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Learning . Life . Work

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EDITOR:
Cindy Shearer

EXECUTIVE PRODUCTION EDITOR:
Amany Marey

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INTRODUCTION

Learning . Life . Work

Today, education is often defined as hybrid. Hybrid delivery in-class and online. Mixed theories of teaching and practice. Cross-disciplinary courses and programs. Alternative modes of enquiry. Community and student engagement. Concepts of explorative learning. Multicultural perspectives on subjects. The combined arts and sciences of STEAM – to name but a few. The same hybridity is true of life and work. We value a work-life balance. We seek self-fulfillment in professional contexts. We see education as continual through professional development and life-long learning.

In this context, education plays many roles, and serves many people and purposes. It takes on many forms. In embracing this hybridity, the Learning. Life. Work proceedings publication seeks to explore the numerous ways education morphs and blurs – through varied methodologies across a multitude of disciplines, geographies, and mindsets. As such it welcomes perspectives from the arts and humanities, design and media studies, science and technology, education and training, health and the social sciences.

In this diversity, these proceedings reflect the place and institution in which the conference was set: the California Institute of Integral Studies in San Francisco. A city famous for its counterculture, history of gay rights, its Hispanic heritage, Asian diaspora and its cutting-edge arts scene. It is a place renowned for alternative models of thought. Home to the first free public school in California, San Francisco has also spearheaded various education initiatives in United States. It implemented the Indian Education Program in the 1970s, supporting Native American communities. It led in the adaption of the Beacon Initiative to use schools for community needs, and it is home to one of the largest publicly funded university systems in the United States.

Incorporating authors from locations across the world who consider the future hybridities of teaching and learning, this publication aims to share perspectives, initiatives, programs, and projects, and disseminate best practices across the education sector.

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BRIDGING THE DIVIDE: TEACHING WRITING IN THE DESIGN DISCIPLINE

Author:
SANA KHAN HUSSAINI

Affiliation:
SAN FRANCISCO STATE UNIVERSITY, UNITED STATES

INTRODUCTION

As the profession of design advances, writing is becoming more central to the design practice.[1] Proficiency in writing skills and research methods has become equally important as acquiring technical design skills.[2] Typically, designers write to sell their ideas to the client, document their design process, instruct the users to improve engagement, analyze and evaluate critical design issues, and generate creative thinking. Design practitioners' design process is centered around design thinking principles and differs greatly from their writing process.

Rim Razzouk and Valerie Shute describe design thinking as an analytical and creative process that allows for experimentation, model creation, feedback collection, and revisions. This process typically includes five steps: empathize, define, ideate, prototype, and test.[3] In undergraduate design studio courses, students consistently apply these principles to solve problems and use these skills to address real-world challenges in the industry. They continue implementing this standard design process learned in school to tackle industry problems.

However, while teaching an upper-division undergraduate Writing and Research in a Design course at San Francisco State University (SFSU) in the Fall of 2022/23, I observed that this process-based learning approach that works well in teaching a design studio course can pose challenges when it comes to teaching writing to the undergraduate design students. Many design students view writing and design as two distinct fields, making it difficult to integrate writing skills into their overall design practice.

Therefore, this research aims to understand why SFSU design students perceive writing and design as separate domains and identify hybrid teaching methods to help them integrate writing into design for a cohesive learning experience.

Hybridity, as defined by Jesse Stommel, is about the moment of play where the two sides of binaries begin to interact and transform into a new configuration.[4] Similarly, Cohen, Nørgård, and Mor describe hybridity as the blurring of boundaries between distinct contexts of learning and activity, leading to unexpected and interleaved experiences.[5] These definitions highlight the importance of hybrid teaching methods, which merge different learning modes and create a dynamic and integrated educational experience.

Hybrid teaching methods are particularly effective for SF State's diverse student body, which comprises over 60% students of color. Additionally, around 44% of the university's student population are first-generation college students, and many are non-native English speakers.[6] This

diversity brings a wide range of perspectives and experiences to the classroom, necessitating flexible and inclusive teaching approaches. Hybrid methods can accommodate different learning styles and cultural backgrounds, promoting engagement and comprehension among all students. By employing hybrid teaching methodologies, we can bridge the perceived divide between writing and design, fostering a more cohesive and integrated learning environment for students.

CHALLENGES IN TEACHING WRITING TO DESIGN STUDENTS

Within design disciplines, writing is often allocated less time than studio activities, making it an unfamiliar territory for many practice-based designers. Linda Apps and Carolyn Mamchur note that while some explicative writing is requested for students' final exhibitions, historically, writing has been marginal within art and design disciplines. They argue that design students often lack the literary skills to adequately describe or discuss their projects, despite the analytical nature of their making processes.[7] Traditionally, the design discipline has created visible divisions between classroom and studio, theory and practice, and writing and making. This division is deeply ingrained in design students' knowledge and became increasingly apparent as the semester went on, with students displaying hesitation and avoidance towards writing and the iterative process involved.

This reluctance revealed underlying issues: a lack of ownership over writing among design students, their previous experiences with writing, and their perception of time in relation to design versus writing.

Lack of Ownership of Writing

Design students often feel more in control and connected to their design process compared to their writing tasks. They actively seek feedback on their design projects, perceiving these outcomes as personal expressions of themselves. According to Orth, Thurgood, and van den Hoven, design outcomes serve as objects that reflect the students' identities.[8] Cara Jones further notes that for many students, the design process functions as a means of self-expression and self-discovery, making feedback crucial for affirming their creative abilities.[9]

In contrast, design students generally do not consider themselves professional writers and tend to distance themselves from writing tasks. Research by Orr, Blythman, and Mullin has shown that design students often view writing as a peripheral aspect of their careers, frequently perceiving it as a technical and impersonal activity.[10] As illustrated in Figure 1, undergraduate design students showed a greater willingness to embrace iterations in their design process compared to their writing process. This detachment is exacerbated by the emphasis on standardized formats and formal writing styles, which restrict self-expression and diminish personal connection.

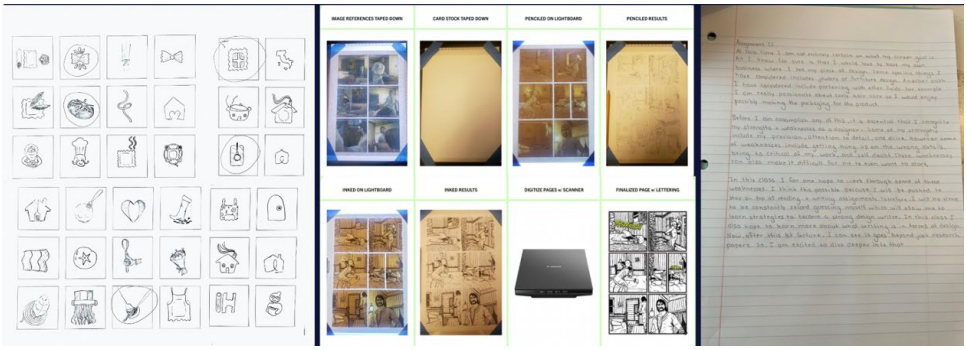

Figure 1. Undergraduate Design students' design process vs their writing assignment.

Students' Prior Association with Writing

The contemporary university structure features specialized domains of knowledge, each with its own scholarly communities. Consequently, general writing courses are offered to freshmen outside these disciplines to enhance their writing skills. Carter distinguishes between 'knowledge' and 'knowing'—where disciplines are seen as repositories of static content versus active ways of understanding.[11] In design courses, students engage with concepts through hands-on craft and experimentation, which promotes an active way of knowing. However, a focus on writing in design often causes hesitation due to previous writing experiences.

Daly and Wilson describe writing apprehension as a situation-specific individual difference in their article "Writing Apprehension, Self-Esteem, and Personality." They find that individuals with high writing apprehension tend to avoid writing due to anxiety, while those with low apprehension are more confident. Design students, who often experience high levels of writing apprehension, find writing anxiety-inducing and prefer visually driven majors.[12] This hesitation was evident in my class, where students described writing as daunting and intimidating, leading to procrastination, unlike their approach to design project deadlines (See Figure. 2). Understanding this apprehension is crucial for developing strategies to support design students in overcoming their writing challenges.

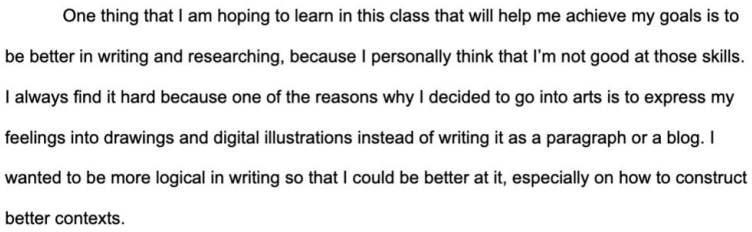
One thing that I am hoping to learn in this class that will help me achieve my goals is to be better in writing and researching, because I personally think that I'm not good at those skills. I always find it hard because one of the reasons why I decided to go into arts is to express my feelings into drawings and digital illustrations instead of writing it as a paragraph or a blog. I wanted to be more logical in writing so that I could be better at it, especially on how to construct better contexts.

Figure 2. Student's reflection on what they are hoping to achieve from the Research and Writing in Design Course.

Concept of Time in Relation to Design vs Writing

Design students perceive a strong positive correlation between the time invested and the quality of their designs, often staying after hours to refine their projects. Zaretsky identifies three ways designers view time: as a limitation, an opportunity for improvement, and a driving force. Consequently, design students create project timelines, set deadlines, and track progress to achieve successful outcomes.[13]

In contrast, students often feel that time spent on writing tasks does not lead to significant improvement. Graham found that students frequently underestimate the time required for writing assignments, resulting in insufficient investment.[14] This issue is linked to a lack of understanding of the writing process, limited metacognitive skills, and low confidence. Additionally, students often experience lower motivation and increased anxiety regarding writing, which leads to procrastination. Steel's study connects procrastination with anxiety, influenced by factors such as assignment complexity and personal confidence issues.[15] As a result, students may submit first drafts as final papers to meet deadlines. Figure 3 illustrates the extensive and time-consuming steps the student undertook for their design project, while for the writing assignment, the same student did not even meet the minimum word count.

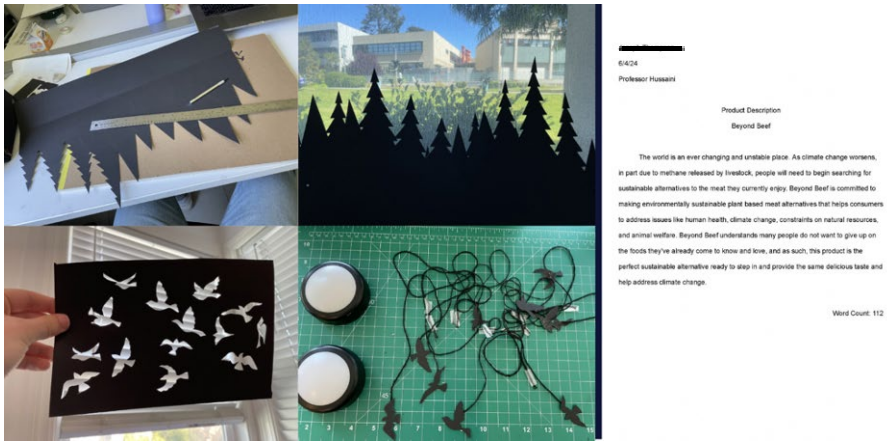

Figure 3. Student invested more time in their design project, compared to their writing assignment which did not even meet the minimum requirements.

HYBRID APPROACHES TO INTEGRATING WRITING AND DESIGN

The concept of hybridity, originating from Latin and traditionally associated with biological cross-fertilization, provides a compelling framework for examining innovative educational approaches. As Pedersen, Young, and colleagues describe, hybridity fundamentally involves "a cross-fertilization or amalgamation," emphasizing the blending of diverse elements rather than simple intersection.[16] This perspective is crucial for understanding hybrid pedagogies in design education, which do not merely mix traditional and modern learning environments but seek to create a dynamic interplay between physical and virtual learning contexts.[17]

Stommel further elaborates on this by defining hybrid pedagogy as a practice that challenges conventional binaries, aiming to reconfigure and engage various forms of learning in a more integrated and critical dialogue. He asserts that "blended learning is tactical, whereas hybrid pedagogy is strategic."[18] While blended learning typically refers to the combination of classroom and online environments, hybrid pedagogy fundamentally rethinks our conception of place. It brings together the learning experiences that occur in physical spaces and those in virtual spaces into a more engaged and dynamic conversation.[19]

In discussing the integration of writing and design, it is essential to differentiate between blended and hybrid approaches. Blended learning involves a process or practice of combining classroom and online learning. However, hybrid pedagogy transcends this by fostering a re-engagement and dynamic conversation between different learning environments. This hybrid approach is particularly effective in addressing discipline-specific and interdisciplinary writing needs, accommodating diverse learner backgrounds, and balancing collaborative and individual learning experiences.

Postcolonial theory, particularly Bhabha's concept of hybridity, offers valuable insights into this integration. Bhabha suggests that the language of critique is effective because it overcomes the given grounds of opposition and opens up a space of translation—a place of hybridity where new political objects are constructed. This space of hybridity challenges and changes our recognition of conventional categories and expectations.[20] Similarly, in the context of design education, hybrid approaches can create spaces where writing and design intersect in innovative ways, leading to new forms of understanding and practice.

This section explores how hybrid approaches can be applied to the integration of writing and design, focusing on how they address discipline-specific and interdisciplinary writing, meet diverse learner needs, and balance collaborative and individual learning experiences.

Hybridity of Discipline-Specific and Interdisciplinary Writing

The new curriculum embraced the concept of hybridity, drawing inspiration from Mouat's research by integrating Writing-to-Learn and Writing-to-Communicate methodologies to foster both independent thinking and effective design communication.[21] According to Murdick, writing to learn involves "writing that is done primarily to explore one's thoughts on a subject, to pour out the mind to see what's in there, to mull over the subject, to develop thinking, to learn in other words, what the mind holds and what the mind can discover by making largely unconscious connections."[22] In the design context, this approach is exemplified by student reflections on their design process and peer reviews. Mouat further explains that Writing-to-Communicate is "discipline-rhetoric oriented, it must be addressed to an audience, and clearly describe the design process, explain the design research, define the design objectives, and point out the design project's outcomes."[23] This type of writing is crucial for helping students articulate their ideas clearly and effectively in both written and oral forms. Examples in design include design briefs, persona development, design research reports, copywriting, and poster design.

Given the diverse student body, it was crucial to integrate writing conventions with design knowledge. Thus, elements from SF State's Composition for Multilingual Students Program (CMS) were incorporated, focusing on various writing techniques and their application within design (See Figure. 4). Descriptive writing, which uses sensory details and expressive language to depict a subject vividly, was integrated with copywriting in the design course.[24] Expository writing, aimed at conveying information and clarifying concepts objectively, was initially used for essay writing and later evolved into design research reports.[25] Persuasive writing, employing rhetorical techniques and emotional appeals, was applied in poster design projects.[26] Narrative writing, which provides insights through sequential discourses, was utilized in case studies to emphasize human experiences.[27] This interdisciplinary approach ensures that the curriculum is inclusive and supports students from diverse cultural and linguistic backgrounds, thereby enriching their educational experience.

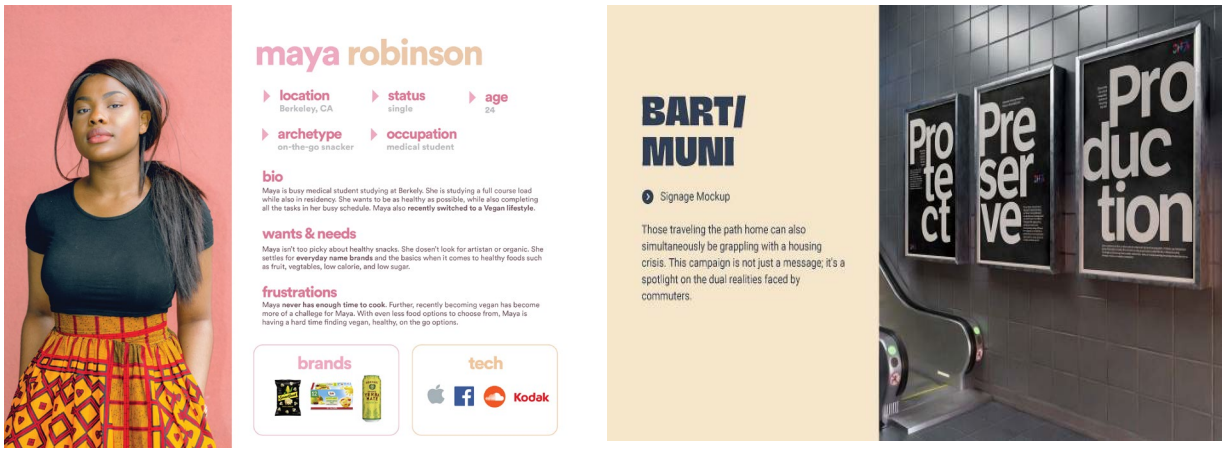

Figure 4. On the left is a Persona developed by the student using descriptive writing, while on the right, there is a snapshot of the student's case study which employed persuasive and narrative writing techniques.

Hybridity of Student-Specific Needs and Diverse Learners

To address the diverse needs of students and enhance their learning experience, the course employed a hybrid approach combining scaffolding and independent learning strategies. Initially, scaffolding was utilized to break down complex tasks into manageable steps. For example, assignments evolved from

simpler essays to more intricate research reports, gradually increasing in complexity. To accommodate varying time management skills among students, multiple low-stakes assignments were introduced, particularly at the course's start. I provided structured support by offering detailed guidelines, examples, and feedback for early assignments, which helped students build confidence and clarify expectations. As the course progressed, this support was gradually reduced to promote student autonomy. In later assignments, such as the design research report and case study, students were encouraged to select their own topics and explore various research methods discussed in class (See Figure 5). This gradual shift allowed students to apply the skills they developed through initial scaffolding in a more self-directed manner, accommodating their specific needs and fostering a deeper engagement with the material.

Figure 5. To apply Persuasive Writing Techniques, students developed posters supporting a social justice cause of their choice.

Hybridity of Collaborative and Individual Learning.

The course embraced a hybrid approach by integrating both collaborative and individual learning experiences. Collaborative learning was facilitated through group projects, peer reviews, and community engagement. Students worked in teams to tackle design projects, leveraging their collective skills to achieve varied and innovative outcomes. Peer reviews were instrumental in developing critical thinking and communication skills, as students engaged with diverse perspectives. Furthermore, partnerships with local organizations enabled students to address real-world design challenges, applying their skills practically while understanding the social impact of their work.

For instance, one student examined the lack of educational programs and accessible resources for economically disadvantaged youth in the Bay Area aspiring to pursue the creative arts. To better understand this issue, the student collaborated with Creative Growth, a non-profit organization in Oakland that supports artists with developmental disabilities through a nurturing studio environment and gallery representation. Based on their research, the student proposed a design intervention inspired by the influential Hyphy movement in Bay Area culture (See Figure 6.). The proposal included a mobile creative center—a bus line dedicated to offering creative events and resources in low-income communities to support the artistic development of disadvantaged youth.

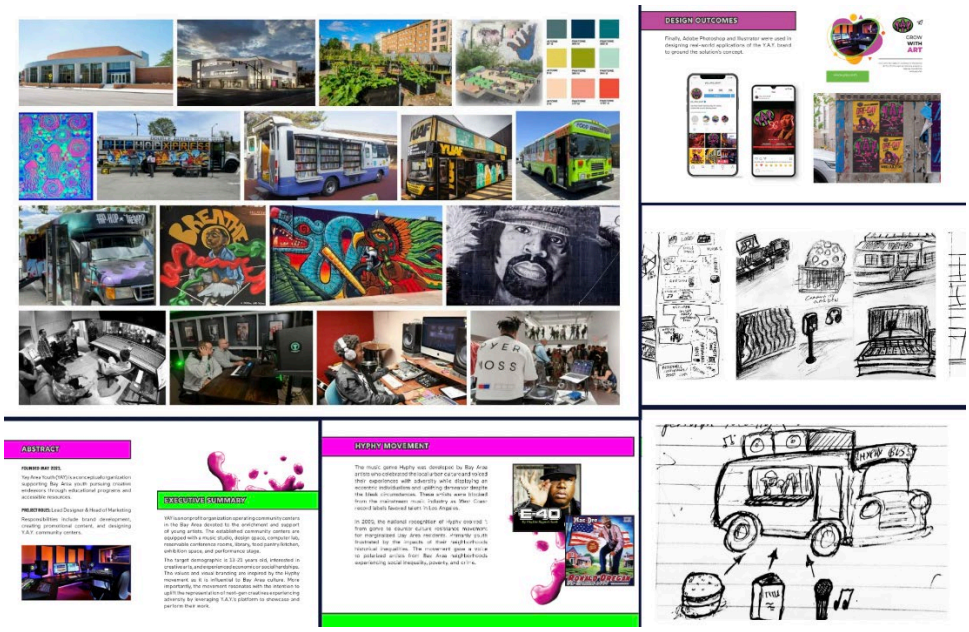

Figure 6. Highlights a student's final case study. The student collaborated with Creative Growth, an Oakland non-profit organization supporting artists with developmental disabilities. Inspired by the Bay Area's Hyphy movement, the student proposed a design intervention based on their research.

In addition to collaborative tasks, students completed individual assignments emphasizing personal skill development and self-reflection. They conducted independent research and crafted design reports, encouraging self-reliance and critical analysis. Reflective papers were used to promote metacognitive learning, allowing students to document their learning processes, challenges, and insights. For example, students were tasked with reflecting on their strengths and weaknesses, as well as their learning goals. Throughout the semester, students also participated in both formal and informal assessments to evaluate and improve their learning experiences in the course (See Figure 7).

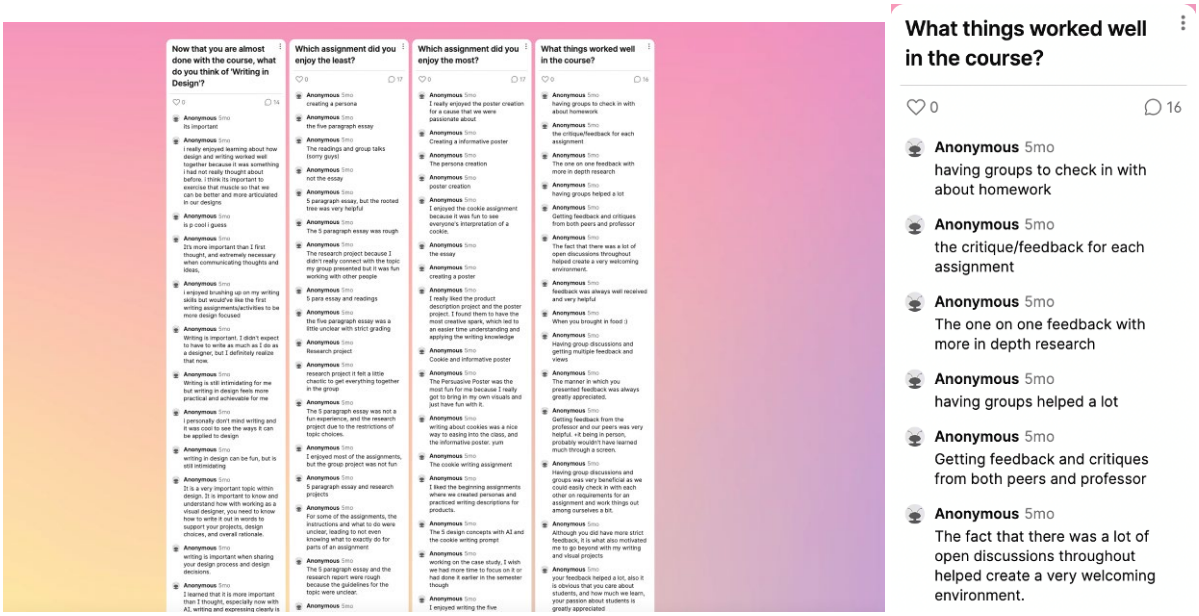

Figure 7. Throughout the semester, students are involved in their own learning through Formal and informal course assessments thorugh Miro Boards and Padlet, evaluating what is and what is not working for the students in the course.

IMPLICATIONS

At the start of the semester, students enrolled in the course were assigned to reflect on their writing skills and the relationship between writing and design. Some of the responses included:

“I personally am not a fan of writing.”

“I have done a lot of formal academic writing for other courses. It has made me dread writing ever since, almost like it took the life out of the activity.”

These responses reflect students' resistance to writing and their perceived gap between writing and design. However, as the students moved through each section of the course, their perceived gap between the two domains began to bridge, helping them recognize the significance of writing in the field of design.

“Writing is still intimidating for me but writing in design feels more practical and achievable for me.”

“I really enjoyed learning about how design and writing worked well together because it was something I had not really thought about before. I think it's important to exercise that muscle so that we can be better and more articulated in our designs.”

The findings and outcomes of this research hold several implications for the field of design education and for those seeking to bridge the gap between writing and design:

Integration of Writing Skills in Design Education: This study underscores the growing importance of integrating writing skills within design education. As the design field continues to evolve and embrace interdisciplinary approaches, students should be equipped with strong writing and communication abilities alongside visual and aesthetic skills.

Alignment of Writing Education with Discipline Needs: The approach taken in this study, which introduced two key forms of writing, namely Writing-to-Learn and Writing-to-Communicate, resonates with the unique requirements of the design discipline. Similar efforts should be made to customize writing instruction in other fields to ensure that students acquire skills relevant to their disciplines.

Recognition of Diverse Writing Types in Design: Students, through their journey in descriptive, persuasive, expository, and narrative writing, not only honed their writing skills but also developed a profound understanding of how to apply these techniques in a design context. This understanding is invaluable for designing products, conveying ideas, and engaging audiences. Design educators and institutions should incorporate a variety of writing styles into their curricula to foster versatile designers with strong communication skills.

Tailored Support for Diverse Student Needs: The feedback from students throughout the course emphasizes the importance of aligning writing education with students' specific needs, particularly non-native English speakers and those unfamiliar with academic writing conventions. This aligns with the growing diversity of student populations in universities. Educators should provide tailored support to students who find the linguistic and rhetorical demands of academic writing challenging, ensuring all students can benefit from writing in their design practice.

Limitations of the Study: This research was conducted with a single cohort of 25 students in one upper-division undergraduate Writing and Research in Design course at San Francisco State University. The diverse student body, primarily from the Bay Area, presents a unique context that may not be directly applicable to other regions or institutions. Additionally, the relatively small sample size limits the generalizability of the findings. Future research should aim to include a larger and more diverse sample across multiple courses and institutions to validate these findings and explore the broader applicability of hybrid teaching methodologies in design education.

CONCLUSION

This research highlights the transformative potential of hybrid teaching methods in bridging the gap between writing and design for undergraduate design students at San Francisco State University. Through the integration of writing into the design curriculum, students were able to see the practical application of writing skills in their design practice. This approach not only improved their writing abilities but also enhanced their overall design capabilities, emphasizing the symbiotic relationship between these two domains.

The initial resistance to writing observed among the students underscores the importance of addressing preconceived notions and anxieties associated with academic writing. By gradually introducing writing tasks that are directly relevant to their design projects, students began to appreciate the value of writing as a tool for communication, reflection, and critical thinking within the design process. The positive shift in student perceptions, as evidenced by their reflections, demonstrates that hybrid teaching methods can effectively dissolve the perceived boundaries between writing and design.

Moreover, this study's findings have broader implications for design education and interdisciplinary learning. They advocate for a more holistic approach to education that recognizes the interconnectedness of various skills and disciplines. By tailoring writing instruction to meet the specific needs of design students, educators can foster a more inclusive and engaging learning environment that accommodates diverse learner backgrounds and preferences. However, it is important to recognize the limitations of this study. The research was conducted in a single course with a relatively small sample size of 25 students at San Francisco State University. The diverse student body from the Bay Area provided valuable perspectives, but the findings may not be easily generalizable to other contexts or larger populations.

Ultimately, the successful implementation of hybrid teaching methods in this course serves as a model for other institutions seeking to integrate writing into design education. It underscores the necessity of adapting teaching strategies to align with the evolving demands of the design industry, preparing students not only as proficient designers but also as effective communicators. This research

contributes to the ongoing dialogue on educational best practices, advocating for a more integrated and interdisciplinary approach to teaching and learning in the field of design.

