES FOR *XR*<sup>3</sup> Embodiment and heritage

 $XR^3$  is conceived for collaborative design in heritage settings to leverage and complement the skillsets of local teams. Co-creation of heritage experience affords, as demonstrated by our case studies, preservation of historical grounding in the adaptation of the design framework and allows heritage venues to develop their audiences. For Digital Ghost Hunt, we worked with local community groups, curators and archivists in the development of the story framework to deliver custom experiences that meshed with heritage buildings and their history. The objectives for curated heritage experience must incorporate authenticity and any set of values that are stipulated by local organisational priorities. Translation of such objectives into designed experience for young and family audiences presents some key challenges. Young audiences have often encountered interactive design primarily in online game environments, where historicity mainly features a source for visual and storyline themes, rather than a structured and accurate source of facts and discourses. Historical research raises more questions than it offers closure, and a hedonic shift that positions the former as an enjoyable experience can be aided by dramatic design Exploration with a flavour of independent enquiry is attractive particularly to young audiences, especially those that are accustomed to the game environment. Freedoms or affordances to roam are less narrowly confined in physical spaces than they are in digital or virtual spaces, where technical limitations and designed interpretation gaps at the infrastructure level offer relatively narrow constraints. Games typically offer more readily available closure, whereas historical research poses more questions. Leveraging these differences to maximise the scope for experiential space facilitates embodied engagement with heritage in a 'quest' format that follows the Aristotelian story arc and is shared with many computer games.

# Future-proofing the heritage sector

Building new audiences through design of curated experience that respects historical artefacts and incorporates new modes of interaction can serve to future-proof the heritage industry. The heritage industries were already under pressure to build audiences and revenue prior to the crisis presented by

COVID-19, and the pandemic has created new financial threats across the entire sector.<sup>14</sup> It is too early to foresee the full impact on heritage sites and their funding, but it is likely that these pressures will intensify further, since the financial stresses that result from the pandemic impact the broader economy.<sup>15</sup> Assistive frameworks such as  $XR^3$  will hopefully be able to provide meaningful support in the emergent situation, and help heritage organisations rebuild and grow their audiences. The framework will compensate flexibly for skillset gaps in local development teams, supporting localised research and curatorial skills with technological means and logistics, and he adaptation and production of custom heritage experiences.<sup>16</sup> We were already developing  $XR^3$  at the beginning of 2020 and adapted the project to the emerging situation when it became clear that it was going to have massive impact on the creative and heritage sectors. Since then, we expanded the concept to incorporate training and capacity-building for the creative industries through artist residencies and the development of educational methodologies for teaching collaborative immersive experience design.

# Integrating social distance in experience design

An unexpected, but in the post-COVID-19 landscape possibly quite significant advantage of approaching experience design by way of the shape of the audience journey is that it allows the design team to consider audience density in detail within the development process. Through-flow can be carefully managed in tandem within the overarching design scheme, and even adapted in response to emerging guidelines. Providing local teams with the means to respond to emergent government and local guidelines that are issued in response to levels of new infections will help heritage organisations through the near- to mid-future in a post-COVID-19 environment.

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# REPRESENTATION AND RECONSTRUCTION OF MEMORIES ON PUBLIC SPACE – A DOCUMENTARY STRATEGY ABOUT GRAFFITI WRITING

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### INTRODUCTION

Aerosol art or Writing is a movement that has always had difficulties in counting itself completely, privileging the evident and superficial aspects.<sup>1</sup> In Italy, documentations in Writing subculture have always been focused on the "capital" cities, such as Milan, Bologna, or Rome. Rarely the stories came from people who experienced this subculture in smaller cities, where the globalisation influences arrive later. The key idea of the current project is to give voice to fewer known writers that work in smaller, provincial cities approaching to the movement in a different way. This research still aims at documenting the Writing movement, analysing the aspects that characterize the lives of those who join this subculture as a lifestyle, instead of the most known and superficial characteristics, such as the works. Being that, as Ferri states "the general public perceives Writing as a grouping of signs or doodles on a wall which have neither face nor identity"<sup>2</sup> (Ferri, 2016). This project aims primarily at representing the interviewed artists and their work in the Writing movement frame, defining the fieldwork in the Ferrara province, a peripheral area near Bologna, Italy.

The theoretical part of this investigation establishes on the research about the history of the Writing movement, from its conception in the United States to the arrival in Bologna, but also on the analysis of documentation and media about this subculture, in order to better understand and define the strategies and visual language for short-film animated documentary to be produced. The documentary presents the most fascinating and least known aspects of it.

#### **BRIEF HISTORY OF WRITING**

Thanks to mass media and the easiness of diffusion and sharing of contents over the Internet, currently the terms "graffiti", "street art" and "Writing" are part of a common language, reaching outsiders to the movements. Due to the great conceptual scope that the word "graffiti" brings, it is used as a vague concept to understand areas that are sometimes distant from each other.<sup>3</sup> That said, it

is important to define the key terms analysed in this paper, understanding the distinctions between "graffiti", "Writing" and "street art".

The term "graffiti" comes from the Italian word "graffiato", which means "scratched". "Graffiti" is applied in the art history to works produced by scratching inscriptions or figurative drawings on walls. The use of the word ends including any graphics applied to surfaces in a way that constitutes vandalism. Per example, in the documentary *Style Wars* (1983), directed by Tony Silver (1935-2008) and Henry Chalfant (1940), detective Bernie Jacobs uses the word "graffiti" to define the act of "applying a medium to a surface". The same Henry Chalfant, in the book *Subway Art* (2015), declares that: "We are aware of the strong objection that some writers have raised to using it ["graffiti"]. They say that is the name given to the art form by the oppressor, that it is the nomenclature of the criminal justice system, and that it is used to denigrate and control people."<sup>4</sup> It is evident that those who join the movement prefer to use the terms "Writing" or "aerosol art" instead of "graffiti", in fact the curator Claudio Musso speaking about the writer PhaseII states that "He hated the word "graffiti", preferring "aerosol art".<sup>5</sup> Likewise, the Italian writer and theorist Alessandro "Dado" Ferri states that he: "agree with PhaseII, one of the pioneers of New York, according to which it is better to speak, in a more technical meaning, of aerosol art, or of Writing".<sup>6</sup>

The practice of graffiti began long before the Seventies of the 20th century.<sup>7</sup> Informal Writing in public spaces is an old practice, probably as old as Writing itself. People of all types in the history of mankind feel the desire to symbolize their own existence in public spaces, leaving a personal trail for others to see.<sup>8</sup> The first drawings made by humans in caves may be interpreted as such. In the 20th century, the practice acquired unprecedented intensity and became the central feature of several subcultures worldwide. The most sophisticated of these twentieth-century movements is the Writing tradition that develops in New York City's subways during the 1970s and then becomes part of the landscape of cities around the world.<sup>9</sup>

#### Writing Movement goes Overseas (International Aerosol assault)

When the movement integrates in the metropolitan of New York it gains considerable attention by the media, who start to attribute to the phenomenon of Writing the term "graffiti". The growing interest of journalists, researchers and photographers creates the basis for Writing to spread to other metropolitan cities. In the early Eighties, the phenomenon is spreading globally thanks to the means of the time. International crews, fanzine networks, inter-rail travel are, among others, key means in which writers become protagonists.<sup>10</sup> The first fragmented and superficial images of painted trains arrive in Europe through music videos, TV series and films set in the marginal neighborhoods of New York. The opening credits of the series *Welcome Back, Kotter* (1975) by Gabe Kaplan, Alan Sacks, Peter Meyerson, where painted metro trains appear (the series is broadcast in Italy from 1980), and the films *Saturday Night Fever* (1977) by John Badham and *The Warriors* (1979) by Walter Hill represent a reality in New York, where Writing pieces are an inevitable scenario in the filming of that time.<sup>11</sup>

But the European public still doesn't understand what these paintings on the walls mean. Only in the first half of the Eighties, with the help of the first videotapes with films and documentaries on the subject, entitled Style Wars and Wild Style of 1983, and Beat Street of 1984, thousands of young people outside the United States learn the techniques, utensils and dynamics of a movement still unknown.<sup>12</sup>

"I started in spring 1983, I saw a picture of graffiti with some text next to it in a magazine. [...] I started drawing and looking around, but there was nothing in the city, except anarchy signs. [...] I tried finding some more information on Writing but it was quite impossible until *Wild Style* was

shown at the cinema."<sup>13</sup> *Style Wars* (1983) portrays writers such as Skeme, Dondi, MindOne and Zephyr, but also reinforces the role of the aerosol art in the emerging Hip-Hop culture, incorporating break-dance groups such as Rock Steady Crew, and featuring rap music on the soundtrack. Hollywood productions also paid attention to the movement, consulting writers like PhaseII and giving international exposure to culture in the film *Beat Street* (Stan Lathan, 1984).

Photography fulfills the role of disseminating knowledge on a large scale, thanks to a true market for amateur prints, made by the writers themselves or through self-produced and specialized magazines, called fanzines. Through the photographs of documentarians interested in the movement, the first official publications that documented aerosol art were born, such as *Subway Art* (1984) by Martha Cooper and Henry Chalfant and *Spray Can Art* (1987) by H. Chalfant and James Prigoff. <sup>14</sup> The same Chalfant recognizes that: "*Subway art* was one of the vehicles that gave life to this movement and that can be an inspiration to people everywhere in the coming decades". <sup>15</sup> The Writing subculture also finds a way of dissemination through artists travelling outside the United States, such as Futura 2000 with The Clash and Doze with Rock Steady Crew. <sup>16</sup>

Hip Hop and aerosol art arrive in the main European cities, especially those that have a metropolitan network, continuing the New York Writing tradition, but here, in this period, it is almost dying.<sup>17</sup> In Paris, Skki and Jay One write at Trocadéro, Quik exhibits in Rotterdam at the *Post-Graffiti* exhibition and Milan welcomes American masters, thanks to the art galleries that bring artists like PhaseII and A-One into the city.<sup>18</sup>

#### Arrive to Bologna

Bologna is a city with the reputation for being the epicentre of countercultures in Italy.<sup>19</sup> In fact since the end of the Seventies and the first Eighties are present creative university non-local groups, which reveal the youths dissatisfactions and concerns, preparing the city to welcome new thoughts and languages. Like many Italian cities of that time, Bologna is experiencing a period of decadence, like the homeland of the first Writing, which is the basis for the emergence of new cultural and multidisciplinary expressions.<sup>20</sup> In 1984, with the exhibition *Arte di Frontiera: New York graffiti*, curator Francesca Alinovi brings for the first time in Bologna some of the greatest exponents of the vanguards of New York, showing the best of the first generation of American writers (Futura 2000, Dondi, Daze, Lee, Crash, A-One, Toxic, Rammellzee, Zephyr, Jean-Michel Basquiat, Keith Haring, Kenny Scharf, Ronnie Cutrone). After that event, Bologna became one of the first European capitals of Writing.<sup>21</sup> The New York subculture soon finds fertile soil in the area between the railway line and the industrial sites that are gradually abandoned, in these spaces the first generation of Bologna writers is being formed. First among all is Deemo (a.k.a. First Shot / Dayaki / Dumbo), which starts between 1985 and 1987:

"My very first letter piece with character is also the first ever done in Bologna, and is still there where I painted it, after more than two decades. I went to the concrete garden called Giardini del Guasto and just did it. That was an early skate so I wrote "Skate Tough" with a skater character on one side and my first tag "Dumbo", in all its primitive glory. It's been featured in books, even postcards I think."<sup>22</sup>



Figure 1. "Skate Tough" painted by Dumbo, Giardini del Guasto, Bologna, 1985-1987. Ph: Texas BBS.

Following this first play, Deemo begins to spread the tag "One Shot" over the city, with the aim of arousing curiosity in other young people and starting the characteristic "game" of the competitiveness in Writing. The idea works well so that Magma and Mined join the movement. Then follow Rusty and Shan R (a.k.a. Deda from the rap band *Sangue Misto*), which are the first incarnation of the SPA crew.<sup>23</sup>

The yellow walls of the Livello 57 host the SPA crew pieces (Rusty, Deemo, Dado, Ciuffo, Benja) for several years.<sup>24</sup> In addition to the city's native writers, the self-managed and/or occupied youth spaces (such as Link, Livello 57, Crash and XM24) and Bologna itself, attract PhaseII, whom established in the city for some time"predicating" the dogmas and theories of the discipline. The New York artist has the first-contact with Bologna in 1984 and in the Nineties his relationship with the city became more intense after the exhibition-festival *Dal Muro alla Pelle* (1994) in the self-managed space Link.<sup>25</sup> Thus, in the following years, young people from the provincial area of Bologna (an example is Ferrara and the surrounding small-cities), participating in events and shows in the city, finding Writing and being influenced by the characteristic styles developed in that city.



Figure 2. "Blind Justice" painted by Rusty, railway line Bologna-Ancona, 1992. Ph: Texas BBS



Figure 3. Piece painted by Phase II, Link Club, Bologna, 1994.

# DISCUSSION: A VISUAL CONCEPT TOWARDS A DOCUMENTARY STRATEGY

By the analysis of the history and projects from the Writing movement, it is evident that the existing material analyses and exposes the phenomenon from the large metropolises and/or from the most well-known artists. For this, the choice to document the movement from a provincial area was applied in the development of a short-film animated documentary. After identifying some of the first artists to practice Writing in the territory near Ferrara, a provincial area of Bologna in Italy, we've proceed to documentation through interviews with those writers.

The artists on whom the project is based are: Mask, class 1979, Saed from 1985 and Rash born in 1994. The three come from different villages in the province of Ferrara, started to write graffiti at different periods and despite knowing each other – Mask during our research interview stated that: "Writing is a microcosm in which everyone knows each other" – they have very different approaches to movement and styles. Due to the differences between these artists, we identify the possibility to represent the movement in a relatively broad and general way, nevertheless the geographical limitations of our territory.

The objective is to record the personal choices and experiences that led the artists to start painting graffiti, going through an analysis of the characteristics that they find most important in the practice of Writing and that determine that they do not stop doing that, in order to explain to a general audience the aspects beyond the superficial images present on the public walls. In order not to interfere with the interviewees' memories, it was necessary not to correct or ask for the dates of the events again, since the project is based on the artists' memories and narratives. Another key step of the fieldwork was to collect documenting material from the artists, such as sketches, photos of the artworks, articles, etc. Thus, it is possible to implement this material in the short-film animation. In addition to the sound content of the documentary, based on the audios recorded during the interviews, we want to reserve the visual part of the animation to be developed to represent the artists and their visual works. This option provides the possibility to explore new concepts with the encounter of the aesthetics from

urban art and authorial animation, with the objective to define a language appropriate to subject of the project.

After recording the interviews, it is important to proceed with an accurate analysis of the contents, using a video editing software to separate each part and make a list of the subjects. This decision makes it possible to create a list subdivided by artist, subject of the report, and salient points and duration. The use of this table that summarizes the subjects of the interviews is useful for defining the storyline and the base script for developing the short-animated documentary.

As each interview with the artists had a length around one to two hours, several subjects emerged: memories of personal stories, points of view, plans, etc. Because of this, the list of subjects was essential to subdivide the reports into macro groups and choose what to use for the development of the narrative and what to omit.



Figure 4. Conceptual Map for the storyline with the topics from the interviews (© Mattia Ronconi)...

For the storyline it is followed a chronological timeline, starting from the discovery of the movement by the artists, ending to the choice not to stop, going through various subjects that characterize the approaches and points of view of the interviewed writers. After the presentation of each artist, it was decided to expose what characterizes the choice in painting graffiti, starting by the negative aspects (time, spent of money and energy, dangers) until reaching those positives that explain why the artists continue in this activity (strong emotions, lasting friendships, unforgettable memories). The choice to deal with these issues aims to provide the audience with information about a marginal and contradictory movement, sometimes called "art" by some and others identified as "vandalism". Thus, we do not want to present a definitive conclusion, although the subjective filter of the director may be visible, but provide the necessary information for the viewer, in the end, to generate a thought and to elaborate the conclusions on the theme.

Although the project is intended for a short documentary film, the defined storyline tries to follow the classic three-act structure in the narratives: in the beginning the protagonist has a problem, they follow the attempts to find a solution and finally the character solves the problem. <sup>26</sup> So the choice to start introducing artists and the Writing movement, following with the problematic, the negative aspects derived from choosing to join this subculture, and ending to present the motivations that justify this choice. The climax of the narrative is reached with the story told by Mask, which is itself a micronarrative. This memory summarizes the characteristics of the practice of Writing presented

throughout the short film, the climax is played when a security guard tries to shoot / shoot the writers and the viewer can feel the danger and the adrenaline.

Phase II was a pioneer of the New York City Writing movement, defining the foundation and executing style and influencing this subculture worldwide. He was also a master "collagist", his works are known inside of the Writing movement because of his collaboration as art director of the fanzine IGTimes.<sup>27</sup>



Figure 5. "Wildstyle collage", Phase 2. From the book "All City Writers" (2009), p. 77.

Maybe due to Phase II, the collage technique became commonly used between the writers, to make flyers for the events, and even in the layout of many sketchbook. The sketchbooks, called "blackbook", are used since the birth of the Writing movement, to collect sketches, colour palette studies and even photos and other relevant documents for the artist, as memories or reference images.



Figure 6. Part of a collage made by Skah, Dext One and Onis, end of 80'. From the book "All City Writers" (2009), p. 204

Due the objective of this animated documentary is to represent a visual subculture and illustrate three artists and their artworks, it is used various techniques: spray-paint and Writing textures, collages and visuals inspired on the "blakbook style", as infographics. This allow to illustrate dates, photos or others documents for better explain the narration, accompanying the regular frame by frame animation.

In the Writing movement the research for a personal and unique style is one of the un-wrote rules. The signs on the wall are communication of individuality, the writer describes himself through a language made of shapes, composition and colour palettes. Thus, the style is a filter of multiple experiences through a pictorial language representing the writer itself, his character and his experiences.<sup>28</sup>



Figure 7. "Styles-board" of (from left) Mask, Rash and (on the bottom) Saed.

In fact, after making board with collages from the photos of the artworks of each artist, it emerges that there are base-shapes and composition logics used on the creation of the letters. Different pieces from the same artists, are identifiable as made by the same person also if the inscription is different. In the same way, it is possible to recognise different artworks from different writers, identifying who painted each one.



Figure 8. Study of the typical shapes and compositions used by Rash in his pieces (© Mattia Ronconi).

For this reason, the exploration of the aesthetics and techniques for the characters of this short film to be developed is based on the graphic language and aesthetics of graffiti Writing. Each character, with its shapes and colours, is be inspired by the "styles" of the artworks from each artist. In this way, the characters represent not only the artists, but also their works, thus becoming beings composed of abstract forms, the same forms that are recurrent in the composition of the letters by each interviewee. This choice also makes it possible to maintain the artists' anonymity, due to their illegal activities, through these almost tribal "masks".



Figure 9. Concept study for the character Rash, using his writing style (© Mattia Ronconi).

Through these "masks" inspired by the visual language of graffiti Writing, the intention is to represent the artists, while simultaneously maintaining their anonymity, as in the subculture itself, in which the artists want to be recognized (getting up) within the movement through the tag itself, but maintaining anonymity as people from a society with different rules.

# NOTES

<sup>1</sup> Corrado Piazza, *Buio Dentro*, (Milan: Shake Edizioni, 2018). 6.

<sup>2</sup> Alessandro Dado Ferri, *Teoria del Writing. La ricerca dello Stile*, (Professional Dreamers, 2016). 14.

<sup>3</sup> Claudio Musso, "Graffiti? Non usate quella parola! Anche sì...," *Artribune Magazine* (2015): accessed July 21, 2020, URL: https://www.artribune.com/attualita/2015/11/graffiti-street-art-marcello-faletra-libro-postmedia-books/.

<sup>4</sup> Henry Chalfant and Martha Cooper, Subway Art, (London: Thames and Hudson Ltd, 2015). 127.

<sup>5</sup> Salvatore Papa, "Le opere del fondatore del Writing Phase II a Bologna," *Zero Magazine* (2019): accessed June

10, 2020, URL: https://zero.eu/it/news/le-opere-di-phase-ii-a-bologna/.

<sup>6</sup> Ferri, *Teoria del Writing*, 15.

<sup>7</sup> Marcello Faletra, Graffiti. Poetiche della Rivolta, (Milan: Postmedia Books, 2015). 29.

<sup>8</sup> "Tag: Name Writing in Public Space," Conference website, accessed July 10, 2020,

http://thetagconference.com/.

<sup>9</sup> "Tag: Name Writing in Public Space"

- <sup>10</sup> Andrea Caputo, *All City Writers* (Bagnolet: Kitchen93, 2009). Cover.
- <sup>11</sup> Caputo, *All City Writers*, Cover.

<sup>12</sup> Luca Ciancabilla, *The Sight Gallery. Salvaguardia e Conservazione della Pittura Murale Urbana Contemporanea a Bologna,* (Bologna: Bononia University Press, 2015). 10.

- <sup>13</sup> Cemnoz in Caputo, All City Writers, 20.
- <sup>14</sup> Ciancabilla, *The Sight Gallery*, 10.
- <sup>15</sup> Chalfant and Cooper, Subway Art, 7.
- <sup>16</sup> Chalfant and Cooper, Subway Art, 126.
- <sup>17</sup> David Schmidlap, in Caputo, *All City Writers*, 72.
- <sup>18</sup> Piazza, Buio Dentro, 21.
- <sup>19</sup> Deemo in Caputo, *All City Writers*, 154.
- <sup>20</sup> Fabiola Naldi, "Love of Indifference" in Caputo, All City Writers, 233 254.
- <sup>21</sup> Ciancabilla, *The Sight Gallery*, 9.
- <sup>22</sup> Deemo in Caputo, All City Writers, 155.
- <sup>23</sup> Caputo, All City Writers, 158.
- <sup>24</sup> Caputo, All City Writers, 234.
- <sup>25</sup> Papa, "Le opere del fondatore del Writing Phase II a Bologna".
- <sup>26</sup> Liz Blazer, Animated Storytelling: Simple Steps for Creating Animation and Motion Graphics, (San

Francisco, CA: Peachpit Press, 2015).

<sup>27</sup> David Schmidlap, in Caputo, All City Writers, 74.

<sup>28</sup> Ferri, *Teoria del Writing*, 13, 14.

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# CITIES, COUNTRYSIDE AND HERITAGE: BIOPOWER AND NEW VALUES IN DESIGNING PUBLIC SPACES

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#### INTRODUCTION

In answering the call and the spirit of this conference that hinges on heritage, architecture, cities and media, the initial proposal was submitted on the 10<sup>th</sup> April, coinciding with the first peak of the Covid-19 crisis in this country. Uncertainty and the fear of the unknown were palpable. The PM was in the hospital, 866 people died in England after testing positive, while the Archbishop of Canterbury led the first national digital Easter Sunday service from his kitchen. People were warned to stay away from holiday destinations, and statistics emerged showing that BAME people have been disproportionately more effected by Covid-19 contributing to the discussion on race and racism that came to play a role in examining our society's heritage and monuments in public spaces. Under these conditions the question I pose in this paper is what are the new dynamics between cities and the countryside, particularly in relation to public spaces and the position of the subject? What do we as architects and designers of public spaces in the situation of a pandemic need to unravel and focus on in order to create safe, inclusive and delightful spaces that will help us to live better and to thrive?