NOTES

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DESIGN BUILD STUDIO: AGENCY THROUGH LEARNING BY MAKING

Author:
CAMILO CERRO

Affiliation:
AMERICAN UNIVERSITY OF SHARJAH, UAE

INTRODUCTION

Fed by the accessibility and affordability of smart tools, rapid prototyping, digital fabrication, and computational technology, the *Maker Movement* has upgraded the art of tinkering into a celebration of idea sharing and hands-on creativity, empowering problem-solving and creating agents of change. It can be seen as a cultural revolution that places value on individuals creating, more than consuming. Where the participants are learners, seeking ways to prioritize self-sufficiency over a reliance on consumer brands. While the maker movement is only a decade old, the desire to ideate, plan and create has been an inherent part of the human condition since our beginnings. And as such, has manifested on a movement that resides inside and outside of academia, normally relying on fab labs and makerspaces as a point of origin. The *Maker Movement* based on pedagogies like, learning-by-making and the concept of design thinking as a teaching methodology, are slowly becoming more common in the mainstream educational system.[1] Two ideas that are fundamentally linked to experiential learning tactics that go back to Jean Piaget's constructivist[2] and Seymour Papert's Constructionism.[3] Where Piaget's constructivism proposes that humans create knowledge through the interaction of their experiences and ideas, while Papert's constructionism, in contrast, focused more on the art of learning, and on the significance of making things. Unlike Piaget, Papert stressed the importance of tools, media, and context in the construction of knowledge. The sharing or using of these learner artefacts, as he calls them, complements the construction of knowledge achieved through personal inquiry and creativity. Today, design thinking has manifested on a number of phases that are not always sequential, starting at context analysis, followed by observation, problem finding, brainstorming, ideation, creative thinking, sketching, prototyping, testing, and evaluating with making as a learning process at its center. And since innovation is an endless process, design thinking is endless as well, so the phases are repeated with every design iteration. As the continuous flow of new technology changes the job market, it is hard to predict the occupation learners will end up in once they finish their education. Effective teaching strategies (figure 1) must take the unpredictability of the future into consideration by develop critical thinking, problem-solving and decision-making skills.

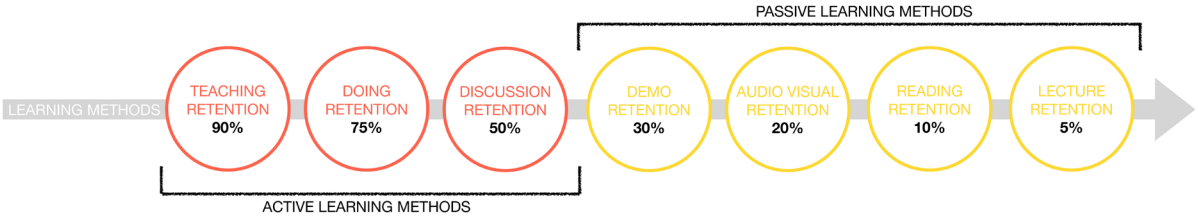

Figure 1. The learning pyramid (reconfigured linearly) original idea created by the National Training Laboratories Institute.

Starting from the premise that at the heart of an education based on learning-by-making practices is the idea that all students are creators. A *maker education* and the *maker movement* will rely on hands-on, discovery-based, collaborative experiences where projects focus on experimentation and problem-solving for the act of learning to occur. Unlike traditional teaching methods, maker education encourages students to learn, not just by watching, but by doing. The idea of do-it-yourself or more accurately do-it-together, emphasizes the learning process rather than just the end-product. As we are going through the reassessment of our Interior Design Program, we have been experimenting with the inclusion of learning-by-making components throughout our curriculum. We are creating a maker-centered learning environments, where students can imagine, design, and create projects that align the content of learning with hands-on experimentation. This article will focus on the addition of a design-build component as a culmination to an evolving learning-by-making curriculum, covering our observations since its implementation in 2017. During this intensive studio and after multiple learning-by-making processes in other courses, students experience and understand the design-make-design cycle, address client parameters, learn to produce construction drawings, integrate universal design principles, respond to multiple contexts, integrate landscape, learn collaborative design skills, and physically build a permanent one-to-one project. But the real learning experience is about collaboration, about community, about complexity, and about themselves.

THE MAKER MOVEMENT: A BRIEF HISTORY

In 1998, the director of MIT's Center for Bits and Atoms (CBA), Neil Gershenfeld, taught the first *how to make (almost) anything course* which was followed seven years later by the publication of *Fab: The coming revolution on your desktop-From personal computer to personal fabrication.* The book presented the work of a collection of designers that embraced a culture of making by giving individuals access to a series of creative tools through the establishment of the first Fab Labs.[4] Starting in this way the era of personal fabrication. The launch of *Make: Magazine* in 2005,[5] followed by the first *Maker Fair* in San Mateo California in April 2006, established what we know today as the *Maker Movement*.[6] A sub-culture that places value on an individual's ability to be a creator of things naming their participants *Makers*. The *Makers* have different vocations, with a diverse skill sets and interests, brought together by creativity and digital connectivity. The growth of the movement is often attributed to the rise of makerspaces, community centers, libraries, or schools where makers got access to fabrication and digital tools that would otherwise be inaccessible or unaffordable. Paired with the appearance of web marketplaces like Etsy, giving makers a platform where to sell their products and inventions. The idea of the makerspace has its roots in a previous iteration that grew from academia named the Fab Labs mentioned previously.[7] Fabrication laboratories (FabLabs) are physical spaces, just like the makerspaces, linked to virtual communities that promote the creative use of new technologies. The first one was created in 2001 at the Center for Bits and Atoms at the Massachusetts Institute of Technology (MIT) with a grant of the national science foundation by

Professor Neil Gerschenfeld linked to that first *how to make (almost) anything* course.[7] The idea behind the Fab Lab was simple, to provide the environment, skills, advanced materials, and technology to make things cheaply and quickly anywhere in the world, and to make this available on a local basis to entrepreneurs, students, artists, small businesses, and anyone who wants to create something. While the first ones originated around universities, their proficiency as a learning tool expanded their reach into schools, non-governmental organizations, and cultural institutions, where they serve educational purposes while giving a fabrication capacity to local communities. The makerspace provides a physical testing ground for inquiry-based learning whether in or out of academia. Today, it is common to have a Fab Lab associated to an architecture program, this is not always the case with interior design programs. Our program has had one for over a decade, and we are using our access to the Fab Lab as the catalyst for its transformation into a learning-by-making active member of the maker movement.

LEARNING-BY-MAKING, A TYPE OF EXPERIENTIAL LEARNING

How can students benefit from an approach to education that focuses on experiential learning through a Maker experience? How can this approach to design, develop in students a sense of agency? This and other similar questions are what we are investigating as we transform our Interior Design curriculum. By looking at examples of Maker centered learning and reviewing literature about the subject we are trying to develop a program that takes as much as possible, advantage of a learning-by-making methodology. As an Interior Design program, we are already using Design Thinking as part of our process. Design Thinking is a problem-solving approach that revolves around ergonomics and human centered design. In this sense, it has always been inherent in design education, second nature to most creatives. As a concept, it was presented to the non-designer world by Tim Brown on an article named *Design Thinking* written for the Harvard Business Review in 2008. He proposed that instead of allowing design to come along towards the end of the development process in a cosmetic way designed to make a product attractive to a buyer, the field of innovation should expand to encompass human-centered related processes that ask designers to create ideas that produce better solutions to human needs.[8] He believed that taking from the designer's toolkit allows businesses to better integrate the needs of the public, the possibilities that technology bring, and the requirements for a business to succeed.[9] In other words, Design Thinking refers to the use of the design process by disciplines outside of the design field. And normally it is done on a linear way which is not how the design process really works. This does not mean that as a teaching strategy it can't be complementary to a learning-by-making methodology since both as presented above are linked to experiential learning processes and theories. To incorporate learning-by-making or hands-on learning processes into formal education requires the creation of a maker culture. Which in the case of our Interior Design program, existed at a distance, done by others in the architecture program but not within interior design. The Fab Lab was there, but the interior design students were not taking advantage of it. Making, promotes student agency by encouraging them to create their own questions and actively seek answers to these questions. And it was evident that our program was lacking agency. To start we looked into David Kolb's *Experiential Learning Theory* due to its similarities to the design process. As the name suggests, it involves learning from experiencing more than from hearing about things. Kolb suggested that the learning process requires the procurement of abstract concepts that can then be applied flexibly in a wide range of situations. Therefore, knowledge is created through the transformation of one's experiences.[10] This process is presented as a four-stage cycle (Figure 2) followed by a categorization of learning styles, and its broad enough to provide the basis for a course, a section of a course, an assignment or just a learning experience within it.

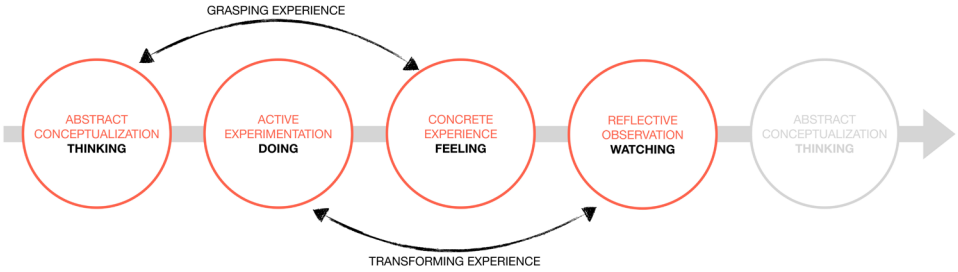

Figure 2. David Kolb's learning cycle presented linearly

Kolb's experiential learning cycle parallels Design Thinking making it very easy to assimilate into both educational and professional design processes in the creative fields. Analogous to Kolb's move through stages, a typical interior design process starts with a concrete understanding of the site and its context, to try to figure out the problem to be solved. Then through a decision-making process through theorizing possible solutions, an abstract idea takes form through means of representation and a process of making to present a conclusion. At that point the cycle can restart the design process as is the case of what happens on a midterm review or be finalized and developed for construction as happens on a final review or in professional practice. The design process moves from Concrete Experience, through reflective observation, into abstract conceptualization, culminating on active experimentation. And it is in active experimentation that learning-by-making can be incorporated into the design process in a robust way to develop a methodology that focuses on a hands-on way of teaching. In a similar way, the design process used by creatives parallels a maker education in many of its outcomes, it already enhances students' creativity, they constantly are solving real-world problems and developing critical thinking skills. The novelty resides on how far can we take the hands-on aspect of the process within the cycle? And whether it can manifest in the full curriculum as a complementary system that develops in complexity as the student moves through the program year by year.

Figure 3. IDE402 Taught by Professor Daniel Chavez in 2018. Project name: Khaima-Theatre under the stairs. Participating students: Farah Al Hazeem, Amer Madhoun, Aya Kanafani, Lina Ghalib, Hana AlKhalib, Reem Saab, Aya Hurbli, Aya Chafic, Ninoshka Cardoz, Sarah Quadeer, Mena Ahmed, Hadeel Mutahar & Farah Mahmoud.

DESIGN-BUILD AS A LEARNING BY MAKING TOOL

Design-build is not a new learning method in architectural education; its roots go back to the Dessau Bauhaus, established by Walter Gropius in 1919. The school had an avantgarde pedagogy evolved from industrial design and mass production.[11] The Bauhaus program aimed to connect the craftsman with the artist and shift construction to the center of the architect's training. Students in the program were encouraged to build as a learning-by-making educational tool. Later, one-to-one constructed design/build was initiated with the work of Yale University's Building Project headed by Charles W. Moore in the 1967,[12] followed by the Auburn University's Rural Studio established by Dennis K. Ruth and Samuel Mockbee in the 1993.[13] The popularity of design-build courses within the traditional architecture curriculum has been on the rise since due to the manufacturing and fabrication potential of new technologies.[14] Design-build offers an experience that differs significantly from the typical studio-based architecture education in the sense that the work does not remain hypothetical. Today, this trend has not shifted much into interior design education. There are few interior design schools around the world that have design-build studios and fewer that build their pedagogy around making. Our current design/build studio align closely to this Bauhaus lineage by centering on live projects that encourage research through trial and error (figure 3 & figure 4). The working process in design-build is animated, fostering experimentation, where accidents may lead to new insights and unintended design consequences. Our design-build studios attempt to connect students with the design process the way a practicing architect experiences it, while also understanding the contractor's procedure of building. As the studio emulates real-life experiences, it simultaneously presents a much more complex constructive reality and enhanced decision-based thinking by confronting the learner with the intricacies of the construction process. It mixes experiential learning and learning-by-making methodologies while developing learners with agency about what they are doing. A process that manifests constantly in our new curriculum filled with learning-by-making opportunities that culminates with the design build studio as its strongest manifestation.

Figure 4. IDE402 Taught by Professor Ammar Kalo in 2021-2022. Project name: Studio for creative work and instructionParticipating students: Abiha Zaidi, Alya Alsarkal, Alya Saeed, Batoul Alasmar, Danah Alsaleh, Dania Hasan, Douha Ahmad, Elham Masoum, Gheed Fekaiki, Haneen Darwish, Jana Diab, Krstin Raed, Lama Al Shadid, Layla Matrahji, Maha Babiker, Mariam Khaireddin, Misbah Ahmad, Nagham Hijazi, Noora Almulla, Raghad Hassan, Rajaa Taye, Ramasha Mashood, Rania Alfakhouri, Razan Hussein, Sahar Bokhary, Sawanjit Takhar, Shahad Maatook, Tala Hassan, Wafa Alfalahi, Zayinab Alsayrafy.

CONCLUSION

Every couple of decades a new set of skills and ways of thinking become necessary to move forward, often democratizing knowledge and technology previously only accessible to experts. Digital fabrication and the maker movement are the new chapter in this process of bringing ideas, knowhow, and tools to a larger segment of the population. Today, the range of accepted disciplinary knowledge has expanded to include programming, engineering, and design,[15] allowing for subcultures like the *maker movement* to come into existence. As the *maker movement* becomes ever present in Interior Design programs, we find that in our case our students are graduating with a much better understanding of how things are put together, resulting in better designers. While this article has presented the advantages on a learning-by-making methodology, the obvious disadvantage resides on the dependency of the CAADLab itself. A *learning by making* program requires resources and financing, making it hard for some institutions to emulate our approach. Having said that, our process has been based on the idea that education needs to be a form of empowerment fostering creativity and inventiveness, principles influenced by Dewey, Piaget, Papert, and Freire around the constructive uses of technology, a culturally aware education, experiential learning, and an interest-driven curriculum.[16] Our program functions under the believe that instead of learning the answers, students should be encouraged to create the answers. The need to better our program has given us the opportunity to test new and old ideas into a curriculum that fosters idea sharing, hands-on creativity, empowers problem-solving and creates agents of change.

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PRODUCING SUSTAINABLE ENERGY AND TECHNOLOGY THROUGH ART AND DESIGN

Author:
ADELAIDA DEL PUERTO GARCÍA

Affiliation:
ESCUELA DE ARQUITECTURA DE TOLEDO UCLM/ DEPARTAMENTO INGENIERÍA CIVIL Y DE LA EDIFICACIÓN / GRUPOTOL RG, SPAIN

INTRODUCTION

In an educational environment where virtual elements and a certain distance from material reality are marking our exit from the pandemic, shared experiences and direct production result are an enthusiastic way of developing learning experiences.

At the Toledo School of Architecture UCLM in Spain, we have maintained face-to-face teaching except during the spring of 2020. In September 2020, the campus expanded to various empty buildings in the city of Toledo, giving us the opportunity to redesign our space, experiment, and stay together—teachers and students-. During the lessons and workshops of the Highly Technological Projects subject, we seek sustainability through the interaction of art and technology. In recent years, we have created prototypes of renewable energy systems integrated into architectural spaces with the contribution of piezoelectric sensors. We have also developed solutions for artificial lighting by introducing conductive paint and integrating heritage elements, increasing material savings in architecture and furniture design through 3D printing. Students produce their own prototypes at a 1:1 scale—the scale of reality-. By identifying their design weaknesses, they attempt to solve them, transforming their work into improved proposals that are closer to their future real designs. They share information and efforts, discovering the possibility of uniting different disciplines with one main objective: putting Art and Technology at the service of Sustainability.

This article explores the role of hands-on practice and offers insights into adaptable architectural education amidst changing landscapes. It defends the need for interactive workshops and highlights the importance of craftsmanship in prototyping. Additionally, it examines the scalability of 3D printing for material efficiency enhancement by experimenting with its geometric possibilities and the reduction in the use of raw materials that additive manufacturing entails.

THE FUSION OR ART, SCIENCE AND TECHNOLOGY IN THE 20TH AND 21TH CENTURY

Architecture has been over time the discipline where the encounter between Art and Technology has taken place: Mathematics and Ornament, Physics and Aesthetics.[1]

But in the first half of the 20th century, Art condensed many of the changes in the understanding of the world that were the result of scientific and technological advances.

Cubism, led by artists such as Pablo Picasso and Georges Braque, sought to depict reality from multiple simultaneous perspectives.[2] This approach shared conceptual similarities with Albert

Einstein's Theory of Relativity, which challenged traditional notions of time and space.[3] In paralell, pedagogic experiences related to Art, Design and Technology like the Bauhaus founded in Germany in 1919, promoted the integration of art, craftsmanship, and technology. Bauhaus artists and designers, such as Wassily Kandinsky and László Moholy-Nagy, sought to fuse aesthetics with functionality and adopted scientific and technological principles in their creative approach.[4] Surrealism figures such as Salvador Dalí and René Magritte, explored the world of dreams, the subconscious, and the human psyche. These artists were often inspired by Sigmund Freud's theories of psychoanalysis, creating works that challenged conventional reality.[5]

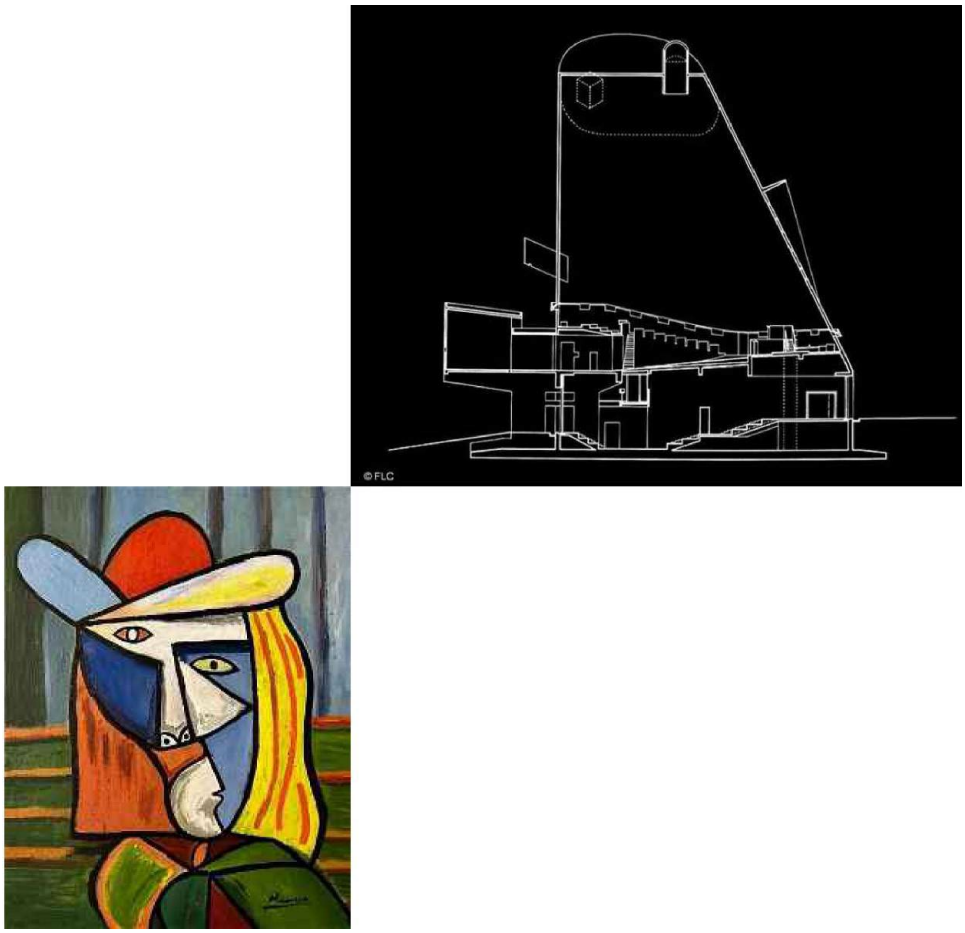

Figure 1. Image composed by the author with the original Firminy church cross section by Le Corbusier (credits https://www.fondationlecorbusier.fr/en/collections/) and Pablo Picasso cubism woman spanish hand portrait (credits: anonymus private collection)

In the case of Kinetic art, with representatives such as Victor Vasarely, it sought to engage the viewer through optical illusions and visual movements. These artists drew inspiration from scientific research into visual perception and psychology to create works that defied the observer's expectations.[6] In the case of the encounter between Music, Technology and Architecture, collaborations were materialized in some buildings like the Phillips pavilion designed by Iannis Xenakis and Le Corbusier in the Expo of 1958.[7] The pop art movement, with artists such as Andy Warhol, reflected on consumer culture the influence of the media that was boosting its presence on everyday life at the time with the help of progresses on communication technology.[8]

THE SCHOOL OF ARCHITECTURE OF TOLEDO AND THE UCLM PANDEMIC RESPONSIVE EXPERIENCE

The University of Castilla La Mancha is a public university located in one of the regions with the lowest per capita income in Spain. Primarily focused on agriculture and the agri-food industry, the region of Castilla La Mancha has only one university which serves a territory equivalent in size to a country like Belgium. The university campus is divided and distributed across the region's five provinces, one of which is Toledo. The Toledo campus is the result of the restoration and the change of use of an 18th-century masonry factory of weapons situated on the banks of the Tagus River, outside the medieval city walls.

The preventive lockdown resulting from the global spread of the covid 19 virus in 2020 had different versions depending on each country. In Spain, it lasted approximately three months form March 12th, and completely closed all educational centers. From that moment until the end of the academic year in July 2020, we faced the only possibility of continuing our students' education: online training. The rector of our university, with a clear vision of the immediate future and a strong conviction that in-person education should be resumed as soon as possible and together with his board, dedicated the lockdown to finding vacant buildings owned by the public administration and carrying out works on the campus during the summer of 2020.

The desired result was accomplished: the uclm was able to resume classes normally in September 2020 complying with social distancing, ventilation, and other requirements still demanded by health authorities. In the case of the School of Architecture of Toledo, the chosen building was a Tourist Reception Centre created in 2006 that had remained empty for years. A building without interior distribution and, at that time, lacking some basic facilities. The initial bewilderment of teachers and students was followed by an unexpected enthusiasm: the result of the immense freedom that allows you to reach a place where there is apparently nothing of what you need or believe you need. Emergency solutions were taken, such as teaching on terraces until November 2020, designing makeshift lamps with our mobile phones when the lighting system had not yet been rehabilitated, and gradually emptying spaces that had been used as storage by the Town Council. In return, we could teach in a cinema and in two television studios that were part of the original building spaces. We all had to be architects: teachers and students. To invent and transform together a place where everyone was in contact with everyone in a continuous open space. And we had to learn how to teach and learn together in a much closer and respectful way.

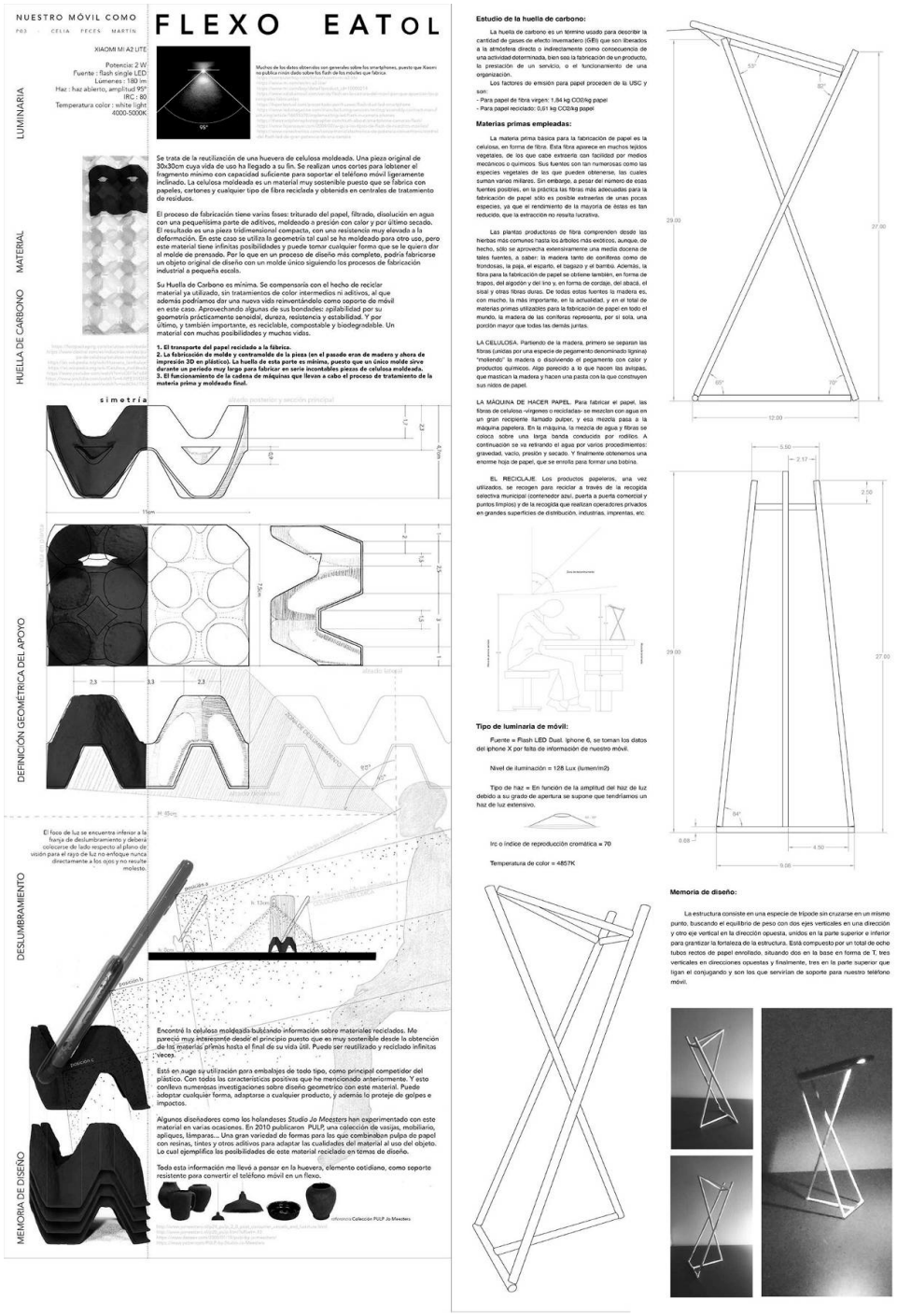

Figure 2. 2021 EAT UCLM Proyectos Altamente Tecnificados results. Two examples of lightning designs using the mobile phone as luminary 2021. Students credits: Celia Peces and Daniel Negrín

A COMPARATIVE ANALYSIS OF HISTORICAL AND INNOVATIVE ARCHITECTURE

Any innovation task requires an in-depth study of its precedents. The main objectives are to leverage accumulated knowledge and experience and to propose possible improvements by recognizing past positive aspects and future potential. In the context of the fifth year subject called Highly Technical Projects in EAT UCLM, one of the proposed exercises consisted on discovering spatial quality, constructive accuracy, and degree of efficiency in different architecture master pieces examples.

Comparative studies were conducted between traditional or historical architectures and paradigmatic 20th-century experimental and innovative examples. Housing was the chosen typology as it facilitates a low scale approach. Paired studies were comparing examples such as the Galician traditional *Palloza* with Richard Rogers' *Zip-Up House*, or the *traditional Balinese house* with one of the Jean Prouvé's prefabricated homes. Another comparative study involved two extreme cases of courtyard houses: the Roman *Villa of the Faun* in Pompeii and the Smithsons' *Future House* -as illustrated in Figure 3-. Through spatial, constructive, and infrastructure analysis, students drew final conclusions and evaluated the salvageable and improvable aspects of both designs. In the case of the courtyard homes, students identified deficiencies in infrastructure as well as lower efficiency degree in water management and the use of energy use in the modern piece. The extension of the Balinese house and its landscape integration highlighted the criterion of minimums which was the basis of Jean Prouvé's strategy that, on the contrary, resulted into a more efficient system of facilities. The issues of land humidity and orography present in the *Galician Palloza* were completely resolved in Rogers' stilt structure. In the analysis of use and needs programs, the most contrasting cases studied by peers were Buckminster Fuller's *Wichita* prefabricated house and Sir John Soane's house, now a museum in London -as illustrated in Figure 3-.

In the first case, the architecture addressed basic needs without allowing for a more transcendental understanding of living, which was precisely Soane's approach. Also the use of natural light was evaluated leading to the conclusion of a more efficient use in the case of Sir John Soane´s house. Concurrently, the technical advantages of the *Wichita* house were noted, but its thermal envelope performance generated significant dependency on a heat generation device, making its example impractical for our climate, for example, due to the lack of thermal inertia.

Without any temporal bias, the pros and cons of each example were considered, and all characteristics were deemed feasible for the present if positively evaluated.

EVALUATING THE STATE OF THE ART AFTER 2020

Virtual, renewables, conductive painting and 3dprinting

In present time augmented reality and virtual reality in architectural design and public art installations are on the rise. With the help of these technologies virtual art and physical structures can coexist in unique experiences.[9] Also the discipline of Biomimicry, that involves imitating natural processes and forms, influences Art and Architecture improving the pursue of sustainable design options embracing strategies for the minimization of nature impact and increase of environmental awareness.[10]

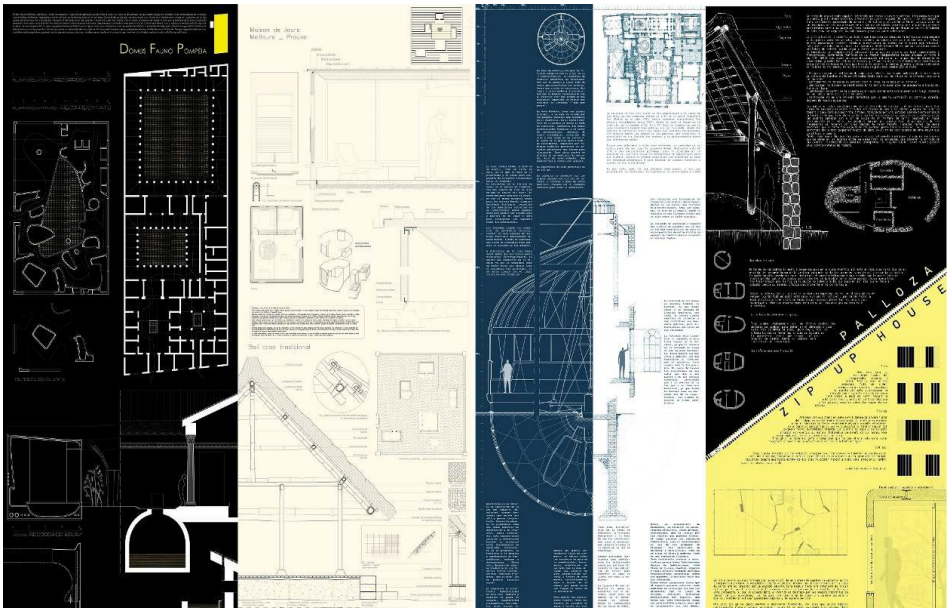

Figure 3. 2022 Proyectos altamente tecnificados EAT UCLM results on four examples of comparative architecture analysis. Students credits: Iván Martín, David Flores, Mario Zamarra, José María del Río, Asier Crespo, Bruno Bonivardi, Sara García Ochoa, Andrea Ruiz Almaraz, Andrea Ruiz del Castillo, Virginia Gutiérrez, Ainoha Vilurta, María López, Fernando Manzaneque, Micaela Castellanos, María Vaquero, Fátima Talib, Elena Mendoza, Juan Pablo Martín, Pedro Sanguino, Nataly Saavedra, Patricia Ramírez, Berta Aguado.

Data and technology art installations that respond to real-time information, such as weather patterns, social media feeds, or other dynamic data sources, is an emerging trend that blurs the lines between art, technology and architecture. Digital Art and Virtual Reality Artists today use digital tools and virtual reality to create immersive art experiences. Virtual reality art and architecture installations allow viewers to interact with and explore artwork in three-dimensional spaces. Artists like Refik Anadol and Mario Klingemann use algorithms and artificial intelligence to generate unique, ever-evolving artworks.[11] These pieces often involve the collaboration between the artist and the computational system. Artists leverage 3D printing technology to create intricate sculptures and installations.

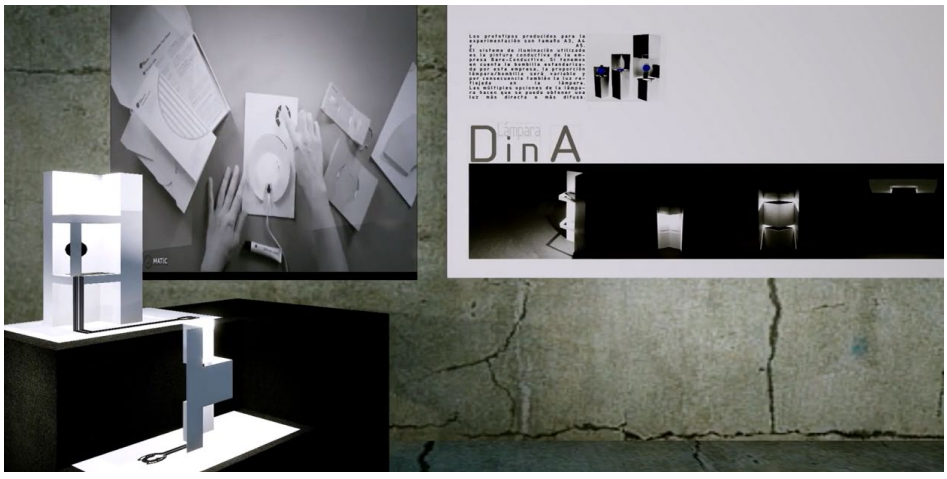

Figure 4. Screenshot of the virtual may 2020 exhibition of Proyectos Altamente Tecnificados EAT UCLM results on conductive painting design (https://www.youtube.com/watch?v=3Ma7Io4O35s) . Student credits: Violeta Calvo y Carlos Jiménez

The ability to design and manufacture complex forms has expanded the possibilities for sculptors. Artists such as Rafael Lozano-Hemmer and teamLab[12] create interactive installations where the audience's participation influences the artwork. Sensors and technology respond to human movements, creating dynamic and participatory experiences.

Projection Mapping. Projection mapping involves using projectors to transform physical objects, such as buildings or sculptures, into dynamic displays. This technique has been used in public art, advertising, and live performances, merging digital visuals with physical spaces.

BioArtists like Eduardo Kac integrate living organisms and biotechnology into their artworks. Genetic engineering and biotechnology become mediums for artistic expression, challenging the boundaries between art and science.

THE PAT PROPOSAL FOR THE FUSION OF SCIENCE, ART AND TECHNOLOGY IN SUSTAINABLE DESIGN

Integrating theory and application in a collaborative environment: the Art of Co-creation

Currently, and especially since 2020, interaction between students can be achieved through digital media in the creation of realities that, except for the final addition of an additive manufacturing method, remain in the digital realm. However, we architects are creators of tangible, liveable, and experiential realities in the real world. We must be capable of working with materials and physical objects from the beginning of a design. Only in this way can we properly approach the properties and possibilities of objects and materials, as well as the potential errors or improvements from direct experience. Our work, if committed, is not much different from laboratory work. It is an experimental approach to reality.

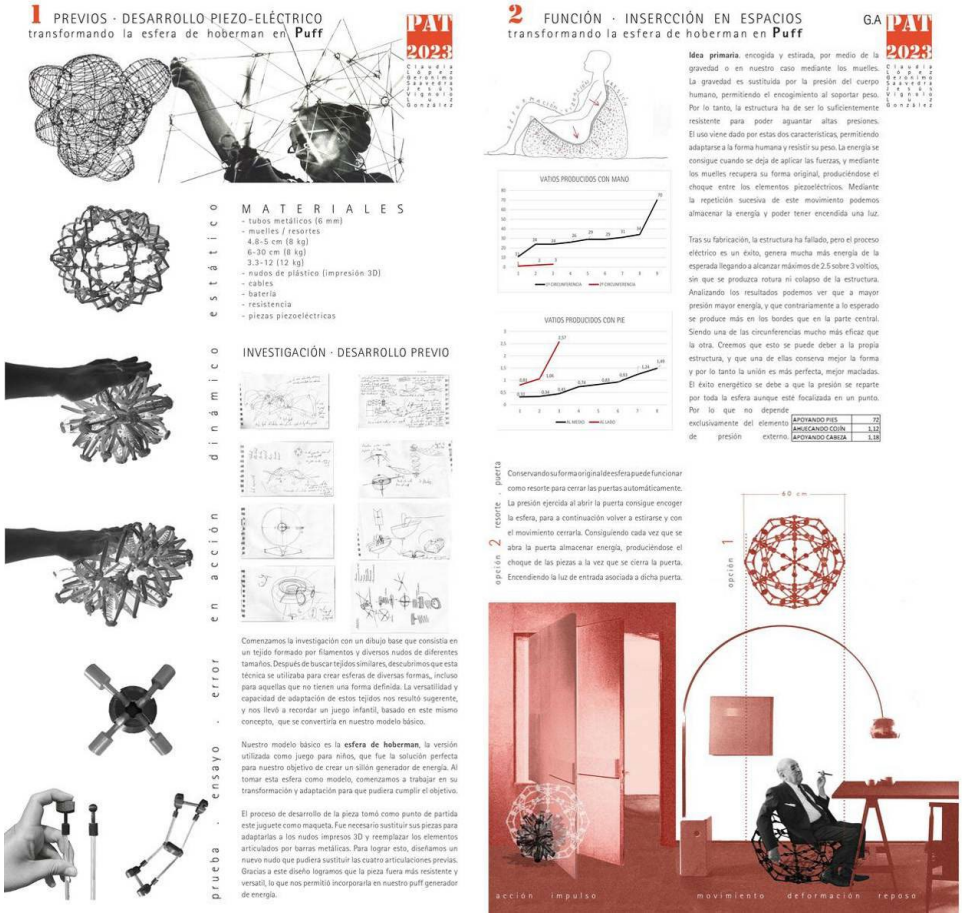

Figure 5. 2023 Proyectos Altamente Tecnificados EAT UCLM results on art and piezoelectric power devices design (1). Student credits: Claudia López, Gerónimo Saavedra, Jesús Vignolo, Luz González

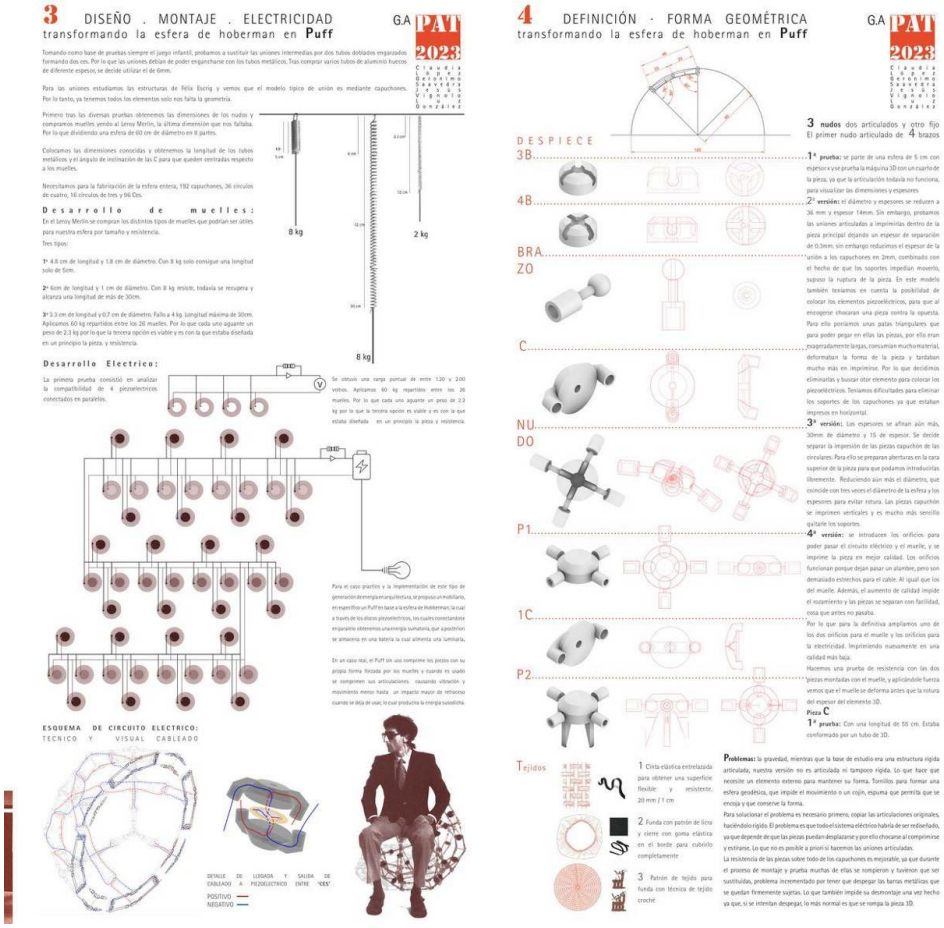

Figure 6. 2023 Proyectos Altamente Tecnificados EAT UCLM results on art and piezoelectric power devices design (2). Student credits: Claudia López, Gerónimo Saavedra, Jesús Vignolo, Luz González

In the case of the Highly Technical Projects course at EAT UCLM, the integration of the application of imparted theory and experimental practice during classes occurs collaboratively. That is, all research, design, experimentation, and improvement work is carried out in groups. This method allows for co-creation from the beginning of the process. Collaboration includes the theoretical sessions since, during the first phase of work, each group of students presents their research findings to the rest of the class. This way, innovation is integrated into the theoretical classes, and understanding becomes much easier because the language used is that of the students themselves.
Theory, research, and implementation thus occur collaboratively, allowing the results of the class to be shared by everyone. Replacing competitiveness with collaboration, and sometimes letting students make decisions about what is studied at the theoretical level; usually leads to high participation, greater enthusiasm, and a clear commitment to the subject.

A multidisciplinary approach to prototypes

Since the Highly Technical Projects course at EAT UCLM advocates that technification should always serve sustainability, practical exercises usually focus on small-scale design proposals that integrate some form of renewable energy and/or conductive paint. The designs for renewable energy generation devices must always be resolved through architecture. That is, they must always fulfill some other function within the needs program of a project, whether architectural or design-related.

In this way, renewable installations are conceived as part of the construction system or with the other functions of a design object, rather than as something external added once the work is completed. It is also discovered that, as designers, we are capable of proposing alternative solutions to those offered by the industry, which are much more coherent with our objectives of transforming and improving the built environment and our multidisciplinary approach to designing.

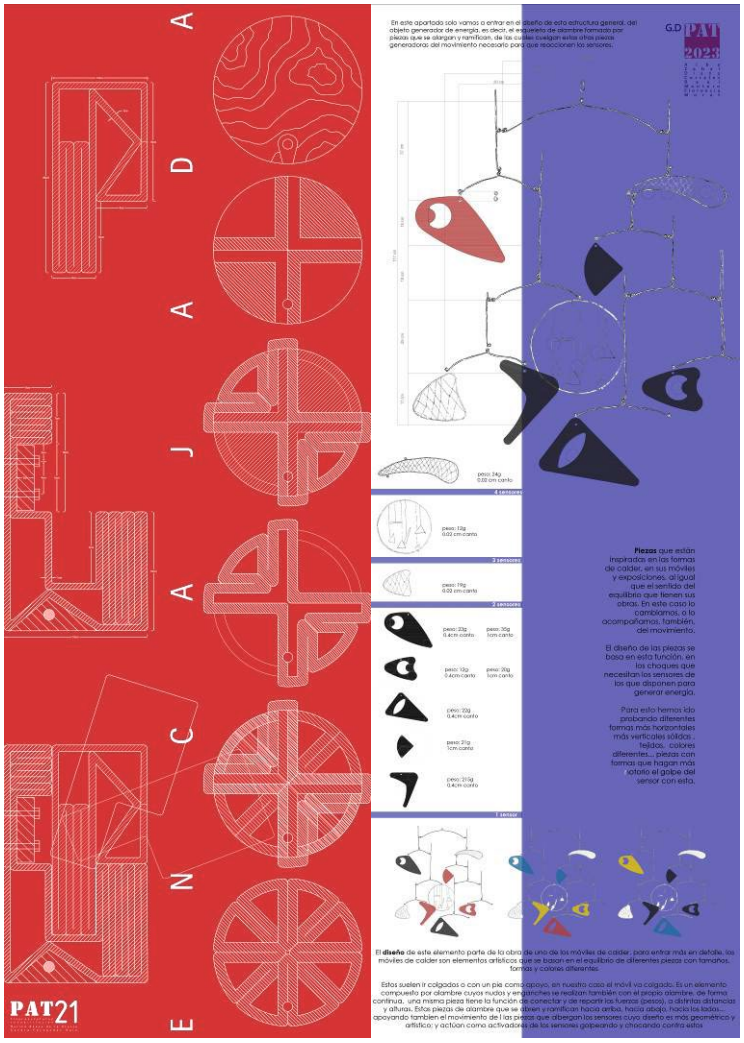

Figure 7. 2021 and 2023 Proyectos Altamente Tecnificados EAT UCLM results on art, geometry, heritage renovation structural joints and renewable energy producing furniture design with 3dprinting prototypes. Student credits: Sandra López y Alba Zabal.

Merging sustainability, technology and art

Approaching areas of knowledge related to art, technology and sustainability requires prior training during the theoretical phase that integrates these three disciplines. Art is studied from the perspective of composition and the characteristics of its material reality. The classes on renewables focus on small, affordable technologies, such as low-intensity and low-power piezoelectricity. Conductive paint allows a piece of art to become a switch/dimmer circuit for lighting control. Combining all of this allows us to tackle a small lighting project with an innovative approach, where we can design the piece from start to finish. Moreover, it includes the system that enables the generation of energy to make it work.

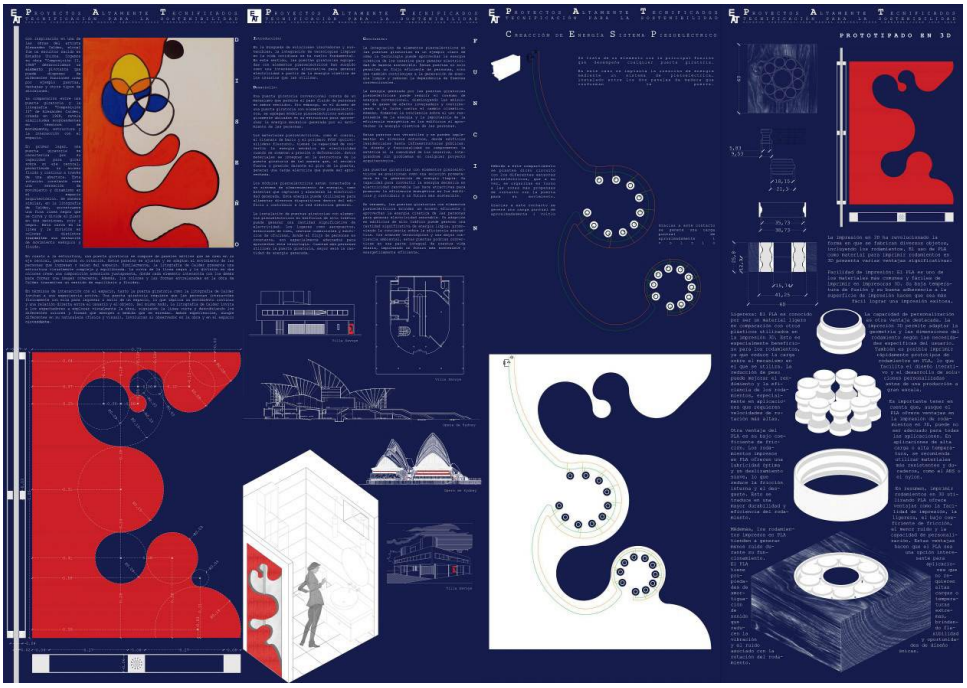

Figure 8. 2023 Proyectos Altamente Tecnificados EAT UCLM results on art, architecture and renewable energy producing architectural elements design with 3dprinting prototypes. Students credits: Eduardo José Contreras, Jorge Carbonell, Alberto Granados, Juan Manuel Sánchez de Pablos.

The decision to equip a mobile component with its own energy generation system directly impacts its capacity for survival, as it eliminates reliance on external energy sources. This operational independence, often overlooked in our designs since the advent of energy generation systems such as electricity, is crucial for the adaptability and scalability of everything we create in a volatile, unpredictable, and climatically extreme context. From the design of small components to large buildings or urban areas, self-sufficiency must be a central consideration in our planning. This approach should not devolve into a purely rational exercise in engineering. Instead, with our humanistic training and architectural tools, we can transform it into an opportunity for improvement, ensuring that the sensitive aspects of the human experience are represented.

CONCLUSION

The strategies developed in response to the COVID-19 pandemic, with the aid of technology, successfully mitigated the temporary disruption of the educational system due to lockdowns. Concurrently, the prolonged necessity for social distancing has prompted reflection on the suitability of online education. The approach advocated by the University of Castilla-La Mancha (UCLM) and the School of Architecture of Toledo in Spain has consistently emphasized and valued in-person education, collaborative work, and the tangible practice of project-based learning. While the initial phase of conceptual thinking and analysis can be effectively addressed within a virtual environment, the subsequent phase requires the physical generation of prototypes. This physical phase facilitates learning through trial and error, enabling students to engage directly with materials and their properties, approach projects at a 1:1 scale, and necessitate a thorough definition of design elements. Group work has been a central strategy in the course "Highly Technological Projects" at the School of Architecture of Toledo between 2020 and 2023, alongside an unbiased analysis of architecture throughout history, examining its advantages, disadvantages, and relevance to contemporary practice.

The primary objective of the course has been to harness art and technology in the service of sustainability. This objective entails reconciling two fundamental fields of human inquiry, encouraging the adoption of rational criteria in artistic expression, while also promoting creative freedom within the domain of technological design. Architecture stands to benefit significantly from this intersection, as its historical context lies precisely at the confluence of these two fields of knowledge. Furthermore, its engagement with renewable energy and sustainability holds immense potential. Integrated design can transform current energy generation—typically reliant on industrial devices unrelated to architecture—into elements seamlessly incorporated within the built environment, serving multiple purposes.

The experience conducted at the *Proyectos Altamente Tecnificados* in the School of Architecture further supports the close relationship between a passion for knowledge, collaborative work, co-creation, and the tangible reality of outcomes.

NOTES

[1] Josep Perelló y Altaió Vincens, "Physics of Aesthetics: a meeting of Science, Art and thought in Barcelona," Leonardo 41, no. 3 (2008): 232–237.
[2] Charles Palermo et al., Picasso and Braque: The Cubist Experiment, 1910–1912 (Texas: Kimbel Art Museum, 2011).
[3] John Richardson, A Life of Picasso: The Cubist Rebel, 1907–1916, Vol. 2 (New York: Knopf, 2007).
[4] Magdalena Droste, Bauhaus: Bauhaus Archiv Berlin 1919–1933 (Bosnia Herzegovina: Taschen Biblioteca Universalis, 2003).
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[7] Sven Sterken, "Travailler chez Le Corbusier: Le Cas de Iannis Xenakis," Massilia: Anuario de Estudios Le Corbusierianos (2003).
[8] Andy Warhol y Pat Hackett, POPism: The Warhol Sixties (London: Penguin Books, 2009).
[9] Sara Eloy, Anette Kreutzberg y Ioanna Symeonidou, Virtual Aesthetics in Architecture: Designing in Mixed Realities (New York: Routledge, 2021).
[10] Marjan Eggermont, Vicran Shyam y Alosyus Hepp, Biomimicry for Materials, Designs and Habitats: Innovations and Applications (Exeter: Elsevier, 2022).
[11] "Making Art Modern: Reflections on MOMA's Vision," MOMA Online Magazine, consultado el 15 de diciembre de 2024, https://www.moma.org/magazine/articles/821.
[12] Rafael Lozano-Hemmer y teamLab, "Exhibitions," consultado el 15 de diciembre de 2024, https://www.lozano-hemmer.com/exhibitions.php.

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ALONG THE RIVERBANK: PLACE WRITING AND STUDENT TEACHERS' ENVIRONMENTAL AFFORDANCE-ABILITY

Author:
MAGNE DRANGEID

Affiliation:
UNIVERSITY OF STAVANGER, NORWAY

INTRODUCTION

In this paper we follow six Norwegian student teachers and their professor during a hike in the fall of 2023. Through the students' place writing, we explore their attention to water and the surrounding landscape. Our aim was to experiment with place writing as part of a course on "critical cultural literacy" in the teacher education program at the University of Stavanger. We did not develop succinct research questions from the start, although we searched for parallels between cultural diversity, which was already a theme in our course, and non-human diversity. To achieve this, we designed a research study inspired by participatory action research.[1]

First, we will outline our preliminary understanding of place writing and describe how the students' writing assignment was formulated. Next, we will explain our approach before clarifying the concept of "affordances". Finally, after analyzing the students' place writing, we will discuss our experiences and findings. The data analyzed consist of the students' texts, along with our own observations and field notes. The project was approved by the Norwegian Agency for Research on September 21, 2023. All names used are pseudonyms.

Figure 1. The Viglesdalen valley. Place writers crossing the river. Foto: Frode Skarstein.

PLACE WRITING

We use "place writing" as a broad term that encompasses a wide range of genres. Our understanding is inspired by several strands within theories of place, particularly human geography,[2] anthropology,[3] cognitive literary criticism,[4] and the phenomenological tradition.[5] Our emergent comprehension is closely related to what David Cooper calls a "embodied situatedness of what it means to-be-in-the-world."[6] In our project, we encourage this embodiment through an attention towards "place", and through the experience of walking. Our approach also aligns with Philip M. Mullins' view on outdoor education research: "to research outdoor activities, people, places, landscapes, flows, and/or wildlife is to study their interconnected movements, actions, lives and stories as well as the impacts of these on one another and their shared environment."[7]

Our emphasis on attentiveness, interconnectedness, and flow is influenced by Tim Ingold's perspective on places as continually shaped by "wayfarers" moving through them, molding them in the process. According to Ingold, a place is never static; it is continuously co-created through intra-actions among humans and non-human actors in the environment. Consequently, places consist of interwoven strands of life and knowledge, continually shaped by various wayfarers. As wayfarers, we are all woven into places as fellow place-makers – both humans and non-humans – "with the whole of our being in the currents of a word-in-formation."[8]

AFFORDANCES

We did not initially use the concept of "affordances". It emerged as a useful analytical tool, closely related to our curiosity about the value of place-based environmental education: What do the landscape and waterscape afford? What environmental affordances are perceived and used by the students?

The term "affordances" was introduced in 1977 by James J. Gibson.[9] Since then, it has been developed further and gained wide application, especially in fields like human–computer interaction, social semiotics, and various approaches to design. We align our understanding more closely with Gibson's ecological psychology and his original definition: "The *affordances* of the environment are what it *offers* the animal, what it *provides or furnishes*, either for good or ill."[10]

According to Gibson, the environment offers the animal "a way of life."[11] Its affordances are understood as the animal's ecological niche – how it lives more than where it lives. This explains the great variety of species-specific affordances among animals.

However, to strengthen the educational relevance and emphasize human-specific diversity and creativity, we will adopt a somewhat adjusted definition proposed by Erik Rietveld and Julian Kiverstein: "*Affordances are relations between aspects of a material environment and abilities available in a form of life.*"[12]

FORMS OF LIFE

According to Rietveld and Kiverstein, Gibson's formulation "way of life" is somewhat ambiguous regarding humans. Does Gibson refer to humans in general, or customs or cultures? To clarify, they prefer the Wittgensteinian expression "forms of life", intended to include human diversity at all scales, from ways of doing things to social norms. Diversity among humans as a species, in sociocultural practices, and on an individual level, constitutes what they call a rich landscape of affordances. They also emphasize the importance of what is relevant to the actor's concern and that affordances are always relational; they do not exist solely in the environment or in the animal alone. They depend on both in a complementary way; affordances are action possibilities related to our concerns in specific situations. Particularly relevant regarding culture, language and art, is Terence

Cave's emphasis on affordances as open-ended: Creativity and change of perspective make them, by definition, inexhaustible.[13]

To perceive affordances, attention is crucial, especially if what is offered is something new. This causes Rietveld and Kiverstein to reflect on how we make use of our opportunities: "Should we perhaps pay more attention to the skill of being open to the detection of unconventional but relevant affordances?"[14] Fortunately, the skills of being attentive and creative – what one might call our "affordance-ability" – is something we can learn: "The novice learns to selectively pick up some aspects of the environment while ignoring others."[15] This is crucial in both education and life when encountering new affordances. Our affordance-ability and situated concerns are at the core. Therefore, Rietveld and Kiverstein ask, should we not: "increase our exposure to other (sub)cultures (practices) in order to learn about their skills and the values-rich affordances they perceive?"[16]

This understanding informs our exploration and reflection, leading towards questions like this: What aspects of the environment do the participating students pay attention to, and how are they reflected in their writing?

WATERSCAPE

Our fieldtrip took place in Hjelmeland Municipality, in western Norway. We followed a route through the Viglesdalen valley, about 7 kilometers to a mountain cabin owned by The Norwegian Trekking Association. We were especially interested in water because our route followed the Storåna river. We walked through a beautiful landscape with many waterfalls and rich cultural heritage. Most of the time, we walked along the riverbank on a historic road built by Swedish laborers more than a century ago.

Figure 2. The Hiafossen waterfall, Viglesdalen. Foto: Magne Drangeid.

The students had been given the following assignment:

- Please read in advance: Engelhardt and Schraffenberger's "Ecological Creative Writing".[17]
- While walking alongside the river, try out various simple writing exercises related to water, the landscape, and your own movements within the landscape.

• Group Submission: At least one edited, self-written text. At least two in-progress notes or sketches. A brief reflection on the writing process, the resulting texts, and their didactic relevance for school.

It's worth noting that before our fieldtrip, the students also had access to several other mentor texts and sources for preparatory work. This material was presented and discussed briefly in class, including discussions on haiku poetry, travel and nature writing, and the possibility of combining such genres.

Later, while walking, the students were encouraged to engage all their senses and to walk slowly, paying close attention to what their surroundings might afford. This was done by reminding them of a wide range of possibilities, with the recommendation to emphasize a few. Many chose to focus on the sounds of water, perhaps influenced by the immediate auditory experience – the roar of the river heard already at the parking area. Here, they were instructed to take notes or make sketches of the waterscape and landscape.