# COVID-19 AND THE RE-EXAMINATION OF OUR UNDERSTANDING OF LIFE, SPACE, VALUES AND THE BIOPOWER IN THE SOCIETY

Humbled by the destructive power of the smallest of entities, we are re-addressing the inter-dependent nature of our lives with a sense of urgency. Two phenomena have been emerging in parallel. First, there is a recognition that we humans are not above nature but part of it and as such profoundly embedded and reliant on the environment, resulting in a newly nascent commitment to the planet as the willingness to curb pollution and climate change now comes from previously unexpected quarters. Second, there is a clear acknowledgement that digital, online communication has become our main means of relating to each other and of coming together as a society: we now almost completely depend on digital communication between us and for locational wayfinding information as applications increasingly lead us through the maze of cities, towards secluded corners in the countryside, beauty spots and places of heritage. Moreover, at present, there are hardly any untouched, uninspected or un-surveyed corners, while huge quantities of data constantly float around us<sup>1</sup>.

These two tendencies, the concern for the environment and our dependency on the digital realm appear contradictory. Indeed, in the minds of some 5G critics they are 'mortal enemies'. It could be argued that they belong to the dynamics of the double-bind as theorised by Gregory Bateson. At the

same time, this double bind is increasingly becoming pervaded with a third element, the obligation to act responsibly and more ethically towards all: all individuals, the environmental ecosystems and in particular towards those most vulnerable in society who often happen to be the fellow citizens we now see as essential workers.

In Foucault's terms, the virus has brought to the fore and made tangible the shape of the structures in which society operates by making previously invisible biopower evident in practices of public health, regulation of heredity, race and ethnicity, social care and other social regulatory mechanisms of today<sup>2</sup>. The pandemic has brought into plain site and mass circulation previously unseen glimpses of hospital intensive care rooms showing affected people in wards as unconscious bodies on respirators, or semiconscious ones rolling in wheelchairs. Sometimes we see a view of mass coffins taking over new cemetery grounds, but that would always be elsewhere. These aspects of everyday life that were previously imperceptible to most have now been viewed daily in full exposure, as newsrooms focus on positives, editing out disturbing news.

We observe how some of the predictions by Bateson<sup>3</sup>, Foucault<sup>4</sup>, Deleuze and Guattari<sup>5</sup> in their search for a better understanding of humankind, have gained ground. Their ideas that we create the world that we perceive, not because there is no reality outside us, but because we select and edit the aspects of phenomena that fit our beliefs about the world, have gained new relevancy. Indeed, we have edited out from our perception of the world that viral pandemics of this kind were even possible. As a result it caught us ill- prepared, pushing us to change our basic world views. This is where we are now - adapting by catching up with previously ignored aspects of earthly phenomena. In doing so we are creating a new system of values.



SPATIAL IMPLICATIONS - CITY VS. COUNTRYSIDE

Figure 1 View of London from Greenwich park

Following the predicament that more viral attacks similar to Covid-19 are due, we have to acknowledge that our communication, relationships, our complete environment has been destined for change. This will affect both cities and the countryside, as transformation of habitats, population movement, workplaces and overall investment are likely. Our governments are pressed to do the things they were trying to avoid, i.e. to become more ecologically minded, as they concede that due to Covid-19 we inevitably have to organise urban life to be more pedestrian and cyclable, less congested or polluted.<sup>6</sup>

People living in big, unsustainable and expensive cities such as London are buying houses in the countryside as they crave for contact with the earth, sky, healthy nourishment and non-polluted air.

The question becomes what is an architect's role in all of this? How are we to act to best facilitate, plan, and design for this transformation in a sustainable and balanced way for all:

- the environment (including natural, built and landscaped heritage)
- society (as big divisions need to be curbed)
- for every individual (giving the rise of depression and mental illnesses during the pandemic).

Crucially in addressing this conference agenda, how does the digital sphere enable and empower us in the search for a new balance between the city and the countryside, given that much digital data is constantly beaming across our neighbourhoods while being collected and updated at the same time. How are we to prepare both the countryside and cities for the transformation that will conceptualise the spatial design that will be more inclusive, less restrictive, healthier and more enjoyable?

The process has already begun, it is happening now, as newspapers report a surge in interest and purchases of homes in rural environments and relocation of urban homes towards healthier and ecologically more satisfying peri-urban areas.<sup>7</sup> In this context all peri-urban spaces will potentially be areas of gentrification. This should be seen as an opportunity for architects to work on the design of the often only contemplated city edge.

In approaching this design the question becomes:

What will happen to public spaces? How will they change? How are we, humans, changing? What aspects will come to the fore?



Figure 2 Canterbury – strolling through the streets that shield and protect

We know slightly more now than in April when this question was posed. This was before the tragic death of George Floyd and the subsequent rise of the 'Black Lives Matter' movement that has galvanised a long-overdue call for the revision of spatial heritage including figures celebrated in our public spaces. As we now sense, many are due for revision and destined to museums as the link between colonialism, the slave trade and the accumulation of wealth comes to light. It is becoming evident that this amassing of wealth was materialised in numerous grand houses of the 17<sup>th</sup>, 18<sup>th</sup> and 19<sup>th</sup> centuries now characterised as heritage under the auspices of extreme forms of exploitative capitalism based on slavery.



Figure 3 Kara Walker, Anti-Slavery Fountain, Tate Modern 2019 - water as a key theme, refers to the transatlantic slave trade and the ambitions, fates and tragedies of people from different continents

Long-overdue questions of inequality, racism and lack of inclusivity as well as historically inadequately grasped issues concerning the slave trade emerged on top of the agenda. It is striking but also logical how this virus-induced crisis opened up a series of inter-connected issues that we have to address as a society nationally and globally, if we want to see improvements in our overall way of life.

Urban, peri-urban and rural design questions more tangibly than ever interlace with issues concerning national physical and mental health, and sociological aspects including the disputed question of heritage, race and inclusivity.

This is why some of the recent architectural explorations of habitats, even when they come from worthy protagonists appear anachronous.

# WARNING TO THE DWELLERS OF THE COUNTRYSIDE

As I was initially writing this paper, the news came out about the latest show by OMA – AMO Office of Metropolitan Architecture incongruously called *Countryside, the Future* marking a new area of engagement for Rem Koolhaas, who had launched his career with a city-centric attitude reflected in the name of his practice as well as of his early book *Delirious New York* (1978)<sup>8</sup>.

Without insinuations and remaining respectful of this architect's important contribution to architectural discourse and practice, due to the urgency of our overall situation there is a need to express criticism more directly, something I might not have done in the past.

It could be my confinement-based perception of the show that remains closed, but in the current global pandemic, post-'me too' and post 'Black Lives Matter' movement, the digital presentation of this exhibition feels strangely out of place and belonging to a different era.

The work of this architect, well-known for his sharp and critical mind and for his down-to-earth attitude, now appears as a patronising déjà vu and another white male's voice advising on 'how to unleash the future' if you know 'how to look at the present in a creative way'. This 'creative way' seems to be via OMA's instructions about how to find the solutions to all our major problems such as migration, climate change and preservation of the countryside. In a manner similar to his books such as SMLXL etc, the Countryside exhibition seems to showcase everything. Coupled with the promise of a creative approach to countryside globally, this venture appears daunting. Led by their master, the men in white overalls march into an open field assuming territorialisation. Paradoxically, this enabler's manual on the countryside's future is in the most metropolitan setting i.e. the iconic, spiral museum building by Frank Lloyd Wright's on the edge of the Central Park and across the road of one of the most ridiculous, colonialist museums - Metropolitan Museum of Art, New York.

The presentation of wide-ranging themes and conditions that numerous associates and employees have spent time organising into the exhibition of common places is puzzling. It offers unsubstantiated claims that the countryside is the 'site of the most radical, modern components of our civilisation'<sup>9</sup>. The aim of the exhibition is not clear as the collected items appear as fragments of current global research on architectural, urban and rural discourse and practices, already considered by most architects, urbanists, agriculturalists, researchers and students worldwide – i.e. something that neither one person nor one practice can claim as their own creative approach to knowledge.

Koolhaas must have realised the absurdity of this overambitious approach as he admitted it in the accompanied film clip, leaving to his co-author Bantal to state the buzz words: 'migration', 'climate change', 'preservation' culminating in a slogan that the solution to everything is in the countryside. Dressed in white plastic, the OMA -AMO men triumphantly march by the camera as if undertaking an expedition to the Antarctic, unconsciously enacting the narrative of white colonialization.

Aesthetically and conceptually the film exhibits too much arrogance and a lack of judgement to tune into meaningful discussion. The impression is (perhaps wrongly) that a globally ambitious architect set a stall in this iconic place of architectural heritage simply because he could. Is it a vanity project? Possibly. Who is it aimed at? While this is unclear, below the shiny surface it appears to be aimed at clients / developers, galvanising the market forces to consider investing in the countryside.

This is when alarms should start to ring as we should be concerned of the likely damage the influx of the big capital can cause to the rural environment by disproportionate privileging of the commercial spaces, potential distortion of the housing market that leaves the majority of people out, and no real care for public spaces, inclusivity or heritage unless there is a clear line of profit<sup>10</sup>.

# **DESIGNING PUBLIC SPACES**

Even if future public spaces would in time adapt and become assembled in an evolutionary manner, the question remains: how much are we going to meet in person? How would these encounters happen, how would they look like if at all? The answers to these questions posed in April started to emerge in June and July as we notice the new configuration of our streets now extending the pedestrian pavements to provide for social distancing, cafes spreading tables to the roads and squares. In the middle of London the feeling was becoming overwhelmingly Mediterranean.

What about other aspects: are we going to meet our fellow human beings by chance, such as going to the theatre or a gallery place, or, will it be due to the twists and turns of the algorithm determined by an unidentified artificial intelligence model based on how much density certain areas can hold?



Figure 4 Abstract representation of human encounters - Algorithm

If so, who is going to be in charge of the database for those Artificial Intelligence depositories that include information about us beginning with health, but extending to all other aspects of our lives including locational and beyond?

The owners and the major shareholders of big companies that process this data are in a strong position, as the governments increasingly depend on big businesses and turn to them when unable to deliver through depleted public service systems. The alternative to this unfair monopoly is to radically address this condition, by reinserting new democratic principles for the digital age.

This will have to include us reversing the situation and becoming true subjects and rightful owners of the information and knowledge that concerns ourselves, to which we are currently mainly objects; targets for data collection.

Should we not all become shareholders of this venture that should have a democratic structure of governance? After all, now more than ever before, these databases are us.

In this respect we need to begin by reversing the old order of things and claim new sets of relations in respect to public spaces, their designs and the data that smart cities and equally smart rural environments store when the economy calls for restructuring.

If public spaces are to be truly public be it in cites or in the countryside, we have to know and own these spaces in the sense of owning the knowledge about them / and us. All citizens ought to be able to access and share relevant information and knowledge anytime.

This involves us all as the aim should be to empower the subjects with information such as health related sensory data as we try to move out of confinement or at least provide a sustainable spatial functioning of the most important aspects of our society such as safe and healthy surroundings, food and water provision, education and care.

As questions of heritage, knowledge and space become more inextricably related, responsible twentyfirst century citizens need to bravely and imaginatively confront the implications for architecture and protected urban / rural spaces by promoting inclusivity and democracy while taking care of their size, density and organisational structure to begin with. The sensitive questions of heritage (natural, environmental and built) and the democratic inclusion of all individuals is a logical necessity as mutual environmental and social dependency became both scientifically proven and practically evident.

Inclusivity, social harmony and balance with the environment are key for best design practices in both urban and rural areas, which need their own index; a measure of a healthy environment and society. It should replace the FT100, Nikkei and Dow that have previously been worshiped *ad nauseam* and are

luckily seen less in our daily news, clear proof that we can live without them and without worrying about global profiteering.

In this way we can begin to protect ourselves and all those around us from the present unbalance tipped against the majority of citizens across the globe.

When ready to restart the economy, the emerging consensus should be that we build a better, more sustainable greener economy, where jobs lost will be swiftly replaced by green jobs such as: i) retrofit projects on a large scale, ii) jobs involved with greening of the country, iii) restructuring transport to be environmentally sustainable, non-polluted and based on sustainable movement, flexible working place and flexible hours<sup>11</sup>. Crucially, consideration should be given to new organizational schemes such as a four-day working week planned for being trialed in Finland.<sup>12</sup>

# CONCLUSION: TOWARDS GREEN ECONOMY AS REBIRTH OF THE SOCIETY

It is intriguing and at the same time logical how for society to recover whether in the city or in the countryside, the Covid-19 virus is pushing us to work holistically by combining care for the environment, society as a whole and the psychological wellbeing of every individual. Through these ecologies that intertwine and work together, the crisis seems to offer a trajectory towards possible solutions. We need to recognize their profound mutual dependence within the new social organization in which we work without prioritizing profit but the wellbeing of all living creatures and the planet that we are all part of.

The task is to establish a new set of values based on a novel system of reference and scale of measurement that will address and monitor the growth, distribution and usage of true biopower based on an economy of care for humans as subjects and citizens rather than humans as their productive capacity.

It comes as no surprise that delicate social issues such as the revision of heritage paradigms, historical injustices and the reevaluation of public monuments due to their links to the slave trade have resurfaced, as it became clear that the disproportional wealth amassed in this period could not have come from the resources of these islands only.

The pandemic led us to face centuries-old underlining exploitation based on colonialism, social inequality and exploitation that still exist in our society. Capitalist-based racism still thrives and is overdue for serious societal revision as we cannot close our digitally attuned eyes to this delayed emancipatory work that awaits us.

#### NOTES

<sup>1</sup> London is one of the most surveyed cities in the world. It is estimated that there are 500,000 CCTV cameras dotted around London, with 15,516 cameras in action in the Underground alone, the average person living in London will be recorded on camera 300 times in one day. https://www.caughtoncamera.net/news/how-many-cctv-cameras-in-london/

<sup>2</sup> Michel Foucault The History of Sexuality Volume 1: An Introduction. (London: Allen Lane, 1979. 1976)

<sup>3</sup> Gregory Bateson, *Steps to An Ecology Of Mind: Collected essays in anthropology, psychiatry, evolution, and epistemology* (Northvale, New Jersey and London: Jason Aronson Inc. 1971) vi.

<sup>4</sup> Gordana Fontana-Giusti *Foucault for Architects,* (London: Routledge, 2013)

<sup>5</sup> Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, Trans. By Brian Massumi, (London: The Atlone Press, 1988) 26-39

<sup>6</sup> Gordana Korolija Fontana-Giusti, "Urban Strolling as a Measure of Quality", *Architectural Research Quarterly*, 11 (3/4) (2007) 255-264

<sup>7</sup> Rupert Jones, "Homebuyers 'plotting move to country' amid increased home working" The Guardian, accessed June 20. 2020 <u>https://www.theguardian.com/money/2020/may/08/homebuyers-plotting-move-to-country-amid-increased-home-working</u>

<sup>8</sup> In this project he is the co-author with Samir Bantal, Director of AMO, the think-tank of the OMA.

<sup>9</sup> Extract form the OMA promotional film clip <u>https://www.guggenheim.org/video/see-countryside-the-future-at-the-guggenheim</u> accessed June 20, 2020

<sup>10</sup> Simon Jenkins 'The Jenrick-Desmond row lays bare the rotten heart of the planning system' *The Guardian* accessed 26 June 2020 https://www.theguardian.com/commentisfree/2020/jun/25/jenrick-desmond-uk-planning-system-towers-housing

<sup>11</sup> Climate Change Committee report <u>https://www.theccc.org.uk/2020/06/25/covid-19-can-be-an-historic-turning-point-in-tackling-the-global-climate-crisis/</u> Accessed June 27, 2020

<sup>12</sup> Jon Stone, "Finland's new prime minister backs four-day working week", *The Independent* accessed June 20, /2020 <u>https://www.independent.co.uk/news/world/europe/finland-four-day-working-week-hours-prime-minister-</u> sanna-marin-a9272476.html

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# DESIGN EDUCATION AS RESEARCH PATH TOWARDS THE HERITAGE AND SEMANTICS OF THE PORTUGUESE GRAPHIC TRADITION OF 'AZULEJOS'

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#### INTRODUCTION

Project "Anti-Amnesia: design research as an agent for narrative and material regeneration and reinvention of vanishing Portuguese manufacturing cultures and techniques" is a research initiative that is co-financed by Portugal 2020, alongside the European Regional Development Fund and the Foundation for Science and Technology, Portugal (ID+/Unexpected Media Lab: POCI-01-0145-FEDER-029022; 2018-2020).). The design research project seeks to sustain disappearing traditional industries and practices in Northern and Central Portugal (Pereira et al., 2019), conducting design-led research interventions and educational strategies that focus on securing and sustaining systems of traditional knowledge and intangible value prospects embedded in craft and small-scale industrial practices. The project's aim is to recover material, human and social narratives surrounding traditional Portuguese industries facing various degrees of obsolescence: towards re-inscribing and re-purposing the gathered knowledge in sustaining associated identities, customs and practices.

Under these circumstances, it identifies the heritage and semantics of the Portuguese graphic tradition of 'Azulejos' as a case study that conforms to the aforementioned assessment, and consequently, procures means for constructing an evidential base that can potentially aid in its cultural appraisal and reactivation.

The project's direction towards reinvigorating indigenous arts and crafts industries is its constructive response to the uniformity of present-day globalization abetted by mass manufacturing. This issue is timely and pressing, and among the most critical cultural concerns discussed in European and international research projects, design philosophies and practices (Clarke, 2011; Manzini, 2015; Verganti, 2015; Morrison, 2017), and it respectively finds its own vivid examples in contemporary Portugal through instances such as 'Azulejos'.

#### A PEDAGOGICAL MODEL: ANTI-AMNESIA

The project's conducted research sees an ongoing reversion of its outcomes into multiple contexts of related socio-cultural appropriation through a "build-measure-learn" loop, a significant extent of which is attained by the means of curricular participation from design students. The student participants engage directly with the project's subjects and objectives through an array of impact-focused workshops and curricular work, including design ethnography and supporting multi-disciplinary actions relating to the recovery and restoration of heritage and visual semantics.

Integrated in the process of higher education in graphic design, within the structuring domain of design project, the pedagogical process identifies as main objectives: (i) to explore the grammar of communication design; (ii) to identify attitudes and methods used in the design environment. (iii) to adapt the aesthetic objectives of design to the effective possibilities – methodological, technical and productive – of graphic production; (iv) to develop reasoning and creative stimulation in a project, embodied in the history of visual communication and in the praxis of contemporary graphic design; and finally (v) to develop the capacity for critical thinking in relation to the different perspectives of Design, their role in society and tangencies.

These objectives are not just aimed at solving a particular problem, but also to deliberate on improving the overall instructional approaches. In this type of research and project development, the emphasis therefore lies not only on interpreting the presented situation, but simultaneously with changing the situation and the educational actors. For students, this learning-based engagement with 'real world' scenarios adds two substantive vectors: it is a formative, contextualized, reflective and collaborative learning experience in the construction of knowledge and design practice; and it is a transformative experience, as it involves out-of-class scenarios and the consequent experiences of engagement. The synergy that was eventually created between the various involved entities, including students, artisans and researchers, became central to realizing the project's primary expectations. Its implementation structure allowed for a conducive execution time frame for the undergraduate students to acquire and act upon specialized knowledge.

#### THE PORTUGUESE GRAPHIC TRADITION OF 'AZULEJOS'

Portugal's well-known 'Azulejos' tiles are in a state of flux. The original hand-printed version of the practice may have long ceded ground to more mechanized forms; however, its legacy, marked by century-old artefacts that still adorn building facades, is disintegrating rapidly. As urban centres such as Porto expand and accept newer architectural paradigms, azulejos, a cultural archetype from an earlier era, transforms into a thematic discourse. The symbolic value of the craft, as a cultural marker, thus gains more significance than its material and processual heritage.

Project Anti-Amnesia thus lays particular emphasis on gaining visibility of emergent actions that are being employed from within the wider creative community towards issue. Traditional techniques and practices are inevitably affected by the inconsistent economic and sociocultural circumstances; however, it is often possible to locate endogenous movements that undertake reformatory measures.



Figure 1. The stolen tiles from Porto's facades make a striking argument for the enduring value of originality.

The active pedagogy involved collaborating with 'Gazete Azulejos', an initiative the project considers as a relevant subject of study towards gaining an understanding of the tradition of tile making in Porto, as its aim is to revive and sustain the authenticity factor behind the original craft in the absence of a dedicated community of practice. Consequently, the Porto-based initiative represents the sole instance of an entity that is currently involved in the production of hand-painted tiles, in any capacity, in a city that was once home to several tile-producing kilns, the last of which ceased to operate in the 1980s (Elliot, 2020).



Figure 2. Azulejos' patterns (sample) retrieved from Porto buildings, archived at www.instagram.com/azulejosporto/

As a result of its restorative measures, the initiative represents an intervention scenario which not only promotes active community-based creative engagement with a heritage craft and its associated concerns but also communicates the undiminished value of a local traditional practice to a global audience. Its three-pronged strategy for cultural reconsideration essentially includes design, documentation, and dissemination: as a methodological approach, this falls in line with Anti-Amnesia's articulations.



Figure 3. Workshops provided by 'Os Azulejos do Porto' entail a communal call to action.

# THE APPLIED PEDAGOGICAL PROJECT

Integrated in the degree (BA) in Graphic Design of the School of Design of the Polytechnic Institute of Cávado and Ave (IPCA), the collaborative pedagogic undertaking with Gazete Azulejos (under ambit of project Anti-Amnesia) interprets an educative insight that introduces the heritage and semantics of Azulejos tilemaking to a future generation of designers, which may aid in the continuation of the associated creative and processual legacy in future contexts. Although there is a significant amount of heterogeneity in the graphic language of the student's projects, in most of the works developed there is a concern for exploration and creative experimentation, in trying to validate specific skills tied to different areas of their curricular structure. By exploring and discussing the bases of design, the exercises present a wide range of creative possibilities through graphic design, exploring the limits of the discipline in parallel with a reflection on its methodological grounding. The students were also invited to explore the digital archive being built by Gazete Azulejos, towards gaining a first-hand understanding of how contemporary design and communication can help preserve and promote intangible values embedded in traditional creative techniques and practices. The creative briefing additionally urged the students to recognize the specific potential of three-dimensionality for the conceptualization of a graphic message – the dichotomy of "expected / unexpected".

The project was implemented in three phases, namely, research, creative development, and conclusion. The students were required to create a graphic document showcasing a packaging design concept for a particular visual pattern of the ones presented in the online archive. Starting with a study of the historical and cultural inscription of this city heritage, a corresponding stage of interpretation and graphic design was realized to conceptualize the dichotomy of in relation to the case study's potential vis-à-vis its present standing.



Figure 4. Work-in-progress and project results by graphic design students involved.

The overall results corresponded to expectations, with a number of responses distinctly showcasing quality and applicability. The structuring and organization of the project in different phases supported by the methodological model provided conditions conducive to enhancing the students' creative capacities and motivations. Respectively, it became possible, even in this initial stage of the project, to develop conditions for a pedagogic activity that could profoundly influence the students' creative motivations and approaches further on.

During the corresponding phase the study and implementation of components and elements in relation to graphic design was realized. In compliance with the proposed methodology, this stage of ideation consisted of planning, material selection and exploratory tests. The final phase required the students to construct a prototype in conjunction with the explained objectives and as a culmination of the overall exercise. It included a product photography session before the final delivery of the outputs. The students were also asked to maintain visual records of their creative process for inclusion as a systematized delineation for review in their final reports and documents.

# DISCUSSION

The integration of research projects with design education can enhance instructional methodologies and strategies, requiring educators to build upon their role in a teaching-learning dialogue. This also contributes to adding new contexts to the dynamics of the classes, enriching the activities and inviting students to explore, take risks and actively engage in the search for primary information, which refers to the themes at work.

The context in which the Design discipline operates today is holistic, being an area of investigation that dialogues with other areas that are dedicated to the construction of messages, realities and artifacts. Its main objective is to develop idiographic knowledge, in a pedagogical and professional

reality that is dynamic, multiple and comprehensive, highlighting the interpretation of these assets as fundamental ingredients for the creation of a well-founded visual discourse.

A learning ladder is established between understanding, meaning and action, which is added here to the students' training process, by active processes and pedagogical construction, that are not previously observable or susceptible to experimentation. These are built in the context of the project Anti-Amnesia, towards augmenting research and contributing to the modelling of a design pedagogy (McKernan, 2008). In this way, the pedagogical process is self-motivated and open to exterior influences, maintaining and stimulating the habit of questioning in the participating students about what surrounds them. It provides an accurate view of the role of design, higher education and learning, towards servicing knowledge and understanding of the world and real problems and deriving greater motivation from a learner's perspective.

The developed activities and the dynamics of practical work in class allowed students to consolidate knowledge and skills on research and experimentation processes related to graphic and visual communication, through motivating work assignments. It was also integrated, as proposed in the program, the identification of the historical and semantic capital of graphic design as fundamental ingredients for the creation of a reasoned visual discourse and autonomy in the development of projects.

The educators, as mediators between students and research projects, and also acting in the fundamental role of a researcher, are in a prominent position to reflect on learning, collecting and interpreting data and propose decisions regarding teaching, and constructing an applicable pedagogical model. It is important that classrooms are also living laboratories for research and are also able to transform and be transformed. The educational resources that are built have a lot to do with writing and reflecting on the pedagogical activities themselves, in the form of scientific contributions to the higher education community involved in design. In this way, the participatory pedagogical approach is projected in the following pedagogical guidelines:

- it is revealing, as it proposes a proven transformation in specific and contextual narratives, which reinforce the established patrimonial relationship. It rehearses a holistic vision that treats design as a method of narrative content, opens space for dialogue and awareness of its own heritage.

- it is substantive, as it expresses a specific substance of the place, places and all the citizens who are actively involved. Design and its actions will always be a meeting point.

- it is participatory, as it believes that the viability of this pedagogy will pass through this media interpretation, finding in craft's heritage a ubiquitous and practical resource, which contributes to the emergence and support of this dynamic.

#### CONCLUSION

The synergy that was eventually created between the various involved entities, including students, artists and researchers, became central to realizing the project's primary expectations. Its implementation structure allowed for a conducive execution time frame for the undergraduate students to acquire and act upon specialized knowledge.

From a majority of the produced concepts, it was possible to observe a push towards exploratory development, where in specific elements of the craft were picked up to ascertain their underlying potential for reinterpretation in contemporary or conceptual contexts. In this manner, the traditional scope of graphic design had been breached to include parallel territories of reflection with respect to creative practice.

The permanent transitioning of industrial and socio-cultural contexts inevitably, and at times profoundly, affects typical practices such as Azulejos, which in consequence may lose commercial scope, and thus economic viability. However, since these crafts are fundamentally representative of creative human enterprise, their ingrained artistic value becomes enduring. Through its association with Azulejos do Porto, project Anti-Amnesia recognizes how restorative endeavour and broader dissemination entailing a call to action can contribute to the continuation of specialized knowledge in a strictly cultural context until presented with conducive conditions for reinstatement in socio-economic discourses. In its role as an active collaborator, it presents the initiative with the additional possibility of engaging with students of design, to not only provide support in terms of auxiliary processes related to research and archiving but also to re-inscribe and re-purpose the recovered material, narrative and processual heritage. In this manner, the debate on design and territory gains an expanded frame of reference, wherein design takes a reflective and supportive stance towards an endogenous initiative striving to reclaim lost ground in a world ostensibly geared towards dictated obsolescence.

In this way, Anti-Amnesia's research is being reformulated itself, taking into account new questions and answers that emerge from the pedagogical practice. This evolution invites the implementation of changes in the teaching context itself, acting accordingly to the perception of the contexts, the interpretation of the dynamics and experiences of the students, and acting accordingly to this same analysis. Active pedagogy wants to contribute to these challenges of innovation and change and Design, in this form, moves from specialists to a universe of participation, and creates an opportunity for inclusion of subjects traditionally disconnected from themselves.
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### CHLADNI PATTERNS GONE 3D: COMPUTATIONAL DESIGN AND DIGITAL FABRICATION METHODS FOR PRODUCING SOUND-INFORMED GEOMETRIES

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### INTRODUCTION

This paper deals with the relationship between sound and geometry and is situated in the broader realm of Cymatics or the visualization of sound wave patterns.<sup>1</sup> The aim is to offer a critical overview of recent scientific and creative approaches for the transformation of Chladni patterns into 3D models and 3D artifacts and their application in design, architecture, and fashion. Current progress in computational design and digital fabrication provides new opportunities to revisit the patterns derived from sound waves that Ernst Chladni discovered by scattering sand on a metal plate oscillated by a violin bow. Sequences of sounds can be transformed into 3D models, visualized, and fabricated, going beyond Chladni's historical two-dimensional images by different conversion methods which go from 2D images to 3D digital visualizations and fabricated objects.

This provides new opportunities and challenges, as sound informed 3D models have under-explored potentials both for informing aesthetic geometric explorations, as well as for practical applications in architecture and product design: from informing building acoustics, to music visualizations, or informing the designs of speakers, or fashion creations. A relatively small body of literature presents works where Chladni patterns are transformed into 3D models or fabricated objects. But a synopsis of these approaches and of the resulting visual languages in architecture and design is still missing.

For this topic within the multifaceted field of Cymatics, an interdisciplinary methodology was used. Based on an extensive literature evaluation, representative texts on the main processes and tools for the transition from 2D images to 3D models were chosen according to their relevance and quality. They are reviewed from a technological viewpoint. The history of Chladni patterns and the creative applications of 3D Chladni shapes from very different areas are presented from a critical perspective of cultural studies. Only innovative projects were selected. Not only works by a highly renowned fashion artist, but also by young emerging architects and designers have been chosen. All of them have a special reflective potential for art and society in common.

The structure of this paper is as follows: after the introduction, the second part is a brief overview of the history of Chladni patterns and Cymatics. The third paragraph describes three workflows for the transition from 2D images to 3D models and fabricated objects. Section five presents a selection of works of (conceptual) architecture, product design, and fashion where Chladni patterns and Cymatics are used to inform 3D objects. The paper ends with a conclusion.

### A HISTORY OF CHLADNI PATTERNS

One significant characteristic of sound is its transitory nature, hence there have been several visualization attempts in the past. These visualizations are connected to sound wave research that has a longer history. Its first beginnings can be dated back to the Renaissance. Leonardo mentioned in his notebooks that "when a table is struck in different places the dust that is upon is reduced to various shapes of mounds and tiny hillocks."<sup>2</sup> Afterwards, Galileo Galilei described in "Dialogues Concerning Two New Sciences" (1632) marks on a brass plate caused by a "whistling sound" due to a sharp iron chisel being scraped across it.<sup>3</sup> The English scientist Robert Hooke (1635-1703) observed nodal patterns in association with the vibrations of a glass plate with flour caused by a violin bow on July 8, 1680.<sup>4</sup>

Ernst Chladni (1756-1827) repeated and developed Hooke's experiment further. Chladni scattered sand over a thin metal plate and noticed that striking a violin bow against the plate set it in vibration and the sand grains formed certain shapes. He perfected this method and was able to create different patterns (fig. 1) published in *Entdeckungen über die Theorie des Klanges* [Discoveries in the theory of sound] (1827) for the first time, and later in his famous book *Die Akustik* [Acoustics] (1802).<sup>5</sup> His public demonstrations of the experiment became very popular and were admired by contemporaries such as Goethe.<sup>6</sup> The German romantics were also interested in them.<sup>7</sup> The phenomenon of the Chladni patterns was researched by other mathematicians and physicists. French astronomer Camille Flammarion integrated Chladni's experiments in a popular science book and interpreted the patterns as evidence of cosmic harmony.<sup>8</sup> There were also successors of Chladni who took up his approach and extended it with other aspects.<sup>9</sup> Until now, it has been a popular exercise in schools for teaching physics.<sup>10</sup> Since the 1960s, electric devices have been used in the experiment setup. More experiments have been conducted with water and quasi-3D patterns on liquid surfaces were developed.



Figure 1. Ernst F. F. Chladni, his setup, and selected Chladni patterns

In the 1960s, Hans Jenny took up Chladni's experiments and expanded them. He no longer used a violin bow to generate the vibrations, but electronic tools such as frequency and vibration generators as well as piezoelectric amplifiers. These tools allowed him to produce many precise frequencies and amplifications. Jeny also used different materials like quartz sand, powders, and he made several membranes and liquids vibrate. Liquids react more vigorously than solids. For instance, water responds to sounds with wave patterns that often have flower-like forms. The water experiments by Hans Jenny and his followers since the 1960s included a depth effect that the former illustrations and photos of Chladni experiments on plates were missing. Thus, the newer experiments looked more three-dimensional. A wider spectrum of frequencies could be also made visible.

In general, higher frequencies result in more complex patterns, higher altitudes in faster motions. Jenny showed also that apparently static patterns are made of particles moving within those patterns.<sup>11</sup> Cymatics is often connected to esoteric beliefs.<sup>12</sup> For instance, Hans Jenny was influenced by Rudolf Steiner's anthroposophy. In Jenny's view, all forms in the universe are caused by an invisible vibrational force. Jenny published his experiments and thoughts in a two-volume book, titled with the self-coined word "Cymatics"<sup>13</sup> which gained a lot of attention. The aesthetics of his experiments suited his time with new art movements like op art and his ideas were in line with New Age movements.<sup>14</sup>

### APPROACHES OF PROCESSING 2D CHLADNI PATTERNS INTO 3D

In the 21<sup>st</sup> century, the Chladni experiment seems to become even more popular, partly due also to the many videos posted on social media.<sup>15</sup> In addition, 3D visualisations of the Chladni experiment have been possible because of technological advances in computational design and digital fabrication. In recent research, three distinct approaches were found for the development of 3D Chladni patterns that are sometimes also fabricated. (1) The first one is by using directly manipulating parameters in the mathematical formulations developed by Chladni for 2D patterns extended for 3D. (2) A second method is by creating 2D Chladni patterns digitally as images and processing these images in 3D shapes. (3) The third approach is to create Chladni patterns physically on a plate, to digitize these patterns, and to transform them into 3D objects afterwards.

The first approach, developed by mathematicians Martin Skrodzki et al. in the *Chladni Towers*, presents a formula for a 3D pattern starting from the physical formulation of a damped oscillation of a string.<sup>16</sup> Visualizations of different patterns were made in the JavaView Framework and fabrication-ready meshes were created using PyRayRaytracer. One of these meshes was 3D printed. The *Chladni Towers* was awarded one of the two Asian Digital Modelling Contest (ADMC) 2017 Awards of Excellence because of the special topic and the "elegant" form.<sup>17</sup> The authors mention the possibility to use such print-outs in architecture but they do not pursue this topic further.<sup>18</sup>

A second method was developed by İlke Yıldan and Varlık Yücel through the small software application *Cymatify* in written in Processing.<sup>19</sup> Users can generate different Chladni patterns by playing with parameters for amplitude and frequency through sliders. The application allows the export of 2D images in .peg and .bmp formats. Then, the authors describe importing one image in the NURBs modelling software Rhinoceros 3D and processing it with the visual programming language Grasshopper. A point-cloud was created associated with the Chladni pattern and the Z values of each pint were modified according pixel colour data. The point cloud was interpolated into a surface, processed into a mesh, and finally exported and CNC carved in wood.<sup>20</sup>

A third method to fabricate 3D Chladni patterns was presented by Li Min Tseng and June Hao Hou in a conference paper called *Spatial Cymatics* in 2019.<sup>21</sup> In contrast to the other two methods, the authors created an analogue Chaldni pattern setup which they vibrated using sounds produced in PureData. They then took pictures of these vibration patterns and imported multiple images in Rhinoceros3D stacking them on the Z axis. Grasshopper was used for creating a point cloud and the Z values of the points were changed based on image pixel information. Finally, using Grasshopper add-on Millipede, an ISO surfacing algorithm was applied to extract a mesh from the point cloud. The shape was 3D printed.

### 3D CHLADNI PATTERNS IN MUSIC, ARCHITECTURE, DESIGN, AND FASHION

The visual appeal of Chladni patterns proved to be inspiring for a few artists, architects, and designers. 2D Chladni patterns are used for instance for the decoration of mugs, fashion, and carpets. They also inspire artworks – photographs and paintings, but also elaborate multimedia artworks and immersive and interactive installations.<sup>22</sup> In the music realm, Chladni visualisations are more frequently applied. They are used for music videos and immersive stage visuals for instance by Björk and Cirque du Soleil.<sup>23</sup> There have also been attempts for marketing Chladni patterns as music software.<sup>24</sup> 3D Chladni visualisations have been used in software applications for school education and for the general public. But there have not been so many applications beyond that – their potential to create new and special forms and spaces still needs to be discovered more.<sup>25</sup> In the following part, a few selected 3D applications are presented and discussed.

John McGowan created innovative 3D cymatic visualisations accompanied by music for his short film *Holographic Music: An Interpretation of Cymatics* (2014, fig. 2).<sup>26</sup> The 3D visualisations are based on images of Chladni patterns in water for different pitches. McGowan processed these images with Maya's Nurbs modelling techniques (Autodesk Maya 3D Software).<sup>27</sup> He used visual effects such as rotations and motion blurs for modelling the 3D Chladni images and applied a special "soap bubble" material to create a translucent layer. All layers were assembled with the Nuke compositing software at the end. McGowan's short film visualizes how music travels through the air.



Figure 2. John McGowan, Holographic Music: An interpretation of Cymatics (2014)

In architecture, digital music visualisations have inspired postmodern architecture such as the temporary "Pavillon 21 Mini Opera Space" by Coop Himmelb(l)au built in the year 2010 although its spikes were created with other soundwave visualisations than Chladni patterns.<sup>28</sup> 3D Chladni forms were taken up in conceptual project by the American architect Shea Michael Trahan.<sup>29</sup> He placed a "Temple of sound" with a cymatic design in a concert hall. He used the software Tonoscope developed by Kevin Dill and Sergei Mikhailov for creating 2D images he transformed in 3D.<sup>30</sup> Trahan declared that he paid special attention to the effect of the 3D modelling on the room acoustics<sup>31</sup> and said it was a decidedly experimental project. Potential use for the design of architectural spaces would include sensory laboratories, sonic therapy chambers, or theatres, amongst others, but clients would need to be able to finance it.<sup>32</sup>



Figure 3. Ricky van Broekhoven, Soundshape Speakers (2013)

Much attention was paid to the 3D Chladni design of the *Soundshape Speakers* (2013) by Dutch designer Ricky van Broekhoven (fig. 3).<sup>33</sup> He experimented with the analogue setup with Chladni plates and paid special attention to the transitional stages between distinct patterns. He recorded the experiment and made screeenshots of it as the basis for the following simulations in Rhinoceros 3D and Grasshopper.<sup>34</sup> Digital processing was also necessary because the analogue Chladni patterns created with real-life frequencies were never perfect.<sup>35</sup> For the fabrication, Broekhoven used MDF wood which has good acoustic qualities and is often used in loudspeaker design. Based on digital 3D renderings, 16 wooden layers were hand-cut, bonded, and covered with polyurethane for the casing of the speakers.<sup>36</sup> Broekhoven hoped that because of their organic forms, the speakers would look special and attractive for high-end customers.<sup>37</sup> The special form also supports unwanted resonances.<sup>38</sup> Of course, it seems very appropriate that sound visualisations are used for the design of objects that produce sound from electrical signals.



Figure 4. Iris van Herpen, cymatic dress from the autumn-winter collection 2016 "Seijaku"

Dutch fashion designer Iris van Herpen was more freely inspired by Chladni visualisations in her haute couture autumn-winter collection 2016 "Seijaku".<sup>39</sup> The ultra-light Amaike-organza of one short dress was shaped and handstitched on black cotton with a traditional Japanese 3D Shibori technique (fig. 4).<sup>40</sup> The ornament is inspired by recurring honeycomb Chladni patterns.<sup>41</sup> The 3D effect reminds

the viewer of Hans Jenny's Chladni experiments with water, and the dress' colours are evocative of the black and white photos of these experiments. Jenny also discovered honeycomb structures.<sup>42</sup> There is also a counterpart to the snail shape in the lower part of the dress in Jenny's experiments as Jenny discovered vortices in liquids caused by vibration.<sup>43</sup>

The use of the ultralight thread for the sound patterns expresses the floating character of soundwaves in a tangible way.<sup>44</sup> In addition, the dress makes visible how sound unfolds in space and how it not only surrounds the body but also lets it vibrate.<sup>45</sup> The special sculptural 3D shape of van Herpen's dress enhances the creative character of her fashion style and underpins the artistic claim of her fashion creations.<sup>46</sup> The organic forms act together with the traditional methods as an interesting counterbalance to the technological high-end materials such as the thinnest organza in the world.<sup>47</sup>

### CONCLUSION

Even in the digital age, sometimes only an analogue setup is used for creating 3D Chladni shapes, similar to the one Hans Jenny used for his experiments with water in the 1960s and 1970s. But nowadays, digital and analogue methods are often mixed or the work process of 3D Chladni patterns is even kept entirely digital. For the digital rendering of the 2D Chladni patterns into 3D visualisations, there are two options in general. On the one hand, parametric values can be inserted directly into mathematical equations. In this case, the 3D models need to be post-processed. Self-intersecting meshed need to be cleaned and depths have to be added to the shapes. On the other hand, there is the option of working with one or several 2D image(s). Then, point clouds need to be derived from image pixel values. Their surfaces can be extracted by ISO surfacing which is also a method used in the medical field for processing data from MRI or CT scans. The used process also depends on the chosen fabrication method. For instance, the 3D shapes can either be fabricated manually or the shapes can be sliced, laser-cut, and glued back together. Other fabrications possibilities are CNC that uses pixel information to create depths, or 3D prints that require more processing.

Beyond software applications for educational purposes, there have been only a few applications of 3D Chladni shapes. But the discussed high-quality examples from various areas such as architecture, music visualisation, design, and haute couture fashion make clear that the inspiring potential of 3D Chladni figures is worth be discovered more in today's creative industries.<sup>48</sup>

### NOTES

<sup>1</sup> The title refers to the Greek "Kyma" for wave. The term "Cymatics" was coined by Hans Jenny who published a book with the same title – Hans Jenny, *Cymatics* [1967/1972], revised edition (Newmarket: MACROmedia Publishing, 2001). For more information on Hans Jenny please see below. In general, Cymatics is dominated by the New Age discourses that shape its public image, for instance, Cymatics is combined with energy healing. In our paper, we will thematise Cymatics rationally and scientifically.

<sup>2</sup> Leonardo da Vinci, *Notebooks of Leonardo da Vinci*, arranged, rendered into English and introduced by Edward McCurdy (New York: Reynal and Hitchcock, 1939), 542.

<sup>3</sup> Galileo Galilei, *Dialogues Concerning Two New Sciences* [1632] (New York: Macmillan Co., 1914), 101.

<sup>4</sup> Robert Hooke, *The Diary of Robert Hooke 1672-80* (London: Taylor & Francis, 1935), 448 [entry of July 8, 1960].

<sup>5</sup> Ernst F. F. Chladni, *Entdeckungen über die Theorie des Klanges* (Leipzig: Weidmanns Erben und Reich, 1787), idem, *Die Akustik* (Leipzig: Breitkopf und Härtel, 1802).

<sup>6</sup> Helga de la Motte-Haber, "Musik und Licht – Zeitfarben," in *Licht und Zeit*, ed. Gernot Böhme, Reinhard Olschanski (Munich: Wilhelm Fink Verlag, 2004), 87.

<sup>7</sup> Antje Pfannkuchen, "A Science of Hieroglyphs, or the Test of *Bildung*," in *The Technological Introject: Friedrich Kittler between Implementation and the Incalcuable*, ed. Jeffrey Champlin, Antje Pfannkuchen (New York: Fordham University Press, 2018), 90.

<sup>8</sup> Camille Flammarion, *Astronomic populaire* (Paris: C. Marpon and E. Flammarion, 1890), 285-9. – See also David Phillips, "Abstraction and truth in nineteenth century imagery," *Bulletin of the John Rylands University Library of Manchester* 78 (1996): 125-6.

<sup>9</sup> Margaret Watts-Hughes, *Eidophone* (London: Christian Herald, 1904); Henry Holbrook Curtis, "The Tonograph," *Scientific American* 76 (1897), 345-346.

<sup>10</sup> Jan-Peter Meyn, *Grundlegende Experimentiertechnik im Physikunterricht* (Munich: Oldenbourg, 2013), 29.

<sup>11</sup> Cyndi Dale, *The Subtle Body: An Encyclopedia of Your Energetic Anatomy* (Boulder: Sounds True, 2009), 141.

<sup>12</sup> See endnote 1.

<sup>13</sup> The first volume of Jenny's study "Cymatics" was published in 1967, the second in 1972 (the year of Jenny's death) – Jenny, *Cymatics*. See also: *The Unesco Courier*, December 1969, vol. 22 (with the topic "The sculpture of vibration").

<sup>14</sup> Dale, *The Subtle Body*, 141; *Encyclopedia of New Age Beliefs*, ed. John Ankerberg, John Weldon (Eugene: Harvest House Publishers, 1996), 342.

<sup>15</sup> Andrea Rhodenborgh, *Discovering an uncanny world: Cymatics software and the journey to the creation of knowledge within the field of contemporary Cymatics*, master thesis (Utrecht: Utrecht University, 2016), 19.

<sup>16</sup> Skrodzki et al. give the mathematical formulation in: Martin Skrodzki, Ulrich Reitebuch, Konrad Polthier, "Chladni Towers," in *ADMC 2017 – Asian Digital Modeling Contest 2017. Catalogue*, ed. Kunio Kondo et al. (Tokyo: Japan Society for Graphic Science, 2017), 17. They explain the mathematical and physical background of their approach in a previously published paper: Martin Skrodzki, Ulrich Reitebuch, Konrad Polthier, "Chladni Figures Revisited: A Peek Into The Third Dimension," in *Proceedings of Bridges 2016: Mathematics, Music, Art, Architecture, Education, Culture*, ed. Eve Torrence et al. (Phoenix: Tesselations Publishing, 2016), 482-3.

<sup>17</sup> "ADMC2017 Award for Excellence, News of the Mathematical Geometry Processing Workgroup," Mathematical Geometry Processing Workgroup (Freie Universität Berlin), news section, August 15, 2017, accessed July 25, 2020, https://www.mi.fu-berlin.de/en/math/groups/ag-geom/news/2017\_08\_10\_admc.html#.

<sup>18</sup> Skrodzki et al, "Chladni Figures Revisited."