From the start, we stressed experiential learning as essential. Among other influences, the approach drew inspiration from Maurice Merleau-Ponty's late phenomenology,[18] highlighting the importance of both sensory perception and poetic language in our ability to engage with the world. According to Merleau-Ponty, humans and non-humans are woven into a shared landscape. They merge with each other, and in this merging, the poetic has the affordances of giving voice to the world. This aligns with Glen A. Mazis's concept of a "prereflective, embodied experience."[19]

THE BASS

The students worked in pairs, both during and after our walk. At the cabin, after dinner and a break, they continued developing their texts. Before submitting, some students refined their drafts at home, while others were satisfied with their initial work. In any case, let's look at some of the texts. They have been translated from Norwegian by the author of this paper.

The students Tor and Olav submitted one short text each, both titled In-progress:

In-progress 1

Roar
Slip, danger
Grind
Trickle? Doesn't trickle
Splash
Deep, rumbling bass ("waterfall bass": to feel, more than to hear?)
side by side
with peaceful trickling
Roaring
Sloshing
Slurping
Dripping

In-progress 2

Sounds
- noise level = amount
- roaring (thundering)
- running water
- drip
- Sound from puddles, streams, waterfalls, currents

Waterfall = continuous pleasant noise
Water in several forms
-Water
-Mist
-Mud
The smell of the waterfall almost like the smell of low tide
The sound of the bass, the waterfall.

Both texts consist mainly of one-word lines that express a variety of sensory impressions. However, both also include more extended lines, showing an ability not only to perceive the variety of sound qualities, but also to grasp how they are experienced and how the sounds can be expressed by comparing different phenomena. Both drafts seem to engage in what Gibson describes as the difficult task of "seeing things as they really are."[20] One can assume that both texts are jotted down while walking or during one of the short breaks by the riverbank. At the cabin, the two drafts were further developed into a co-written poem:

The waterfall bass

It feels
almost as much as it
sounds
But the ears don't
get enough
and don't scream
– the legs don't sense
danger.
Flows through
the entire body
in surround sound at 100db
– doesn't scream
and doesn't get enough.

This poem adheres to the bass metaphor already established. Musical metaphors and the sensation of resonance throughout the body, convey the students' encounter with the river's force. The students' imagination likely reflects their abilities, interests, and preferences. At the same time, one can say that the impressive waterfall solicits or even demands the students' attention.[21] As a consequence the poem emphasizes the encounter with Hiafossen over the other impressions found in the drafts. The quieter sounds from the drafts of small streams and puddles give way to one single inspiring moment.

Although the poem focuses on a single experience, it exemplifies human intra-action with nature. One might even say that it challenges the centrality of human presence in the face of natural forces. The river becomes an actor affecting the whole human body. The use of the bass metaphor, along with the tension between danger and delight, gives the poem a certain literary quality for this reason. In line with both the embodied phenomenology of Merleau-Ponty and cognitive criticism,[22] poetic language affords a creative understanding of the human–more-than-human relationship.[23]

PUDDLES AND STREAMS

Birgitte's text in-progress was developed at the cabin, but like Tor and Olav's poem, it doesn't appear to have been refined at home. Her text focuses on the weather, the temperature, and the various kinds and sounds of water. This sensitivity to nature's diversity reminds us of Tor and Olav's drafts, except

that Birgitte's text is written in complete sentences. Although also poetic, it is more like a short narrative:

In-progress

It feels cold, but in a fresh way... when the cold is on the verge, should I put on more clothes or is it fine as it is? That temperature where it's almost nice that it's cold.
The sun peeks through the trees, but only just enough to show itself, but not warm. The river roars so you can barely hear your own thoughts.
Small fleeting rings form on the puddles along the trail as we walk. Along the trail, we hear the streams trickling faintly through the roar of the river. The trickling of water emerges and disappears just as quickly.
The water foams white, and the waterfall roars, creating a rainbow at the bottom of the waterfall.

The text emphasizes different kind of sensory impressions and how they affect the body. In the concluding paragraph, water and sun create a rainbow, in the second, the waterfall demands attention almost to the detriment of what appear as emerging and waning undercurrents or echoes.
It's uncertain whether a further development would have led Birgitte to focus more on a single theme, as seen in Tor and Olav's poem, or if she would have held on to and expanded on her initial expressions of nature's diversity, her ability to perceive and care for other aspects of the environment beyond the obvious and almost demanding.

ROCKS

Siri and Lisa did not develop their text beyond the workshop at the cabin. However, they distinguished themselves by drawing as well as writing, depicting both the river and certain geological phenomena that had solicitated the student's attention. Several "aspects" of the rock immediately under our feet were discussed during one of the short breaks, including rock type, possible age, and which processes that could possibly have resulted in their curious patterns. This unimaginable deep timescale informs Siri and Lisa's writing, with the silent modality of the drawings serving as a somewhat paradoxical starting point:

Landscape

Hearing = what can be heard in the picture?
Silence, peacefulness – how does it sound
Living beings residing in nature
The sound of people
The sound of walking on the rocks
The sound of sliding on wet rock
The sound of a waterfall
Can almost be ignored?
Undisturbed landscape
Minimally affected by humans
Naturally formed over time
But increasingly influenced by humans
Development such as trails, tracks, litter
(Un)disturbed

Again, embodiment is prominent. The initial interest in hearing and sound shifts towards slow processes in nature and threatened peacefulness. The text gradually shifts from attentiveness to the environment towards a reflection on the contrast between pristine nature and human influence and

development. This culminates in the last line, where the brackets make it possible to express the tension between seemingly untouched wilderness and nature affected or destroyed by humans.

SPACETIME

The last text we will comment on is written by Anne. Although the expectations and requirements for preparation were moderate, Anne clearly prepared herself both theoretically and practically, and developed her text more than the other students. Unsurprisingly, this shows that an engaged and mature student gains much greater benefit from independent work with learning materials provided in advance compared to a less motivated student.

Figure 3. The Viglesdalen valley. Evening place writing workshop. Foto: Frode Skarstein.

Anne began her work by taking notes during the hike and recording reflections on her cell phone. At the cabin, these notes and recordings evolved into both prose and poetry. An existential reflection emerges on the self's relationship to nature and even the universe. Back home, she further refined her draft into a sequence of stanzas, using poetic affordances related to those of the haiku:

A journey in time and space:

The rumbling of the river fills the air
and me
I resonate
and tremble along
as I walk the opposite way.
A tiny stream trickles
at my feet
I stop
and follow its journey
over and around intrusive rocks
Its thin tones are heard
over the river's mighty roar.
A round puddle lies mirror-smooth

I study its beginning
and end
White clouds race past
below the surface

In the first stanza, her entire body resonates as she faces the Hiafossen waterfall. In the next, the sound of the river mingles with the humbler forms of water and rocks nearby as she walks. In the final stanza, her observations connect, in a logical yet paradoxical way, the water at her feet and the racing clouds above her, mirrored by the water.

DISCUSSION AND CONCLUSION

We were satisfied that all the students, both orally and in writing, expressed a positive and new experience of being in nature. Like Birgitte. In the didactical part of the assignment, she reflects on using all the senses, not only sight. This "opens new and different sensory experiences. Focusing on what we hear, feel, smell, or even taste when encountering nature, opened new ways for us to reflect on the nature experience."

This embodied experience points to Merleau-Ponty's notion of humans and the world, being woven into a shared landscape. Our fieldtrip and its rich landscape of place-affordances seemed to facilitate such a relational ontology and an openness towards non-human diversity. At the same time, the explored waterscape clearly emerged as a socio-material environment. The emergent social affordances – human interaction and friendship – were prominent. A naturalist might argue that attention to non-human forms of life could be sidelined as a result. And a philosopher might contend that our often-talkative walk worked against a quieting of our brains. These are relevant objections, and truth be told, epistemological affordances were under-emphasized and thus also under-utilized in this exploration. One must have knowledge of nature to be able to see and understand. Hopefully, however, in future walks, it will be possible to better combine the social and the epistemological. In this regard, one possibility is to more consistently use a model developed by Mullins for outdoor learning and research.[24] This model shows how the teacher can stimulate curiosity and attention to relevant aspects of the environment by using engaging prompts that students can explore through observation, reflection, and field notes.

In any case, these shortcomings should not overshadow the positive outcomes. Our place writing experiment, together with new interventions, will clearly lead our future teaching in the direction of both human and non-human diversity. We wanted to bring the students together for some shared experiences and reflections on their place as humans in a more-than-human world. Reflections like Anne's, made during her night walk by the tourist cabin under the constellation Ursa Major and the faint glow of the nebulae. I let Anne have the last word:

Time is not just an abstract concept; it affects us all – the dragonfly, the mountain, the birch, and me, even the sun. Without time, no movement, no life, no death, no space, nothing. Time is beyond me. It worked before me and will continue long after me, and it fills me with peace.

NOTES

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[2] Tim Cresswell, *Place: an introduction* (Chichester: Wiley-Blackwell, 2015); Yi-fu Tuan, *Space and Place: the Perspective of Experience* (London: Edward Arnold, 1977); Doreen Massey, *For Space* (London: Sage, 2005).

[3] Tim Ingold, *Being Alive: Essays on Movement, Knowledge and Description* (London: Routledge, 2011).

[4] Terence Cave, *Thinking with Literature, Towards a Cognitive Criticism* (Oxford: Oxford University Press, 2016).

[5] Glen A. Mazis, "A Posthumanist Truly Back to the Things Themselves: Merleau-Ponty's Embodied Phenomenology and Literary Language," in *Symbiotic Posthumanist Ecologies in Western Literature, Philosophy and Art. Towards Theory and Practice*, ed. Peggy Karpouzou and Nikoleta Zampaki (Germany: Peter Lang GmbH, Internationaler Verlag der Wissenschaften, 2023); Maurice Merleau-Ponty, *The Visible and the Invisible: followed by Working Notes*, trans. Alphonso Lingis, ed. Claude Lefort (Evanston: Northwestern University Press, 1968); James Engelhardt and Jeremy Schraffenberger, "Ecological Creative Writing," in *Creative Writing Pedagogies for the Twenty-First Century*, ed. Alexandria Peary and Tom C. Hunley (United States: Southern Illinois University Press, 2015).

[6] David Cooper, "Contemporary British place writing: Towards a definition," in *The Routledge Handbook of Place*, ed. Tim Edensor, Ares Kalandides, and Uma Kothari (London: Routledge, 2020), 636.

[7] Philip M. Mullins, "Together Along the Way: Applying mobilities through praxis in outdoor studies field research," in *Research Methods in Outdoor Studies*, ed. Barbara Humberstone (Routledge, 2020). https://ebookcentral.proquest.com/lib/uisbib/detail.action?docID=5838720

[8] Ingold, *Being Alive*, 129.

[9] Cave, *Thinking with Literature,* 47.

[10] James J. Gibson, The Ecological Approach to Visual Perception (Hillsdale, N.J: Lawrence Erlbaum, 1986), 127.

[11] Gibson, 127.

[12] Erik Rietveld and Julian Kiverstein, "A Rich Landscape of Affordances," *Ecological psychology* 26, no. 4 (2014): 335, https://doi.org/10.1080/10407413.2014.958035

[13] Cave, *Thinking with Literature,* 48.

[14] Rietveld and Kiverstein, 334-35.

[15] Rietveld and Kiverstein, 335.

[16] Rietveld and Kiverstein, 350.

[17] Engelhardt and Schraffenberger, *Ecological Creative Writing*.

[18] Merleau-Ponty, *The Visible and the Invisible*.

[19] Mazis, "A Posthumanist Truly Back to the Things Themselves", 250. https://library.oapen.org/handle/20.500.12657/62263

[20] Gibson, *The Ecological Approach*, 142.

[21] Rietveld and Kiverstein, "A Rich Landscape of Affordances," 340.

[22] Cave, *Thinking with Literature*.

[23] Magne Drangeid, "Towards a Sustainable Imagination: Reflections on Olav H. Hauge and the Teaching of Poetry," in *Poetry and Sustainability in Education*, ed. S.L. Kleppe, Sorby, A. (Cham: Palgrave Macmillan, 2022), 270.

[24] Mullins, "Together Along the Way."

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INQUIRING BY DISTANT READING: LEARNING AND UNLEARNING ARCHITECTURAL HISTORIOGRAPHY

Author:
ANGELA GIGLIOTTI[1], FABIO GIGONE[2]

Affiliation:
[1] DIS COPENHAGEN, ETH ZURICH, AARHUS ARKITEKTSKOLEN
[2] DIS COPENHAGEN, ETH ZURICH, UNIVERSITY OF COPENHAGEN

INTRODUCTION

Looking at the application of *cross-disciplinary* inquiry approaches, architectural scholars seldom have addressed lexicon-based methods framing the possibilities and limits to identify unheard agencies and unlock the writing of alternative historiographies. This paper occupies this niche looking at the applicability of research lexicon-methodology within a discipline as architecture that is materially and pragmatically oriented. It poses a series of questions about the possibilities offered by such implementation: how is it possible to assess massive corpora of written information in architectural history privileging the assessment of the overview rather than the obsession of the details with the scope to grasp and unravel easily who and what has been neglected by current dominant historiographies? How digital technologies that rely on the architectural lexicon could support alternative historiographies, unveiling previously unheard agencies so far marginalized by class, labour, gender and race? To answer these questions, this paper reflects on the translation of written sources and evidence into electronic data within architectural historic studies, especially when the application of a lexicon-based research method happens at an undergraduate level. Case study is one of the ongoing courses held by the authors in the curriculum for architecture and design studies at DIS – Study Abroad in Copenhagen.[1] Since Spring 2020, the authors have been in fact initiating and conducting a research elective course meant to educate undergraduate students towards academic research in architectural history and theory whose prompt has been to investigate the Danish architectural production under the Cold War (1947-1991) while implementing a specific cross-disciplinary lexicon-based inquiry method - the *Distant Reading.*[2] This paper demonstrates, by introducing such a case study, how what seemed a task of Sisyphean proportion has turned out as an engaging inquiry into the learning and unlearning of architectural historiographies. It unfolds five sections: (1) first, the research content and the task assigned to the students; (2) second, the chosen sources of investigation; (3) third, the theorization about the chosen lexicon-based method learned from literary studies and computer-based science; (4) fourth, the dissemination of the research outcomes is clustered in three groups developed: by exhibition design, by academic writing and by theoretical diagramming.

THE TASK

The case study in object in this paper is the research elective course titled "Transnational Modes of Architectural Production". The course has been initiated in Spring 2020 as the outcome of a postdoc research project in History and Theory of Architecture that Gigliotti conducted since Fall 2019, as principal investigator and one of the authors of this paper.[3] On one side, the implementation of academic research at a pedagogical level, specifically transitioning a postdoctoral project into a research elective course, has to be framed in the international trend of training aspirant architects in research practices already at undergraduate level. On the other, the task explored by the students enrolled as research assistants have investigated how knowledge circulated transnationally and cross-culturally in Denmark as a vehicle for channelling diplomatic relationship and boosting architectural professionalism towards a specific gospel of productivity in the Cold War period. On general level, the field of research of such a project has to be found by those scholarship that had addressed until then the modes of architectural knowledge production and their exchange in the context in object as: the transfer of architectural knowledge from one cultural context to another one;[4] the design of diplomatic architectural typologies;[5] the architectural knowledge transfer Global North-Global South in the Cold War;[6] the cross-cultural exchanges concerning architectural productivity and standardization.[7] On a specific Danish level, and topic-wise, the project is a spin-off of Gigliotti's monographic PhD thesis.[8] The research elective scope departs thus from the postdoctoral scopes of investigating a supranational 'triangle' of influences among Denmark, Sweden, and United States regarding a shift that occurred in the organization of Danish architectural practices during the Cold War. While the initial focus has been on the nature of this triangle – such as how was it shaped? What was its geometry? Which were the paradigmatic documents that reified this supranational economic and cultural 'triangle'? Who were the actors? Which were the outcomes in the implementation of such specific modes of architectural production towards productivity? With the transition into a research elective course the project has reappraised what was a very diversified and multifaceted history of architectural cross-cultural dynamics, beyond the mentioned triangle. Furthermore, the project in the past years has answered to the need to investigate historically current Danish architectural procurement dynamics abroad. Only in 2019, the architectural operation in foreign countries accounted an impressive 58% of global revenue by Danish companies of the sector, through exports and foreign subsidiaries.[9] Thanks to the research findings, such phenomenon has been demonstrated to be other than recent, instead, it was rooted since the latter half of the twentieth century when an unprecedented condition has allowed Danish "state-supported industry", until then based on a welfarist professional model, to achieve notable results abroad and, ultimately, to transform itself introducing neoliberal patterns of work organization.[10]

THE SOURCE

But how to research that with students? The specificity of teaching an architectural research elective for exchange students enrolled in North American universities traveling to Copenhagen, Denmark, combined with the task of instructing them on research methods centred on alternative historiographies, have underscored the need to introduce students, many of whom are traveling to Europe for the first time, to accessible literature as a mediation. On one hand, there is a need to establish a common starting point for the course among individuals who have never met and come from diverse cultural and university backgrounds on the two course core foci: Cold War architectural discourse and Danish historiographies. On the other hand, there is a need to provide facilitation for their own travel, exploration, and living in a completely unfamiliar city for a semester. Pertaining the first core focus, the required mediation may not only serve as an introduction to Danish architecture and specifically Danish modernism, but also as a systematic overview of the discourse in which

students live so Copenhagen, comprising the construction of the local discourse about organized spaces, selected buildings, and established routes. The chosen source as the best fit to all these demands has been the architectural Danish magazine *Arkitekten* still published by the Danish Association of Architects and the main press media – at that time - for architectural discourse and critical debates in the country. As a pedagogical approach the research elective has been a collective, progressive research process where *samarbejde* (in English working collectively) has been strongly encouraged among the authors as the mentors and the students as the research assistants, from data collection until research dissemination. Each student has worked on the research for a minimum of six-weeks during summer term to a maximum of one semester during falls and springs while studying abroad; and, despite the overall research focus has been shared among research members across the semester, the evidences collected by each student are based only on one specific year of the magazine – initially digitalized by us as faculties,[11] and only since Spring 2024 available on the publisher website,[12] and compiled by all the monthly editions published in the year in object that are assigned to each student at the beginning of each course. By doing that, the project has been able to go across almost 50 years of printed Danish architecture, being always very aware to explicit the biases that employing an edited mono-source might entail. Especially considering that such source in the periodization at stake was largely edited and penned by men-architects and critics. Despite that, its employment is still a valuable and precious source for the pedagogical experiment that the authors as faculties wanted to pursue, *Arkitekten* it was in fact at the time the main media where a vivid and prolific – but sometime also harsh, fervent and even cruel – debate happened at the time pertaining the Danish architectural production.

THE METHOD

As in every co-teaching scheme the synergy between faculties is key to establish a common ground and enriching learning experience for the students, in the case in object the authors are co-founders and co-partners of a research-based architectural practice in Denmark since 2015.[13] Having said that, it goes without saying that the collaboration behind the course in object in this paper is part of the works developed by the common practice of the authors and as such it entails a division of works: pertaining the research content, the principal investigator has been Dr. Gigliotti; while, for what concern the coordination of the mixed research methodology and of the training of the students about the employed investigatory tools the faculty in charge has been Dr. Gigone. Among the many explored methods by the practice, the chosen method for the research elective course is *Distant Reading*, a method learned from Literary Studies and tested it to Architectural History and Theory by the authors in several scholarships. As above mentioned, scholars in recent years have urged the field towards the implementation and the conceptualization of unconventional methods to achieve alternative historiographies in architecture beyond the current dominant canons. However, often these explorations have introduced methods learned from social studies rather than literary ones, as for instance: oral history, contact-zones, fictio-criticism, micro-histories, photovoice, reading.[14] *Distant Reading* instead is a method theorized by Emeritus Professor at Stanford Franco Moretti since 2000 and at the basis of Digital Humanities. It is “a method where distance (...) is a condition of knowledge: it allows you to focus on units that are much smaller or much larger than the text: devices, themes, tropes and systems. (…) If we want to understand the system in its entirety, we must accept losing something.”[15] *Distant Reading* privileges the assessment of the overview via computer science to spot who and what is missing from the current canon – what has been neglected so far. Without going too in the detail, the method is stepped into a series of steps some of which are resonant also for architectural history that span from the noting of a quantitative odd aspect - by contextualization and clustering - to the pursuit of a niche where to look for the trend. It allows the researcher to get to the

argument following the odds by difference, answering the question of how powerful things mostly unnoticed contribute to the construction of the overall meaning. Its application in the case study in object has entailed nine steps. (1) The building of an accessible and digitalized dataset for the students; (2) a literature review based on secondary sources; (3) the textual search in the assigned year of the magazine of the keywords emerged from the literature review and in-class discussion; (4) the recording of the keywords hits in a chart; (5) the pursuit of the odds within the keywords hits based on the overall research questions pertaining modes of production of architecture (around 15-20 selected keywords); (6) the recording of each articles where the odds appear (around 100-200 articles); (7) by AI the translation of all the article titles from Danish to English in order to cluster the articles; (8) once again proceeding by pursuing the odds, the selection within the clusters of the articles relevant to the transnational exchanges (around 10-15 articles); (9) the deployment of AI to translate the selected articles to close read them and dive into the topics; (10) the elaboration of the dissemination outcomes. About the shift in distance in the various steps the adaption of *Distant Reading* to architectural history has been implemented by deploying myopic (at focus in close distance) and presbyopic (at focus in far distance) lens of investigation to allow students to develop their arguments by academic writing and theoretical diagramming.[16] By the application of a lexicon-based method in a visual-based discipline, the project tests a shift in distance, from close to distant, crucial to amplify underrepresented voices based on labor, class, gender, and race.

CONCLUSION

To disseminate its results the research has embedded three strategies: by exhibition design, by academic writing and by theoretical diagramming. All the three means have demonstrated how what seems a task of Sisyphean proportion to find the terrain vague into 50 years of untold transnational exchanges turns out as an engaging inquiry into the learning and unlearning of architectural historiographies when activated by an interdisciplinary method. As a matter of example and to conclude each of the three strategies is presented and detailed.

Exhibition Design

The first strategy implemented was exhibition design, the choice to deploy such a mean is not attributable to "a model of practice whereby the practitioner is constantly critiquing own actions, reflecting upon actions as they are taken and changing (the design) as appropriate"[17] so it was not related to what scholars marked as "practice-based research".[18] The installations, in fact, were not finalized to the development of iterative research by design, conceiving the architectural projects itself as an outcome of the research; but, precisely, used as an operative and supporting dissemination means. A common denominator throughout the research developed by each research assistants and before in the postdoctoral project has been, in fact, the collection of a large amount of hands-on data, what in computing is referred to as the "big data" set. The use of exhibition design has been then fundamental to visualize and grasp at once a large amount of data and get a synoptic overview. The project has been exhibited with two installations in international contexts.

Tripolarity

The first outcome was exhibited as an installation titled *Tripolarity* along the Copenhagen Architectural Festival CAFx 2020 (October 2021). The location was the DIS Student Hub whose windows face one of the main bike and pedestrian street of the city.

Figure 1. Tripolarity, CAFx 2020 (©Office U67).

Due to the pandemic restrictions, the installation was based on the outcomes reached only by the first pilot semester of the research elective course and by the postdoctoral project. Specifically, *Tripolarity* delves into the relationship between two main themes that strongly emerged from *Arkitekten* until then as evidence of the transnational triangle above mentioned. The first theme was the implementation of social housing buildings in Sweden that combined standardized construction techniques with socio-cultural demands of the welfare state.[19] The second was the introduction of the supermarket as a new typology in the US.[20]

Figure 2. Tripolarity, CAFx 2020 (©Office U67).

These two shifts interested both the urban scale and the interior one respectively when looking in Denmark to the domestic standardized kitchen system,[21] and the spatial design for goods reselling.[22] Regarding the exhibition design, the challenge was how to visualize themes that visually have very few materials available. The set up was then developed producing two diptychs lenticular-printed able to visualize multiple drawing when seen from different angles on the exact same board. Thanks to that both urban and interior conditions were drawn. This turns out to have a powerful reception by Copenhagers not only about the research but about themes of Danish domestic architecture, which, with the pandemic, had become increasingly important.

Figure 3. Tripolarity, CAFx 2020 (©Office U67).

Old, but Gold

Under different conditions, a year later a second outreach was designed: an installation titled *Old, but Gold*. The venue was SPARK, a private gallery in Malmö (Sweden) which regularly displays works and research in architecture from emerging practices.

Figure 4. Old, but Gold, SPARK Galleri (©Office U67).

Old, but Gold aimed to take stock of the state of research which, in the meantime, had analysed a greater number of issues of *Arkitekten*, and had thus enriched itself with research strands that somehow intersected with more specific research conducted by scholars in the history and theory of architecture. The arranged installation entailed on the windows the big data set collected until then while on the interior a complete transformation of the venue by folding the walls with gold mylar sheets to play with irony about Danish architecture: both reproducing the texture of the Danish bricks and aiming to re-assess the canonization of the golden momentum of Danish Architecture (1945-75).

Figure 5. Old, but Gold, SPARK Galleri (©Office U67).

The room thus became the set up for a talk about transnational exchanges for Danish architecture and their repercussions on the present, where undergraduate research assistants of that semester engaged in dialogue with guests from various Danish and Swedish institutions.

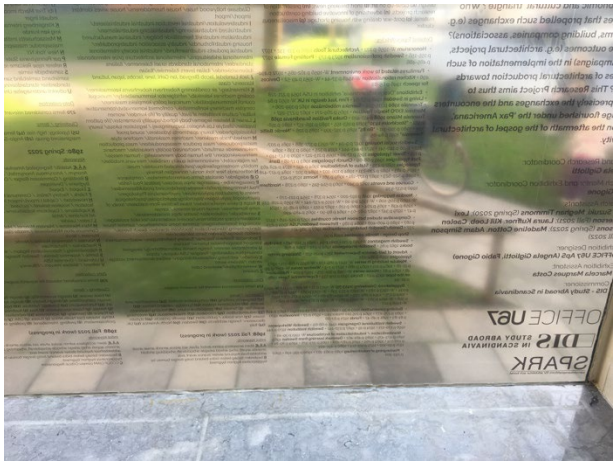

Figure 6. Old, but Gold, SPARK Galleri (©Office U67).

Academic Writing

The second mean of dissemination, much more conventional, has been academic writing. To do that students are introduced to and instructed not only in digital humanities methodology and quantitative data collection but also on theoretical critical writings, being guided in the production of their own individual critical essay based as said on one specific year of the same magazine. Topics vary a lot, among the others: (1) the "gospel of productivity" channelled in Denmark through the neighbour Sweden and the US investment to standardise production in Europe and guarantee strong allies under the Cold War period and the many instruments of the Marshall plan. (2) The Danish governmental agenda of architectural export to expand procurement beyond national border, especially under the so-called 80s crisis of welfarism. (3) The private and public investment in foreign philanthropic, industrial and commercial adventures in foreign countries strongly affected by unstable political and social situation across 20th century: going from the bombing of WWII to the fall of the curtain wall, to the former Danish colonial influences in Africa. (4) The desire of explorations and the need of finding inspirations in connection to educational study tour and grant for travels to Mediterranean destinations (South Europe, Middle East and North Africa) following the Beaux-Arts tradition in

which the Danish architectural education is strongly rooted. (5) The construction of Danish-foreign cultural diplomatic legations like the Danish Academy in Rome (1967) that anticipated the one in Athens (1993) and that in Damascus (2000).

Theoretical Diagramming

The third, and last, mean of dissemination has entailed the visualization of the dataset extracted from the research by two sets of infographics. The first is dedicated to the process while the second to the content developed by each student. Both infographics refer to basic data representation schemes that depict Deviation, Correlation, Ranking and Distribution. On the one hand, the students developed a series of diagrams that show among the others: the distribution of the major keywords; the relationship between the keywords and their clusters; the impact of the clusters within the issue; the distribution of the selected clusters in relation to the total; and finally, how the clusters were generated.

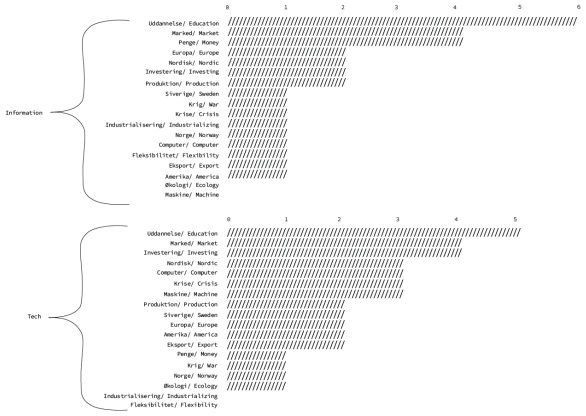

Figure 7. Infographics, process (author: Glen Breeden-Ost).

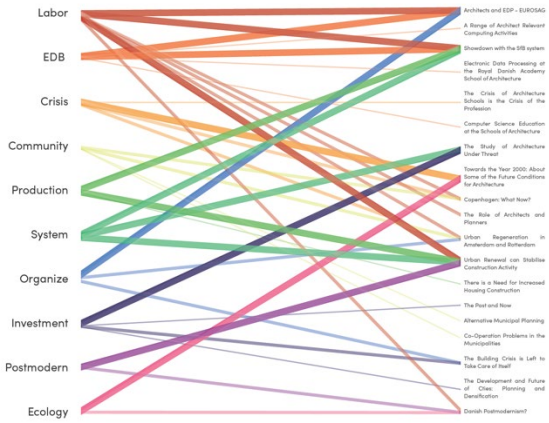

Figure 8. Infographics, process (author: Matthew Paul Murphy).