<sup>19</sup> İlke Yıldan, Varlık Yücel, "Form Follows Algorithm: Differentiation of Chladni Patterns through Mathematical Functions in Processing," in *Proceedings on XX Generative Art Conference*, GA2017, accessed March 20, 2020, https://www.generativeart.com/.

<sup>20</sup> The topic of the printing of the 3D images is broached only shortly in Yıldan's and Yücel's paper – ibidem.

<sup>21</sup> Li Min Tseng, June Hao Hou, "Spatial Cymatics," conference paper presented at *ArtsIT 2019 – 8th EAI International Conference: ArtsIT, Interactivity and Game Creation*, November 6-8, 2019, Aalborg, Denmark.

<sup>22</sup> Because of COVID-19, our paper on Chladni patterns and media art for CIHA 2020 in Sao Paulo was postponed to 2021.

<sup>23</sup> Icelandic singer Björk integrated Chladni visualisations in immersive stage visuals and in a documentary in 2013. For instance. Meara O' Reilley created Chladni floor projections for the song Cosmogeny for Björk's concert tour Biophilia (supported by Scott Snibbe who was responsible for the concert visuals). Sometimes they also were projected on backdrop screens – Jodina Meehan, "Björk Cymatics Collaboration," Journal of Cymatics: The Studv of Sound Made Visible, 16 January 2013. Accessed June 4. 2020. http://cymatica.com/2013/01/16/bjork-cymatics-collaboration/. Evan Grant visualized Björk's song Crystalline for the documentary When Björk Met Attenborough - "Bjork [sic] and Attenborough!," Evan Grant, August 2013, accessed June 4, 2020, http://www.evangrant.com/2013/08/bjork-and-attenborough/. Jodina Meehan created cymatic visuals for the Cirque Du Soleil's show Totem in 2010 - Jodina Meehan, "Cirque Du Soleil Cymatics," Journal of Cymatics: The Study of Sound Made Visible, 15 October 2010, accessed June 4, 2020, http://cymatica.com/2010/10/15/cirque-du-soleil-cymatics/. - Musician and sound artist Nigel Stanford combines electronic music with very diverse sound vibration patterns created in an analogue way in his music video "CYMATICS: Science Vs. Music" - Nigel Stanford, CYMATICS: Science Vs. Music, music video 2014.

<sup>24</sup> John Matthew Tennant developed a software for cymatic music visualisations but he had difficulties with its distribution – see the demo video: John Matthew Tennant, *Cymatic Music Visualizer – Animated Software Tonoscope Demo*, video 2015, accessed May 24, 2020, https://www.youtube.com/watch?v=\_8fySo77IxM. John McGowan and his colleagues suggested potential outlets for digital cymatic visualisations in commercial environments, such as VR or AR applications – John McGowan, Grégory Leplâtre, Iain McGregor, "CymaSense: A Real-Time 3D Cymatics Based Sound Visualisation Tool," in *DIS '17 Companion: Proceedings of the 2017 ACM Conference Companion Publication on Designing Interactive Systems* (New York: Association for Computing Machinery, 2017), 270-274.

<sup>25</sup> See for instance *Resonant Chladni Patterns* app, Technical University Munich website, Application Library of the Chair of Vibroacoustics of Vehicles and Machines, accessed May 15, 2020, http://www.apps.vib.mw.tum.de/app/chladni\_plate\_mph?id=0085.

<sup>26</sup> John McGowan, *Holographic Music: An Interpretation of Cymatics*, video, 2014, accessed July 25, 2020, https://www.youtube.com/watch?v=BtXYzj-iDRs. – After creating the short film, John McGowan continued to research 3D Cymatics with special regard to use it for autistic people, see, for instance, McGowan et al., "CymaSense."

<sup>27</sup> McGowan documented the work process of *Holographic Music* on his personal WordPress page "J. J. McGowan – Digital Art and Music" in detail (accessed July 26, 2020, https://jzmcgowan.wordpress.com/).

<sup>28</sup> Jimi Hendrix' "Purple Haze" and a passage from Mozart's "Don Giovanni" have been transformed into some architectural elements of the pavilion – Coop Himmelb(I)au, *Pavillon 21. Mini Opera Space* (Vienna: Himmelprint 2010), 7.

<sup>29</sup> Shea Trahan, "The Architecture of Sound," TEDxVermilionStreet talk, October 13, 2015, video, accessed June 4, 2020, https://www.youtube.com/watch?v=R-BMF4e-1bg; idem, "Resonant Form: The Convergence of Sound and Space," extended abstract, in *Connections: BridgeSynapses*, ANFA 2016 Conference booklet, 161-163, accessed June 4, 2020, https://www.brikbase.org/sites/default/files/2016-09-16%20ANFA%20Conference%20Abstract\_71.pdf.

<sup>30</sup> Idem, *Resonant Form: The Convergence Of Sound and Space*, master thesis (New Orleans: Tulane University, 2013), 74f.

<sup>31</sup> Idem, "Resonant Form" [extended abstract].

32 Ibid.

<sup>33</sup> The prototypes of Ricky van Broekhoven's "Soundshape Speakers" were exhibited during the Dutch Design Week 2013 at Convoi Exceptionnel exhibition in Eindhoven Strijp-T – Adrian Madlener, "Soundshapes by Ricky van Broekhoven," *frameweb*, November 16, 2013, accessed March 15, 2020, https://www.frameweb.com/news/soundshapes-by-ricky-vanbroekhoven.

<sup>34</sup> E-mail from Ricky van Broekhoven to Viola Rühse, July 1, 2020.

<sup>35</sup> Ibid.

<sup>36</sup> Manufacturing the wooden layers by hand was a cost-effective option for the building of the prototypes at that time – ibid. See also Sunil Chandel, "Sound Designer Creates 3D Printed Speaker From Musical Patterns," *Homecrux*, November 22, 2013, accessed June 5, 2020, https://www.homecrux.com/sound-designer-assembles-3d-printed-speaker-music-patterns/10619/.

<sup>37</sup> Monika Thakur, "20 luxury loudspeakers that look as good as they sound," *Homecrux*, September 17, 2015, accessed June 5, 2020, https://www.homecrux.com/20-luxury-loudspeakers-that-look-as-good-as-they-sound/35042/.

<sup>38</sup> E-mail from Ricky van Broekhoven to Viola Rühse, July 1, 2020.

<sup>39</sup> The Japanese word "Seijaku" means "tranquillity". See also Charles Daniel McDonald, "Iris van Herpen Seijaku," *Forc Magazine*, 2016, accessed June 5, 2020, https://www.forcmagazine.com/iris-van-herpen-seijaku/.

<sup>40</sup> Dress, from the Iris van Herpen Haute Couture Collection, Autumn/Winter 2016, Polyester Monofilament organza, shibori tied, and cotton/elastane-bend twill, collection of the Kyoto Costume Institute. – The dress was presented for instance in the *Kimono Refashioned* exhibition in the Newark Museum and the Asian Art Museum in San Francisco in 2018 and 2019, see also the exhibition catalogue: *Kimono Refashioned: Japan's Impact on International Fashion*, ed. Yuki Morishima and Rie Nii (San Francisco: Asian Art Museum, 2018), 89. – In other fashion designs, Iris van Herpen often uses 3D printing techniques for her creations to achieve special sculptural effects. See also Anneke Smelik, "New materialism: A theoretical framework for fashion in the age of technological innovation," *International Journal of Fashion Studies*, 1 (2018), 40.

<sup>41</sup> See for instance the Chladni pattern that occurs at 1820 hz static on a square plate (photographed by Flickr user "Foster" in April 2014, accessed June 5, 2020, https://www.flickr.com/photos/selenitephotography/13629624875/in/album-72157643421870175/).
<sup>42</sup> Jenny, Cymatics, 48 (fig. 47).

<sup>43</sup> Ibid., 56, 58. – Hans Jenny has assembled many different forms in the volumes of his study "Cymatics".

<sup>44</sup> The organza is woven from extremely thin threads – McDonald, "Iris van Herpen Seijaku."

<sup>45</sup> Vilém Flusser, Gesten. Versuch einer Phänomenologie (Frankfurt a. M.: Fischer, 1994), 154.

<sup>46</sup> The sculptural forms are seen as a signature characteristic for Iris van Herpen's dresses. – Jenna Calvert, "When Couture Collides with Science: A Retrospective of Iris Van Herpen's Most Avant-Garde Creations," *Vogue Arabia Online*, 1 July 2019, accessed June 5, 2020, https://en.vogue.me/fashion/retrospective-of-iris-vanherpens-most-avant-garde-creations/.

<sup>47</sup> In general, Iris van Herpen is well known for her interest in science and her avant-garde designs (ibid.). She often combines cutting edge technology with traditional methods – Charmaine Li, "Interview with Iris van Herpen," *Mono.Kultur* 47 (2019): 6.

<sup>48</sup> See also our further research on a design framework for 3D modelling and digitally fabricating sound patterns – Anca-Simona Horvath, Viola Rühse, "*The Chladni Wall*," in: *HCI International 2020 – Late Breaking Posters, Proceedings, Part II*, ed. Constantine Stephanidis et. al. (Cham: Springer, 2020), doi: 10.1007/978-3-030-60703-6\_50; Anca-Simona Horvath, Viola Rühse, Dimitrios Raptis, "SoundSculpt: A Design Framework for 3D Modelling and Digitally Fabricating Sound Patterns" (paper presented at OzCHI 2020: 32nd Australian Conference on Human-Computer Interaction. Association for Computing Machinery (Australian Conference on Human-Computer Interaction, Sydney, December 1-2, 2020).

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# CONNECTIONS AND CONNECTIVITY: FROM INVISIBLE AND VIRTUAL CITIES TO SOCIAL MEDIA

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### INTRODUCTION

Kublai Khan's magnificent atlas in Italo Calvino's book *The Invisible Cities*, depicts cities which neither Marco Polo nor geographers know if or where they exist, but they could not be missing from the forms of possible cities.<sup>1</sup> Site names change "as many times as there are foreign languages and [...] every place can be reached from other places, by the most various roads and routes".<sup>2</sup> The maps of all cities: those that have existed, that exist today and that will exist in the future are gathered in this atlas.<sup>3</sup>

So taking a closer look, the aspiring traveler would be able to distinguish the new cities of the 20th and 21st centuries with their elaborate forms and dual status taking their place in the pages of the atlas. These are the cities that sought status in our new world that came to complement the existing one and give it new dimensions. They are the virtual<sup>4</sup> cities of cyberspace, distinct experiences for every cybernaut, for every cyber traveler that the coronavirus' outbreak these days has transformed to an almost permanent virtual traveler. They are cities of memory and desire too, such as those described by Marco Polo, cities where signs are more important than themselves and the name is a substitute for the place.

There, on Kublai Khan's map one would be able to distinguish digital cities that were born digital as a reflection in a mirror of those that already exist and which eyes choose to look at through the mirror of the screen and gaze at this place without place, the cyberspace, and see that, in this case, the two Valdradas live for each other looking at each other in the eyes and, unlike those of Marco Polo's narrative, that these two love each other. "Nothing exists or happens in one Valdrada that the other Valdrada does not repeat, because the city was so constructed that its every point would be reflected in its mirror".<sup>5</sup>

### Pairing Digital and Invisible cities

Among the names of these cities the aspiring traveler will recognize *Second Life*. He will also distinguish the cities that sought to look like cities and simulate their existence by design, like Eudoxia's carpet where you can observe the city's true form. "If you pause and examine it carefully, you become convinced that each place on the carpet corresponds to a place in the city and all the things contained in the city are included in the design."<sup>6</sup>

It is exactly there, where if the traveler takes a better look on the map, he will recognize the *Geocities*' footprint. He will also see the cities incorporated digitally on the same map, cities born in the city such as Olinde, and among them he will distinguish *Amsterdam*.

Kublai Khan's atlas has the capacity to reveal the form of cities that have yet to acquire either form or name, but we will wander through cities that have already taken form and name and whose urban fabric has fallen apart over time because our sights have turned with desire to new conquests, new cities.

### DIGITAL CITY: A DEFINITION AND SOME CLARIFICATIONS

Before we begin our tour, however, let us examine the concept of the digital city in order to highlight the duality of its character. On the one hand, a digital city can be defined as the city that is transformed or re-oriented by adopting and integrating digital technology, Information and Communication Technology, with the aim of improving the quality of life of its inhabitants, protecting the environment, upgrading urban services and the working environment, reducing costs and energy consumption while contributing to the strengthening of collective action and citizen participation in the commons.

It is the so-called smart city. On the other hand, the digital city can be defined as the digital presence in cyberspace of a fictional or an existing city, either partly or in its entirety. The fictional city can be based (partially or completely) either on the simulation of urban functioning, or on a design deriving from the urban structure as a metaphor.

It should be noted that, "despite the common terminology digital cities have different goals, offer different services, use different system architectures, and have developed different organizational forms and business models. This variety is related to the different social contexts in which digital cities have developed."<sup>7</sup>

At this point, I would like to stress that the exponential development of information and communication technologies, a system which to a certain extent reproduces and evolves itself, has the effect of making historical time for the digital field extremely short.

In this light, the reference to digital cities, their course, their goals and the consequences of their existence seems more like a historical flashback to online genealogical roots. That is because in the relatively short period of 20 years from the first public steps of the internet to the present day, digital cities were born and died or transformed into something different, both in terms of technological background and in terms of the primary idealistic "liberating" objectives.

### The hyperrreal

Parts of a virtual world, digital cities grew and lived as a computer simulated environment. Their ancestors in the evolutionary history of the virtual, MUDs (Multi User Dungeon) and MOOs (MUDs Object Oriented) provided a virtual place where people could come together. MUDs, says Julian Dibbell, a pioneer cybernaut, and a pop music composer, who wrote tech stories for Village Voice, "mapped a place as yet uncharted by conventional cartographic means: the strange, half-real terrain occupied by the human animal ever since it started surrounding itself with words, pictures, symbols, and other shadows of things not present to the human body"<sup>8</sup>. Dibbell locates the origins of the MOOs in the invention of cartography. So the map comes up again. Great Khan's atlas depicts the cities of the empire for which Italo Calvino says that there is a "desperate moment when we discover that this empire, which had seemed to us the sum of all wonders, is an endless, formless ruin."<sup>9</sup> Respectively, Borges' empire ended in tattered ruins. The perfection of cartography drove to a so detailed depiction of the empire that the map ended up empire's size. So in time, next generations saw "that the Map was

Useless, and not without some Pitilessness was it, that they delivered it up to the Inclemencies of Sun and Winters. In the Deserts of the West, still today, there are Tattered Ruins of that Map, inhabited by Animals and Beggars; in all the Land there is no other Relic of the Disciplines of Geography."<sup>10</sup>

Baudrillard uses Borges' empire's fate to declare that "today abstraction is no longer that of the map, the double, the mirror, or the concept. Simulation is no longer that of a territory, a referential being, or a substance. It is the generation by models of a real without origin or reality: a hyperreal."<sup>11</sup> In the universe of hyperreality, "entertainment, information, and communication technologies provide experiences more intense and involving than the scenes of banal everyday life, as well as the codes and models that structure everyday life. The realm of the hyperreal (e.g., media simulations of reality, Disneyland and amusement parks, malls and consumer fantasylands, TV sports, virtual reality games, social networking sites, and other excursions into ideal worlds) is more real than real, whereby the models, images, and codes of the hyperreal come to control thought and behavior."<sup>12</sup>

Hence, bearing these clarifications in mind, I have chosen three destinations representative of virtual digital cities.

### THE SECOND LIFE

The first stop is Second Life, one of the fictional digital cities that simulate urban functioning in all its manifestations. It is a representative example of hyperreality as a condition in which reality and fiction are blended together so that their boundaries are not clear. In the Second Life app, the subject lives a second, virtual, life. He selects or creates his avatar, the humanoid that will represent him in this new life and with the help of graphics and sound software that reproduce parts of reality he lives a second everyday life in this space of virtual but also actual reality.

Real companies are buying advertising space in Second Life's virtual space, while Google Earth combines reality with the app's virtual reality by adding maps from actual reality. So we can observe an "imaginary reality" at the same time as the virtual Second Life's community can participate in actual reality activities in Second Life's environment.

The idea arose from the tendency of companies to seek increasingly innovative ways of involving their employees in meetings and conferences remotely, long before they were forced to use platforms for communicating owing to the covid-19 pandemic. With the "Enterprise" tool of Linden Lab, the creator company of Second Life, it is possible for the avatars -the animated alter egos- of the companies' employees to meet in private spaces created in the virtual reality of Second Life exclusively for the company that asked for that service, away from the public networks that constitute the cyberspace of Second Life.

This osmosis of virtual and actual reality, as well as the often distorting reflection of actual to virtual reality that takes place in Second Life, can also be observed in the digital cities of computer games or virtual 3D reality. But I will not dwell on that here, I will continue our tour taking us to Geocities, a digital city designed on the basis of urban structural design as a metaphor.

### GEOCITIES

It is a design metaphor of the city's "logic" by creating neighborhoods of common interest. "GeoCities" could be considered the precursors of today's social networking platforms, in the sense of setting up a community and participating in it on the basis of common interests. Founded by David Bohnett and John Rezner, Geocities were a Web Hosting Service that first appeared on the internet in the mid-1990s and specifically in late 1994.

Their themed divided areas rapidly became popular and as happens with most successful innovative applications, just before the "bubble .com" burst in January 1999, "GeoCities", were purchased by Yahoo! which was already large and growing fast at that time.

Ten years later, in April 2009, the company announced that it would close their American division. In June 2009 the message "Geocities close on October 26, 2009" appeared on the home page of "GeoCities" marking the symbolic and actual end of the early websites period and the pioneering, for that time, grouping of websites by thematic interests based on "neighborhoods" and "cities".

The emergence of social networking platforms such as Facebook (2004), Myspace (2003) or Twitter (2006), had the result of GeoCities websites being abandoned by many users. The ease with which blogs could be updated with multimedia material brought about the final blow. And the last GeoCity, remaining in existence in Japan, closed in March 2019.<sup>13</sup>

### THE DIGITAL CITY OF AMSTERDAM

The next city we shall visit belongs to the category of digital cities that "transport" part or all of an existing city into cyberspace. This one is as dead as Geocities too, but it comes alive through memory and conversations.

The digital city we will tour is the digital city of Amsterdam, the famous Digital City (De Digitale Stad, DDS). A city born on January 15, 1994 in Amsterdam, based on the idea of Free-nets that had been founded in the United States as early as the late 1980s.<sup>14</sup> With the emergence of the Internet, Free-nets offered online access to the public in order to support non-profit community actions.

### Free-nets and AOL's Digital City

Tom Grundner was the pioneer who founded the National Public Telecommunications Network at Case Western Reserve University in Cleveland, Ohio in 1989.<sup>15</sup> This network was a non-profit organization with the aim of establishing and developing services free of charge for digital information and communication access for the public. Cleveland's first Free-net<sup>16</sup> was followed by about 100 to 200 other Free-nets that provided the first public internet access geared to community and political goals.

AOL's Digital City was also based on the idea of Free-nets. It was US' larger and most popular local city resource providing locally focused online network services for dozens cities. Each AOL digital city collects tourist and shopping information of the corresponding city and provides local advertising opportunities for vertical markets including auto, real estate, employment, and health.<sup>17</sup> Digital City on 1996 reached 3 million people every month.<sup>18</sup> Two years later AOL's Digital City was the number one local content and community guide on the Internet, according to the research report from Media Metrix, which measured online and Web usage from March 1998.<sup>19</sup> On August 2008 this number reached 60 million unduplicated unique visitors.<sup>20</sup> AOL's Organization is different compared to DDS's because "organizations of digital city projects result from their goals. AOL digital cities are operated by a for-profit company. In other digital cities, public sectors are more or less running the projects. Digital City Amsterdam is operated by a non-profit organization [...], which consists of 30 members including system managers, programmers, html managers and WEB designers. DDS pays salaries to those members, and uses any monies collected for the organizational goal."<sup>21</sup>

### DDS: Actually virtual and virtually actual

The Digital City of Amsterdam was an initiative of the De Balie Cultural Centre and the Hack-Tic NetWerk, a network aimed at providing access for all to the new information and communication technologies. This network later became the well-known online provider XS4ALL.<sup>22</sup> For the first

time, internet access was possible for a large group of citizens. Free of charge, the services of e-mail, discussion groups, newsgroups and limited access to the web --which had just taken its first steps-were provided to visit the pages of special interest groups and local organizations. And all this constructed on a city-like model, a city-like design.

"The concept is simple: the virtual city is based on the features of an ordinary one. For the information providers there are different theme-based squares, serving as meeting places for people interested in particular themes. There is, for example, an environmental square, a news square, a health square, a book square and a gays square, each with eight buildings occupied by thematic information providers.

The users can, like real citizens, build 'houses' between the octagonal 'squares', homepages containing personal or other information. In the 'public spaces' of the squares and in bars discussions take place on a wide range of topics. [As Letty Francissen and Kees Brants note], the transfer of the city has, in short, become both actually virtual and virtually actual."<sup>23</sup>

Its inhabitants and visitors moved around the city. In the first ten weeks of its existence alone, 100,000 citizens visited the digital city and 13,000 were registered as residents<sup>24</sup>. The inhabitants were divided into those who provided information and for this purpose "worked" in the buildings of the squares, and those who were information seekers, had their "houses" and wandered around from square to square entering the buildings in search of information or chatting in cafes and discussion groups.<sup>25</sup>

The digital city of Amsterdam was one of the first online communities and the first in the Netherlands. Marleen Stikker was in charge, they called her mayor of the digital city and as she notes in an interview, the central issue for DDS is the fulfillment of human needs. <sup>26</sup> In 1995 DDS became an institution, but stopped its action when the grant from the Municipality of actual reality was discontinued. In 2011 an initiative was launched to rebuild the Digital City as a digital heritage and is on display at the Amsterdam Museum.<sup>27</sup>

"Community networks like the Digital City of Amsterdam [notes Kees Schalken] create new ways of interaction between politicians, civil servants and citizens and they are breathing new life into the formation of communities of citizens".<sup>28</sup>

## THE EMPIRE IS SICK: FROM THE FREEDOM OF EXPRESSION TO SURVEILLANCE'S REALM

It is true that in those early internet years many analysts had seen the return of an Athenian direct democracy, an e-democracy or a cyberdemocracy. They perceived the new media as the tools to broaden participation, as a way to democratize the decision-making process, strengthen the citizenspolicy relationship through interactive processes, but also as a promise to rebuild the active public sphere that would regenerate the political process and bypass the filters of traditional media. They wondered whether the internet is a new public sphere for a Habermasian discourse and communication, a space "of inclusive critical discussion, free of social and economic pressures, in which interlocutors treat each other as equals in a cooperative attempt to reach an understanding on matters of common concern."<sup>29</sup>

Because, it is a fact that in the early years of its use, the internet was a space of collective action, freedom of expression, independent information, but also a reaction to anti-democratic policies and totalitarian regimes. It was an "open" system, an "open cyber society" geared to the universal rights and seamless coexistence, based on initiatives and creativity, in the collective contribution to a better today and tomorrow. It is the time when the internet had no borders, communication was free and the

expansion of the number of participants was an endless aspiration. However, as with any open system, the reverse course is beginning.