On the other hand, working on the content, students synthesised for instance: the relationships between clusters or concepts; the chronological relationships between characters or events geographically located material or immaterial flows; the quantitative relationships between the identified singularities.

Figure 9. Infographics, content (author: Lexi Andersson).

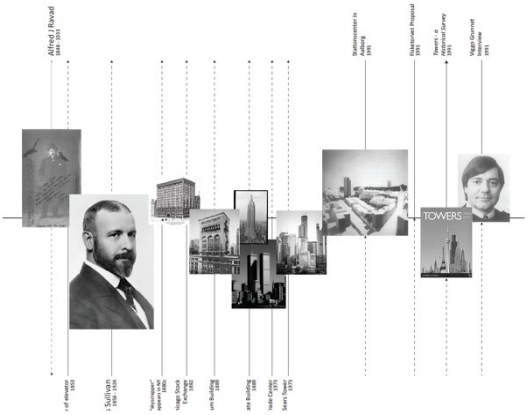

Figure 10. Infographics, content (author: Amy Suzuki).

NOTES

[1] DIS is a non-profit study abroad foundation established as an exchange academic program for North American students in Denmark in 1959, with locations in Copenhagen and Stockholm. Students at DIS span from architectural foundation enrolled in liberal art colleges, to professional architectural ones enrolled in polytechnic universities.
[2] Franco Moretti, *Distant Reading*; Franco Moretti, *Graphs, Maps, Trees*; Franco Moretti and Bettina Engels, *Falsche Bewegung Die digitale Wende in den Literatur- und Kulturwissenschaften*.
[3] "The Triangle of Architectural Productivity: The American, Swedish and Danish modes of architectural production under the Cold War (1947-91)" (DIS Fonden; November 2019 – May 2020).
[4] Jean-Louis Cohen and Christa Weil, *Scenes of the World to Come;* Mercedes Volait and Joe Nasr, *Urbanism: Imported or Exported?;* Tom Avermaete, "Death of the Author, Center and Meta-Theory"; Avermaete et al., "*Authorship = Authorschap"*.
[5] Jane Loeffler, et al., *Building Diplomacy;* Mercedes Volait and Joe Nasr, "Still on the Margin"; Paolo Girardelli, "Power or Leisure?"; Mark Bertram and Douglas Hurd, *Room for Diplomacy;* Charlotte Rottiers, et al., "On the Verge of Neo-Imperialism and Neutrality".
[6] Tom Avermaete and Lukasz Stanek, "Cold War Transfer".
[7] Angela Gigliotti, *The Labourification of Work;* Maryia Rusak, "Narratives of Timber in 1960s Norwegian Prefabricated Architecture"; Sofia Nannini, "Hennebique Moves North".
[8] Angela Gigliotti, *The Labourification of Work.*
[9] Swedish Federation of Consulting Engineers and Architects, Sector Review (Stockholm: Swedish Federation of Consulting Engineers and Architects).
[10] Angela Gigliotti, "Did the Danish Welfare Architects Leave Any Heirs?".
[11] The archive collection was digitalized and indexed by the authors in relation to two research projects: the first part, which corresponds to the Trente Glorieuses (1945-75), along with Gigliotti's Ph.D. scope; while a second one (1975-1991) along with the research project in object. The archival review offers a precious source with the only downside in the time needed to realize it: such digitalization accounted approximately 122 hours, almost 15 days, to create a data set that includes 46 years of the magazine (1945-91) scattered into 324 volumes: 46 yearly; 22 bi-monthly; 48 monthly and 208 weekly issues.
[12] "Archive," *Arkitekten*, accessed August 9, 2024, https://arkitektforeningen.dk/arkitekten/
[13] U67 is specialist in research-based practices whose works have been awarded, published and presented in international venues. Content-wise it works with a historical and theoretical trajectory to face and address the emerging challenges that interest architectural knowledge production. Although it often bridges philosophy and political theory, the practice always operates with the occupation and definition of spatial design. It spans from early modernity to contemporary times tackling historiography, labour, class disparity, decolonizing architectural education, privacy and proximity, archaeology, and anachronism. Method-wise it challenges architectural research methods between art and architecture, establishing its own mix methodology embedding established and experimental research methods.
[14] Janina Gosseye, et al., *Speaking of Buildings;* Tom Avermaete and Cathelijne Nuijsink, "Architectural Contact Zones"; Janina Gosseye and Meitar Tewel, "Graphic Novel"; Anne Hultzsch and Sol Pérez Martínez, "Reading-With: A Collaborative Method for Inclusive Architectural Histories".
[15] Franco Moretti, "Conjectures on world literature".
[16] Béatrice Joyeux Prunel, *How Can You Talk About Images You Haven't Seen?*.
[17] In Ray Lucas, *Research Methods for Architecture,* 43.
[18] "One way of conducting practice-based research is by producing works that provoke a response. A pavilion or installation is the most practical way to construct such works in an architectural context, given the cost of an actual building. These offer a way of testing an idea, and later assessing the response to that experience." In Ray Lucas, *Research Methods for Architecture,* 43.
[19] Nordiske Byggekooperationer, "Boligben i samfundsøkonomien".
[20] Flemming Skude, "Amerikanske impulser".
[21] Edvard Heiberg, "Om køkkener".
[22] Torben Strandgaard, "Selvbetjeningsbutiker".

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OPTIONAL THINKING (OT) DEVELOPMENT AND NEGATIVE STEREOTYPE (NS) CHANGE BY BRANCHING-PLOT FILM WORKSHOPS FOR YOUNGSTERS.[1]

Author:
NITZAN BEN SHAUL

Affiliation:
TEL AVIV UNIVERSITY, ISRAEL

INTRODUCTION

This paper falls within the field of research on intervention strategies to change stereotypes in general and negative stereotypes in particular, presenting a new intervention model aimed at changing negative stereotypes by training optional thinking skill (OT). The implemented intervention model, the research activities, aims and research results during the first and second years of research (October1, 2022 –Oct 1, 2024) are described below. On Oct 1, 2024 the third year of research began once funding was allocated.[2]

Optional Thinking (OT) and Closed mindedness (CM)

Optional thinking (OT) is the cognitive ability to generate and compare alternative hypotheses to explain events.[3] Not deploying OT in real-life may lead to premature acceptance of inadequate hypotheses due to various cognitive biases such as the need to reach a conclusion when facing a deadline. Acceptance of inadequate hypotheses often results in dire consequences due to Closed Mindedness (CM), whereby individuals fail to consider propositions that question a proposition they believe to be true.[4]

It should be pointed out that OT skill requires flexible cognition, not unlike the one sought for within the Cognitive Flexibility Theory for education.[5]

Negative Stereotype Change (NS)

Negative Stereotyping (NS) often impedes cognitive and affective responses to life problems. Research on Negative stereotypes or stereotype threat and its psychological mediators,[6] along with research of various intervention models that attempt to unfreeze stereotypes shows poor results (e.g., paradoxical thinking, inconsistency inducing argumentation.[7] It is argued that these approaches partly fail because they are closed-minded on the proposition that changing negative stereotypes is extremely challenging. OT training intervention might better succeed in changing stereotypes because OT implies encouragement to generate narrative "film futures",[8] not unlike the democratic party-system where each party suggests a viable alternative future for society. OT, by comparing viable alternatives might also reduce fanatic following of stereotypes since OT questions by its nature exclusive views. OT training of young individuals is an important challenge because at this stage of their life they are still relatively able to learn new skills and are open to new ideas. Showing that

training OT changes negative stereotypes held by youngsters will validate the beneficial effectiveness of this new training. We assume change to occur because encouraging youngsters to generate and compare new or alternate options to their negative stereotyped subject raises awareness of his/her point of view and may result in an alternative favorable view that sees the stereotyped subject as three dimensional and complex, thereby changing the two-dimensional negative stereotyping previously held towards the subject.[9]

TRAINING BY BRANCHING FILM WORKSHOPS[10]

Meager research on film workshops suggests that narrative film workshops train social skills for self - other relations, focus on social justice, use self-reporting and a dialogic form of pedagogy.[11]

However, there are questionable results in respect of the achievements presented, in many such film workshops, focus is either on the construction of traditional linear narratives of the type "exposition-complication- resolution," or with the reconstruction of a linear narrative out of a deconstructed one. The concept of branching a narrative in its relation to optional thinking does not occur. On the contrary, such non-branching narrative film workshops often deter OT by striving to forge one coherent dominant explanation, often excluding sub-dominant ones.

This paper suggests training youngsters in OT by film workshops producing a film whose narrative branches in a conflict, with each branched plot leading from the point of view of a different character to a different conflict resolution. It is hypothesized that this structure encourages OT because one needs to compare for comprehension the optional branching plots (see Howitt's 1996 *Sliding Doors*), or the optional character perspectives over the same event (see Kurosawa's 1950 *Rashomon*). Beyond using a branched narrative exercise to compare two endings, two further exercises are used to train OT in aspects of film skill acquirement.

Scriptwriting Exercises for OT encouragement:

In scriptwriting participants where shown a movie with screening stopped at a dramatic conflict. Participants were then asked to script an ending with the various optional endings suggested compared to the original ending upon screening resumption. This was followed by a moderated discussion of optionality (not one ending is a must).

In another scriptwriting exercise, participants were asked to script a fourth and comprehensive run for Lola, to the film *Run Lola Run*, comprising a fourth option to Lola's previous three film optional runs. This resulted in two scripted fourth optional runs. In one, the gangster dies in an accident, this turns obsolete the debt owed him. In the second, Lola gets hold of the bicycle rider who has taken the debt money left in the tram. This also turns obsolete the debt owed to the gangster.

Double perspective short film exercise for NS change and film skill acquirement and training

In respect of this exercise participants were shown the short movie *Lunch Date* (Davidson 1989). In this movie a white woman negatively stereotypes in her head a black man in respect of the American racial conflict. However, by following the woman's shifting suspenseful misconceptions of the negatively stereotyped black man, OT is encouraged (e.g., he is indifferent to the woman's predicament; he seems dangerous to her, he is blunt to her, he is poor, hungry and a thief in her shifting point of view). In any case, this shifting optional negative stereotype presents a multifaceted and more complex view of the negatively stereotyped subject than the restricted view presented by each of the negative stereotypes.

Moreover, trying to focus on the presentation of the stereotyping white woman's point of view reveals that she herself presents a negative stereotype of the faked concern for the underprivileged held by middle class white suburban housewives on a shopping spree in the big city.
Following the screening, the participants were divided into two groups: one group presented a scene from the point of view of a protagonist that negatively stereotypes another, and a second group had to reconstruct the point of view of the negatively stereotyped protagonist on the same event.
A moderated comparative discussion of the opposing points of views was conducted to show through the two versions of the same scene that an event can be comprehended differently by different individuals entertaining different points of view. Further, in discussing the negative stereotyped subject's reconstructed point of view, emphasis was on the multifaceted perspective of the latter as it relates to the former, thus deconstructing the former's negative stereotyping. This double perspective exercise further trained OT scriptwriting, editing, direction and shooting for during these stages of the film's production, tutored participants fulfilling these film crew roles were required to consider how to script, shoot, direct, and edit the two perspectives on the same event without losing sight of the final-cut edit, aimed at encouraging in viewers OT by their comparative assumption of the point of view pertaining to each perspective.

Double perspective short film exercise for NS change in various conflictual settings:

It should be noted that this double perspective exercise is particularly relevant to youngsters involved in national, racial, gender or other conflicts. For example, in respect of the national Israeli-Palestinian conflict, two production crews scripted, directed, shot and edited the same scene with each group assuming an Israeli or a Palestinian point of view (as in *Gaza Sderot*, Khalil Al-Muzayyen, Robby Elmaliah, 2009). Likewise, in respect of an American racial based conflict for example, the wo production crews will be required to script, shoot direct and edit the same scene with each group assuming a black or white perspective on it (as in *Skin*, Nativ, 2018). As mentioned, this double perspective exercise trains OT skill because it requires the participants to compare, consider and assume two different conflictual points of view over the same event.

Group Constitution

During research, 20 high-school film students were divided into 2 groups of 10 students each. Each group consisted of 5 students affiliated with one side of a conflict (e.g. Jews) and 5 with the opposing side (e.g., Arabs). The groups differed with regard to the training. One group underwent an OT branching narrative film workshop as described above, watched and discussed the branching narrative film *Run Lola Run* (see the respective scriptwriting exercise described above in the Scriptwriting Exercises for OT encouragement.
The second, control group, watched the non-branching popular linear film *Top Gun* (scott, 1986) with no moderated OT training. Both groups underwent the same assessments

ASSESSMENT INSTRUMENTS: OPTIONAL THINKING TEST (OTT) AND NS DEDICATED QUESTIONNAIRES (DQ)

OTT

This study offers a valid procedure to measure OT skill and has been applied to that end in different research domains.[12] The optional thinking test (OTT)[13] consists of tasks that require the subject to conceptualize options to hypothetical but typical real-life problems with every relevant and non-incidental option that offers a solution to the problem carrying a 1 point score. In the test, subjects are required to offer as many alternative solutions as they can to a life-like problem. For example, John wants to watch his favorite TV program, but his friend is watching another program. What can John

do so he can have a turn watching TV? (e.g., push his friend over, persuade him or bribe him). Then the researchers scored the results according to the quantity of relevant alternatives offered and gave no score to alternatives that avoided the problem (John could go to a movie) or were accidental (the friend will probably change his mind).
OTT measures by highest score the optional thinking skill discussed here. Comparing the results of the before and after film workshop OTT will indicate whether OT skill has changed following intervention

DQ

Identical before/after Dedicated Questionnaires on eight qualities/negative stereotypes were given to participants to identify NS and their degree of attribution to the other in a conflict (e.g. Jews on Arabs and vice versa). This, on a scale from none to a large degree[14] the eight negative stereotypes included in the DQ were: Snobbism, treachery, ignorance, hostility, cowardice, mendacity, violence, cruelty.
Comparing the results of negative stereotype detection before intervention to results obtained after intervention indicates whether a negative stereotype has changed.

Research Aims

To improve OT cognitive skill
To Change NS
To Change NS due to OT improvement.
To Compare OT and NS between workshop participants and a control group.
All aims where proven and supported by the statistical database analysis built for the research

Discussion of results through graphs:

Statistical database analysis showed that Forty three percent of first year research participants and forty percent of second year participants improved their OT cognitive skill following intervention with the mean being +0.91 in first year and 1.3 for the second year.

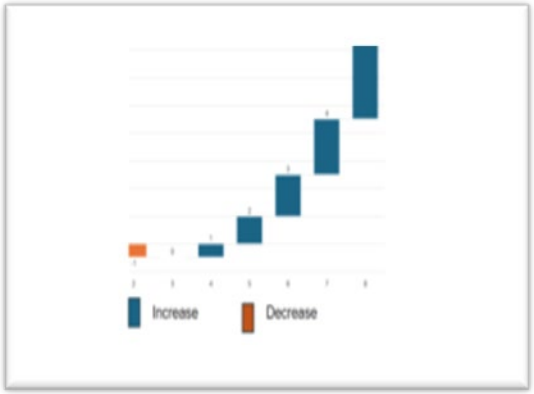

*Figure 1. **First** year OT improvement Graph*

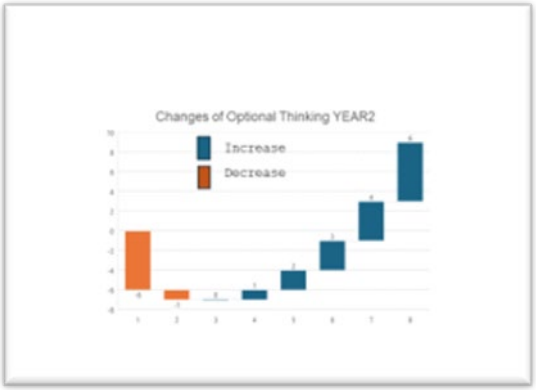

*Figure 1. **Second** year OT improvement Graph*

Analysis of before and after DQ scores shows that all 8 negative stereotypes decreased in degree from before to after the intervention

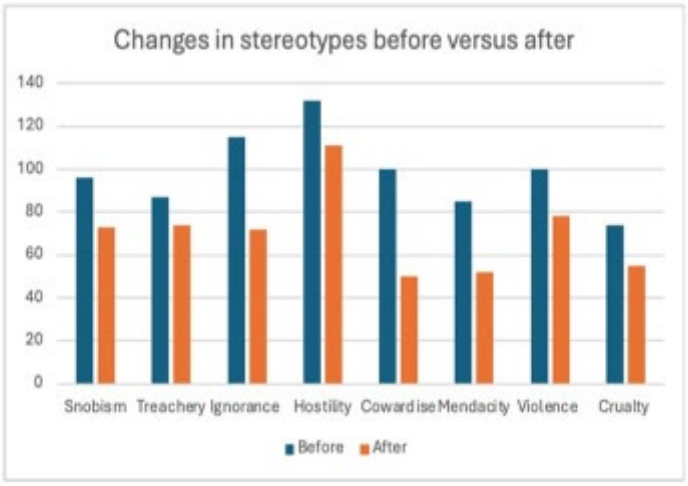

Figure 2. Negative stereotype change

Database statistical analysis of NS change was carried out in respect of OT results. Out of 25 second year participants, 16 changed their NS.11 out of these 16 (%75)improved their OT or showed high OT results. Moreover, 11 participants changed 4 NS in average. (50%). Given these results there seems to be a correlation between OT improvement and NS change. This is particularly evident in a participant who changed all 8 NS after intervention along with a high OT score indicating that high OT score impacts NS change.

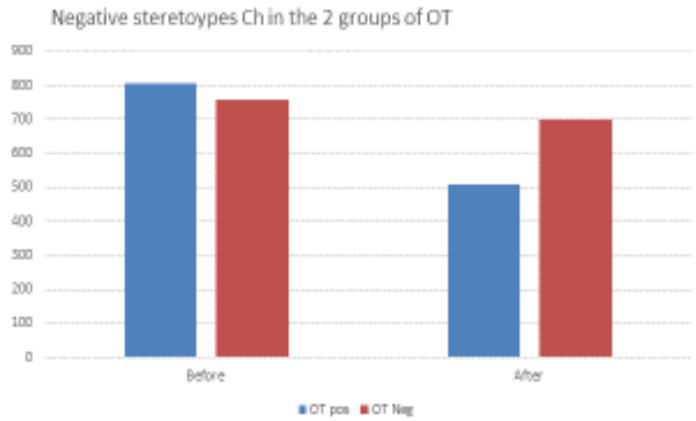

Figure 3. Negative stereotype change due to OT Improvement

Control group participants who did not undergo the intervention showed no OT improvement and no NS change.

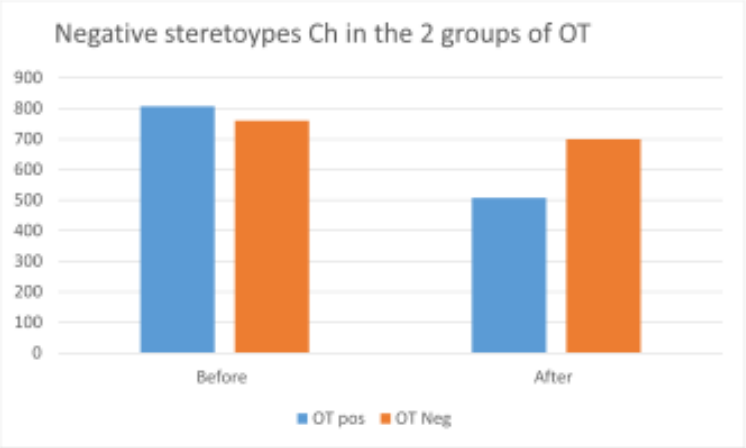

Figure 4. Comparison OT and NS between workshop participants and control group

CONCLUSION

This research has statistically proven that Negative stereotypes are not resilient as presumed in different Stereotype change strategies. In fact, negative stereotypes can be changed in youngsters as evidenced in the optional thinking intervention model described in this paper. This is an important conclusion that calls upon designing further educational strategies to those described in this paper. Improving and encouraging optional thinking skill is beneficial to youngsters, fosters democratic thinking, is anti-fanatical and reduces the dire consequences attendant to closed mindedness.

NOTES

[1] Research Sponsored by the Israel Science Foundation (ISF), Application No.2113/22, Nitzan Ben Shaul PI.
[2] Research activities for the third year include:
A. Detailed research protocol writing and translation into English and Spanish; distribution of protocol to high-schools and high education institutions interested in running the research at their institution.
B. International conference on Optional Thinking (OT), Closed Mindedness (CM) and Stereotype Change (SC).
C. Further analysis of Data base in respect of gender and center-periphery relations
[3] Nitzan Ben Shaul. *Cinema of choice: optional thinking and narrative movies*. Berghahn Books, 2012.
[4] Ariel Kruglanski. *The psychology of closed mindedness*. Psychology Press, 2004 and Daniel Bar-Tal. "The (Social) Psychological Legacy for Political Psychology," in *Political Psychology*, eds. Kristen Renwick Monroe. University of California, 2024: 1-21; One notable example of closed-mindedness among many, was the1973 Israeli government abstention from recruiting reserve soldiers or conducting a pre-emptive strike despite mounting evidence, including the precise hour of the Egyptian and Syrian armies' coordinated attack on Israel on October 6, 1973. Believing as true the proposition that such attack is unlikely after the 1967 Six Day War sweeping victory, the Israeli government failed to seriously consider alternatives, resulting in unprecedented casualties on the Israeli side.
[5] Rand J. Spiro, et al. "Cognitive flexibility, constructivism, and hypertext: Random access instruction for advanced knowledge acquisition in ill-structured domains", in *Constructivism in education,* edited by Leslie P. Steffe and Jerry Gale. Lawrence Erlbaum Associates, Inc, 1995.
[6]Alberto Voci. "Negative Stereotypes" in *Encyclopedia of Quality of Life and Well-Being Research*, ed. Alex Michalos. Springer, 2014.
[7] Boaz Hameiri, Daniel Bar Tal, Eden Nabet and Eran Halperin. "Paradoxical thinking as a conflict-resolution intervention: Comparison to alternative interventions and examination of psychological mechanisms". *Personality and Social Psychology Bulletin* (PSPB) 44, no. 1 (2018): 122- 139; Renee Weber and Jennifer Crocker. "Cognitive processes in the revision of stereotypic beliefs." *Journal of Personality and Social Psychology* 45, no. 5 (1983): 961–977; Daniel Bar-Tal, Daniel, Vered Soli and Shai Fuxman, "Between Open-minded Critical Thinking and Closed-minded Allegiance: Educational Tensions in Societies Involved in Intractable Conflict." *Advances in Political Psychology*, 0, no. 0 (2020): 1-26; Charlotte, Pennington, Derek Heim, Andrew Levy, and Derek. T. Larkin. Twenty Years of Stereotype Threat Research: A Review of Psychological Mediators." *Plos One* 11, no.1 (2016).
[8] David Bordwell. "Film Futures". *Substance* 31, no. 1 (2002): 88-104.
[9] This paper focuses on a summary report on Optional Thinking research conducted by Nitzan Ben Shaul from Oct. 1, 2022 to Dec.16, 2024. While it intermittently quotes from the ISF original proposal submitted by Nitzan Ben Shaul as PI to conduct OT Training by Branching film Workshops, This summary report has never been published.
[10] During research two parallel film workshops were conducted between March 28, 2023 to April 4, 2023 during the first year of research and between March 22, 2024 to April, 17, 2024 during the second year of research for the Jewish participants, as well as between January 19, 2024 to May 15, 2024 for the Arab participants. One film workshop was held during the first year in a Jewish high-school with a film program ("Ha'rishonim" high-school in Herzliya, Israel), and one in an Arab high-school with a film program (Kfar Kara High-school, Israel). During the second year of research one film workshop was held in a Jewish high-school with a film program ("The Democratic high-school" in Jaffa), and one in an Arab high-school with a film program (again in Kfar Kara High-school but with different participants).
[11] Kevin McDermott, Carmel Hinchion, Alicia McGivern and Della Meade. "Learning through Film: Lessons from Workshops for Teachers and Pre-service Teachers of English". *Journal for Learning through the Arts* 14, no.1 (2018): 1-17.
[12] Chino Bun, Masafumi Mizuno, Takahiro Nemoto, Chiyo Yamashita, Haruo Kashima. "Relation between social functioning and neurocognitive test results using the optional thinking test in schizophrenia". *Psychiatry and Clinical Neurosciences* 60 (2006): 63–69; Carmel McAuliffe, Paul Corcoran, Portia Hickey and Breda Mcleavey. "Optional thinking ability among hospital-treated deliberate self-harm patients: A 1-year follow-up study". *British Journal of Clinical Psychology* 47 (2010): 43–58; Hanna Damasio, and Atonio Damasio. "Social conduct, neurobiology, and education", in *Learning in the Global Era: International Perspectives on Globalization and Education*, edited by Marcelo Suarez-Orozco. University of California Press, 2007: 85-104.

[13] Jerome Platt et al. "Adolescent problem- solving thinking. *Journal of Consulting and Clinical Psychology*, 42 (1974): 787–793.

[14] All told, in the first two years of research 47 high-school student participants, 9 males and 16 females from Arab origin, as well as 12 males and 10 females from Jewish origin were enlisted, along with their parents' consent. All workshop films produced by participants are safeguarded and all workshop activities are documented (including day-by-day activities, procured permits and the results of questionnaires and tests conducted).These documents are safeguarded by password and can be accessed pending privacy clearance.

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A MODERN TWIST ON AN OLD CLASSIC: INNOVATIVE AND TRANSFORMATIVE PEDAGOGY FOR NEW TRAINEE TEACHERS

Author:
JENNY FOGARTY, LEANNE GRAY

Affiliation:
ANGLIA RUSKIN UNIVERSITY, UK

TEACHER EDUCATION IN ENGLAND

To train to become a teacher in England is straightforward yet complex. The requirements are clear and laid out annually for prospective entrants to the profession to understand, including qualifications in English, Mathematics and Science, an undergraduate degree and the award of qualified teacher status (QTS) which combine to officially classify teachers as eligible to begin their two year 'Early Career Teacher' probationary period.[1] However, the ways in which new teachers are awarded each of the required qualifications can be complex. They can become teachers through undergraduate education courses that combine with QTS, through subject specific undergraduate degree courses combined with postgraduate qualifications that include QTS, through assessment only routes, work-based routes, salaried routes and now teacher apprenticeships. They can undertake these qualifications via an accredited provider, through a higher education institute or through school centred initial teacher training. From September 2024 there will be 179 accredited providers delivering courses leading to QTS in England.[2]

The market review of teacher education in 2022 represented the largest revision of who could train teachers in England.[3] To award QTS, every provider of initial teacher training, was required to 'bid' to the Government of the day explaining, in detail, their approach to training teachers. Cross-referencing a myriad of government frameworks as well as controversially submitting teaching materials for review by a non-expert panel, the focus was on how providers would meet the updated expectations which were to be implemented from September 2024.[4] As a result, 20% of providers in England lost their accreditation including universities with a long history of excellence, such as the University of Greenwich in South London and Durham University in the North of England. Anglia Ruskin University (ARU) was one of the few new providers who entered the bid process and the only higher education institution in England to be successfully awarded. The outcomes were announced in September 2022,[5] and the Initial Teacher Training team at ARU has since been established to mobilise high quality implementation of our plans for delivery. One of the most frequently cited reasons for the success of the bid process for this institution was the history of excellence in undergraduate education including in national league tables,[6] and the extent to which we were able to collaborate with key stakeholders and partners, including other providers of teacher training, local primary schools and school children themselves.

A MODERN TWIST ON AN OLD CLASSIC

In response to the accreditation process, a key decision was to agree the route into teaching. We have chosen a route that has gone out of favor in the UK, a three-year undergraduate Bachelor of Education degree in primary education with Qualified Teacher Status attached. As part of their teacher recruitment strategy, the Government highlighted the importance of expanding and developing more undergraduate provision in ITT.[7] In the UK, particularly in England, the BEd (as it is known in short), has a high status attached to it despite, just 19% of 2023 entrants to the profession taking this route.[8] Typically, headteachers of primary schools have studied this route and have positive experiences of the time and dedication given to training. Competitor analysis undertaken prior to developing the course revealed there was a significant gap in the market in the region where ARU is located – the East of England. The BEd typically attracts students with a strong vocational pull, who have had the ambition to be a primary school teacher since they were at school themselves and are committed to training in what they see as the highest quality route. However, as a route into teaching for universities, it has fallen out of favor and no new BEd degrees have been written for 30 years in England. Despite the positive reputation as a high-quality route, this program is expensive to administer with considerable academic support and infrastructure required to award qualified teacher status combined with the support required for high contact time undergraduate provision. Students require supervision during their placement of 120 days minimum over 3 years and in person teaching hours over 20 per week. However, a decision was made to embrace the high-quality outcomes for trainee teachers on a BEd route as being the driver for a new provider entering the teacher education space. By prioritizing the quality of student experience and outcomes, and directly responding to feedback from our partner schools, we have designed a new route into teaching that recognizes the value of the old classic, reimagined for a post-pandemic school landscape and maximizing opportunities for innovation.