Thus, for the internet, the basic rule of any code's operation has been confirmed: as it is created, thus it is destroyed. "The code of cyberspace, is changing. And as this code changes, the character of cyberspace will change as well. Cyberspace will change from a place that protects anonymity, free speech and individual control, to a place that makes anonymity harder, speech less free and individual control the province of individual experts only" wrote Lessig in 2000, but, to a large extent, these changes had already occurred.<sup>30</sup>

The commercialization of the internet contributed to this shift as technology enabled geographical location identification and behavioral targeting advertising. Control, surveillance and restrictions arose through the very same code that guaranteed freedom of information. The diffusion of the new media and the social networking platforms that followed later, in the mid-2000s, while being the "absolute" means of freedom of expression, as they enabled anyone who wished to express himself to do so in any way he liked, is at the same time the first pole of a highly contradictory duality. It is a duality of freedom and control that traverses through virtual and actual reality. The first pole of that duality, as it was mentioned, includes the galaxy of the internet and social media, potentially an area of freedom of expression, but at the same time it is an increasingly expanding database of personal data.

The other pole includes the political-economic interests that apply mining techniques to get and use these personal data made public on social media platforms, but also those resulting from systematic users' cyber surfing tracking and digital technologies in general, for surveillance, control and suppression. It should be noted that in the age of social media, freedom of expression is often reduced to promiscuity and the right to information is limited to the user's interests filtered by algorithms, contributing to a fragmentation of the public sphere. <sup>31</sup>

To this should be added the public sphere's distortion by propaganda and fake news produced either by natural persons or by automatic robot mechanisms, the bots that are also contributing to the alteration of the public sphere.

On a night when his heart was heavy, Kublai Khan questioned the existence of the cities mentioned by Marco Polo. And he, knowing how "to fall in with the sovereign's dark mood", admitted that "the empire is sick, and what is worse, it is trying to become accustomed to its sores. This is the aim of my explorations [said Marco Polo]; examining the traces of happiness still to be glimpsed, I gauge its short supply. If you want to know how much darkness there is around you, you must sharpen your eyes, peering at the faint lights in the distance." <sup>32</sup>

So let us sharpen our gaze and look at the faint distant lights of the internet empire with the wish that this perpetual tug-of-war between freedom and surveillance occurring in cyberspace will not lead, as Kublai Khan would say, the pride in the boundless extension of the territories we have conquered, to be succeeded by the melancholically realization that we will cease to want to know and understand them.<sup>33</sup>

#### NOTES

<sup>1</sup> Italo Calvino, *Invisible Cities*, trans. William Weaver (San Diego, New York, London: Harcourt Brace & Company, 1974), 137.

<sup>2</sup> ibid. 137.

<sup>3</sup> ibid. 137-138.

<sup>4</sup> "The virtual, rigorously defined, has little affinity with the false, the illusory or the imaginary. The virtual is not at all the opposite of the real. On the contrary, it is a strong and powerful way of being, which gives play to the creation processes, opens up futures, digs the sinks of meaning under the platitude of the immediate physical presence", Pierre Lévy, *Qu'est-ce que le virtuel?* (Paris: La Découverte, 1995) 10.

<sup>5</sup> Calvino, *Invisible Cities*, 53.

<sup>6</sup> ibid. 96.

<sup>7</sup>Peter van den Besselaar, Makoto Tanabe and Toru Ishida, "Introduction: Digital Cities Research and Open Issues," in *Digital Cities II. Computational Sociological Approaches*, ed. Makoto Tanabe, Peter van den Besselaar and Toru Ishida (Berlin, Heidelberg, New York: Springer Verlag, 2002) 1.

<sup>8</sup> Julian Dibbell, "A Genealogy of Virtual Worlds", in *My Tiny Life. Crime and Passion in a Virtual World*, (New York: Henry Holt and Company Inc., 1998) accessed July 30, 2020 <u>http://www.juliandibbell.com/texts/history.html</u>.

<sup>9</sup> Calvino, Invisible Cities, 5.

<sup>10</sup> Jorge Luis Borges, "On Exactitude in Science", in *Collected Fictions*, trans. Andrew Hurley (London: Penguin Classics, 1999) accessed July 30, 2020, <u>https://kwarc.info/teaching/TDM/Borges.pdf.</u>

<sup>11</sup> Jean Baudrillard, *Simulacra and Simulation*, trans. Sheila Faria Glaser, (Michigan, The University of Michigan Press, 1994) 1.

<sup>12</sup> Douglas Kellner, "Jean Baudrillard", in *The Stanford Encyclopedia of Philosophy* (Winter 2019 Edition), ed. Edward N. Zalta, accessed July 30, 2020 <u>https://plato.stanford.edu/archives/win2019/entries/baudrillard/.</u>

<sup>13</sup>Isabella Steger, "GeoCities Japan is finally shutting down", October 1, 2018, accessed July 30, 2020, <u>https://qz.com/1408120/yahoo-japan-is-shutting-down-its-website-hosting-service-geocities/.</u>

<sup>14</sup> For details about DDS see the results of the project "The Digital City Revives" at <u>https://waag.org/en/project/digital-city-dds</u>, accessed July 30, 2020.

<sup>15</sup> T. Ishida, A. Aurigi and M. Yasuoka, "World Digital Cities: Beyond Heterogeneity", in *Digital Cities III. Information Technologies for Social Capital: Cross-cultural perspectives*, eds. Peter van den Besselaar and Satoshi Koizumi, (Berlin, Heidelberg, New York: Springer Verlag, 2005) 190. See also Doug Schuler, "Digital City and Digital Citizensp", in *Digital Cities II. Computational Sociological Approaches*, eds. Makoto Tanabe, Peter van den Besselaar, Toru Ishida (Berlin, Heidelberg, New York: Springer Verlag, 2002) 73.

<sup>16</sup> Ernie Smith, "The Tale of the Free-Net, the Cheap Way Dial-Up Users Got Online", *The Vice*, January 20, 2018, accessed 30.07.2020, <u>https://www.vice.com/en\_us/article/qvwayd/cleveland-free-net-the-cheap-way-dial-up-users-got-online</u>.

<sup>17</sup>Toru Ishida, "Understanding Digital Cities", in *Digital Cities: Experiences, Technologies and Future Perspectives, Lecture Notes in Computer Science*, eds. T. Ishida and K. Isbister, Vol. 1765, Berlin, Heidelberg, New York: Springer Verlag, 2000) 8. See also "AOL's Digital City to Launch Four New Cities", Adage.com, August 16, 1996, accessed July 30, 2020, <u>https://adage.com/article/news/aol-s-digital-city-launch-cities/2272.</u>
<sup>18</sup> accessed July 30, 2020, http://www.tcl.tk/customers/success/aol.tml?sc\_format=wider.

<sup>19</sup> "AOL Studios Launches Digital City 2.0 Technology in Los Angeles and Expands Site to Web", Warner Media, May 07, 1998, accessed July 30, 2020 <u>https://www.warnermediagroup.com/newsroom/press-releases/1998/05/07/aol-studios-launches-digital-city-20-technology-in-los-angeles.</u>

<sup>20</sup> comScore Media Metrix, August 2008.

<sup>21</sup>Toru Ishida, "Understanding Digital Cities", 15.

<sup>22</sup> During the war in Yugoslavia in the 90s, the internet was a source of information and a field of a fierce cyber war. When the Belgrade government banned operation of the independent B92 radio station, the station managed to retransmit over the internet, using xs4all, the Amsterdam based server.

<sup>23</sup> Letty Francissen and Kees Brants "Virtually going places. Square-hopping in Amsterdam's Digital City", in *Cyberdemocracy: Technology, Cities and civic networks*, eds. Roza Tsagarousianou, Damian Tambini and Cathy Bryan (London and New York: Routledge, 1998) 20.

24 ibid. 23.

<sup>25</sup> ibid. 24.

<sup>26</sup>Shuschen Tan, "An Interview with Marleen Stikker", trans. Patrice Riemens, in ctheory.net, eds. Arthur and Marilouise Kroker, February 8, 1995, accessed July 30, 2020, <u>http://www.ctheory.net/articles.aspx?id=65</u>.

<sup>27</sup> Peter Teffer, "In Amsterdam, web archaeologists excavate a digital city", CSM, March 29, 2014, accessed July 30, 2020, <u>http://www.csmonitor.com/World/Europe/2014/0329/In-Amsterdam-web-archaeologists-excavate-a-digital-city.</u>

<sup>28</sup> Kees Schalken, "Virtual Communities. New Public Spheres on the Internet?", in Democratic Governance and New Technology. Technologically Mediated Innovations in Political Ppractice in Western Wurope, eds. Jens Hoff, Ivan Horrocks and Pieter Tops, (London, New York: Routledge, 2002) 168.

<sup>29</sup> Bohman, James and Rehg, William, "Jürgen Habermas", in *The Stanford Encyclopedia of Philosophy* (Fall 2017 Edition), ed. Edward N. Zalta, accessed July 30, 2020, https://plato.stanford.edu/archives/fall2017/entries/habermas/.

<sup>30</sup> Lawrence Lessig, "Code is Law. On Liberty in Cyberspace", Harvardmagazine.com, January 1, 2000, accessed July 30, 2020, <u>http://harvardmagazine.com/2000/01/code-is-law-html</u>.

<sup>31</sup> See Marina Rigou, *From the digital revolution to the digital surveillance. Publicity, new media and politics*, (Athens: Sideris publications, 2014), Greek edition, and Marina Rigou, "Big brother is (still) watching you. Aspects of the new surveillance", in *Privacy and Surveillance. Current aspects and future perspectives*, selected papers from ICIL 2012 in Corfu, Greece, ed. Maria Bottis, (Athens: Nomiki Bibliothiki group, 2012). See also Shoshana Zuboff, *The Age of Surveillance Capitalism* (London: Profile Books, 2019), Evgeny Morozov, *The Net Delusion. How Not to Liberate the World* (London: Penguin, 2011).

<sup>32</sup> Calvino, Invisible Cities, 59.

<sup>33</sup> Calvino, *Invisible Cities*, 5.

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### DIGITALLY DIVIDING THE PUBLIC? ASSESSING EQUITABLE ACCESS CONCERNS WITH DIGITAL ARTS & CULTURE PATRON ENGAGEMENT TECHNOLOGIES

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### INTRODUCTION

Cultural institutions have increasingly turned to digital technologies to engage. However, there is a lack of equitable access to information and communication technologies (ICTs). Digital divide inequities are being exacerbated by the 2020 SARS-CoV-2 pandemic; the public health crisis has halted face-to-face interactions, posing unique threats to urban commerce and cities' cultural institutions. This exogenous shock threatening to be the death knell to as many as 1 out of 8 museums, globally<sup>1</sup>. The pandemic is also threatening to widen educational disparities – already exacerbated by the emergent digital divide -- as in-person education spaces now pose potential risks to public health. Yet, such mobile computing technologies may also be a way to engage those traditionally left behind in formal education environments.<sup>2</sup>

This manuscript will consider questions of technological access regarding cultural institutions' digitized patron engagement strategies to date and apply the National Digital Inclusion Alliance (NDIA 2018) framework to suggest a path forward for cultural institutions to evaluate their digital engagement modalities with equity in mind.

### The (Once Impending) Digital Divide

Access and participation in the 21<sup>st</sup> Century Knowledge-based Economy (KbE) requires access to Information and Communication Technologies (ICTs) and, importantly the internet infrastructure. Those experiencing barriers to owning and learning about the latest versions of computing – which now includes a dizzying array of SMART devices – or a lack of convenient and reliable internet access find themselves it what has been termed the digital divide. Since Irving's (1999) report<sup>3</sup> to the U.S. Department of Commerce National Telecommunication and Information Administration defining the digital divide, the detrimental effects of this inequity is widely accepted, yet the problem persists. Cultural institutions are increasingly aware of how the digital divide limits their ability to engage the public. In 2011, the Institute of Museum & Library Services (IMLS) called for digital inclusion to aid in the equitable access and use of ICTs for all people. We turn now to applying the National Digital

Inclusion Alliance (NDIA) five-point framework for considering equitable patron engagement strategies with digital technology.

### NDIA's Digital Inclusion Framework

The National Digital Inclusion Alliance, a U.S. advocacy group dedicated to advocating for public policies that address the digital divide, created a five-element framework for promoting equitable access to ICTs.<sup>4</sup> Table 1 presents these five elements and identifies the core theme within each of these points for digital inclusion. Broadly, these elements are concerned with both the access to, need for, and ability to navigate ICTs. These elements, and their related human-centred interface themes, are presented in Table 1.

Digital Inclusion Framework Elements	Core Theme
Affordable, robust broadband internet service	Access
Internet-enabled devices that meet the needs	Need
of the user	
Access to digital literacy training	Comfort & Literacy
Quality technical support	Comfort & Literacy
Application & online content designed to	Comfort & Literacy
enable and encourage self-sufficiency,	
participation, and collaboration	

Table 1. Adapted from the National Digital Inclusion Alliance's (NDIA) Framework

### **Common Digital Engagement Strategies**

Museums have started to deploy three major digital technology engagement strategies; these are (1) Kiosks, (2) Virtual Tours, and (3) Mobile Applications (Apps). Each of these technologies have advantages and disadvantages when addressing digital access concerns within the visitor experience.

### Kiosks

Kiosks, often with touchscreen interfaces, provide an opportunity for museums to streamline ticketing processes or to assist guests throughout the space with their wayfinding needs. Inside of the exhibition spaces, kiosks can provide more interactive information. Kiosks serve as a way to engage patrons with digital technologies within the in-person visit experience. However, kiosks do pose challenges to those within the digital divide. These standalone devices require the user to have enough of a generalized literacy of ICTs to navigate a device that is novel – that is to say that users need to know how to engage in this one-off touchscreen device and intuit how to navigate its information to make a ticket purchase, find their location, or access additional exhibition features. This can pose additional barriers to learning for those without the means to access contemporary technology.

### Virtual Tours

Virtual tours started out as digitized gallery spaces on websites, and for the most part have remained in this form, while there is a growing adoption of virtual reality (VR) tours still limited by massconsumer access to VR technology and needed computing throughput to make these experiences seamless. This manuscript will focus on the former, as most cultural institutions have websites with some form of virtual gallery space 'tour', recognizing that the latter version is just around the corner. This form of virtual tour takes the form of engaging the patron in a non-visit capacity. Patrons visit the museum's website away from the museum to 'traverse' the museum gallery spaces, often navigating through a clickable floorplan. These virtual tours allow museums to have "traffic" to their exhibitions when they are closed to the public; from the patron side, they are often used to assist the visitor in mapping out their desired in-person visit route to assist in their *future* in-person experience. Virtual tours of this kind pose challenges to digital equity. Navigating a three-dimensional space off pf a two-dimensional floorplan can be difficult, outside of the challenges in navigating a website for someone that does not have reliable internet or desktop computing access. Virtual tours can also promote an expectation by museum staff that *all* visitors have access to needed exhibition information through the website – which is not the case – exacerbating inequities in the ease of accessing information.

### Mobile Applications

Mobile Applications, commonly known as apps, provide the opportunity to enhance the in-person visit as well as assist patrons outside of the museum. The user can theoretically access at apps on a personal SMART device anytime; increasingly apps are able to provide a digitized ticketing experience, use GPS to assist with wayfinding, and have some virtual tour capabilities including a digitized version of the audio tour. Gallery spaces are increasingly using apps to enhance the exhibition experience through interactive features triggered by QR codes or augmented realities through the SMART phone's camera, as examples. Apps pose a significant continuum of digital equity concerns, if not properly considered in place. These apps require the most contemporary SMART device models with heavy data usage, making app ecosystems increasingly inaccessible to large swaths of the population. Beyond this barrier is the fact that someone that can only afford an older model, or has to borrow a such devices, will have issues with navigating through contemporary operating systems and features (downloading, uploading, etc), creating pain points in the learning space. Importantly, these inequities are not traversed by museums simply loaning out pre-loaded SMART devices as someone without the ability to afford reliable access to SMART devices and their internet-based ecosystems may not be able to cross the first barrier to the educational space, which is navigating to the information on the device.

### **Evaluating Digital Patron Engagement Strategies**

Users are often looking for technology to enhance their museum experience, not simply replace it<sup>56</sup>. For these reasons, it is important to understand if patrons at a particular cultural institution *value* digital technology interventions within their learning spaces, and if so, how to best position deployed technologies to align with their learning styles. Stereotypes can lead decision-makers astray when it comes to digital engagements strategy formation; it is not uncommon to observe cultural institutions either avoiding digital engagement strategies because of their senior patron base or become overly confident in digitalizing much of the exhibition experience because their visitors skew towards the Millennial cohort. However, the research suggests that today's seniors are both familiar with tech and value these technological innovations, having spent a considerable part of their working careers in the Digital Age; conversely, Millennials who grew up during this technology revolution are often in search of educational and leisure activities that *do not* involve being online.<sup>7,8</sup> So it is important for cultural institutions to research their own patrons' preferences, and not jump to conclusions about digital engagement strategies.

When considering the deployment of kiosks, virtual tours, and apps the cultural institution needs to know its patrons' values and how much access patrons have to the various IoT aspects of these three different engagement strategies. Table 2 presents NDIA's framework with target areas of inquiry for

each element. It is the alignment of access, literacy and digitalized technology engagement requirements on the user that is suggestive of what questions to ask patrons within questionnaires and semi-structured interviews.

Digital Inclusion	Core Theme Ph	rase	Question Targets
Framework Elements			
Affordable, robust	"Access to":		- Reliable Internet
broadband internet service			- Desktop Computer
			- Contemporary
			SMART Device
			- SMART Device
			App Purchasing Ecosystem
Internet-enabled devices	"Need for":		- Museum
that meet the needs of the			Wayfinding
user			- Ticket & Amenity
			Reservations
			- Exhibition
			Information
Access to digital literacy	"Persistence	Through	- Resources
training	Comfort &	Literacy	available (devices, social
	with:"	-	network, & etc.)
Quality technical support	"Persistence	Through	- Tech support
	Comfort &	Literacy	preferences
	with:"		
Application & online	"Persistence	Through	- Alignment you're
content designed to	Comfort &	Literacy	your Patrons' Learning
enable and encourage	with:"		Style(s)
self-sufficiency,			
participation, and			
collaboration			

Table 2. Adapted from the National Digital Inclusion Alliance's (NDIA) Framework

### Ask Your Patrons: Access, Need, Comfort, & Computing Literacy

Before you start sampling your visitors, it is important to note that there will be a temptation to undertake this endeavour efficiently – which often translates into having patrons complete a questionnaire on a SMART tablet. This could result in a significant selection bias for your sample, as those visitors within the digital divide will be unable to complete your questionnaire. Make sure alternative, non-digital (i.e. paper-and-pencil) versions of your instrument are available if you must digitize part of the data collection.

There are a few questions to assist with aspects of access, need, comfort, and literacy. To assess access concerns, consider asking questions about internet availability in the person's home, their ownership of a desktop computer, and if they know how to add applications onto a SMART device.

These questions allow you to quickly assess how much access a patron has – suggestive of whether they could experience challenges with digital engagement strategies.

Asking questions about a patron's membership length, level, and typical visitorship during the year at a cultural institution, can also be helpful in (1) providing an sense of the person's possible socioeconomic status (especially as these questions are often left black by respondents) and (2) assists with understanding the possible needs of the user. For example, a long-time member to a cultural institution with many trips throughout the years will probably need less assistance from such engagement strategies when it comes to wayfinding but also feel more comfortable "trying something new" by this institution when it comes to streamlining experiences such as ticketing.

Furthermore, simply asking the questions of what engagement strategies does a patron prefer is very helpful in knowing their comfort levels. You can ask them on a Likert-like scale how much they prefer to have their SMART devices with them while in the museum to enhance their experience. You can also ask patrons how comfortable they are in making purchases on applications or on websites to see if there is a need here or if this would just be a pain point for your visitors.

### CONCLUSION

The pandemic is creating difficult operating conditions for museums and other cultural institutions. Now more than ever it is necessary to understand how the digital divide could divide the public in terms of their learning outcomes. Digital technologies present advantages and disadvantages to patron engagement; full evaluation of each institutions' patrons is necessary to find the model that will fit within a location's visitors for the most equitable outcomes.

### NOTES

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<sup>2</sup> Bennett, F. "Computers as Tutors: Solving the Crisis in Education." Adolescence 34 (1999): 636–36.

<sup>3</sup> Irving. United States. National Telecommunications and Information Administration. *Falling through the Net: Defining the Digital Divide: A Report on the Telecommunications and Information Technology Gap in America.* Washington, D.C.: U.S. Department of Commerce, National Telecommunications and Information Administration, 1999.

<sup>4</sup> Callahan, Bill & Siefer, Angela. Why SMART Communities Need Digital Inclusion: White Paper. Columbus, Ohio: National Digital Inclusion Alliance, 2019.

<sup>5</sup> Boehner, K, G Gay, and C Larkin. "Drawing Evaluation into Design for Mobile Computing: A Case Study of the Renwick Gallery's Hand Held Education Project." *International Journal on Digital Libraries* 5, no. 3 (2005): 219–30.

<sup>6</sup> Kalliopi Kontiza, Olga Loboda, Louis Deladiennee, Sylvain Castagnos, Yannick Naudet. A Museum App to Trigger Users' Reflection. International Workshop on Mobile Access to Cultural Heritage (MobileCH2018), Sep 2018.

<sup>7</sup> Floros C, Cai W, McKenna B, and Ajeeb D. 2019. "Imagine Being Off-The-Grid: Millennials' Perceptions of Digital-Free Travel." *Journal of Sustainable Tourism* (2019). Ahead-of-Print, 1-16. https://doi.org/10.1080/09669582.2019.1675676.

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### IMMERSIVE LIGHT, IMMERSIVE SHADOW: A CITY REIMAGINED THROUGH TRADITIONAL CHINESE AESTHETICS

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### **RECONSIDERING IMMERSION IN THE CITY**

The issue of how to light up the city in order to reveal its beauty, display unique heritage and attract capital has become a major challenge in city branding in the recent years.<sup>1</sup> Moreover, in many cities across the world, technology has been increasingly used to create fictitious places or enhance visitors' experience through immersions in something exceeding one's physical location and socio-cultural context. It often seems that artificial lighting is primary for the city and solely exciting, as if the city was not lit up in multiple ways throughout the day as well. In this paper I suggest a different approach and make a preliminary attempt to reevaluate the shadowscapes created by the sun in a city. I propose to perceive shadows as a significant component of the urban space, which can and should be assessed with regard to the cultural specificity, aesthetic qualities, heritage value, and the opportunities it creates for various creative industries and urban renewal projects.

I begin my reflection with focus on China, where artificial light and various digital tools are increasingly used to shape perceptions of the rising cities and display Chinese traditional culture. I intend to reverse this trend and inquire instead whether Chinese tradition can inspire creative and more sustainable use of available technologies in China and abroad. In fact, over the centuries China has developed a certain appreciation for shadow in poetry and aesthetics, which is perhaps most consistently and distinctly manifested in the classical gardens. I briefly discuss the most important philosophical and visual aspects of shadow, and examine major reasons why shadowscapes can matter as a modern urban asset for such different cities as Shanghai and Chorzów. I try to understand what can be gained by a city re-immersed in its daylight and ornate shadows. How to help urbanites reconnect with their immediate surroundings? How to incorporate a culturally distinct way of viewing and experiencing architecture into contemporary urban planning and creative pursuits? Redirecting people's attention or desires, as well as activating new urban resources at a relatively low cost, seems particularly relevant in the context of the post-pandemic efforts to rethink the world based on global mobility, and ongoing efforts to invent new formulas for heritage and tourism related industries.

### CITYSCAPE AS A SHADOWSCAPE

It might seem that all possible inspiration has already been drawn from Chinese gardens. They provided theoretical challenges, exotic experiences, intellectual fascinations and sensual fantasies. They took many different forms, including random porcelain pagodas placed in the European gardens, Suzhou Museum by I. M. Pei, and Ping Tom Memorial Park in Chicago. And yet there still remains at least one more major aspect of a classical garden, which has been essentially undervalued by scholars, architects and designers, even though it creates great opportunities for reimagining cities and immersive experiences.<sup>2</sup> I am thinking here of the garden perceived first of all as a continuously changing space, which over the day and over the four seasons layers intricate shadow patterns like an ivory puzzle ball.

Opposites work together to create the changes and rhythms of life, and according to the Chinese understanding, in the garden shadow is a complementary element to light, not unlike water and stone, or manmade and natural elements. Distinct shadows can be cast by quaint plants, rockeries, wooden lattice ornaments incorporated into architecture structures and furniture, roof ends, traceries and ornate gates. Most frequently they tend to be appreciated on curved plastered walls, which as Tong Jun vividly explains serve "to "print" the shadow of a plant like bamboo in sunlight".<sup>3</sup> However, as a matter of fact, shadows or their fragments can be captured by almost every element of the garden – such as tiled floors, cobbled forecourt, white-washed walls of the interiors, water surfaces, porcelain flower pots, tree trunks or wooden pillars. Depending on the training of an eye and light effects on a particular day, one might contemplate fragility and aliveness in the world through such remarkable shows as shadows cast by the sunlight reflected in architecture elements. Particularly magnificent interplay of light and shadow takes place in the early morning and late afternoon, when shadows seem to ascend or descend across the garden and mark transition between light and darkness.





Fig 1. Evening shadows in Kezhi Yuan, Shanghai.

Fig 2. Daytime shadows of a gazebo and a tree in Kezhi Yuan, Shanghai.

In order to grasp the significance of shadows in the Chinese garden we have to realize that it can be appreciated in its own right, as an integral component of an object or a scenery, and not just as a trace. In other words, it is important to unlearn everything what Western tradition has taught us at least since Plato's Cave,<sup>4</sup> and discover that shadows approached through a different cultural lens, can evoke much more than a kingdom of the dead, or distorted cityscapes from Expressionist cinema, or sunlight blocked by the high-rise buildings. Indeed in many cultural contexts it may be challenging to brand a city explicitly as a "City of Shadows", since it may be easily associated with prostitution, gangs, homelessness, disease, poverty and overall hopelessness. Nevertheless I advocate to seek convincing and groundbreaking ways to engage actively with spaces where ornate and abstract shadows are shifting like in a cinematic projection or in an unfolding ink scroll. I suggest embracing explosions of shadows through thoughtful urban design and storytelling. I believe that an alternative topography is possible – such in which we would know our cities by shadows and seasonal light changes on particular walls or in the courtyards, just as we often know them by favorite old doors or admirable illuminations. We could learn where and when to look for a shadow, and yet be constantly surprised by new, unpredictable visual effects.

City rearranging itself around its shadowscapes is an alternative to what Charles Landry depicts as a place where we rush so fast that we experience less, and we lose capacity for reflection. Audiences are amazed and dazzled by a world "of bright lights and logos" where one can only "look and experience the things that jump out at you – the hype, the shrill, the loud – and miss out on subtler intricacies – the enjoyment of lingering, mulling over things, simply being."<sup>5</sup> Reimagining cityscapes in analogy with Chinese gardens leads to questions how to help urbanites appreciate impermanence of a different

kind, and develop mindfulness, which would eventually allow us to see as an integral part of the cityscape the microshadows of stamens in the flower cups in the park, or shadows cast in a domino manner on one house after another all the way to the end of the street. In other words, perhaps we can consider adding to the pleasures of birdwatching joys of "shadow-watching" or "shadow harvesting". Perhaps we may also acknowledge a different way of meandering through the city, closer to meditation than flânerie, allowing both visitors and urban dwellers to contemplate the perpetual flow of (urban) life. In this scenario nothing is sold, branded or placed on a seductive display, which corresponds to the Pan Jianfeng's postulate to temporarily suspend the information flow. In his book *What Can We Do? Chinese Typography and Cross-Cultural Visual Communication*, Shanghainese designer and calligrapher made a direct reference to Chan Buddhism, and has set a challenge for designers when he concludes that in order to facilitate inner freedom, meditation and communication on a deeply spiritual level, designers have to "touch people's souls without use of words or images".<sup>6</sup> If he is right, then shadowscapes entice as realms full of promise.

Immersion into the city mediated by shadows, reveals ephemerality and tender physicality of space. It also anchors viewers in time and space. In fact, shadows always mark a specific time of the day or year and a particular place, because their general visual qualities change (such as length or density determined by the changes of sunlight), and so do their shapes (plants and streets look different throughout the year and over the years, which results in very different shadowscapes). While Chinese cities may engage with shadow aesthetics in order to manifest a thorough understanding of their cultural roots, for other cities this can be an opportunity to retrieve full presence in the present moment – far beyond fossilized heritage and engineered future. Shadow viewers are gifted by the city with temporary pictures in different shades of grey. These unpredictable and uncontrollable displays discreetly shake the order of a well-planned and perfectly managed city, and familiarize us with the unexpected or the uncertain, which does not imply a catastrophe or failure, but rather a different form of beauty. This makes shadow displays a very unique show in the city filled with various screenings and performances. After all, a flow of afternoon shadows cast by natural light will not take place in case of cloudy weather or storms. It may be also more or less significantly interrupted even by a single cloud covering the sun. Even though it is beyond the scope of this paper, a truly fascinating issue of its own is how to approach these moving pictures theoretically? Should they be seen as moving pictures and fit into research on cinematic qualities of urban spaces and architecture? Or is it rather a distinct form of the shadow theatre, which in some cases may even invite participation of the audience? Or maybe we can understand something essential by seeking analogies with murals, ink scrolls and Chinese rubbings?

### URBAN REGENERATION THROUGH SHADOWS

I have suggested that more vigorous and innovative engagement with urban shadowscapes can be beneficial for the well-being of the urbanites. Partial return to traditional uses of light and shade may also be a way of enhancing and appreciating the traditional city as a site with unique energy. The latter factor seems particularly relevant in the context of the increasing unification of modern urban spaces in the cities across the world. In case of many Chinese cities, such as Shanghai, Wuhan or Hohhot, certain notions of glittering urban nightscapes (inherited from the 20th century and Western modernities) clearly limit their own creative pursuits today. As a result, distinct urban built environments with rich histories and complex cultural identities are increasingly threatened by aspirations for an imagined global modernity marked by dazzling nocturnal lightscapes. Often they simply turn into new advertising or political propaganda media. Therefore I insist on raising two questions. Firstly, whether urban lightscapes with distinct Chinese features are possible? Secondly, can Chinese garden aesthetics become globally recognized as a significant asset and inspiration in the 21<sup>st</sup> century? Can we actively seek ways to protect cultural specificity of the lightscapes even in those cities which aspire to be global? Can we train ourselves to approach issues of visual quality of the urban spaces we inhabit or design through the lenses of non-Western aesthetics as well?

For a city of the size and significance of Shanghai, creative engagement with shadows (in a bottom up manner, implying shaping certain attitude and visual sensibility, and also through the top-down actions) can turn out rewarding as a reconnection with the indigenous heritage of Jiangnan literati gardens, and a rediscovery of a past way of seeing architectural surroundings. This is likely to have a positive impact on branding certain elements of the traditional culture in new, transnationally valid ways. Moreover, in the era of overwhelming connectedness and fascination with AR, spaces allowing for digital detox are of great value for any city. Inclusion of shadowscapes among the city's major urban assets seems also valid in regard to creating new opportunities in commerce and creative industries. One the one hand, it may for instance inspire new approaches in space and product design, or encourage experimentation with culturally sensitive lighting practices. In many cases even daily use objects, in the streets (such as railings) and indoors (such as cocktail glasses), need to be reconsidered, and perhaps even redesigned, as soon as we learn to perceive shadow as an integral and equally significant component of an object or a structure. Perhaps a creative reinterpretation of patterned lights and shadows in residential gardens could result in more interesting and unique animations or illuminations for Shanghai's multiple glass facades, public parks, and the iconic skyline. A glimpse of such urban modernity, which is not required to give up on any of its charms and seductions, but at the same time remains strongly rooted in the local heritage, was captured already back in 1935 by Zhou Hanming. He published in *Liangyou*<sup>7</sup> a set of sketches in which he takes full advantage of the contrasts between light and shadow, and alludes to the tradition, in which gardens were used not only as a space for contemplation and intellectual pursuits, but also for a romance.



Fig 3. Zhou Hanming, Pine.

Many (if not all) cities are inlaid with shadows like a Chinese garden – not only those located in the Yangtze River Delta. I take Chorzów (a postindustrial town located in Upper Silesia, Poland) as a thought-provoking example of an entirely different city, which unlike Shanghai struggles for

recognition even on the national level. Even if it is beyond the scope of this study, still I would like to reflect, even briefly, what Chorzów's violated urban spaces can teach us about transformative or healing potential of shadows approached through the lenses of the Chinese aesthetics. Whereas nothing is left of this city's dreams of a splendid modernity with impressive infrastructure for travel in the air captured in postcard "Königshütte in der Zukunft" ("Königshütte in the future") dating back to the times when Chorzów was a thriving German industrial town, in terms of shadowscapes the city remains rather competitive. Countless bare side walls of the 19th century tenement houses and socialist era housing blocks tend to be perceived as unpleasant traces of either irresponsible urban planning, or tragic accidents in the coal mines underneath, which in the most critical cases lead to the collapse of the house or severe damages, which forced demolition and disrupted the layout of the entire street. However, each of those plastered walls can be easily reimagined as a photosensitive membrane. What if we dare to develop new spatial approaches and practices? What if instead of looking away we notice extraordinary shadows and recognize new visual qualities of 3 Maja Street or Rynek (Main Square)? What will be the social and economic impact?



Fig 4. Shadows cast by a blooming white chestnut tree, Chorzów.

In fact, Chorzów is a perfectly suited city to be reimagined as a vast Chinese garden. Creative approach to voids, choreographed paths of spectatorship, carefully framed views, shadows on plastered walls, surprising superb views framed by a gate, old mosaics, and ability to direct the visitor's attention in order to multiply thrills and enchantments in a confined space are the most obvious features of a classical Chinese garden, which through imaginative city branding can be transposed on many streets and districts in Chorzów in order to provide a new story and experience. The metaphor of this city as a garden exploding with shadows is additionally validated through intricate Art Nouveau balustrades in the balconies and handrails, and perhaps even more importantly, through shadows cast indoors by exquisitely patterned stair risers in vintage staircases, which easily

bring into one's mind ornate lattice shadows of the Jiangnan gardens. Tong Jun compared overlapping and interpenetrated views in a garden to the collage in modern architecture.<sup>8</sup> If Chinese garden can be perceived as a collage of views, then a city can be approached comprehensively as a garden, and it can be done in ways unforeseen by Ebenezer Howard.



Fig 5. Daytime shadows in Public Library staircase, Chorzów.

I am not advocating hereby that cities like Chorzów should acquire Chinese visual features. I rather insist they should dare to rethink and collage existing historical sceneries into a new entity. If we invent a suitable language to describe this new visual realm and propose an appropriate format to promote it, would people come to watch shadow displays as they watch illuminations, parades, holograms? What if such a show was accompanied by a jam session? What if we make one step further, and not only map existing shadowscapes, but also curate (or direct) these shadow displays, for instance through poems or sculptures installed on the nearby roofs to be revealed for a moment by the changing sunlight at dusk? Opportunities abound and they require further, more systematic investigation – both through critical reflection and creative practice. This paper is just a preliminary outline, presented with hope that the ongoing conversation about the future of the light in the cities can be extended, and include such uses of light and shadow, which will potentially reconnect us to the city in ways that are totally different to the mediated visual image of the contemporary city spectacle.

### NOTES

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<sup>2</sup> Jun'ichirō Tanizaki's *In Praise of Shadows* is an outstanding exception (first published in 1933), but it reflects on darkness more than the patterns of shadows.

<sup>3</sup> Tong Jun, *Glimpses of Gardens in Eastern China* (Nanjing: China Architecture and Building Press, 1986), 6.

<sup>4</sup> Anna Greenspan, "The Power of Spectacle", Culture Unbound 4 (2012), 90-91.

<sup>5</sup> Charles Landry, *The Art of City-Making*. (London and Sterling: Earthscan, 2006), 154-155.

<sup>6</sup> Pan Jianfeng, *What Can We Do? Chinese Typography and Cross-Cultural Visual Communication* (Shanghai: Shanghai Fine Arts Publishing House, 2013), 432-433.

<sup>7</sup> This images appeared in Liangyou 良友 Nr 110 (1935), 54-55. I would like to thank Gretchen Liu for bringing my attention to it.

<sup>8</sup> Tong Jun, Glimpses of Gardens in Eastern China (Nanjing: China Architecture and Building Press, 1986), 4.

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### **REEF: DRAWING IN THE EXPANDED FIELD**

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Figure 1. Reef installation, Tin Sheds Gallery, Sydney, 2020. [Photo: Maja Baska]

#### INTRODUCTION

In this article we introduce a body of research on drawing in the extended field and discuss a recent outcome - *Reef*, an installation at the Tin Shed gallery, Sydney. The research agenda has evolved from architectural sketch drawing. The research extends the open, evocative capacity of drawing through experimental installation art works, deploying sculptural sketch objects, VR, AR and soundscapes. *Reef* is the second in a series exploring the landscape phenomena of seismic shock. It is a sketch of a section of seabed in Kaikōura, Aotearoa New Zealand.

#### KAIKÕURA REEF

The landscape at the sea edge of Kaikōura, Aotearoa New Zealand, has an eerie, abstract quality. Alien platforms of twisted rock extend far out to sea, just above the water line, before plunging to the abyssal depths of the Kaikōura submarine canyon. Both canyon and reef jolted upwards in the 2016 Kaikōura earthquake, causing massive ruptures, undersea landslides and moving the South Island of Aotearoa five metres closer to the North<sup>1</sup>. Walking on the reef gives the sense of traversing an alien,

unfamiliar landscape, figured by seismic presences. The *Reef* project attempts to draw these elusive conditions through a spatio-temporal installation composed of cast concrete sketches, soundscapes and sketches in VR and AR.

*Reef* is part of ongoing research into experimental architectural drawing exploring abstract possibilities in the open sketch. The work is an interdisciplinary collaboration between Simon Twose, Anastasia Globa, Jules Moloney, and Lawrence Harvey. *Reef* follows an installation at the Venice Biennale in 2018, *Canyon*<sup>2</sup> which distilled presences for the submarine landscape. *Reef* extends the work in *Canyon* by sketching the landscape of the canyon as it emerges from the water; it sketches its intangible presence through attention to the reef's materiality, textures, forms and sounds. This paper reports on the resultant *Reef* installation exhibited at the Tin Sheds Gallery, Sydney<sup>3</sup>. We introduce the thinking and creative practice process behind the project and connect it to research within an expanded field of drawing.



Figure 2. Reef at South Bay, Kaikoura, 2019. [Photo: Simon Twose]

#### **REEF INSTALLATION**

Visitors to the gallery are immersed in a single spatial sketch of the Kaikōura reef. The sketch is dispersed throughout the dark gallery space as a cloud of four hundred and fifty smaller sketch elements, morphing from castings of rock surfaces to hand formed, gestural concrete sketches to 3-D printed digital interpretations. These are hung from the ceiling on filaments and flow through the space at approximately waist height to create a pixelated 'reef' sketch. Viewers are prompted to move through this array, carefully picking their way through narrow channels or being captured in bays where the objects become too dense to allow movement through. In doing so viewers re-trace the iterative process of sketching the reef, moving along sequences of castings that gradually shift in form, material and surface detail, or they become contained within denser clusters of investigations. The sequences threading through the gallery are like pixelated lines and the clustered bays are similar to smudges, where the sketching process has become blurred through repeated tests, creating ideational eddies.



Figure 3. Reef cast concrete sketch objects, 2020. Concrete, graphite, wax. [Photo: Maja Baska]

The reading of these sketches is framed through the body as much as vision, and is augmented by overlapping, three-dimensional soundscapes. These shift in scale and degree of abstraction as the viewer moves through the space. Delicate sounds generated from field recordings of the reef, such as the popping of dry seaweed, morph to abstract sonic interpretations of the reef landscape. This auditory field overlays the cloud of objects in the installation, subtly shifting their reading.

At the end of the gallery, visitors pass into a digital section of the reef sketch. In this zone, an array of translucent reef objects, 3-D printed in ABS, explore abstractions of the reef through generative algorithms. Behind this array, a set of four videos is projected on the end wall of the gallery, showing excerpts from the VR sketches of the abstracted submarine space of the canyon. The digital investigations in *Reef* are augmented by AR portals, which allow viewers to experience digitally created reefs in virtual space, using tablets or cell phones.

Navigating the reef sketch, which is carefully lit so the gallery around it disappears, a viewer is immersed in a sculptural analogue of dynamics of the reef at the same time as being within the dynamics of a sketch.

#### THE OPEN SKETCH: ART + ARCHITECTURE RESEARCH AGENDA

The research agenda has evolved from architectural sketch drawing, where rapidly drawn marks capture evocative presences yet are also coded, analytical, and need to be read. The research extends the open, evocative capacity of the architectural sketch to installation art works, engaging a mix of architecture and art research.

Architectural drawings are corporeal and abstract portals to space beyond them. As Robin Evans famously argued, architectural drawing involves 'on the one hand, the 'involvement, substantiality, tangibility, presence, immediacy' and direct action of the thing made; on the other, 'disengagement, obliqueness, abstraction, mediation' and 'action at a distance.'<sup>4</sup>. Even in a crude architectural sketch, lines refer to scale, form and materials in space beyond them, at the same time as recording the authors' imaginative projection into those worlds. As such, each mark is a record of thinking involving an architectural spatial acuity; a sketched line imagining the sectional contour of a landscape might be repeated many times in the same place, and in doing so become smudged, dense and invested with movement. Marks like this approximate the form of space beyond them but also

afford impressions about that space: the smudged indeterminate marks begin to speak of vast scale, great mass and, perhaps in the case of a landscape sketch, an ominous latency for seismic movement.

This capacity of the architectural sketch to evoke openness and presence is close to that acknowledged in art practice. Jean Luc Nancy discusses drawing's inherent capacity for open possibility through gesture, 'in the sense of a beginning, departure, origin, despatch, impetus, or sketching out' and through 'an essential incompleteness, a non-closure or non-totalizing of form.'<sup>5</sup> This power of drawing to explore the incomplete, non-representational, and intangible is widely understood in art-research, such as in the work of artists Nikolaus Gansterer, Emma Cocker, and Mariella Greil who use drawing as a research device that involves an ever-emergent process of discovery. They describe the process as *figuring*, involving:

 $\dots$  small yet transformative energies, emergences, and experiential shifts which operate before, between and beneath the more readable gestures of artistic practice, that are often hard to discern but which ultimately shape or steer the evolving action  $\dots^{6}$ 

Thinking through drawing like this involves complex performative and material acts, engaging art's capacities in 'enabling matter to become expressive...to intensify-to resonate and become more than itself'<sup>7</sup>. It is this mix of gestural and material performance that supports artistic sense-making of aspects at the periphery of research's vision, such as presences. It accentuates the power of drawing as art research to pursue and yet maintain uncertainty; to follow the indeterminate flux of 'no-how' rather than 'the methodological steel tracks of know-how'<sup>8</sup>. It involves what Alex Arteaga describes as 'barely perceptible micro-movements at the cusp of awareness ...' where the figure "always remains at the edge of its own explicitness".

We engage this established research capacity of art practice, to expand understanding through the materiality and performance of the sketch, and merge it with architectural drawing's projective capacity. In this merged mode, the sketch becomes radicalised as an open tool, able to research presences through an open method engaging gestural acts in concert with affordances of materiality and space. We do this through multi-modal sketch installations that intensify the sketch's fundamental modes. The installations are thought of as 'habitable drawings'<sup>10</sup> that immerse the participants, encouraging readings of the drawings that are more than coded and instrumental. They cross real space and material with virtual space and sensory feedback.

This research attempts to radicalise the open architectural sketch and discover how it can be a method to research characteristics that escape instrumental description, such as unseen, intangible, non-discursive and non-representational presences.

#### Sculptural-gestural Sketching



Figure 4. Reef sketch casting (2019). Latex, rock, graphite. [Photo: Simon Twose]

The observations of intangible facets of the reef were conducted through gestural sculpting in cast concrete. These are akin to observational architectural sketches, where the act of making a mark is a sculptural act, merging agencies of material, such as graphite and paper, and the subject matter, in this case the reef. A sketch in this sense records visual evidence, the shapes, textures, colours and forms that meet the eye, but is also a way of thinking about less tangible characteristics, such as flows, pressures and spatial and scalar ambiguity. They are three-dimensional thinking devices, engaging 'thinking in action' or thinking-feeling-knowing' operative within artistic practice'<sup>11</sup>.

The sculptural components of the reef installation began with literal observations, through castings of flexible latex moulds taken from various rock surfaces. These were re-formed by hand, laid over rock forms, stretched, joined, overlapped, combined, cast as whole forms, cast as zoomed in details - of miniature forms and textures - cast in gradations of darkness, cast through applying wax to the latex and distressing the mould, cast in combinations of concrete, ice and seaweed. This series of sketches experimented with capturing a scalar ambiguity and involved feedback from the reef material, as a dynamic set of forms and textures, and feedback from concrete, which in its liquid state is an analogue flow and in its hardened state resembles rock.

This literal observational sketching of, and in a sense with, rock moved to more abstracted modes. Sculptural tests were conducted using various casting media; plastic and paper of varying thicknesses, interacting with rock surfaces and the terrains of earlier castings laid in piles, culminating in a series of hand-drawings imprinted onto the distorted surface of the concrete, which was then sketched over by hand, creating sketches that were at once drawn in graphite, rock-like in material and creased with mountainous valleys, ridges, and liquid flows.



Figure 5. Reef sketch casts using hand manipulated plastic moulds, detail, 2019. Plastic, concrete, black oxide, wax. [Photo: Simon Twose]

The sketch objects began to hover between their presence as analogous rocky material and representations of landscape at vast scale beyond them. In this sense they acted as architectural drawings where the materiality and actions in the sketch are inseparable with space projected at huge scale beyond it, transitioning from accurate representations of the rock to allusions of larger landscapes. In this way the sculptural sketch objects were devices that afforded thinking, on intangible characteristics of the reef. They allowed presences to emerge through a co-authorship between drawer and subject matter.

#### **Digital-VR-AR sketches**



Figure 6. Engagement with AR Reef sketch environment, 2020. [Photo: Anastasia Globa]

The Virtual Reality (VR) sketch environment was developed as an immersive, highly abstract threedimensional space, crafted to be fluid and mesmerising. Viewers freely move through the space in any direction, including up and down, without using any hand-held controls. There is no real-world gravity or physics enabled, instead the VR camera moves in the direction of the user's gaze. A system of hidden 'currents' and pull-push 'forces' is embedded within the scene and these unseen currents affect a virtual avatar, pulling it into various pathways, adding extra levels of complexity and unpredictability to the VR navigation. Viewers inhabit deep black space animated with hundreds of three-dimensional drawings that constantly move and change scale.