TEACHER TRAINING FOR AN UNSETTLED WORLD

It is proposed that we live in an unsettled world, which has previously been described as *volatile*, *uncertain*, *complex*, and *ambiguous* (VUCA), a notion that been attributed to the US military,[9] although the roots of this acronym go back to a seminal text produced by Bennis and Nanus,[10] in which they explored leadership in a challenging and rapidly changing world. However, due to recent global issues post-2020, it is argued that the world is even more unsettled than when VUCA was first developed, and the term does not comprehensively describe the situation post-2020.[11] In response to this, the acronym BANI was proposed by Grabmeier in 2020 to facilitate new perspectives for a changing world. BANI stands for *brittle*, *anxious*, *non-linear*, and *incomprehensible*. Grabmeier argues that the complex world has now turned into a chaotic one and that we are no longer living in a VUCA world. He proposes that what used to be volatile has now become *brittle* because global critical systems are so interlinked. Therefore, if one component of a systems breaks down, it is likely that other systems will follow. He argues that people do not feel uncertain anymore, instead they feel *anxious*, a point that is often attributed to constant newsfeeds, social media, and the aftermaths of the global pandemic. Grabmeier states that systems are no longer complex, instead they follow *non-linear* systems. And finally, he argues that issues that were once ambiguous to us, now appear as *incomprehensible* to us.[12] BANI is a recent concept, so there is limited research literature available to support and critique this model however, working in the context of teacher education, the concept of BANI appears to apply to the current situation in England. Firstly, the context is *brittle* due to the complexities in the process of training to become a teacher in England and due to the changes in requirements required by the Department for Education.[13] Aside from the most recent reaccreditation process (detailed above), other changes have been made to the teaching curriculum and the

requirements around mentoring trainee teachers.[14] Secondly, the teacher training context is *anxious* for both teacher educators and for trainee teachers due to the *brittle* nature of the context. Trainee anxiety is also at significantly high levels, with a recent report on young people's mental health in the UK, describing universities as 'hotbeds for mental health problems', with young people at university having higher rates of mental health issues than young people in work or out of work.[15] Although this research explored young people on a range of university courses, it is still something that needs to be considered in the context of trainee teachers. Next, the teacher training process is *non-linear*. For example, designing a new teacher training course from scratch has involved negotiation with both internal and external stakeholders who have an impact on and interest in the delivery of the course. On occasions, their interventions have led to unexpected changes having to be planned and implemented. Finally, there are aspects of teacher training which are *incomprehensible*. For example, the potential impact of artificial intelligence (AI). The ever-changing AI landscape is difficult to comprehend for non-specialists. In the ITT context, consideration of the implications of AI when teaching children will need to be carefully thought through. The children themselves will have access to AI and the benefits and challenges of this need to be considered in the training of new teachers.

COURSE DEVELOPMENT IN RESPONSES TO AN UNSETTLED WORLD

As noted previously, no new BEd courses have been written for 30 years and there are only a small number of universities in England offering the course. Starting a new course provides the opportunity to develop it in response to the unsettled world in which we find ourselves, whilst also retaining some of the tried and tested elements of current successful teacher education. Our three-year course was designed using a spiral curriculum, a concept widely attributed to Bruner,[16] whereby course content is taught in the first year, then repeated and built upon in year two, and then built upon further in year three. From a trainee perspective, this allows them to build their knowledge and understanding over the three-years by being given the opportunity to revisit learning and to increase the complexity at an appropriate pace. This approach ensures that learning is embedded so that trainees can then adapt and respond to the *brittle* nature of teaching as a discipline. For example, when any future changes by the Government to the taught curriculum occur, our graduates will be able to use their embedded knowledge and understanding to adapt and feel confident in their broad understanding of education as a subject. The spiral curriculum will also potentially reduce *anxiety* around the amount of subject knowledge needed to complete the course, as trainees will have three years to build their knowledge base. The trainees also have three planned school placements, one in each year of their course, along with other opportunities for school experiences. Research indicates that school placements are where the trainees do most of their learning, however, engagement during placement will vary between trainees.[17] The *non-linear* aspect of teacher training can be addressed during placements as trainees will have a mentor who will be able to provide a personalized approach to supporting the trainee's individual needs. Finally, the *incomprehensible* nature of teacher training will be supported by provided trainees with opportunities for simulation-based learning (discussed below), which will give trainees the opportunity to apply their knowledge in a safe and supportive environment.

DESIGN OF A TRANSFORMATIVE COURSE

The course has been designed to deliberately promote and support the conditions for transformative learning to occur as pioneered by Jack Mezirow.[18] Creating the conditions for transformation often focuses on maximizing the opportunities presented by the 'disorienting dilemma' to support the next generation of teachers to alter their previous frames of reference and consider alternative viewpoints and perspectives. In this context we are embracing the hybridities of multiple approaches, using the BANI framework developed by Grabmeier,[19] to inform the design, utilizing a tried and tested

approach to curriculum design pioneered by Bruner,[20] and a pedagogical approach underpinned by Mezirow.[21]

Our pedagogical approach is designed explicitly to elicit transformation. It presents new knowledge through a socially constructivist lens as appropriate for adult learners and utilizes dialogue at every opportunity to deepen understanding and critique perspectives.[22] Using dialogue as the main tool is embedded in every teaching session as there is a requirement for peer and group discussion throughout. A tangible example of this can be seen whereby each week is structured around a 'Big Question' which will be referred to and used as a springboard for further discussion and re-framing of understanding. For example, in the first few weeks, the cohort will consider 'Is a teacher's influence always positive?' as the starting point for a broad discussion. By sharing theoretical perspectives, practical examples from teachers currently working in local schools and trainees' previous knowledge, tangible debate to reframe and reorganize knowledge will be created, providing the conditions for meaningful learning to take place.[23]

HYBRID WORKING WITH INDUSTRY PARTNERS

We recognize the ambitious nature of the task in establishing a new teacher training offer in our region. To do this effectively, we have embraced and intentionally designed opportunities to work collaboratively with colleagues in schools to reflect their experience authentically throughout the curriculum. In our context, this is the nature of industry collaboration, our industry partners being schoolteachers and leaders of our partner schools. Our region in the East of England covers over 6000 square miles with over 2000 primary schools, over 120 of which have expressed an interest in working with us to deliver our course. Their involvement has taken many forms, including; curriculum design, particularly sequencing; supporting selection events where prospective students are assessed for their suitability; designing specific teaching sessions, particularly those sessions teaching early reading; providing examples from their settings; and holding focus groups with children to find out their views on what teachers should be like, a selection of which were used in formal university validation events such as those seen in Figure 1.

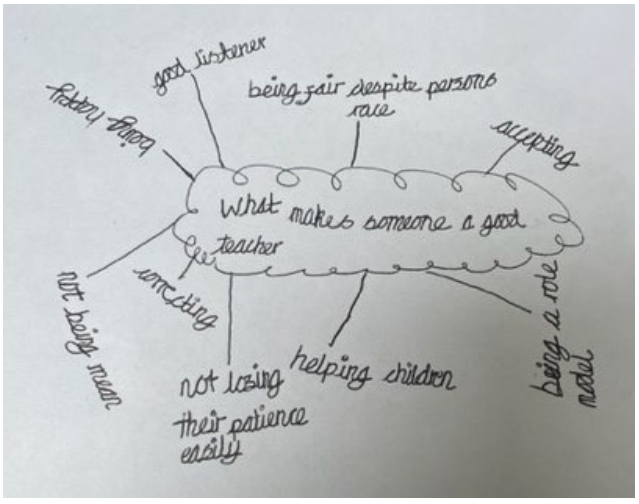

Figure 1. Pupil A's views on what makes a good teacher.

A range of further examples of educational innovation have been designed as part of the curriculum including the use of simulation-based learning, to provide authentic digital approximations of classroom teaching interactions within the university classroom, rather than the primary classroom. These digital approximations are further examples of meaningful hybridities in our approach as we

utilize the effective partnership working to enhance the trainee learning experience and reflections on their own practice.[24] Whilst this includes examples utilizing advanced technology and artificial intelligence, particularly valuable for modelling safeguarding scenarios, there are also other examples that are simpler to implement including narrated recordings of experienced teacher's practice – where they provide a commentary on their pedagogical decision making. By intentionally blurring the lines between university teaching and school placement, we are creating the conditions for dialogue and unpacking of understanding in a range of contexts, multiple times across the course.[25] This approach also recognizes hybridity by creating an alternative learning space for our partners to contribute their expertise which they have described as invigorating and professionally refreshing in line with the mutual benefits outlined by Robinson and Feldman.[26] By taking them away from their traditional classroom environment and supporting them to contribute by combining their expertise with a university context, we are providing an innovative space to collaborate, using digital hybrid solutions to maximize efficiencies to enable this to happen.

NEW REALIITES FOR IMPLEMENTATION

We have outlined the extent to which a new teacher training course in England has been designed using a range of hybrid approaches, from the curriculum design, the pedagogical approach and the extent to which our industry partners are able to contribute to it. Despite the intentionality of the design, and in line with the BANI framework, as we move towards launch in 2024 further challenges and opportunities are revealing themselves. A new Labour Government has been elected to the UK Parliament with a renewed focus on education and the positive role of the teacher,[27] which provides a particular socio-political context to launch a course that is designed for public service. A renewed optimism for what is possible in education is emerging and the course is flexible enough in its design to enable a dynamic response to changing content should that be required. Establishing a new course in any University is a rare and often Utopian endeavor. We are conscious that the complexity of collaborative working, the challenging context for UK undergraduate recruitment and an ongoing cost of learning crisis all combine to make this a potentially difficult time to launch a new course. However, by integrating these challenges as part of the curriculum and pedagogic design, we are shaping a new space for teacher education in the fraught landscape that currently exists.

Whilst sharing our experiences with colleagues at the California Institute of Integral Studies we were introduced to the idea of integral studies through the lens of the historical perspective of San Francisco as a center of renaissance and for disruptive thinking. These ideas, shared by keynote speaker Professor Debashish Banerji, align with his work placing the modern knowledge academy as a space where academics consider the piecing together of fragmented ideas in a fragmented world,[28] deeply resonated with us when reflecting on our process of curriculum and pedagogic development. By outlining our approach to intentional course design, embracing the uncertainty of living in a fragmented and BANI world, we are making a small contribution to the changing landscape of teacher education in England. This is a once in a generation opportunity to shape a new and exciting approach to training to be a primary school teacher and we are optimistic that by working with our partners to embrace a hybrid approach, teachers in our region will be prepared for the challenges and opportunities that will come their way in this rewarding profession.

NOTES

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FILM GROUP PROJECT AS AN EDUCATIVE ADVENTURE

Author:
HASMIK GASPARYAN

Affiliation:
UNIVERSITY OF YORK, UK

INTRODUCTION

United Kingdom remains one of the leading cinema markets worldwide; and as the recent data from the British Film Institute (BFI) evidences, after the pandemic, the UK film industry has bounced back with record-breaking figures and is busier than ever.[1] At the same time ScreenSkills, the body that represents workers in the UK film and TV industry and provides accreditation to film craft-based university courses, alarms about severe skills shortages that can threaten British film studios production boom.[2]

First shorts remain a 'calling card' for film graduates' to unlock doors to the competitive film and television industry. Yet while having their first pre-industry collaboration experiences in Higher Education, inexperienced young adults are expected to master collaboration on their own, 'as if it were an innate skill, not a learned one'.[3] It can be argued that the current emphasis on film technical competencies driven by the film and media industry demands allows less focus on collaborative aspect of film production, which is the essence of any filmmaking beyond the basic home movie production.[4]

To allow students' access to not only technical but also to the best creative collaboration experiences a film educator's role becomes crucial. Bergala sees a film educator as a 'passeur': not merely an agent of transmission, but 'someone who gives of himself [herself], who accompanies his [her] passengers in a boat or up the mountain and takes the same risks as those temporarily in his [her] charge'.[5] This recalls Friere's 'educative adventure', an idea of education being a journey where there is no teaching without learning, as well as learning without teaching.[6] Prominent filmmakers that were closely engaged in teaching filmmaking (e.g. Eisenstein, Kiarostami, Romm), often consider teaching as a form of creation that is not very different from creating films. Moreover, Eisenstein notices a film director - spectator relations of dependence and necessity very much similar to a teacher-student.[7]

This paper will focus on a student' small group collaboration as a teaching and learning method and aim to answer to a question on what are the specific areas that need a tailored approach when applied to a 'film group project' in particular. Further, to learn students' perception on their first film collaboration experience at the University of York, UK, the two anonymous online survey results will be discussed, that were conducted with undergraduate and postgraduate film students in 2022-2023 academic year.

A 'Small group' collaboration

To locate a 'film group project' within education, 'a small group' teaching model has been identified. This is an umbrella term for a teaching and learning occasion that brings together two to twenty participants.[8] This form of teaching, which has a long history since Socrates, develops participants' not only critical but also personal attitudes. A range of transferable skills to be cultivated while at university are at play during this form of interaction: emotional intelligence, conflict management, leadership skills, ethics, and responsibility, use of modern communication and information technologies.

Based on tutors' level of control, 'small groups' are broadly divided into 'cooperative' and 'collaborative'. The first, is more structured, with educator keeping positional power, and competition (or conflict) here is uncommon. In this case, the emphasis is on task rather than process and it is more common in science knowledge (4-16 y - K12 education). In contrast, the second focuses on the process – here interaction happens between articulate and autonomous participants who can (and are expected to) challenge the subject of knowledge; and more applicable to humanities in Higher Education.[9] Returning to a 'film group project', it is worth establishing that 'a film group project is a collaborative learning interaction between students that work together from script to screen and where a tutor guides students throughout the filmmaking process.

There is sufficient material on how to teach the technical film craft; yet still limited research on the collaborative aspect and learning implementation that is tailored specifically for film group interaction. Therefore, based on "Collaborative Learning Techniques: a handbook for college faculty" by Barkley, Major and Cross, 2014, the following six stages of implementation of group collaboration will be discussed in relation to film collaboration: Designing the Learning Task; Orienting Students; Forming Groups; Facilitating students; Grading and Evaluating Collaborative Learning; Avoiding and Resolving Common Issues within the groups.[10]

COLLABORATIVE LEARNIING: A FILM GROUP PROJECT

Designing the Learning Task and Grading and Evaluating

Today one of the major questions that film educators face is whether we are teaching students who make films; or are we teaching them how to become the people who make films?[11] Often film programmes, including the Film and Television Production programmes at the School of Arts and Creative Technologies at The University of York, aim for both. When it comes to 'Designing the Learning Task' the questions -' what needs to be learned?', 'how?' and 'how to assess the learning?' – the process is prioritised over the achieved result (the final film).[12] The 'film group project' is a 'concrete experience' that is part of 'experiential learning',[13] which often becomes students' first pre-industry film practice. For example, to get familiar with key specialist roles involved in filmmaking, on a 'film group project' a student is responsible for a specialist role (e.g. editor, sound operator, etc.) and works in collaboration with other specialist group members. Or, to apply some of the key technologies learned during the practical sessions/workshops/lectures (e.g. on use of cameras, microphones, etc.), a student directly tests the received information in the process of creating the film content. To learn about the stages of filmmaking and to relate technical aspects of film production to editorial and creative objectives, a student engages directly on production workflows from technical and editorial perspectives. To plan ethical and sensible health and safety measures to keep the cast and crew safe on the shoot, a student engages with the risk assessment processes and creates the necessary production paperwork to secure safety and ethically responsible work in practice. In tune with the mentioned Kolb's 'experiential learning' cycle, in this learning by doing oriented process, the assessment for a 'film group project' relies predominantly on students' individual reflective reports,

where 'reflective observation, conceptualisation and experimentation' is more important, rather than the film itself.[14]

Orienting and Facilitating Students

Based on the authors' film teaching experience at the University of York, often the orientation lecture on the 'film group project', to familiarise students with the overall group task and the stages of filmmaking, appears not sufficiently perceived by the students. As again, only when students move through the filmmaking process – the stages of story development, pre-production, production, post-production - the need to revisit the orientation resources becomes a necessity. For example, the understanding that the 'paperwork' and detailed planning before the shoot is key for a smooth film production, becomes evident when the poor planning has resulted in loss of precious production time. This learning from mistakes, becomes a valuable learning point for future filmmakers. Moreover, time allocated for students to move through the stages of filmmaking to create a film is usually tight (often five to seven weeks) which often adds to the pressure. Hence to support students through this 'perfect' chaos, the educator-facilitator's role as a 'guide on a side' is essential. This involves being responsive and flexible to changes in group dynamics; communicating necessary information throughout the film processes (e.g. signposting about the milestones, providing film resource pack, etc.) on a timely manner through virtual learning environment (VLE) online platform; and being in contact with the group producers to monitor students' attendance, contribution to the project and possible conflicts in the groups.

Group Forming: film group structure and common patterns

There is certain assumption that group project teams tend to have no formal structure - no hierarchy, no clear delineation of roles and responsibilities.[15] It is different when applied to a 'film group project'. Here, to promote understanding on film industry practice there is tendency to replicate the duties and reporting structures used in film industry. Often, five to seven students are required for the group to function, and there is delineation of the specialist roles and responsibilities: producer, writer, director, cinematographer, sound operator, editor. However, depending on the number of the students in the groups, often the members can have more than one role, or do a bit of everything.

A known 'free-rider' behaviour[16] is also relevant concern for a 'film group project' collaboration. In particular, the delineation of specialist roles suggests a hierarchical team structure, which can result in students' disproportionate workload and overall engagement. For example, a film editor may consider that his/her turn to engage is after the shoot (in post-production). Or, there is a misbelief that the director tells people what to do and in charge of making all of the decisions,[17] which can result in uneven power distribution within the groups. As Rabiger notices, 'When film students fail, it is seldom because they can't handle the work or the technology. Usually, it's because they can't work as equals with others.'[18]

It can be argued that the hierarchical film structure, and existing baggage of misconceptions film audiences have about the director's egocentric leadership role - which students entering film schools effectively bring with them - have a negative impact on quality of students' early collaborations; hence require time to be adjusted. It is true that 'collaboration thrives when the creative 'leadership' is granted to whoever in the moment has the best idea or solution to a difficulty rather than who is in the most powerful role'.[19] It is true that film educators being aware of the continuing power imbalance in film industry, would need to see the opportunity to avoid mirroring the industry and make plans to nurture collaboration where behavioural changes and emphasis is on 'how' the films made, not 'who with'.[20]

Another aspect of group collaboration is a 'sub-grouping', which in general known to signal issues in group dynamics.[21] In contrast, for effective film collaboration, sub-groupings – e.g. meetings between 'scriptwriter- director'; 'director -cinematographer'; 'director and actors', etc. -- are encouraged.

Avoiding and Resolving Common problems

Since the 1950s, interest in learning about group dynamics can be noticed.[22] As the Table 1 demonstrates, the group development models have some similar patterns and interesting overlaps when compared with the film production stages: the development, pre-production, production, post-production (and distribution).

Model	Stages of Group Development				
Bales's Equilibrium model (1950)	Orientation	Evaluation	Decision Making		
Homans' Theory of Group Formation (1950)	Needed states and behaviours	Emergent states and behaviours	Results of collective actions		
Tuckman's model (1965)	Forming	Storming	Norming	Performing	Adjourning
Fisher's theory of decision emergence (1970)	Orientation	Conflict	Emergence	Reinforcement	
Cog's Ladder (1972)	The Polite Phase	'Why are we here'? Phase	The Power Phase	Cooperation Phase	'The Esprit de Corps Phase' (Feeling of solidarity)
Bass & Ryterband' Stages of Group development (1979)	Acceptance	Communication and Decisions Making	Solidarity	Control	
Woodcock's analysis (1979)	Infant Team	Exploratory Team	Under Consolidation Team	Mature Team	
Jones' model (1979)	Immature	Fragmented	Sharing	Effective	Synergy
Tabb's System (1994)	Orientation	Conflict	Consensus	Closure	
Wheelan's Model (2003)	Dependency/ Inclusion	Counter dependency Conflict	Trust/ Structure	Work/ Productivity	
Stages of Film Production	**Story Development**	**Pre-production**	**Production**	**Post-production**	**Distribution**

Table 1. Stages of group development revised from Vaida & Serban[23]

For example, Tuckman's stages of group development - forming, storming, norming, performing, adjourning - suggest that often group conflicts occur in a 'storming stage' (similarly in Fisher's 'conflict', John's 'fragmented', etc). This coincides with group conflicts happen before the film shoot - at the end of the film pre-production stage. Hence, to control the possible group tensions at this stage of production, a facilitator may have a support plan in place: e.g. checking in with the groups in case they need a drop-in session before the shoot. Moreover, when dealing with conflicts, it is important for facilitator to identify whether it is a 'task conflict' based on members' different opinions, which is productive for a team development, as can ignite a healthy dialogue and give shape to a new (and different) ideas;[24] or if it is a 'relationship conflict' based on emotional and interpersonal relationship among the team members, which is less beneficial.[25] Here timely interventions will help to defuse the situation; and students' attempts to resolve the issues within the teams should be encouraged. Hence considering the overall group development stages, Hodge's proposed four questions for students to understand their role in a film team, [26] are useful when avoided at a turbulent late film pre-production stage just before the shoot:

- Appreciation and status: "Am I valued on this crew?"
- Affiliation: "Am I being treated as a colleague or as an adversary?"
- Autonomy: "Am I being kept from doing my job?"
- Role: "What is my role? Is it too limited? Too broad? Do others see my role in the same way I do?"

FILM GROUP PROJECT: TWO CASE STUDIES

Two examples of 'film group projects' will be examined in this section that were conducted at the School of Arts and Creative Technologies in the 2022/2023 academic year: the first-year undergraduate formative film task and a postgraduate summative task. In both cases for students these were the first film group project collaborations at the School of Arts and Creative Technologies, University of York. Two anonymous student google surveys were conducted during a two-month period after students' completion of the module, films and assessments. Equal percentage of students have completed the anonymous voluntary survey - 30% from total of 90 students in each UG and PG groups. All groups had five to seven students. The final film was not assessed separately: in case of the undergraduates, oral feedback was provided during the final film screening event; for the postgraduates, a combined final mark was given based on the artefact film portfolio and a written individual reflective report. All projects were filmed within the grounds of University of York. Hence there was no need to obtain written permissions to secure shooting locations, which is often time consuming.

Despite the mentioned similarities, there are differences between the undergraduate and postgraduate groups which could potentially have an impact on dynamics and collaboration within the groups, as well as survey results:

- Postgraduates were provided with three written scripts to choose from (three to eight minutes in legth); the undergraduates were given only a title for a three-minute film: *There is no Planet B*.
- The specialist roles for the postgraduates were based on their chosen MA film programme; the undergraduates needed to agree within their groups on a specialist role. The latter were newly introduced to these students as part of the introductory module.
- Postgraduates worked on projects during the whole autumn term; the undergraduates had five weeks to create a short.
- Postgraduates had three supervision meetings with assigned for each group supervisor; undergraduates had no separate timetabled supervision meetings with assigned supervisor

• The postgraduates had a budget of £300 and spent time on casting; the undergraduates had no budget and needed to rely on their own network of university friends.
• The postgraduates needed to shoot within the designated university studio setting; undergraduates needed to source a film location within the university premises
• For the UG groups this was a formative task and for the PG groups summative.
• Majority of postgraduates were international students (87.1%); majority of undergraduates were British students (77.4%). (Figure 1).

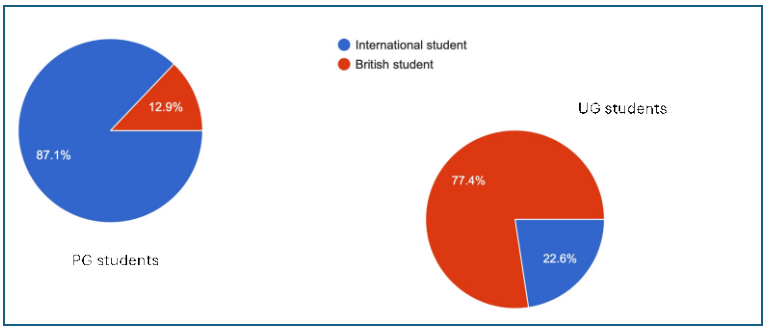

Figure 1. PG and UG students' survey results on the question:
'Please tick the corresponding box if you are International or British student'

Student Survey Results and Discussion

The survey results between the PG and UG groups suggest certain similarities and differences of students' perception on film group interaction. It is evident that both groups recognise the 'strong communication skills' being key to a group success (Figure 2). Yet, it can be noticed that postgraduates prioritise also the 'proficiency in specialist role' being a crucial factor. The groups 'partly agree' and 'agree' in recognising the fact that the group members get credit without equal contribution to the group work (Figure 3), potentially the reason for this can be the mentioned hierarchical group structure. There are differences in responses on members' previous group film project experience (Figure 4) and members' age demographics (Figure 5) which appears reasonable based on students' UG and PG levels.

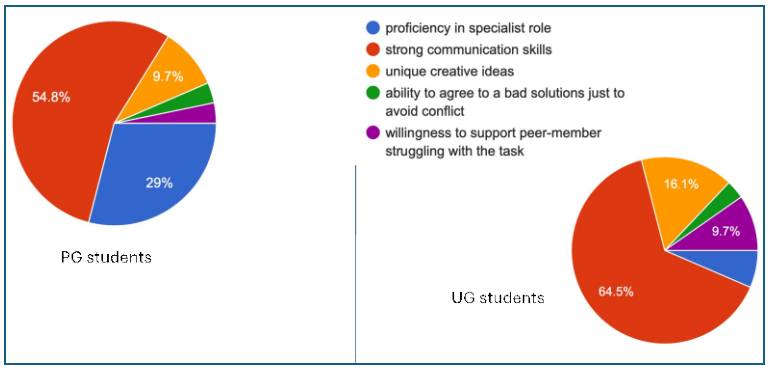

Figure 2. PG and UG students' survey results Survey results on the question:
'Based on your experience choose what is more important for film group success?'

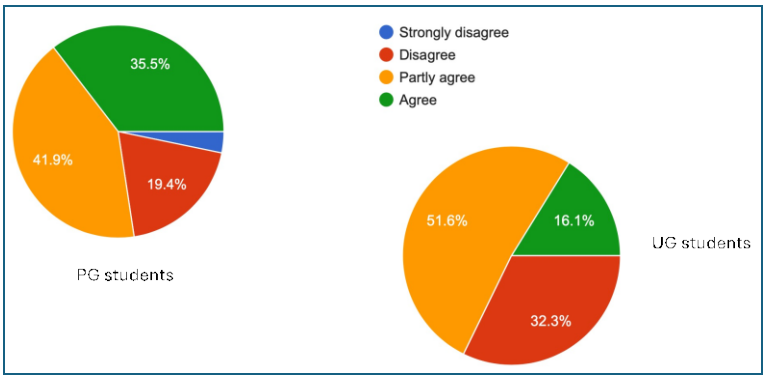

Figure 3. Survey results on the question:
'Based on your experience, please choose if you find that the 'group work' allows members to get credit without doing equal amount of work'

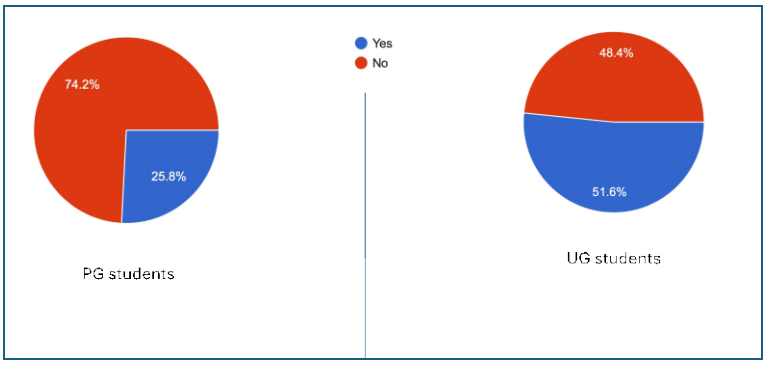

Figure 4. Survey results on the question:
'Was this your first 'group work' experience to create a film?'

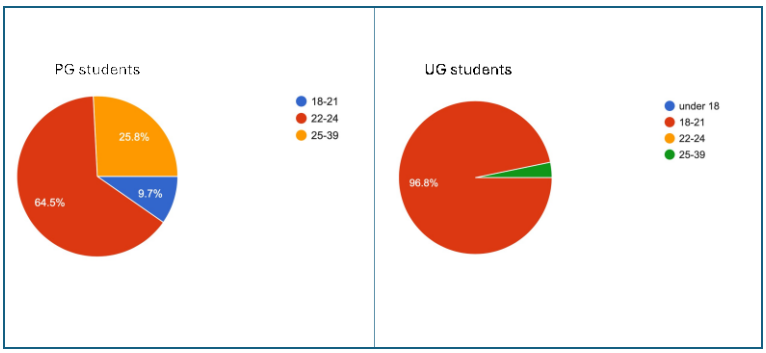

Figure 5. Survey results on the question: 'Please choose the relevant age group'.