The VR installation was built for Oculus Rift - VR headset and one hand-held controller<sup>12</sup>. Both VR and AR applications were developed using Unity3D gaming engine<sup>13</sup>.

The Augmented Reality (AR) application was built for an Android touch screen tablet. Three small image markers were used as targets to project a range of interactive augmented reality artefacts. Each AR artefact was animated and allowed different interactions, enabled by the on-screen UI (User Interface) buttons, such as 'shift', 'explode', 'animate'. The first AR target artefact explored the forms of sculptural 'rock' castings in the installation. 3D scans of the objects were subjected to a number of generative mesh distortions to create a gradual blend from 'natural' to 'abstract/digital' forms.

The second AR artefact explored algorithmic rock generation. It was created using parametric rules with a voxel (three-dimensional pixel) typology. 3D prints of the forms were arrayed in the physical space of the installation.

The resulting augmented reality environment engaged with pivotal nodes of extended reality in the installation, through referencing: the physical real-world, physically constructed/re-interpreted digital world and the virtual reality world. An immersive video projection, in the darkest part of the space, displayed dynamic imagery from the virtual and augmented environments, thus binding all extended realities into one interconnected hybrid experience.

#### **REEF – SPATIALISED SOUNDSCAPES**

On entering a multi-format exhibition such as *Reef*, the gallery visitor is both viewer and listener. In the installation, sound combines with physical material to provide spatial and imaginative cues, transporting the visitor to the reef landscape. Three sound zones in the gallery overlap, sharing a single foundation sound – long recordings of gentle wave movement. At the entrance, site recordings of the reef are un-transformed, and as the participant moves through the space, the recordings become progressively more abstract and sketch-like.

Swirling water and seaweed popping's are digitally manipulated through a combination of GRM Tools Resonance and Evolution processing. By way of the authors' imaginative projections into those worlds<sup>14</sup>, the seaweed pops hover close to musical-like moments – becoming choral or chorus-like presences, or sometimes an environmental percussion ensemble of small pitched instruments. These come about by short popping sequences running through the space, by adding metallic resonances to individual or groups of pops, call-response type moments and cloud bursts of sound. These suggest a strange vocalising of the landscape.

The sound design works to destabilise the sense of place (a gallery) helping to tip the visitor into another way of sensing landscape. While the foundation sound provides sonic continuity, the swirling water and popping helps direct the gaze and reinforce intensities in the suspended reef array, augmenting the need to carefully choose a path through the narrow channels or providing sonic correlation to being captured in a dense bay where movement is difficult.

The three drawing modes: sculptural sketching, VR/AR and soundscapes, focussed on presences rather than re-presentation. They intensified embodied, material and spatial characteristics of the sketch, expanding its capacity to afford the imagining of presences.

#### SHIFTS IN NOTIONS OF DRAWING

*Reef* short circuits the projective distance between sketching and the space being sketched; the Reef landscape projects back into the sketch as much as the sketch projects towards the landscape. The intention of this conflation of sketching and subject matter is to experiment with how inherent indeterminacies can emerge in both; how the actions, space and materiality of sketching can coincide with imagined dynamics in the thing sketched, and in doing so, distil characteristics at the periphery of understanding. The *Reef* installation pursued a radicalised version of the sketch, attempting to create a research tool that expands the limits of drawing and its capacity to capture intangible and evasive spatial presences.

#### NOTES

<sup>1</sup> Ian J. Hamling, Sigrún Hreinsdóttir, Kate Clark, John Elliott, Cunren Liang, Eric Fielding, Nicola Litchfield, Pilar Villamor, Laura Wallace, Tim J. Wright, Elisabetta D'Anastasio, Stephen Bannister, David Burbidge, Paul Denys, Paula Gentle, Jamie Howarth, Christof Mueller, Neville Palmer, Chris Pearson, William Power, Philip Barnes, David J. A. Barrell, Russ Van Dissen, Robert Langridge, Tim Little, Andrew Nicol, Jarg Pettinga, Julie Rowland, Mark Stirling, "Complex multifault rupture during the 2016 Mw 7.8 Kaikoura earthquake, New Zealand," *Science* 356(6334) eaam7194 (2017): 2, Accessed June 2020. doi: 10.1126/science.aam7194.

<sup>2</sup> Simon Twose, Jules Moloney, Lawrence Harvey, "Canyon," in *TIME–SPACE-EXISTENCE*, Palazzo Bembo, XVI Venice Architecture Biennale, Venice, 26 May – 27 November, 2018.

<sup>3</sup> Simon Twose, Anastasia Globa, Jules Moloney, Lawrence Harvey, *"Reef: Reimagining Architectural Drawing through a Multi-sensorial Installation,"* installation at *Tin Sheds Gallery*, University of Sydney, Sydney, Australia, 5 March – 1 May, 2020 (Gallery closed March 18 due to Covid 19).

<sup>4</sup> Robin Evans, *Translations from Drawing to Building and Other Essays* (Cambridge, Mass: MIT Press, 1997), 160.

<sup>5</sup> Jean Luc Nancy, *The Pleasure in Drawing,* trans. Philip Armstrong (New York: Fordham University Press, 2013), 1.

<sup>6</sup> Nikolaus Gansterer, Emma Cocker, Mariella Greil, *CHOREO–GRAPHIC FIGURES Deviations from the Line* (Edition Angewandte, Berlin/Boston: De Gruyter, 2017), 70.

<sup>7</sup> Elizabeth Grosz, *Chaos, Territory, Art: Deleuze and the Framing of the Earth* (New York: Columbia University Press, 2008), 10-11.

<sup>8</sup> Sarat Maharaj, "Know-how and No-how, Stopgap Notes on 'Method' in Visual Art as Knowledge Production," *Art and Research, a Journal of Ideas Contexts and Methods*, Vol. 2, No. 2, (Spring 2009): 3.

<sup>9</sup> Alex Arteaga, "Researching Aesthetically the Roots of Aesthetics" in *CHOREO–GRAPHIC FIGURES: Deviations from the Line*, Nikolaus Gansterer, Emma Cocker, Mariella Greil (Edition Angewandte, Berlin/Boston: De Gruyter, 2017), 259.

<sup>10</sup> Artist Fred Sandback quoted in Bois, Yves, "A Drawing that is Habitable," in *Fred Sandback,* ed. F Malsch, C Meyer-Stoll, (Ostifildern-Ruit: Hatje Cantz Verlag, 2005), 28.

<sup>11</sup> Nikolaus Gansterer, *DRAWING AS THINKING IN ACTION*, solo show at Drawing Lab Paris, France, March 21 - June 15, 2019, Curated by Jeanette Pacher. Accessed March 19, 2020, http://www.gansterer.org/drawing-as-thinking-in-action/

12 "Occulus," accessed May 29, 2020. https://www.oculus.com/

<sup>13</sup> "Unity 3D," accessed May 29, 2020. <u>https://unity.com/</u>

<sup>14</sup> Simon Twose, Jules Moloney, Lawrence Harvey, "Canyon: Experiments in Drawing a Landscape," *Drawing On*, Issue 3. (2019): 23-37.

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## SYNERGISTIC CORRELATION OF BATIK HERITAGE AND URBAN SPACE AUTHENTICITY: IN BUILDING UP THE CITY'S COMPETITIVE ADVANTAGE - CASE STUDY: CIREBON CITY, INDONESIA

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#### INTRODUCTION:

Batik is one of the masterpieces of Indonesian culture that has been recognized worldwide since 2009 when UNESCO has designated Batik as a Representative List of the Intangible Cultural Heritage of Humanity (Clark 2013). Batik is an Indonesian wax-resistant coloring technique that is applied to the whole fabrics. This technique is originated from Java, Indonesia. Batik is made by drawing resistance dots and lines with a bursting device called "*tjanting*," or by printing resistance with a copper cap called a hat (Situngkir 2008b). This fabric dyeing technique is similar to the one in Indonesia that has been applied by the Egyptians for thousands of years and is proof that fabric dyeing with wax resist technique has a very long history (Robinson 1969).

Compared to the Batik of other countries, Indonesian Batik is the most unique and complex of both of its style and motifs, the tools used are also very distinctive. In addition to that, Indonesian Batik's philosophy is dominant; its cultural root is profound; even its history is very long. In its development, although Indonesian Batik interacted with various cultures of other nations, it still has its own unique identity and philosophical basis. It has been revealed by several researchers dealing with Indonesian Batik. They state that Batik is a nation's icon for Indonesia that has been recognized by UNESCO, where the growth of Batik has a significant effect on the Batik industry afterward. The improvement of the Batik industry has had multiple impacts on the economy and socio-culture in Indonesia (Steelyana 2012).

Batik, which is an authentic Indonesian tradition, can be traced through historical evidence of its existence since prehistoric times in the fifth century, the ancient Mataram kingdom, the Sriwijaya Kingdom, the Islamic Mataram kingdom to the Japanese occupation (Moertono 2009) to the spread of Islam (Syafrizal 2015). Indonesian Batik grows and develops following the dynamics of society, carrying out a dialectical process with cultural development. The area of Batik distribution and changes in various motifs are strongly influenced by the dynamics and cultural development of Indonesian society.



Figure 1. Distribution of 9 cities of Indonesian Batik producers. Source: Nursanty, 2020, based on the Google map.

In this study, researchers tried to place nine cities with the most significant spread of Batik derived from data from the Indonesian Industry Office and illustrated in Figure 1 above. On the island of Java, the city of Batik producers begins with the center of the ancient Mataram Kingdom, namely Surakarta and Yogyakarta, which were initially a unity and split into two kingdoms following the Giyanti agreement (Hendriatmo 2006). In these two places, the development of Batik entered a period of diversification using skills both technically, conceptually, and using materials according to the environment. In these various regions, Batik art and techniques grow and develop with their respective characteristics. Nevertheless, regional Batik often influenced each other (Nursalim, A, 2016).

In connection with the role of place and culture carried out in this study, the focus is on the development of Batik heritage that occurs in coastal areas where the center and development of the Batik industry has shifted from the royal city to the center of international trade at the same time. Thus, the process of making Batik requires a high level of concentration, patience, and perseverance, as well as the clarity of the Batik artist's soul. The resulting motifs and patterns contain meaning and hope to God the Creator, where Batik motifs always reflect beauty laden with philosophical meaning. (Situngkir 2008a).

#### INTANGIBLE HERITAGE

Intangible cultural heritage is the practice, representation, expression, knowledge, or skills, as well as instruments, objects, artifacts, and cultural spaces that are considered by UNESCO as part of the cultural heritage of a place (Smith and Akagawa 2009). The word Batik comes from Javanese. It came from the Javanese word *amba* ('to write') and *titik* ('dot'), or it might also be originated from the roots of the Proto-Austronesian hypothesis *beCik* ('for tattoos'). This word was first recorded in English at the Encyclopædia Britannica in 1880, where the term sounds *battik*. It has been known in the Indonesian Archipelago during the Dutch colonial period in various forms: *mbatek, mBatik, batek,* and *Batik* (Blust 1989).

Many Indonesian Batik patterns have symbolic meanings. Babies are carried in Batik slings adorned with symbols designed to bring the child's fortune, while specific Batik designs are provided for brides and bridegrooms, as well as their families (Hitchcock 2016). During the colonial era, Javanese courts issued decrees that determined specific patterns to be imposed according to one's rank and class in society. Sultan Hamengkubuwono VII, who ruled the Sultanate of Yogyakarta from 1921 to 1939, prepared several patterns such as the Parang Rusak and Semen Agung for members of the royal Yogya and restricted ordinary people to wear them. Batik clothing plays a central role in certain Javanese rituals, such as ceremonial ceremonies of the royal Batik being a volcano. In the Javanese

*naloni mitoni* tradition, expectant mothers are wrapped in seven layers of Batik, hoping for good things. Batik is also prominent in the *tedak siten* ceremony when a child touches the earth for the first time. Contemporary practice often allows people to choose Batik patterns according to one's tastes and preferences from casual to formal situations, and Batik makers often modify, combine, or find new iterations of popular designs. Special pattern requirements are usually reserved for traditional and ceremonial contexts (Haake 1989).

At first, Batik was only produced in the palace with the primary purpose as the clothes of the King, followers of the King, and the King's family. As time goes by, the art of Batik is increasingly developing to areas outside the palace until eventually it is frequently being used as clothing for men and women. Finally, the charm of Batik can make it come out of the palace walls and enjoyed by all people. In this context, the existence of Batik also becomes a social identity in the community (Ulum, I 2016).

#### **RESEARCH METHOD**

The research method carried out is briefly illustrated in Figure 2 below. Research on the relationship between heritage products (Batik) and the place (place) where humans live is carried out using qualitative methods. Data collection uses 2 (two) types of data groups, namely: (1) static data in the form of data that can be linked chronologically and found variables that play a role in it. Static data used in this study are ancient maps, photographs, and history obtained from various literature sources or online; (2) dynamic data is data collected based on virtual interviews and big data from social media. The information is interpreted using techniques that relate the context between the person and his place of residence. The results of the analysis process will be a coding process, which then becomes elements of the findings that are systematically and hierarchically structured after going through the analysis using the "Butterfly Mamoli" method that was invented by the author in her doctoral research.



Figure 2. Qualitative method and the relationship between place and people. Source: Nursanty, 2020

Figure 3 below is the process of analysis carried out using the technique, where the authenticity of a place is seen as a combination of the way of thinking of humans or the user of space in making decisions using the left brain and right brain. (Nursanty 2020). The authenticity of a place can be known through the efforts and choices made by space users based on emotional factors (right brain) and rational factors (left brain). Along the way, these decisions continue to run according to the needs of the times. Some elements change with development, and some remain unchanged so that it

becomes an identity passed down from one generation to the next, which can ultimately be recognized as a "DNA" in a place or city.



Figure 3. The Mamoli Butterfly method as a technique for tracing the authenticity of places. Source: Nursanty, 2020.

#### **CIREBON CITY OF PALACES**

Batik in the Cirebon region classified as the Coastal Batik, which grows outside of the palace Batik. Coastal Batik is produced outside the inland cities of Solo and Yogyakarta; instead, it is made in the towns on the northern coast of Java such as in Cirebon, Indramayu, Lasem, and Bakaran. In the beginning, coastal Batik used a long fabric that would be used as kebayas and mostly for carrying goods or carrying children, and even for blankets. (Sukirno 2012). The harbor cities and the coastal region as a meeting place for various nations in the trade have led to many developments in Batik patterns that are unique, where the motives were more moderate, and influenced by foreign patterns. One of the characteristics of coastal Batik is the choice of colors and motifs that are not as rigid as the result of foreign influence, especially since the presence of Islam in the sixteenth century. One motive is floral motifs that are not naturalist, because of the prohibition of Islam drawing in a naturalist style (Rahayu and Alrianingrum 2014).



Figure 4. a) The Position of Cirebon City; b) Administrative region of Cirebon City. Source: (Putra, 2013).

Cirebon a city in West Java Province, Indonesia, located on the northern coastal region of Java Island, as shown in Figure 4a) above. The name Cirebon came from the word *Sarumban*, a small hamlet established by Ki Gedeng Tapa. Over time it was developed into a lively village, which was later called Caruban ("*carob*" in local language means to unite). It was named so because there are mixed immigrants from various tribes and races (including Sundanese, Javanese, Chinese, and Arab), religion, language, and customs. Then the pronunciation of the word *Caruban* changes again to *Carbon* and then Cirebon (Hutama, S.D. 2003).

The history of Cirebon Batik is closely related to the urban history of this royal city. At the beginning, there was a small fishing village called Muara Jati. At that time, many foreign ships had come to trade with the locals. The port administrator was Ki Gedeng Alang-Alang, who was appointed by the ruler of the Galuh Kingdom (Pajajaran). In this Hindu kingdom's port city, Islamic activity as growing. Ki Gedeng Alang-Alang moved the settlement to a new location in Lemahwutut, 5 km southwards onto the foot of the hill towards the kingdom of Galuh. Ki Gedeng Alang-Alang was appointed as head of the new settlement, with the title *Kuwu Cerbon*.

In further developments, Pangeran Walangsungsang, the son of Prabu Siliwangi, was appointed the Prince of Cirebon with the title of Cakrabumi. This Prince founded the kingdom of Cirebon, preceded by not sending a tribute to the King of Galuh. Therefore, the King of Galuh sent envoys to Cirebon to ask for the shrimp paste tribute to the Duke of Cirebon. Still, it turns out that the Prince of Cirebon succeeded in convincing the envoys of independence in the Cirebon region.

Cirebon was a prominent Islamic Sultanate in West Java in the 15<sup>th</sup> and 16<sup>th</sup> centuries AD and was an important base in inter-island shipping and shipping lines. Because of its location, making it a port and "bridge" between Javanese and Sundanese culture with a distinctive culture, that is neither dominated by Javanese nor Sundanese cultures. The Cirebon Sultanate was established in the kingdom of Pakungwati as the center of the state government of the Islamic Sultanate of Cirebon, the location of the Kingdom of Pakungwati is now the palace of Kasepuhan Cirebon (Hoadley 1994).

The year 1679 was a new chapter for the Sultanate of Cirebon, where the territory was divided into three and each of them came to power and inherited to the next rulers: (1) Sultan Kasepuhan, Prince Martawijaya, with the title Sultan Sepuh Abil Makarimi Muhammad Samsudin (1679-1697); (2) Sultan Kanoman, Prince Kartawijaya, with the title Sultan Anom Abil Makarimi Muhammad Badrudin (1679-1723); (3) Panembahan Cirebon, Prince Wangsakerta with the title Prince Abdul Kamil Muhammad Nasarudin or Panembahan Tohpati (1679-1713). The title changed from

Panembahan to Sultan for the two eldest sons of Prince Girilaya was carried out by Sultan Ageng Tirtayasa, because both of them were appointed to be the Sultan of Cirebon in Banten. As sultans, they had full territory, people, and their respective palaces. Prince Wangsakerta was not appointed sultan but only Panembahan. He did not have his area or palace but ruled as Kaprabon (Paguron), a place for the intellectuals of the palace (Firlianna Tiya 2016).



Figure 5. The development of native and Chinatown communities before the arrival of the Dutch before the 17<sup>th</sup> century. Source: Nursanty, 2020 based on the map of Cirebon in 1690

Figure 5 shows the Chinese trade in the city of Cirebon (yellow zone) that has existed northward of the area of the palace (red zone) since the seventeenth century, as deducted from the old map in Figure 6a below. Figure 6b shows the development of zones in Cirebon after the arrival of the Dutch. There were three different ethnical zones: Native zone (N) with four palaces (with the status of the fourth palace is still debated), Chinese zone (C), and Dutch zone (D).



Figure 6. a) Map of Cirebon in the 17<sup>th</sup> century. Source, (Gomperts 2008); b) The development of the zone after Dutch rule since the beginning of the 17<sup>th</sup> century. Source: Nursanty, 2020 based on Google map

#### DISCUSSION

As a trading city with a large port, Cirebon rapidly developed both in terms of trade and cultural acculturation. The diverse regions within it illustrate the strength and ability of the city's growth in the past.



Figure 7. a) Heritage zone in the city of Cirebon; b) Hierarchy between heritage zones in the city of Cirebon. Source: Nursanty, 2020

The authenticity in the city of Cirebon can be found in three main zones of the heritage core in Cirebon: (i) native territory (N) which was established since the founding of the Kasepuhan keratin in 1430 with the first king Prince Cakrabuana as a descendant of the kingdom of Pajajaran (Zulfah 2018). This native area was divided into three since 1679 to 3 Cirebon princes, namely Martawijaya, Kartawijaya and Wangsakerta (Firlianna Tiya 2016); (ii) Chinatown region, and (iii) European territory controlled by the Dutch people who lived in the city of Cirebon began in 1681 (Suparman 2017).

The urban development of Cirebon, in terms of trade, politics, and economy, still keeps the unique and authentic structure of the city's past. In Figure 7 diagram, the native area, which was initially one, was then divided into three areas according to the number of crown princes of Cirebon in the 15<sup>th</sup> century. Chinese diaspora who entered Cirebon around the beginning of the fourteenth century, the period that is believed as the beginning of contact between the Arab and China (Rizky 2019). The European area was developed along the coast and around the port.

#### **People and culture**

Places of the existing community groups zones in Cirebon correlate with Cirebon Batik. The motifs following the settlement distribution of existing communities, as illustrated in Figure 8 below:



Figure 8. Distribution of Cirebon Keraton Batik centers. Source: Nursanty, 2020, analyzed from (Hasyim 2020), based on Google map.

Each area around the palace has a different Batik style, according to the meaning or source of Batik motifs, generally taken from building artifacts, golden chariots, landscapes, and myths in the palace environment. (Irianto 2015) as illustrated in Figure 8 above. These motives are closely related to the *tarekat* (teachings) of the residence of a Muslim missionary in Cirebon, Sunan Gunung Jati. Islam, which forbids the depiction of animals and humans, required Batik to use metaphoric adaptation on existing animal motifs as in the three main motives of each palace above (Nursalim, 2016). It is according to historical records, which explain that Cirebon is one of the two entry points of Islam in West Java, along with Banten, which was very popular with members of the *tarekat* (Lombard 1996). Batik is a tool to keep and to convey spirit or ideals that are transmitted as messages from one generation to the next so that shared ideals will remain alive and not fade (Widiaty 2018). The other traditional Cirebon art productions, including tombstones, wood carving, glass painting and ceramics or pottery, in addition to *daluang* or lontar paper manuscripts, also embedded the messages. According to a study, there are three typological groups of Cirebon Batik: (i) Palace Batik version; (ii) Trusmian version, and (iii) Cirebonan version (Arwanto 2017).

#### Batik and the economic value

Figure 9 below shows the analysis of the existing Batik centers in Cirebon, which consists of 7 Batik centers in Cirebon, namely: (i) Pegajahan area; (ii) Pulasaren area; (iii) Trusmi area; (iv) Kalitengah area; (v) Plumbon area; (vi) Kenduruan area; and (vii) Ciwaringin area (Hasyim 2020).



Figure 9. Distribution of Cirebon Batik centers. Source: Nursanty, 2020 processed from Hasyim, 2020 on Google map

Creativity is the ability to create, to bring into existence, to arrange into new forms, to produce through imaginative skills, and to realize something new. Creativity is not the ability to create randomly, but the ability to generate new ideas by integrating, changing, or reapplying existing ideas. Some creative ideas are amazing and brilliant, while others are only good practical ideas, and no one has thought about them (Choiron 2018), regardless of gender, level, age, and race. Creativity is also the ability to create something new, including tools or methods to describe the problem, and most of it moves from the known to the unknown. Deducted from the Cirebon Batik center distribution in Figure 9 above, the economic growth of the Cirebon community has been supported by the ability to produce Batik that had been inherited by the community for generations. These are the specific Batik variations in Cirebon: (i) Batik Keraton Cirebon is Batik with motifs that according to history were created directly by prince Walangsungsang Cakrabuana who founded Cirebon as well as the first Islamic King in the land of Sunda (Zulfah 2018); (ii) Trusmi version of the Batik and its surroundings made by people who live in the Trusmi area around the Kasepuhan palace which is the location of the Prince's palace Walangsungsang; (iii) Batik with Cirebonan motifs with more freedom. As a whole, Cirebon Batik motifs, in general, is classified as Pesisiran (Coastal) Batik, influenced by cultural change and development in Cirebon as a port trading city, inseparable from the integration, collision, and assimilation and interactions between the local and international, such as Chinese, Indian, Arabic, European culture and so on. This cosmopolitan culture is due to the geographical location at the crossroad of trade routes that pass through the northern coast of Java. This route is part of the Silk Road of the sea (Jaelani 2016). The material culture formed in Cirebon is the result of the mixing of cultures there.