There is noticeable difference between the groups in recognising understanding gained on the 'specialist roles' before and after the 'film group project' task. Here, postgraduates observe no significant changes in understanding of their specialist role 'before' and 'after' the film group project. (Figure 6) In case of the undergraduates, the contrast can be explained due to the specialist roles being newly introduced, and students had no previous experience on allocated roles. (Figure 7)

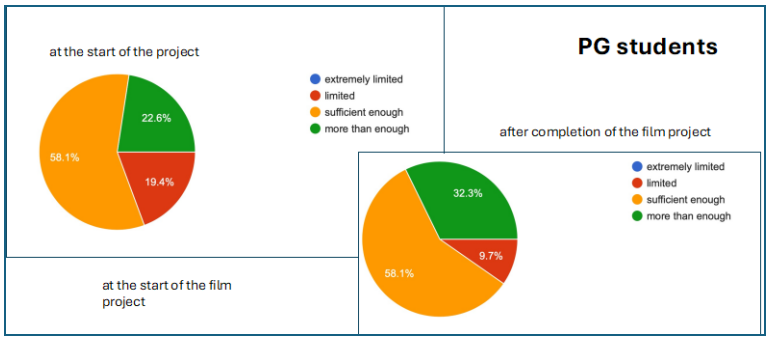

Figure 6. Survey results on the questions for the PG students:
'Please choose based on your understanding of your specialist role at the start of the project' and
'Your understanding of your specialist role after completion of the group project'

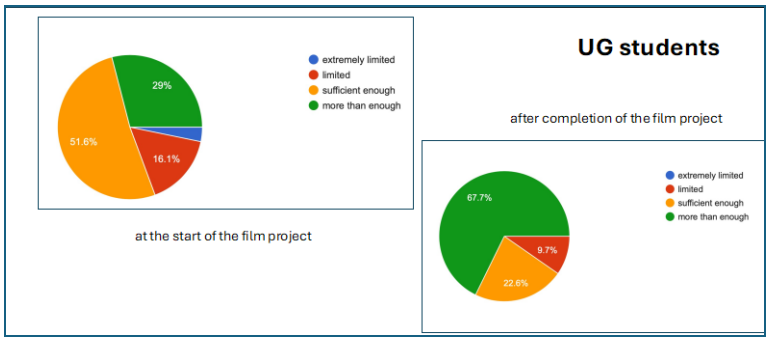

Figure 7. Survey results on the questions for the UG students:
'Please choose based on your understanding of your specialist role at the start of the project' and
'Your understanding of your specialist role after completion of the group project'

Despite the earlier mentioned limitations that the undergraduates had, which could potentially impact (or impede) these students' level of collaboration, they had contrastingly more active level of engagement and (to some degree) registered a more positive experience based on Figures 8, 9.

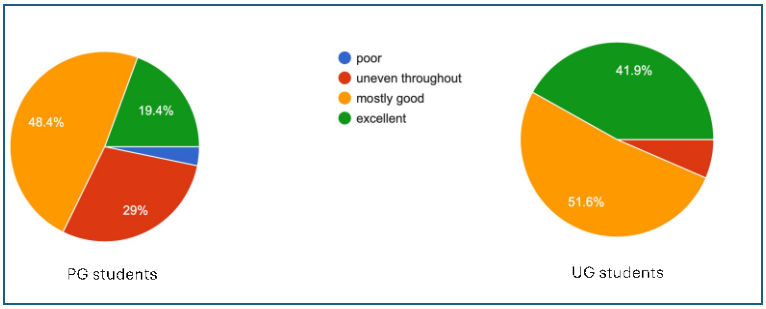

Figure 8. Survey results on the question:
'Please evaluate your group members' level of engagement on this film project'.

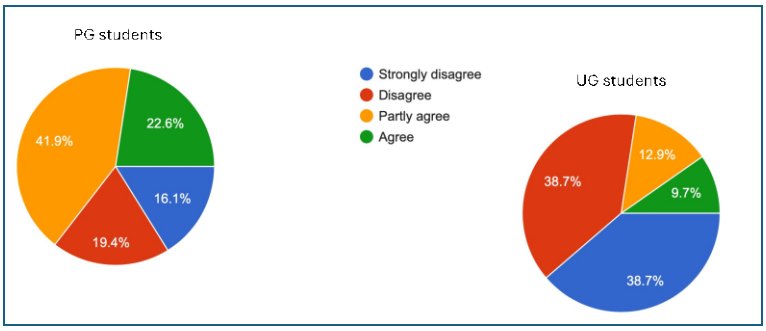

Figure 9. Survey results on the question:
'Please choose if the specialist role assigned to you suggested limited contribution to the project'

The survey results suggest that a more time dedicated to postgraduate groups for a film project, their previous experience in film collaboration and in specialist roles; as well as supervision support and additional sources provided (e.g. a script, budget, location) did not necessarily resulted in stronger group collaboration. There are other factors that had an impact on communication within these groups. Here the use of English as a second language might have had an impact on quality of communication;[27] or, previous 'good' or 'bad' film group work experience and specialist skillsets could have form false expectations within the groups. It is clear that there is a scope for further research to better understand the possible patterns in postgraduate group dynamics. Having said that, each group project is always a new learning experience and when applied to a 'film group project' diverse viewpoints, experiences, skills, ideas are a great asset that can lead to a more varied content to reflect our reality and to speak to a wider audience.

CONCLUSION AND LIMITATIONS

It is obvious that technology is going to change and so are the film production processes; yet film and television production will remain possible only through collaboration of group of people working together, where each brings their strengths and weaknesses to the project.[27]A 'small group' interaction can be an effective method to foster not only technical but also collaborative film skills. However, as discussed in this paper, taking into account characteristic aspects such as hierarchical structures, sub-groupings, delineation of the specialist roles, and conflicts in late pre-production stage are important, to allow educators' more careful planning when design the learning and teaching film group project task. The survey results, despite being limited in terms of number of participants; and being focused on experience of film students from the University of York during one academic year only, bring attention to possible other factors that may impact communication, and as a result, group collaboration in Higher Education: a language barrier, previous experiences, and multicultural background. This opens a scope for further investigation, in order to find more effective ways of international students' integration to our film collaborative learning processes in Higher Education.

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TEACHING WITH THE PLACE AND BODY

Author:
MARIA FREIRE, AURORA CARAPINHA

Affiliation:
ÉVORA UNIVERSITY, RESEARCHER CENTRE FOR ART HISTORY AND ARTISTIC RESEARCH, PORTUGAL

INTRODUCTION

The concept of place is crucial in landscape architecture. It is more than just the space where design and planning occur. Understanding the physicality that encompasses the dynamics of transformation, as well as the eternity and spirituality of spaces and the embodied experience of those who inhabit them, is essential to creating landscape planning and design that are integrative, functional, and meaningful. Understanding spatial, temporal, and dynamic dimensions requires a device - our body. The methodological practice of experiencing the place is essential. Teaching landscape architecture involves working at the *locus* and with the *locus*.

This paper explores the idea that the connection between place and body is a fundamental tool in teaching landscape architecture, vital for reading, conceptualizing, and managing landscapes. Activities such as living, looking, moving, drawing, annotating, mapping, diagramming, discussing, reflecting on what we feel, and engaging with communities and stakeholders must be activated. It investigates the fundamentals of working with and at the *locus* and how these concepts can be integrated into teaching methodologies. The paper explores practices carried out at the University of Évora since 1980, mainly study trips, fieldwork, and addressing community issues.

Based on our experience, working at and with the *locus* must be seen as an ethical responsibility in teaching landscape architecture.

LANDSCAPE ARCHITECTURE

Landscape architecture is both an art and a science that collaborates with nature to meet human needs. It is a social art, serving human values. This definition, promoted by the first generations of landscape architects in Portugal in the mid-twentieth century, remains undeniably contemporary and forms the first founding principle.

With origins in the gardening profession, the landscape architect's intervention begins with an awareness of the biophysical place, its culture, and beauty. This manifests in a reflective action, integrating knowledge to respond to societal demands from a sustainability perspective. The intervention involves balancing economic interests, social and cultural purposes, ecological foundations, and aesthetic and ethical considerations. This is an activity that therefore requiring great maturity.

Teaching landscape architecture encompasses a wide range of scientific, technical, and artistic knowledge, which is crucial to the process of transforming landscapes. This education involves

acquiring and integrating knowledge from a humanist perspective, essential to human life, and preparing landscape architects to frame actions ethically and humanistically. This involves learning objective and subjective knowledge, understandings, and skills integrated into a complex, interactive process involving research, reflection, and synthesis.[1]

THE EXPERIENCE OF THE PLACE

Several authors from different scientific fields have a multifaceted perspective of how space and place influence and are influenced by human interaction. Space is an abstract, quantitative and impersonal entity, while place is concrete, qualitative, and personal. Space is often seen as a neutral context for activities, while place is a space that has been endowed with meaning through human experiences. Space is perceived through its physical dimensions and coordinates, while place is experienced through emotions, and cultural and social engagements. Space is associated with what can potentially occur, as well as movement, while place is associated with identity, attachment, and belonging.[2] Each author brings a distinctive viewpoint from their field.

For philosopher Merleau-Ponty, the body's interaction with space is the "genesis of all things," and "the human experience is explored in the articulation of the relationship between the visible and the invisible".[3] The philosopher Rosario Assunto argues that pleasure comes from the multiplicity of physical sensations of being in the landscape, through space and time. The space we experience where we live relates to our way of experiencing, implying our being in it.[4] For psychologist Jean Piaget, the first learning belongs to the individual's interaction/experience with the body in space, based on the subject's cognitive structures. This real experience of space is dominated by the senses - vision, touch, smell, hearing, and taste.[5] For anthropologist Tim Ingold, knowledge derives from lived involvement.[6] The sculptor Nuno Mendoça asserts that space presupposes a multisensory, corporeal relationship, known through the sensitive internalization of its multi-relationships.[7] For landscape architect Michel Corajoud landscape is a relational place, connected to spatial characteristics, individual knowledge, and movement in space.[8] Aurora Carapinha reinforces this perspective, stating that "landscape can no longer be understood merely as that which is meant to be contemplated, but as a product of the relationship between subject and space, rooted in diverse relationships, constant motion, and evolution, biotic and abiotic factors, and various functions and meanings inherent to the structural ecological unit (…)".[9]

The commonality across these perspectives is the emphasis on the active, sensory, and relational aspects of experiencing place. Space is not a static backdrop, but a dynamic entity created by human interaction. Thus, the *locus* is understood as a complex interplay of sensory experiences, cognitive processes, and emotional responses, all contributing to our understanding and engagement with our common ground and our lives.

WORKING AT THE *LOCUS* AND WORKING WITH THE *LOCUS*

The concept of *locus* derives from the Latin word for place. For Christian Norberg-Schulz, *locus* is not just a physical location but also a contextual framework that influences design decisions. The concept of "genius loci," or the spirit of the place, emphasizes the importance of understanding the intrinsic characteristics of a location to create harmonious and contextually appropriate designs.[10] Anne Spirn describes the concept of *locus* as extending to the larger environmental and ecological contexts. It involves designing with the natural and built environment, considering factors such as topography, climate, vegetation, and cultural heritage. Understanding and integrating these elements into the design process is crucial for creating sustainable and meaningful spaces.[11] For architect David Leatherbarrow, teaching in the *locus* involves immersing students in real contexts. Site visits, field trips, and hands-on projects allow students to engage directly with the physical and cultural context.

This experiential learning fosters a deeper understanding of spatial relationships, materiality, and ecological impact.[12]

As expressed before, the perception and action of landscape architects are founded on the complementarity between ecological and cultural systems.[13] "The concept of *locus* corresponds to construction, an existential place where one is, where one lives, where opportunities and possibilities for dwelling are created (…) a space for being, a space for existing, fusing with *topus* creating an ecological, cultural and aesthetic occasion that all constructed landscape should be*"*.[14]

Thus, *locus* is a dynamic interplay of physical, contextual, ecological, and cultural elements that must be understood and integrated to create designs that are sustainable, meaningful, and deeply connected to the landscape. As landscape architects we work with the *locus.* To understand the spatial and temporal dimensions linked to the landscape, we need our body. In this way, teaching methodologies in landscape architecture must work with the *locus* and at the *locus*. The value of immersive landscape learning is more expressive with the use of study trips and fieldwork, as well as interdisciplinary collaboration, involvement of communities, and hands-on projects.

Study Trips and Fieldwork

The aim is to place students in situations where they experience the landscape, allowing them to use their bodies to explore spatial relationships, emotions. and memories. "The mind realizes the awareness of the place, the perception of exteriority, and the interior deduction for visible facts".[15] Space is perceived in multiple dimensions: spatially in the construction of depth, in various directions,[16] and in time and movement. Space thus presupposes a relationship through the senses, allowing the understanding of how things assert themselves as global or structuring signifiers.[17]

Study trips and fieldwork enrich the imagery repertoire (forms, patterns, materials) and enhance natural and cultural references (elements, uses, functioning, and management). They provide a real proximity to the landscape system and its dynamics, offering opportunities to embrace various domains present in its interpretation and transformation, enabling students to capture the essence of each landscape, essential in future interventions.

These methodologies are also fundamental for understanding and internalizing the sustainability and authenticity of the landscape. It is *in situ* that ancient knowledge, perfected and transmitted over generations, can be observed and debated.

Overall, such methodologies provide a compendium of intricate influences that build students' knowledge: "knowing how to see," "knowing how to be," "knowing how to do," and "knowing how to become".[18] Knowing how to see involves the body in space and is decisive for other mentioned skills. Only with the apprehension of biophysical and cultural components (size, shape, matter, surfaces, and spaces) and sensorial components (light, colors, sounds, skin sensitivity, odors, movements, time/moments) is it possible to identify physicalities, eternities, spiritualities, or atmospheres. This skill is strongly related to individual knowledge, the act of motion (body movement, directions, speed) and spatial characteristics. This process culminates in the ability to identify the character and meaning of space. Only after acquiring direct knowledge of ambiances and spatiality can one enter the complex domain of associating abstract information with real equivalents. Knowing how to see then reflects on lived experiences, acquired knowledge, and the ability to relate knowledge to visual patterns. The learning achieved also forms an important repertoire of references for practice. The greater and more diverse this experience, the broader the knowledge and the richer the possible reflections, namely in the transformation of the characteristics of the space into visual information (sketches, maps, and diagrams), capturing the real dimensions of objects and spaces (size and proportions). This knowledge must be trained using multiple contexts and examples to allow generalizations and to build a hierarchy of values. This knowledge and experience go beyond

documenting the biophysical and cultural characteristics of the place. We must learn innocently, guided by feelings, seeking the unknown, discovering, losing, and finding ourselves - an intensely sensitive knowledge.[19] Understanding the multiple dimensions present in space (physical, historical-cultural, aesthetic, and ecological) integrates the sensitive and rational domains, blending scientific, technical, and artistic knowledge.

Study trips and fieldwork must be supported by other pedagogical strategies such as: drawing as main expression; complementary tools such as graphic diaries, portfolios, posters, reports, videos, and documentaries; metacognitive scripts, provided in advance, well-structured and detailed, to support "diving" into and "emerging" from the *locus*; collaborative experiences, involving technicist, stockholders and the communities; interdisciplinary collaboration; and discussion sessions.

The "Rural Studio" offered at Auburn University's School of Architecture, Planning, and Landscape Architecture in the United States is another exemplary case of teaching with and in the *locus*.[20] Located in rural Alabama, this design and construction program immerses students in the local community, addressing real-world challenges through hands-on projects. It emphasizes the social and environmental responsibilities of architects and the impact of design. [21]

The future of landscape, understood as a significant cultural and ecological practice, depends on the capabilities and skills we provide to students, enabling them to look, imagine and perceive the world and each landscape in a responsible and creative way. All the pedagogical strategies must contribute to generating and influencing holistic and innovative design and planning solutions.

LANDSCAPE ARCHITECTURE AT UNIVERSITY OF ÉVORA, PORTUGAL: TEACHING METHODOLOGIES

Study Trips

Study trips have been conducted since the 1980s.[22] The plan mainly includes our country and, very occasionally, trips abroad. The itineraries cover different regions, landscapes, and gardens. These trips can be annual or biannual and can be mandatory or optional. They involve students from all three educational levels (Bachelard, Master, and PhD) or specific courses. The study trip program can range from short trips (a full day) to longer trips (a few days or a week). Costs are partially supported by schools and students. Study trips are designed according to the landscape architecture core (three-dimensional space, landscape complexity and landscape architect activity) or are given a study theme for each course. They begin as an intuitive spatial experience and gradually transform into a cognitive experience. In any case, they address many objectives, including knowledge, skills, and experiences. They are usually organized in conjunction with other educational strategies.

Long study trip: Drawing along a River

The goal of the first study trip in the 1980 was to spend a week in a rural landscape marked by subsistence agriculture. Teachers and students undertook this week-long journey, following riversides and villages, on foot with backpacks, carrying tents, food, and work materials. It was a deeply immersive experience. More than just seeing the landscape, students lived there and created a trip diary with drawing and writing materials, as illustrated in Figure 1. They explored various dimensions associated with these landscapes through a sensitive understanding of their characteristics, dynamics and transformations, values, and problems.[23]

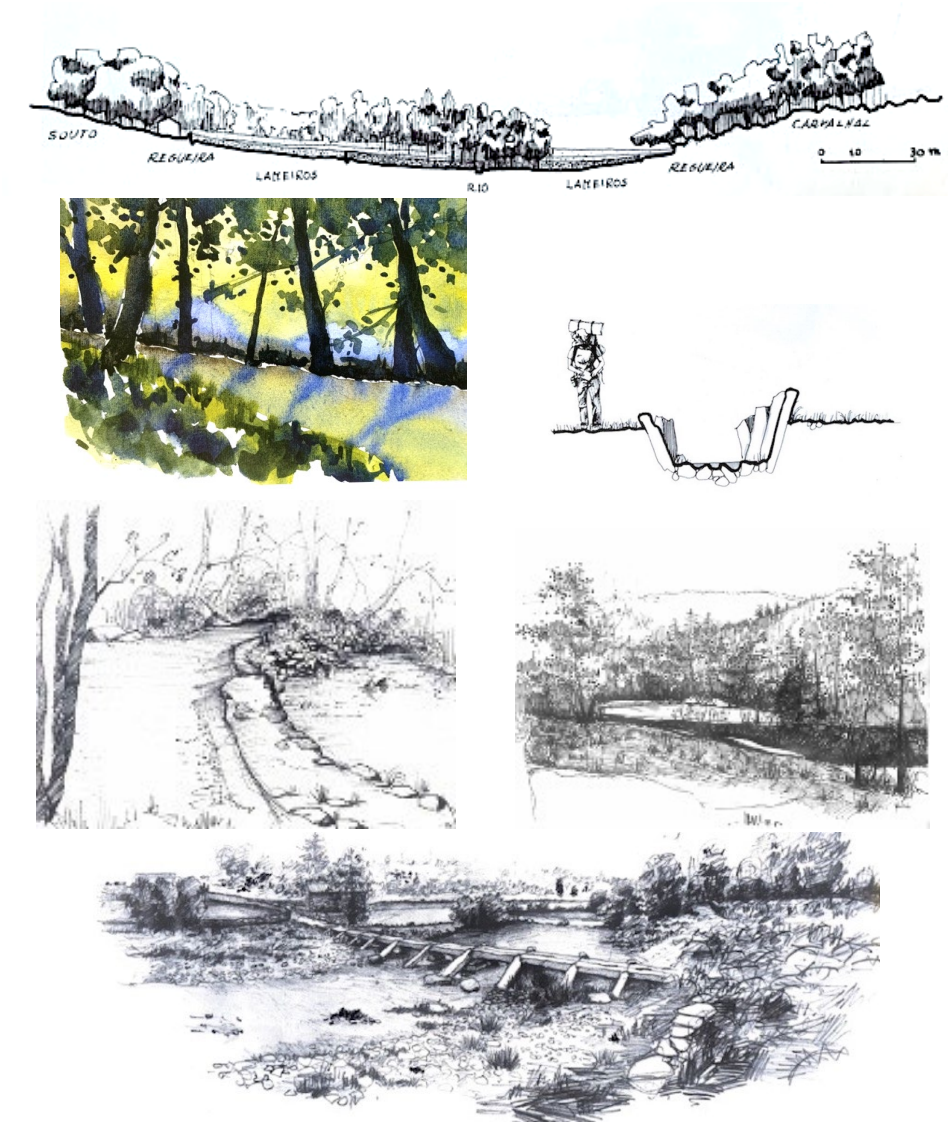

Figure 1. Study trips: student's drawings.[24]

Short Study Trip: Introduction to Landscape Themes

Since the beginning, we have organized various types of study trips, visiting different regions and landscapes. These short trips now involve traveling by bus and often include short walks on foot, by boat, or by train. Professors from different scientific fields, such as landscape architects, botanists, biophysical engineer and geographers, accompany the trips. We establish contact with the local communities, as well as with designers and other technicians who work locally. These experts share and reflect with students and teachers on the values, problems, and challenges associated with each landscape, as illustrated in Figure 2.

For the past decade, we have started the academic year with a study trip like this, involving students from all three levels of landscape architecture education, as well as from other related fields offered by the university of Évora. The aim is to introduce students to the landscape, revealing the multiplicity and complexity of processes and actors, stimulating curiosity, and highlighting different scales and perspectives.

Figure 2. Study trips: examples from diverse contexts and landscapes.

Fieldwork in Landscape Planning or Design

Fieldwork can be linked with planning or design, and it can be an exploratory thematic activity or practical work addressing a given problem, often involving community participation. Students should spend a significant amount of time on-site, experiencing, drawing, and working during the main phases of the process: analysis, strategy discussion, scenario development, proposals, on-site experiments, work model, and community involvement, as illustrated in Figure 3. Being on-site makes it easier to understand scale, temporality, dynamics and atmospheres, combining the emotional dimension (our five senses) with the scientific dimension.

Figure 3. Students participating in fieldwork and students on-site experimenting design solutions using a working model.

CONCLUSION

Among the pedagogical strategies for teaching landscape architecture with and in the *locus,* we can consider study trips, fieldwork, and community involvement as the central tools. This approach has been maintained and refined for almost forty-five years at the University of Évora.

Students are encouraged to see and understand the landscape while learning to represent it. Furthermore, they must remain in the landscape to understand how it works, express the sensations it evokes, and grasp the problems and values present in each landscape. It is important that opportunities occur in meaningful landscapes, prompting students to experience and reflect on them with their teachers, other professionals, stakeholders, and through community engagement.

As we have seen, the evaluation of scale, temporality, and atmosphere results from combining the emotional dimension with the scientific dimension. The sensitive landscape approach is particularly slow and includes exploring different dimensions of a place. In this process, we explore the emotional, ecological, and cultural dimensions.

Living, researching, knowing, working, interacting with communities, leading to critical reflection, is the approach we convey through our methodologies. Any intervention must use the most innovative technology, but it must always integrate human scale and temporality, resonating through the senses and the act of sensory registration and apprehension. This is a very gestural act, where the whole body moves to record, draw, and reflect. The subsequent development of work with technology allows a more realistic and vigorous approach to consolidating the research process, synthesis and construction of sensitive and innovative strategies and proposals, which can then be transmitted in a clear, appealing and creative way.

NOTES

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[5] Maria Freire, "*Towards a Different Approach in Teaching Landscape Design"* (PhD diss., University of Évora, 2011), https://rdpc.uevora.pt/handle/10174/11089
[6] Tim Ingold, *The Perception of the Environment. Essays on Livelihood, Dwelling and Skill* (London: Routledge, 2000), 189-208.
[7] Nuno Mendoça, "*Para uma Poética da Paisagem"* (PhD diss., University of Évora, 1989), https://dspace.uevora.pt/rdpc/handle/10174/11889
[8] Michel Corajourd, "Le paysage c'est l' endroit où le ciel et la terre se touchent," *Mort du Paysage?* in *Philosophie et Esthétique du Paysage*, ed. Françoise Dagognet (Seyssel: Éditions du Cham Vallon, 1982), 36-53; Michel Corajoud, "Les neuf conduites nécessaires d'une propédeutique pour un apprentissage du projet sur le paysage," in *Jardins Insurgés, Architecture du Paysage en Europe* (Barcelone, Espagne: Biennale Européenne du Paysage, 2001), 119-132.
[9] Aurora Carapinha, "Of the *Topus* and the *Locus.*" *Arquitetura Paisagista* 11*,* (October 2015): 15, https://apap.pt/wp-content/uploads/2017/09/AP-11-Out-2015.pdf
[10] Christian Norberg-Schulz, *Genius Loci: Towards a Phenomenology of Architecture* (New York: Rizzoli, 1980).
[11] Anne Spirn, *The Language of Landscape* (New Haven and London: Yale University Press,1998).
[12] David Leatherbarrow, *Architecture Oriented Otherwise* (New York: Princeton Architectural Press, 2004).
[13] The concept of cultural systems corresponds to constructions, so that with the relationships that human societies establish with nature.
[14] The concept of *topus* is the expression of the "inter-relationship of natural systems" and it is also "the very poesis of Landscape". It is "the operating system that leads to construction and transformation of a particular kind and that denies our relationship with the material world and the corporeality of the Landscape". Aurora Carapinha, "Of the *Topus* and the *Locus*" *Making Landscape* 11 (2015):13.
[15] Nuno Mendoça, "*Para uma Poética da Paisagem"* (PhD diss., University of Évora, 1989), 2, https://dspace.uevora.pt/rdpc/handle/10174/11889
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SOCIAL GREEN VS. ORNAMENTAL GREEN. FOR PEDAGO-GICAL SUSTAINABILITY IN OUR CITIES

Author:
AINHOA AKUTAIN, IMANOL ESPERESATE, XABIER LAKA

Affiliation:
UNIVERSITY OF THE BASQUE COUNTRY (UPV/EHU), SPAIN

INTRODUCTION

For centuries, green construction in cities has represented nature. From the Renaissance and, especially during the Baroque, flower beds and *tapis vert* (green carpets) highlight the need to reach infinity and the visual enjoyment of the environment, emphasizing the ornamental qualities over productivity. In an eagerness to imitate virgin and Arcadian nature, its English version will build a natural-looking yet artificial nature with subtle[1] yet determinant interventions.[2] The invention of the lawnmower in 1830 marked a milestone in the development of modern lawns by democratizing its maintenance (mowed almost at ground level), which was previously an indicator of social and economic power due to the peasant manual labor required. In fact, all lawn-related terms,[3] such as field, pasture, or prairie, refer to mown grass cut almost to the ground. This quality brings us to the modern notion of “lawn,” understood as an expanse of manicured grass.[4] In cities, the construction of the first urban parks in the 19th century, inspired by English landscaped gardens (cheaper and easier to maintain than French formal gardens), will replace gardens with green areas, clearly marking the difference between beauty and usefulness. It could be said that "green from fondness" will be replaced by "green with an effect," switching from quality to quantity.[5] As a physical entity, Green will transform into a detachable function, an abstract unit (a surface), quantifiable but undefined.[6] Since then, we have perceived these spaces as "green areas" of contemplation used to zone, "limit and organize spaces".[7] As well as social collectivities, as we will now see.

SOCIAL GREEN AS A SHAPER OF BEHAVIOR

Leisure reform: the social role in question

The Central Park project, a competition won in 1858 by Frederick Law Olmsted and Calvert Vaux under the slogan "Greensward" (grass-covered ground), was one of the main initiatives carried out during the first campaigns to force out from the peri-urban area of Manhattan the community life of the vulnerable groups that had occupied this land for decades.[8] Labeled "outcast" (among various other disqualifications),[9] the inhabitants of these communities, unskilled and informal workers mainly from rural areas, strove to ensure areas of autonomy. They created a network of relationships and multifaceted appropriation of the space that would provide them with opportunities to deploy their survival tactics through reciprocal commitments, friction, and ties with strangers from the most diverse backgrounds. They created an alternative urbanization regime, hybrid and porous (along the lines defended by Richard Sennet[10]), that differed drastically from the bourgeois idea of what an

adequate regime of demarcation, content, and use of public space was. Furthermore, Central Park's construction project brought up two dominant mentalities of the time: a material culture that linked environmental conditions to social behavior and an architectural practice that assigned moral meaning to the shapes built.[11] Until then, while primary relationships and institutions such as schools and churches reinforced segregation, shared spaces, including green areas and vernacular parks (managed by the *slum* inhabitants themselves), were used to foster integration, openness, and even political mobilizations.[12] During this time riots, strikes, demonstrations and other forms of public disorder were frequent, in an attempt to regain control over reproduction and social relations, demanding not only better housing conditions and neighborhood facilities but also the right to leisure.[13] The stalked bourgeois imaginaries saw it necessary to supervise and structure the right to leisure demanded by these communities to avoid endangering their social project.[14] They recognized their demands but used them as an opportunity to disempower, reeducate, and integrate the proletariat, replacing an everyday infrastructure that accommodated rural practices and allowed certain degrees of self-sufficiency with an arrangement that promoted greater segmentation.