Cirebon strategic position on this leading shipping and trade route between the Strait of Malacca through the north coast to Maluku led to the creation of a maritime, economic and political network with Islamic kingdom such as Demak in the 16<sup>th</sup> century. Thus, the development of politics, culture, economic, and ethnic groups in Cirebon begun since the formation of local Muslim communities. The milestone of the history of Cirebon was not only influenced by the spices trades, but also by the tenderness and subtlety of inclusive interwoven human and intercultural relations.

#### Batik heritage and urban place

Coastal Batik in places or cities of heritage value has regional cultural influences from outside Java as well as foreign cultural powers such as China and India, as well as Hinduism and Buddhism. This acculturation underlies the style of coastal Batik, which is distinguished itself from the other Batik developed inland. Coastal Batik that grew in communities living outside the palace area or in the coastal regions of Java, such as Cirebon, Pekalongan, and Madura can be word by anyone and is not specific to certain groups (Furyana 2013).



Figure 10. Grouping of Batik motifs and places. Source: Nursanty, 2020 based on Google map

Batik manufacturing centers and the characteristics that is related to the hierarchy of place are shown in Figure 10 above. (A) is the Palace Batik that is developed into 4 areas of the palace, each of which has a unique Batik motif namely Singa Barong for Kasepuhan Palace, Nagaliman Paksi motif for Kanoman palace, Bintulu for Kacirebonan palace and motif for Kaprabonan palace; (B) Kalijaga Batik is a Batik motif that has been found in locations where Sunan Kalijaga once taught about Islam. He also taught the technique of making woven cloth to the people around his residence in the Kalijaga area of Cirebon. Over time this area also became a center for buying and selling woven fabrics with Islamic religious nuances (Irianto 2015); (C) Kenduruan Batik is used and produced by the Chinese community who live in the Chinatown in the middle of Cirebon city. The Kenduruan region is inhabited by pure Chinese ethnic communities where in the process of assimilation that occurs, they use Batik cloth as their daily clothes (Handayani 2018); (D) Plumbon Batik is a motif found in the Plumbon area which is located in Cirebon Regency, where this area is led by a Figure who is close to the palace and produces a Batik motif that becomes the uniqueness of the people in this region; (E) Trusmi Batik is a motif found in a village called Trusmi, with powerful developmental capabilities to date. The ability of Batik in this region is developing very rapidly, strongly influenced by two factors, namely internal and external factors (Dienwati 2015). Internal factors are in the form of two palaces, namely Kasepuhan Palace and Kanoman which very often entrusts the production of the palace family Batik needs to the Trusmi village community and external factors in the form of natural elements because Cirebon is a maritime area that has various types of animals, plants, birds, flowers, and habits that are carried out by the people of Cirebon. The process of making Batik, which has various manufacturing techniques, the use of color in Batik also influences the types and motifs of Batik in Cirebon.

#### CONCLUSION

The ability to compete in a heritage city is closely related to the strength of the catalysts in creating their creative works and communicating their meanings to stay awake. These original works have various hierarchies and types, namely tangible and intangible works. Following the timeline, tangible forms will always change according to tastes, trends, and resources that develop, and intangible values will be selectively preserved. Intangible values will be selected according to the ability of each generation to adjust to changes while maintaining their true identity.

Heritage Batik is a combination of tangible and intangible artworks that have been recognized by the world as belonging to the Indonesian people. Each heritage city has a heritage Batik work that arises from the process of the maturity of the catalysts and the process of assimilation that takes place between the local community, the environment, and the outside community involved in it. The place and spatial decision taken by the community on the environment where they live will affect the uniqueness of Batik both on the motifs, colors, and meaning of the patterns and messages that are in it. Thus, the city of heritage and Batik heritage is a unit that is very valuable to foster the ability to compete in a city as proclaimed by UNESCO, namely, Batik is a manifestation of Human Genius that ever existed.

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## LOOKING, USING, INTERACTING: NET ART AS A MODEL FOR BUILDING TRANSPARENCY AND COLLABORATION IN THE INSTITUTIONAL SETTING

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In 2016, then-curator of London's Whitechapel Gallery, Omar Kholeif introduced his exhibition of digital art by asking: "How do we materialize things that were made for a computer, into real space?"<sup>1</sup> a question curators and institutions have eagerly engaged with since. In 2019's "The art happens here: net art's archival poetics" at New York's New Museum, curators displayed digital-based art inside the gallery space in an arrangement of interactive desktop setups, video projections and tech-materials most viewers would recognize as a tangle of wires relegated to the deepest depths of their office floors.

In the last 10 months under global shutdown, the reverse of Kholeif's question has occupied us. No longer are creative ways being fashioned to materialize digitally born artworks, but instead the methods and technologies through which we translate art to remote viewers have expanded infinitely to accommodate digital viewing. Because the question of digital art viewership is now more relevant than ever to both traditional and new media art, commercial art fairs and galleries have quickly made use of novel technologies in virtual reality spaces and online viewing rooms. Museums have followed similar tactics for digitizing exhibitions, and over a thousand have partnered with Google Arts and Culture to widen their audience scope.<sup>2</sup> It seems though, regardless of the existence of an unprecedentedly willing digital audience, digital-born, or net. art<sup>3</sup> has not made its way to popular culture consumption.

In his 2009 text, "Can Art History Digest Net Art?" Julian Stallabrass establishes incongruities between digital art and art historical dialogues. Damningly, he suggests, net art has been inherently tied with radical politics and a disconnection from the museum and commercial art market. It lends itself to collaboration but can cultivate niche cultures of specialization.<sup>4</sup> While recent exhibitions have 'materialized' digital art in various ways, because of its lack of constant, (and often tangible) material, the net art 'genre' is hardly autonomous, and rather undermines understandings of the status of art as a valued cultural good or even as a unique tangible object.<sup>5</sup> By way of the museum display, art is venerated for technical exceptionalism or conceptual novelty, but always on some dimension of 'specialness.' Of course, this attention fades with the appropriation of the banal in pop art discourses, but in practically any materialization within the institution, art's status is renewed. But lacking physical white walls and richly diplomatic discursive plaques, museal digital platforms fall into a curious place. Institutions that naturally subscribe to ingrained traditions and answer to some degree

of state oversight, are naturally slower moving and more conservative with online offerings than rogue and the ever-explorable internet of things. Requisitely the institution's digital viewing platforms have been slower to develop, and up until the global shutdown of the last six-months, they were largely secondary concerns. Racing to catch up, there is a lot to be done to make art - whether traditional or new media -accessible and compelling to the online audience. In an attempt to provide solutions to this quandary, this paper will heed Stallabrass' call. Looking to the concepts of collectivity as well as the viewing 'space', this paper establishes what born-digital art can teach the arts industry about viewer's interactions with art in all of its materializations (and lack thereof).

A software art festival called *Readme*, held first in Moscow in 2002, brought together practitioners and users in two weeks of programming, discussions, and displays. Concurrently, projects submitted for the festival were entered, stored and viewed on a repository called *runme.org*.<sup>6</sup> As the festival came to a close, the database of works was made permanent, maintaining and cataloguing the digital art initiatives. The *runme.org* platform became a working archive, a repository for new projects, a newsletter, and a community content board. In their essay, "From art on networks to art on platforms," festival curators Olga Goriunova and Alexei Shulgin discuss *runme.org* and similar software art platforms. They explain that the structure of their site complies with a database structure and is requisitely shaped by the material that it contains.<sup>7</sup> Artworks can be searched by a 'category list' and 'keyword clouds' that change on every visit. While some of these categorizations are familiar, vernacular words; many, such as "bots and agents" and "MIDI" are software specific. Both vernacular and technical subcategories and categorizations can be 'clicked' to lead to further subcategories. The user with the requisite knowledge experiences this information as a network. There are no set beginning points, only information and key words act as nodes connecting in a multitude of

paths to other nodes. But as the networked and non-hierarchical structure of this information makes no claim to an order of priority, the question becomes one of *how*, and *where*, to enter.

rinnin dra Sectit thitthin the			
search se			
front I latest I featured I categories I keywords I news archive I submit a project I readme festival I about I fag I feedback			
category list	latest projects	keyword cloud [alphabetical order]	
algorithmic appreciation (2)	L3-37 [19 Dec 2019]		
> non-code-related (1)	Light Pattern [06 Aug 2014]	convergetists	
> pseudo-quines (0)	Drunk Eliza [23 Oct 2012]	symmetry market	
appropriation and plagiarism (5)	torrent ov [24, kp 2011]	chaos	
> stealing (0)	100 000 000 stolen pixels [16 .lun 2011]	representation	
	Incorrect Music 2 [22 May 2011]	pews Binp/telling	
artificial intelligence (11)	Excerpts From the Chronicles of Pookie &	PHYORUsercrash	
	JR [06 Nov 2010]	imagery python	
artistic tool (38)	[more]	Manalan .	
> audiovisual (28)	featured projects	eccentric	
> useless (1)	Total and projecto	plagiaristic	
	LYCAY (Let Your Code pIAY)	- de de servetive	
bots and agents (16)	Beject Me	addogecorative	
h	Go-Logo	silence	
browser art (22)	The Invisible Hand Machine	apothetics	
code art (26)	aPpBoPiBaTe!	friendly collaborative	
> code poetry (9)	[more]		
> minimal code (3)		post- kotting	
> obfuscation (3)	news	PHP desktop	
> programming languages (9)	Social Bits!	windows	
<ul> <li>Manuals (1)</li> </ul>	Three new Twittery/Facebooky projects on	**************************************	
conceptual software (31)	Runme. How Hetero by Stockholm Pride -	outeource	
> without hardware - formal instruction (4)	uses artificial ignorance to analyze	someonistic tertottem	
the second second second	heterosexuality based on language. Evil by	story	
data transformation (37)	might just he the work's largest	1996	
> multimedia (5)	phonebook. And you C O D E me by	COOR CK	
> sonification (6)	youandme takes a poet's-eye view of	9	
> visualization (7)	Twitter.	semanticsuperstitiouspam	
	[01 Jun 2010]		
digital aesthetics r&d (12)	Speak Broulow of Bupme's New Website	nude forminist	
> distunctionality (4)	Design	genetic constraints	
- <u>NW 10041</u> (0)	Check out a preview of runme's new	error dos	
digital folk and artisanship (20)	website design: http://beta.runme.org	text_manipulation	
> ascii art (3)	[01 Apr 2010]	. talking	
> audio-visual (1)		sound minimalistic	
> gimmicks (6)	More bits: There's a twitter in the air tonicht!	linux	
> Screen Savers (2)	#twitterart - new ascii-folk-twitter tradtion	community	
existing software manipulations (8)	and The Last Supper why you should	anti information	
sectoring portrait o manipulations (0)	never tweet at the dinner table And a	surreal	

Figure 1: runme.org, website view 2003. Accessed June 26, 2020. http://runme.org

That some of these categorizations use specialized terminology points towards the repository's targeted audience. Goriunova and Shulgin wanted to bring recognition to the "folk cultures of

programmers and users that inspired software art,"8 a feat they accomplished with several selfreferential and discourse-specific categorizations. Some shortlisted for inclusion, they note, were ironic or impudent evaluations like "best classicist vomit" and "JODI plagiarism."9 These layers of meaning within the organization of the database are not benign: they structure the user's engagement with the material. The more one knows, the richer and more meaningful the interface— there are more nodes through which to enter. Though on the reverse, the user who lacks this technical language has fewer options to access the network and thus move through it easily. If the plain text does not elicit meaning, the user is confronted simply with pages devoid of color and a grid stuffed with a foreign language. If the Barthian network relies on numerous democratized access points, this network functions for the initiated. Thus, the network of users and makers in *runme.org's* community risk alienating a casual viewer and feedbacking into a homogenous audience with specialized knowledge. Indeed, the effects of community building have been extrapolated on by several authors of digital art. As well psychological concepts of social capital building and a strengthened community can mean an alienated outgroup.<sup>10</sup> Online communities such as *runme.org* emphasize the importance of community and collaboration via its database structure but because this structure works best with an initiated viewer, it facilitates a kind of exclusive community.

Ironically, the institutions that digital art often criticize are the same ones that began to democratize the viewing of art outside the homes of the wealthiest classes. During two hundred years of public art viewership, institutions have functioned primarily to display, preserve, and translate the profound experience of the art object. For instance, the Victoria and Albert Museum was founded in 1852 to be "an impressive schoolroom for everyone," claimed its first Director.<sup>11</sup> Of course, it is important to acknowledge what the term "everyone" meant in the 19<sup>th</sup> century, but since that time, the concern of accessibility has been central to institutional efforts, and diverse audiences are reached by initiatives such as optional donation ticketing systems, youth programmes, and physical accessibility guides.<sup>12</sup> Of course, this has logically expanded into digital engagement with audiences through digitized collections and in-house events programming.<sup>13</sup>

However, the collaborative and replicable mode of net-based art production has distinguished it from the singular and reverential viewing historically at play within the institution, the same kind of looking which has produced a profound tradition of dictative social tastes,14 and has in turn contributed to the ethos of the museum as a site of veneration. The Museum of Modern Art in New York boasts that its first director "persuaded an entire generation on modern art."<sup>15</sup>Theodore Adorno also asserted his ideal kind of museum viewing occur when picking two or three works during a single visit, and "concentrat[ing] on them as fixedly as if they were his idols."<sup>16</sup> Such an experience is supremely individual, even religious, and is an exchange between viewer and object alone. According to the Kantian model of metaphysics, socially defined values (in this case formed in the museum) feed into the viewer's perception of objects; these values colour our "reality edifice." <sup>17</sup> The cultural ideology that Nazi Propaganda Minister Joseph Goebbels reified with the travelling degenerate art exhibition in 1937 remind us that this institutionalized mode is not only grounded in the physical space.<sup>18</sup> This opens up the question beyond the physical space int the museum's digital spaces as well. Recent projects have demonstrated possible modes of working around the two boundaries of exclusionary communities on digital interface, and the institutionally promoted singular modes of viewership. Considering the pandemic centric We=Link: Ten Easy Pieces, an exhibition which began in late March, 2020, it is possible to see possible ways in which the boundaries of exclusive online community and singular modes of viewership might be reoriented the museum setting. The exhibition, hosted by Shanghai's Chronus Art Centre in partnership with Art Centre Nabi (Seoul), Rhizome and the New Museum (New York), and nine other institutions, was made up of ten digital art projects that address a rising state of anxiety and global isolation. It was mounted in lieu of Chronus Art Centre's physical summer exhibit and included new commissions and pre-existing digital projects. According to curator Zhang Ga, the collection is "network native" and explores novel technologies for mobile communication and connectivity.

There is possibility to connect the exhibition to a network structure similar to *runme.org*, although the manifestation of this network appears quite different. The projects, displayed on a vibrant interface, function on fundamentally visual information such as interactive polka dots, text, and artwork 'previews.' At points, they are all visible simultaneously.



Figure 2: We=Link: Ten Easy Pieces, website view, 2020. Chronus Art Centre, Shanghai. Accessed April 5, 2020 <u>http://we-link.chronusartcenter.org</u>

Lev Manovich picks up on formal qualities that can manifest on the net art interface; the flat rectangular planes prompting comparison to a framed painting. In this homogenous plane, Manovich states, "everything is made of the same stuff."<sup>19</sup> Manifested accordingly, We=Link projects can be accessed through floating forms reminiscent of modernist geometric shapes. Just as the visitor's eye wades across the screen, so too does their cursor. There is no pre-determined path or architecture of the space, but rather an open plane to be explored. The user must mouse over the dots randomly to find the artwork's preview. Without a search bar or keyword list, the user's path is mediated by clicking, watching, and scrolling. This is an experience of what cultural anthropologist Tim Ingold, would call 'wayfinding' rather than 'navigating.'<sup>20</sup> For an initiated viewer, the network of information that makes up digital art platforms such as *runme.org* provide a wayfinding experience. For the uninitiated viewer, this must be augmented with an interface that promotes explorations rather than destinations. The user experience of using a database, of moving across rather than 'through' or 'down,' is cultivated explicitly in visual platforms such as We=Link. Once the user 'mouses' over a project portal, clicking reveals further information. This network is textural, visual, and superficial. The works are interconnected in their visual arrangement in space. Exploration is democratized.

Ironically, it is through avoiding the network as created in the *runme.org* platform that the connectivity of a digital experience is fostered on this platform. We=Link's layered and visually rich body of information (text, image, and video) creates an experience akin to web browsing, wherein the everyday user is confronted with a tremendous amount of information within the screen: pop-up advertisements, social media notifications, windows of text, image, and video. The web browser's screen becomes its own ecological system of communication, learning, shopping, and leisure. The constellated forms of information through text, image, and video on the flat interface of We=Link makes visual the simultaneity of this ecological system.

Textural networks like We=Link, however, do not necessitate any kind of input from the viewer. Returning to the repository function of *runme.org* that invited visitors to become creators via additions or comments, this quality is missing. But reasonably, there is less freedom for distributed input from exhibitions mounted by large institutions. Can creativity and a reorientation of priorities, from what Kholeif calls "making material,"<sup>21</sup> or displays of tangible, translatable objects, to accessibility and learning, result in successful community and collaboration within a museum setting? Again, We=Link presents promising results.

On March 30, 2020 an informal discussion around We=Link was held by Chronus Art Centre in partnership with the academic publisher, Leonardo, and brought together the curator, the directors of the Chronus Centre and Art Centre Nabi, and a number of the artists. The two-hour discussion was held via Zoom and streamed on Facebook events Live as well as the Chinese art and digital communication site, MANA. Viewers had the option to stream the video and listen anonymously, physically join the Zoom 'conference room' and engage with presenters via questions and responses sent through any of the three platforms. The 'gallery' view in the Zoom conference room had discussion audience set physically face-to-face with the artists and organizers of the exhibition in the same way one might be video chatting a close friend or colleague. The casual, and intimate discussion and open dialogue for questions and comments throughout the discussion fostered familiarity.



Figure 3: Virtual Dialogue: We=Link Online Exhibition, discussion view, hosted by Leonardo, March 30, 2020. Photo: March 30, 2020.

During the live question period, attendees were prompted to ask questions to the discussion participants. The collaborative efforts of the 12 institutions as well as the artists and staff became palpable. Such a direct line to artists and curators is, of course, rare in a museum environment. One might only dream of the opportunity to ask questions of their favorite renaissance painter or mid-century sculptor. Likewise, the curators and museum directors are seldom easily contacted via email, let alone available for face-to-face contact. This was an experience of a community network - and

potentially - accountability-building as well. As members in a discussion are prompted to explain their priorities in-depth and answer technical questions, a sense of accountability was cultivated between the institution and its people. For example, during the We=Link discussion, technical processes were elaborated on, such as the 'black box'<sup>22</sup> functioning at the core of the clichéd suggestions by Ye Funa's AI-run *Dr. Corona Online* (2020). When asked, curator Ga spoke to his careful collaboration with graphic designers toward the interface's colourful design. Its "presentation addresses the medium [of net art]. It does not overtake it, but addresses it as indispensable," Ga said.<sup>23</sup> This kind of dialogue between artists, institutional representatives, and its audiences, are especially valuable when discussions about donor transparency are had, collection repatriation is being re-thought, and the diversity of museum infrastructure is being rightfully demanded. If this is a result of collaboration and communication re-formatted away from engaging with the 'art objects' or 'interface', and towards engaging with the people behind the institutional bodies, then this model proves promising.

Considering recent exhibitions of digital art, it seems we have become more adept at looking *and* using on multiple planes simultaneously. As populations are increasingly able to return to eye- to-eye business, in-store shopping, in-person socializing, and of course in-situ art experiences, it is worth re-evaluating our tendencies for engaging with digital information. As we become less reliant on aesthetic and individual viewing experience cultivated in places deemed 'art worthy', it is possible to re-figure not only how we look, but also put pressure on who dictates this looking. Perhaps these questions have been manifestly addressed in digital art practices for its 30-year existence, and increasingly they are addressed in the institution. In this way, digital art is not incongruent to established modes, indeed the two can be symbiotic. The institution need not only deliver a venerated art object, but a set of questions and problematics to its audience, *and* an arena in which to explore them.

#### NOTES

<sup>1</sup> Whitechapel Gallery, Curator's Tour: Omar Kholeif on "Electronic Superhighway (2016-1966)."

- <sup>2</sup> As reported by Adrien Searle, in "Private View: Our Art Critic's Favourite Online Galleries."
- <sup>3</sup> A variety of terms have been used, I will proceed with 'net art'.

<sup>4</sup> Stallabrass, "Can Art History Digest Net Art?" 173.

<sup>5</sup> Ibid.,173.

<sup>6</sup> Goriunova and Alexei, "From Art on Networks to Art on Platforms (Case Studies: Runme.Org, Micromusic.Net, and Udaff.Com)." 246.

<sup>7</sup> Ibid.,249.

<sup>8</sup> Goriunova and Alexei, "From Art on Networks to Art on Platforms (Case Studies: Runme.Org, Micromusic.Net, and Udaff.Com)." 253.

<sup>9</sup> Ibid., \_\_\_\_

<sup>10</sup> Trebor Scholz references this danger in the essay "The Participatory Challenge" published in *Curating immateriality: the work of the curator in the age of network systems* edited by Joasia Krysa, 237–56. DATA Browser. Brooklyn, NY: Autonomedia, 2006. His term "social capital" is likely borrowed from Robert Putnam. <sup>11</sup> Arieff, "Reading the Vicotria and Albert Museum." 403.

<sup>12</sup> For example, the 2001 commitment to re-instate free museum admission across London, the presence of youth programmes embedded within large institutions such as V&A CreateVoice (London), MoMA Teens (NYC), and Young Stedelijk (Amsterdam), and the Tactual Museum in Athens, Greece.

<sup>13</sup> For instance, London's Tate Youtube performances.

<sup>14</sup> See Haladyn, Boredom and Art: Passions of the Will to Boredom. Winchester, UK: Zero Books, 2015.

<sup>15</sup> According to "The Museum of Modern Art History," moma.org.

<sup>16</sup> Adorno, *Prisms*. 185.

<sup>17</sup> Haladyn, *Boredom and Art.* 29.

<sup>18</sup> The Editors of Encyclopaedia Britannica. "Degenerate Art." In *Encyclopaedia Britannica*. Encyclopædia Britannica, inc., October 7, 2019.

<sup>19</sup> Manovich, *The Language of New Media*. 265.

<sup>20</sup> Tim Ingold, *Lines*, (London; New York: Routledge, 2007), 77.

<sup>21</sup> Whitechapel Gallery, Curator's Tour: Omar Kholeif on "Electronic Superhighway (2016-1966)."

<sup>22</sup> Borrowed from cybernetics, a metaphor for understanding the input and output of complex systems.

<sup>23</sup> Ga, ZHANG, in Leonardo and Chronus Art Centre, "Virtual Dlalogue: We=Link Online Exhibition."

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