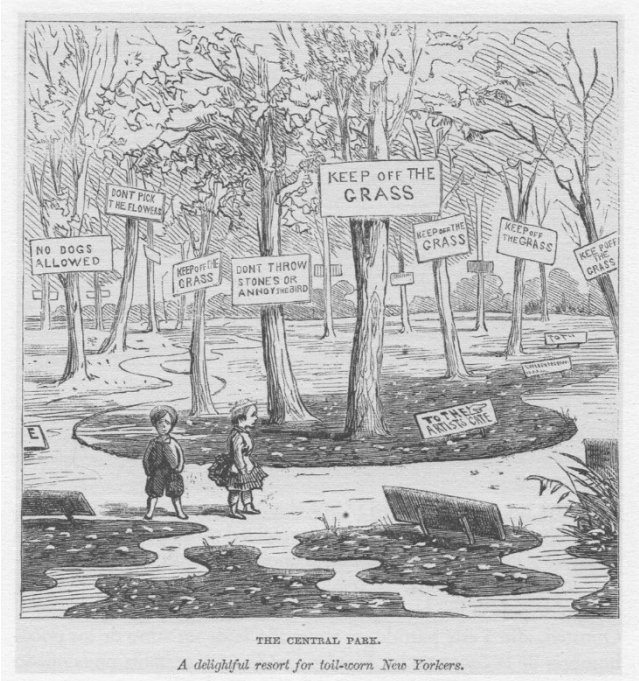

Figure 1. "The Central Park. A delightful resort for toil-worn New Yorkers". Frank Leslie's Illustrated Newspaper, 19th June 1869, 221. Source: Álvaro Sevilla-Buitrago*, Contra lo común. Una historia radical del urbanismo* (Madrid: Alianza, 2023)*,* 144.

Addressing discontent and social unrest by creating a park was the way to create what Joseph Lee, leader of the *playgrounds movement*, called "a new social order from within".[15] Thus, along with the attempt to control neighborhood leisure through the experience of the *playground movement,*[16] the precept of public space as an educator was strengthened. Law Olmsted participated directly in this discourse that would consolidate parks' ability to normalize public behavior by promoting contemplative and passive forms of recreation that would exert "a harmonizing and refining influence on the most unfortunate and ungovernable classes," and their ability to "weaken the dangerous inclinations of the anarchic classes of the city"[17] would be proven. The ornamental character of the green was thus defined, and its main goal was to effectively incite park users to observe, rather than transgress, the "admirable display of order".[18] In 1858, the first park ordinances were added. These

new rules and dynamics regulated the individual and collective use of public space.[19] They served as a model for broader regulation of public space, not only in the immediate vicinity but also in other green space initiatives in cities aimed mainly at deprived children.[20] Since then, contrarily to urban streets, open spaces have been conceived as demarcated spaces where children aimlessly hanging around on the streets[21] would gather, and where playground equipment such as swings and slides served as a "pedagogical device" or a "citizens' school" with the intended to educate children to be "productive" and "useful and loyal," also for war.[22]

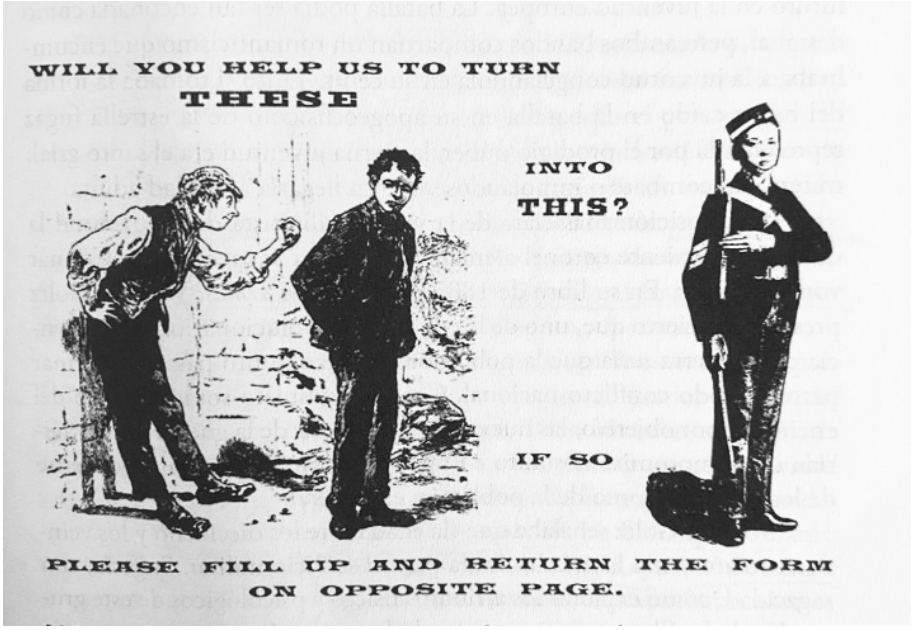

Figure 2. "Will you help us to turn THESE into THIS? If so, please fill up and return the form on opposite page". Church Lads' Bridge Pamphlet, 1890's. Source: Jon Savage*, Teenage. La invención de la juventud 1875-1945* (Madrid: Desperta Ferro, 2018), 19.

GROW YOUR OWN
Same image, different reaction

….....
…….....
….....
……. and
everything else green.
Le Corbusier (n.d.)

Under the title *Can Our Cities Survive?*, José Luis Sert presented in 1942 one of the many manifestos of the 20th century aimed at promoting the cause of "architecture as a social art (...) designed for the well-being of the disadvantaged."[23] A friend and collaborator of Le Corbusier, he exemplified the undesirable result of unplanned and profit-oriented urbanization with photographs of children playing in the streets of marginal neighborhoods. Sert used these images to defend the implementation of the Functional City model promoted by IV CIAM,[24] which aimed to demolish ruined neighborhoods and rebuild them according to rational principles.[25] Children appeared as "victims of urban chaos" and street play as "an aberration" that introduced them to drinking and sexual promiscuity.[26] Sert advocated the Neighborhood Unit as a cornerstone of post-war urban renewal,[27] where the unit, a residential district surrounded by a green belt, was determined by sufficient people to support a

primary school, which became the centerpiece of these residential spaces. CIAM's planning discourse sought to distance children from the streets by defining the playground and the park as their allocated leisure spaces. In fact, this leisure relocation policy follows the tactics aimed at zoning and shaping the daily lives of the working classes used by American reformers of the late 19th century.[28]

In contrast, many of CIAM's postwar sessions, especially those carried out by Team 10 (the group of young architects whose polemical stance against the Functional City led to CIAM's accidental demise[29]), used leisure in marginalized areas to represent the desirable qualities and regenerative potential of the urban space. Aldo van Eyck's work is well known as a precursor of a sensitivity towards a city where children participated in its public spaces. He agreed with his employer, Jacoba Mulder,[30] on the fact that, instead of approaching the reconstruction of the city from a massive and large-scale perspective, typical of functionalist cities, they should move away from the traditional gardens and provide existing smaller, abandoned spaces between buildings with playground equipment and sandboxes. This idea came to Mulder when she saw a girl from her neighborhood playing with the sand that she dug out of the street, an image that, on the other hand, saddened her deeply.[31]

However, in the same city where van Eyck still kept his relevant public playgrounds project alive, children continued to be segregated and dismissed. The fragility of childhood was an obstacle to traffic speed and the broadcast of *Namens de kinderen van de Pijp* (On behalf of the kids from De Pijp) in 1972 on Dutch public television placed their safety at the heart of the debate, drawing on the experience of De Pijp, one of the most marginal neighborhoods in Amsterdam. At the time, De Pijp's population density was five times higher than Amsterdam's average, its narrow streets populated by a lively mix of workers, intellectuals, immigrants, and prostitutes. However, the city council's policy was to demolish the entire neighborhood and build roads so traffic could reach the city center. The general decay was evident, but Ronald Dam, one of the neighborhood children, was affected mainly by the lack of green.[32]

The grandparents of these children had experienced the street as a meeting place where they could learn from others. That social life, due to traffic, was largely lost. The neighborhood's children organized demonstrations proclaiming their desire to play in their streets.[33] The general reaction, however, followed the *Save Traffic Netherlands* movement and its idea of teaching children how to act in front of a car and not vice versa: "Impossible. You'll never close a street. Out of question … It's a street for traffic." It is how movements like *Stop de kindermoord* (Stop Killing Children) emerged. Riots, sometimes even dangerous, occurred, but it remains an example of how to campaign to change the mobility of an entire country: "If people see small victories, then bigger changes can be proposed,"[34] stated a neighborhood resident.

Figure 3. Screenshot of the documentary in: Pau Faus*, "Kinder City. Seven actions towards a better city for kids".* Documentary film. Youtube: 30:00. Published on April 19, 2023.

Figure 4. Screenshot of the documentary in: Pau Faus*, "Kinder City. Seven actions towards a better city for kids".* Documentary film. Youtube: 30:00. Published on April 19, 2023.

THE GROUND AS PLAY MATERIAL

Our children's right to roam

We have discussed how zoning, which is the arrangement of a specific space differentiated (to a greater or lesser extent) from the rest - an urban park, a playground, or green areas between buildings - has been a behavioral device. Zoning goes hand in hand with the materiality of the space and, in the case of play areas, the shaping of leisure and play. If we delve into the realm of leisure, precisely into the dichotomy of Paideia and Ludus, modern artists and architects "coaxed Paideia into prescribed grounds."[35] They wanted to "tame that celebration of chance that is Paideia" through the playgrounds next to parks, squares, schools, and housing complexes. According to Rodrigo Pérez de Arce,[36] in that group, we find Le Corbusier, Lissitsky, Sert, and Van Esteren and, on the opposite side, Jane Jacobs, Rudofsky, Duvignaud, Constant or Jackson, who denounced its institutional coercive nature. In the middle, with ambivalent positions, Rasmussen, Lady Allen, Van Eyck, and The Smithsons (we would also include Isamu Noguchi in this group). They sought more imaginative alternatives than the traditional playground, but they differed radically from the agent - the child - as the promoters of "Adventure Playgrounds" defended.[37]

Regarding the materialization of the play from the ground, Lady Allen of Hurtwood designed the Adventure Playgrounds based on her experience in a park in Wales where children were allowed to "dig and dwell."[38] Furthermore, since these were places where the unpredictability of the construction and destruction processes as triggers of the games was guaranteed, shapes and visual appearance remained undefined in the background. They depended on what was happening then rather than what was projected or pre-established.[39] Overall, the idea of zoning playtime in a safe space where children could play protected from the dangers of the streets was shared, despite the differences amongst "Adventure Playgrounds."[40] Mulder, who, along with van Eyck introduced sandboxes into urban Amsterdam, said that the initiative arose from observing the previously described little girl on the sidewalk playing with the layer of sand dug around a tree.[41] Jaime Álvarez-Santana recovers for his PhD thesis a 1970 news item from a local Amsterdam newspaper: concerned about their kids' safety, mothers from the Burgermeester Hogguertstraat neighborhood remove the pieces of hard pavement from the children's playground designed by van Eyck in 1964 and fill the gaps with sand after several children fell from the structures and got injured.[42]

Figures 4 and 5. Small-scale green areas in Bilbao (Spain)

The green and play areas currently found in the squares and streets of our cities are the result of zoning, outcome superficiality, and the hegemony of the quantitative and the visual: they are designed for admiration, not stepped on.[43] We refer to small-scale green areas, unlike the larger areas of urban

parks that we can find on the perimeter of housing blocks, at intersections, or changes in street levels, around playgrounds, etcetera. Their functions become merely ornamental, with flowers, shrubs, and trees.[44] Lewis Munford recognized the conflict between those who desire a well-kept garden, and the unstructured play children require. In the face of this inevitable conflict, Munford proposed the provision of specific enclosures for these games within larger green areas, emphasizing the importance of children's play in these spaces.[45] However, green areas are conceived as the backdrop of the urban space, where prevail concrete-based hard pavements so, in social terms, their marginal location highlights their residual character, underlined by the location of urban benches that face away from the green, thus neglecting it. This residuality is materialized through curbs of variable height and width, and parapets, even by enclosing them with metal fences. Recent research on lawns in Sweden[46] shows how green areas around residential buildings are not actively used, and they are considered "green carpets" that are pleasant to the eye.[47] However, the children surveyed disagree, arguing that they prefer to walk on the grass and utilize green spaces. They value the proximity and relationship between spaces. In addition, they demand to participate actively in local decision-making and request areas with grass of different heights to run around and, above all, to play.

Figures 6 and 7. Comparison between the concrete-based rainproof ground in Bilbao (Spain) and the sand based permeable ground in Berlin (Germany)

CONCLUSION

Few options exist for managing green areas, regardless of their use and location in the city. These green spaces are often assumed to be relatively uniform and considering them continuous and homogeneous areas does not promote spontaneous activity. However, these are diverse and rich spaces where languages, objects, people, constructions, and shapes can be assembled, disassembled, and reassembled. They intermingle and interrupt each other, as does the research in this proposal, since how we conceive it will affect how we care for it and, thus, how we care for ourselves. Something as naturalized as grass has managed to change the perception and dynamics of urban space use without neglecting the fact that our cities' green and play areas, organized in squares and streets, are the result of zoning and the hegemony of quantitative. We now need this gaze to become more sensitive and humbler towards the actual inhabitants of these areas, especially the most vulnerable groups, including children. Humble practice implies building modestly, starting from the materiality of the ground and assuming that it would be irresponsible and arrogant to despise the already existing resources. Reinventing the city requires actions that respect the existing resources and recognize their potential for transformation. Central to this process is a sincere commitment to education, which plays a pivotal role in expanding the boundaries of experience-based knowledge. This, in turn, encourages us to problematize reality rather than accept imposed knowledge. Landscaper Gilles Clément argues: "I had to unlearn what I have learned because I had been taught to kill instead of to care… If you look closely, gardeners are protected like soldiers, and they kill to beautify spaces. Fields have become dangerous".[48]

Our approach recognizes that beauty can arise from simple constructions, from community life as it is (process), and not as it should be (project). However, we understand that a certain order cannot be renounced. Just like art, it does not seek to reproduce but rather to produce new orders from the already existing. Otherwise, it would be a mere training that does not pursue a process of emancipatory education but of domestication.

NOTES

[1] According to John Dixon Hunt and Peter Willis, the landscape garden's subtle and seemingly natural artificiality took advantage of advances in 18th-century agricultural techniques, such as drainage systems, earthworks, fertilizers, crop rotation, etc. John Dixon Hunt and Peter Willis, eds., *The Genius of the Place. The English Landscape Garden 1620-1820* (New York: Harper & Row, 1975), 18.
[2] Nikolaus Pevsner, “La génesis de lo pintoresco,” in *Estudios sobre arte, arquitectura y diseño. Del manierismo al romanticismo, era victoriana y siglo XX*, Nikolaus Pevsner (Barcelona: Gustavo Gili, 1983), 119.
[3] Ana María Rodríguez-García explains that the original *lawns* were closed enclosures with grass in the settlements of the Early Middle Ages, used for communal livestock grazing. Ana Rodríguez García. “Huellas de lo vernáculo en Team 10. Alison y Peter Smithson, Aldo van Eyck, José Antonio Coderch” (PhD diss., Universidad Politécnica de Madrid, 2016), 121.
[4] Rodríguez-García, 122.
[5] Isabel de Cárdenas-Maestre, “Lo verde como regenerador social en las teorías urbanas de principios del siglo XX,” *AXA. Una revista de Arquitectura*, no. 1 (2009): 24.
[6] Isabel de Cárdenas-Maestre, 23. According to Ávaro Sevilla-Buitrago, Martin Wagner, the architect and modern urban planner, is a clear example of green in urban planning as an abstract and instrumental variable to convert green areas into social reproductive systems to improve the physical and mental health of the population. Wagner relied on the differentiation between “decorative green” and “sanitary green” by Camillo Sitte (1889) to lean towards the latter. Álvaro Sevilla-Buitrago, “Environmental speculations. Landscape suburbanism between housing and planning, 1920s-1940s” In *Landscape of housing. Design and Planning in the History of Environmental Thought*, ed. Jeanne Haffner (Abingdon and New York: Rouledge, 2022), 102.
[7] Santiago Beruete. *Jardinosofía. Una historia filosófica de los jardines* (Madrid: Turner, 2021), 287.
[8] At that time, around 1,600 people lived on the land selected for the park, not counting those who had previously been displaced from the area called Nigger Village, which was utterly swept away in the previous decade. Its inhabitants complained that "the authorities' only objective in building the park was to expel them permanently." “The Present Look of Our Great Central Park”, New-York Daily Times, July 9 1856.
[9] Other derogatory definitions they received were such as: "city barbarians without a fixed occupation," "dwelling in rude huts built by themselves and living off the refuse of the city," "wild," "primitives," "ignorants of civic duties," "street Arabs," "lazy and vicious" that it was "humiliating... to recognize them as part... of the human family." In Frederick B. Perkins, The Central Park (New York; Carleton, 1864), 13; Peters, Annal of St. Michael´s, 446; Egbert Viele, “Topography of New-York and Its Park System”; James Grant Wilson, ed. The Memorial History of the City of New York (New York: New York Historical Society, 1893); Jane Addams, “The Subtle Problems of Charity”, Atlantic Monthly 83 (1899): 163-178; “The Children´s Aid Society”, New York Times, 1860 April 7.
[10] In this sense, Sennett starts from the cell membrane, which must allow matter to flow in and out of the cell simultaneously. However, it needs to do it selectively to retain what it needs to feed itself: “This resists indiscriminate mixing; it contains the difference, but it is porous.” Porosity exists in dialogue with resistance, so sometimes the cell opens to be flooded, and other times it is retentive: “This dialogue is what the urban planner should tend to initiate, instead of imagining that porosity consists of a completely open space, in a pure void.” Moreover, a relevant aspect of his theory for this research is when he points out how a solid mass of material can become socially porous. Richard Sennett, *Construir y habitar. Ética para la ciudad* (Barcelona: Anagrama, 2019), 282-284.
[11] Álvaro Sevilla-Buitrago, *Contra lo común. Una historia radical del urbanismo* (Madrid: Alianza, 2023), 141.
[12] Many of these vernacular parks were maintained by working-class organizations that incorporated radical and explicit political content in their agendas. In Chicago, for example, unions and socialist, communist, and anarchist groups used these parks to attract new members with programs that could include everything from commemorations of the Paris Commune to experiments with dynamite. Colin Fisher, *Urban Green: Nature, Recreation and the Working Class in Industrial Chicago* (Chapel Hill, NC: University of North Carolina Press, 2015), 119-122.
[13] "Appropriate everything that makes life magnificent," commemorative note of the Haymarket riot, 1907.
[14] Neil Smith and Don Mitchell, eds., *Revolting New York: How 400 Years of Riot, Rebellion, Uprising and Revolution Have Shaped a City* (Athens, GA: University of Georgia Press, 2018), 71-121.
[15] Joseph Lee, *Play in Education* (New York: Macmillan, 1915), 331.
[16] They contended that the state's management of working-class recreational activities was a strategy to make “social control attractive,” particularly when “men and women (when they were) more easily influenced.” Howard

Braucher, secretary of the Playground Association of America, 1911, quoted in: Cary Goodman, *Choosing Sides: Playground and Street Life on the Lower East Side* (New York: Schoken, 1979), 25.
[17] Sevilla-Buitrago, *Contra lo común. Una historia radical del urbanismo*, 140 and 145.
[18] The park's control of public behavior was designed from the beginning. Visitors were segregated by class through a hierarchical system of tracks, walks, and paths throughout the site. Visitors were gathered in the central places to produce an impression of harmonious coexistence.
[19] Street vending, spontaneous music and dancing, begging, drunkenness, the use of indecent language, flags and banners, processions and demonstrations, intense sports, games of chance and fortune telling, fireworks and balloons, having a dirty appearance, and any activity "that could cause a disturbance of public order."
[20] Jon Savage, *Teenage. La invención de la juventud 1875-1945* (Madrid: Desperta Ferro, 2018).
[21] Carole A. O'Reilly, *The Greening of the City. Urban Parks and Public Leisure, 1840-1939* (New York and London: Routledge, 2019), 38.
[22] Savage, 91-106.
[23] María del Mar Arnús, *Ser(t) arquitecto* (Barcelona: Anagrama, 2019), 3.
[24] Acronyms for International Congress of Modern Architecture. The four functions (housing, work, recreation, and transportation) of the Functional City were developed to subordinate land use to the "human needs" of the "great masses of its populations" rather than to the "merciless violence of private interests," as stated in the Athens Charter of 1933, which summed up the deliberations of CIAM 4 (1933). The Charter defined town planning as the science of coordinating the four functions by providing each with its autonomous space.
[25] Let us remember in this regard Le Corbusier's words: "The street exhausts us; we must admit that it disgusts us.", "The suburbs are the degenerate descendants of the suburbs (…) The suburb is a kind of foam that beats the city's walls. Over the 19th and 20th centuries, the foam became first a tide and then a flood." quoted in Richard Sennett, *Construir y habitar. Ética para la ciudad* (Barcelona: Anagrama, 2019), as well as in Ulrich Conrads, *Programs and Manifestoes on 20th Century Architecture* (Cambridge, MA and London: MIT Press, 1997).
[26] José Luis Sert, *Can Our Cities Survive? An ABC of Urban Problems, their Analysis, their Solutions* (Cambridge, MA: Harvard University Press, 1942), 31.
[27] The Athens Charter was first published by Le Corbusier in 1941. Its English version appeared one year later as an appendix to *Can Our Cities Survive?*. Conrads, *Programs and Manifestoes on 20th Century Architecture*, 138.
[28] Like Octavia Hill's housing plans for the "deserving" poor of Victorian London. Hill argued that "you can't deal with people and their houses separately … All work is based on the principle that inhabitants and their environment must be improved together." Hill set a precedent for the 20th-century practice of constituting the playground as an indispensable social housing component. She persuaded (and even forced) parents to send their children to school instead of working. She opened playgrounds in the yards of her housing estates to separate the child from what she and other reformers considered the demoralizing influence of the street.
[29] By the young generation of architects (also called the third generation of the modern movement) that working with artists, wanted to adapt the modern language to the present requirements. The partnership (and friendship) between Alison and Peter Smithson and Niggel Henderson is a good example of this.
[30] She was the coordinator of the Urban Development Division of the Public Works Department of the Amsterdam City Council.
[31] In the interview that Francis Strauven did with Jacoba Mulder. *Francis Strauven, Aldo van Eyck. The shape of relativity* (Amsterdam: Architectura & Natura, 1998), 101.
[32] "On Sunday mornings, I always wake up my dad, and we drive to small towns to see beautiful grasses and trees. We don't have any of these here." In: Pau Faus, "Kinder City. Seven actions towards a better city for kids". Documentary film. Youtube: 30:00. Published on April 9, 2023. 1:47.
https://www.youtube.com/watch?v=8YpPonRiRhs&t=1747s
[33] "Get these cars off the road! We want to play!", as well as, "If after asking so much the city does nothing, you have to do it". In: Pau Faus, "Kinder City…", 3:56.
[34] Pau Faus, "Kinder City…", 26.33.
[35] Rodrigo Pérez de Arce, *City of play. An Architectural and Urban History of Recreation and Leisure* (London: Bloomsbury, 2018), 26.
[36] Rodrigo Pérez de Arce, *City of play. An Architectural and Urban History of Recreation and Leisure* (London: Bloomsbury, 2018), 26.
[37] Roy Kozlovsky, *The Architectures of Childhood. Children, Modern Architecture and Reconstruction in Postwar England* (Abingdon eta New York: Routledge, 2013), 49.
[38] In a 1938 article titled "The Future of Landscape Architecture". (Kozlovsky, 66)

[39] Kozlovsky, 49.
[40] For example, the informal character of Clydesdale Road Playground (1952-1955) was formalized and planned with a dirt floor and remains of cobblestones, bricks, and wooden boards. Lollard Adventure Playground (1955-1960) organizes three areas of different materiality: a steep/rough terrain for construction, a hard surface for ball games, and a lawn surrounded by vegetables and flowers for camping and sunbathing.
[41] Francis Strauven, Aldo van Eyck, 101.
[42] Jaime Álvarez Santana, "Aldo van Eyck. Parques de juego en Amsterdam 1947-78" (PhD diss., Universidad Politécnica de Madrid, 2017), 164.
[43] For example, the Bilbao Green Zones Ordinance (where we live) prohibits "stepping on ornamental grass, entering it and using it to play, rest or park on it. Ornamental grass is understood to be that which serves as a background for ornamental gardens and in which the flower, the trimmed hedge or any other type of gardening work is involved" (Bilbao City Council).
[44] Another significant regulation is the General Urban Planning Plan/PGOU of Bilbao. In its article 55, it specifically addresses the uses of "leisure and recreation" in free spaces like paved and landscaped squares, walks, gardens, etc. It emphasizes the importance of maintaining the "visual and ornamental enjoyment of the trees and vegetation" in these areas (Bilbao City Council, 2022).
[45] Ainara Aranburu, *Del hogar a la ciudad. Transiciones adaptadas a la infancia* (Buenos Aires: Diseño, 2020), 252-253.
[46] Maria Ignatieva et al. "The lawn as a social and cultural phenomenon in Sweden". Urban Forestry & Urban Greening 21 (2017): 213 Märit Jansson. "The role of green spaces and their management in a child-friendly urban village". Urban Forestry & Urban Greening 18 (2016): 228.
[47] Maria Ignatieva et al. "The lawn as a social and cultural phenomenon in Sweden". Urban Forestry & Urban Greening 21 (2017): 213.
[48] Guilles Clément, "El campo se ha vuelto peligroso, lo que plantamos está lleno de venenos". EL PAÍS, November 25, 2020, https://elpais.com/elpais/2020/11/19/eps/1605786292_072842.html

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BRIDGING THE GAP AND INTEGRATING THE SPACE: WHEN INSTITUTIONS AND STUDENTS WORK TOGETHER

Author:
SUMEI KAREN TAN

Affiliation:
WINCHESTER SCHOOL OF ART, UNIVERSITY OF SOUTHAMPTON, UK

INTRODUCTION

Challenges exist in various forms of learning with attendant difficulties and barriers that need to be overcome. If individuals can successfully navigate their learning process(es) either early on or midway, the rest of their academic journey need not be fraught with anxiety, stress or worry.[1] Accordingly, the task of facilitating learning can take on a slightly different direction than just the role of imparting knowledge or core information. What steps then can institutions adopt in order to encourage a smoother if not an uplifting learning process for all concerned? What would elicit the greatest number of positive responses towards learner commitment that includes enjoyment, such as experiencing 'a-Ha' moments or mini epiphanies in the process of acquiring knowledge and skills? What can be done to encourage enjoyment and an embrace of new challenges in learning? This paper focuses on the mediating role of educators, arguing that by working collaboratively with students it is possible to make learning more accessible and enjoyable and offers three recommendations how learners can be encouraged and supported without eliminating their agency for decision-making. Only then can learning become more equitable and collaborative in any educational institution.

Learning Context and Space

It goes without saying that educators and institutions want to enable or encourage a more conducive and inclusive learning environment that welcomes a variety of learners. In order to make this possible, the focus ideally should not just be on learners but also on educators or facilitators who both constitute the educational environment and contribute to the learning context. Without delving too much on action research, it must be mentioned here that this learning context and space is only possible when educators continually reflect and review the learning and teaching in key stages, and then adopt and implement changes in a never-ending circle of helping learners become better whether acquiring knowledge and/or gaining relevant desirable skills.[2]

One good starting point is interrogating expectations – both implicit and explicit - held about the learning environment particularly those held by students. Such expectations can influence behaviour and beliefs, including attention in general and motivation in particular.[3] What do students expect or come to expect in learning? A failure to address and meet these expectations or overturn certain assumptions that make up expectations can unfortunately perpetuate a vicious circle wherein negative expectations take root and sometimes become fact.[4] Such unmet or unrealistic expectations will have an adverse impact on the learning environment.[5] These considerations are highly relevant here

because not only are expectations closely linked to student motivation, they will also affect the implied (additional) effort and time allocated or devoted to mastering the learning point or skill in discussion. Admittedly, expectations held by educators or facilitators themselves are equally important and can similarly affect motivation and effort in helping students cross any threshold in key concepts.[6]

One possible solution is the return to enjoyment in learning, and for the educator, the processes involved in making this possible; though the focus here is on the learner. Enjoyment in learning is crucial given that studies after studies reveal emotions particularly enjoyment having disproportionately huge effects in learning and motivation; and by default encouraging behaviour and actions that can lengthen or continue this highly positive emotion. In other words, instead of a vicious circle, a virtuous circle of learning takes its place.

Learning from Online Games

To paraphrase one Japanese celebrity: what sparks joy in learning?[7] And, after that, how can enjoyment be sustained in learning? This is where theories and concepts from different domains and fields come in particularly when viewed from the lens of enjoyment vis-à-vis online games. Successful online games, especially wildly successful ones, remind us that individuals can become passionate and enthusiastic fans or learners.[8] This is where the concept of 'flow experience' offers a clear explanation for their effectiveness: when "goals are clear, when above-average challenges are matched to skills, and when accurate feedback is forthcoming, a person becomes involved in the activity".[9] Add in another step - scaffolding key information or threshold concepts - and then combine them with adjustments or modifications known to be effective courtesy of the field of psychology. Used judiciously, this combination provides compelling reasons for changes and tweaks that educators or facilitators can feasibly adopt to encourage learners, and thereby make learning more accessible, if not an enjoyable experience.

Briefly, the concept of 'flow' is based on research developed made popular by Csikszentmihalyi which has been shown to be embedded in successful (addictive) games.[10] Playing games is an enjoyable activity, but more importantly, an activity which is sustained because at discrete moments, players are offered incentives or positive feedback that motivates a continuation or repeat of the action, and implied continuation of enjoyment.[11] I refer of course to the nine conditions for this experience of 'flow' to occur and the desired-for experience. They are reproduced below in Figure 1 based on research by Quinn who focused on the flow state in complex activities.[12]

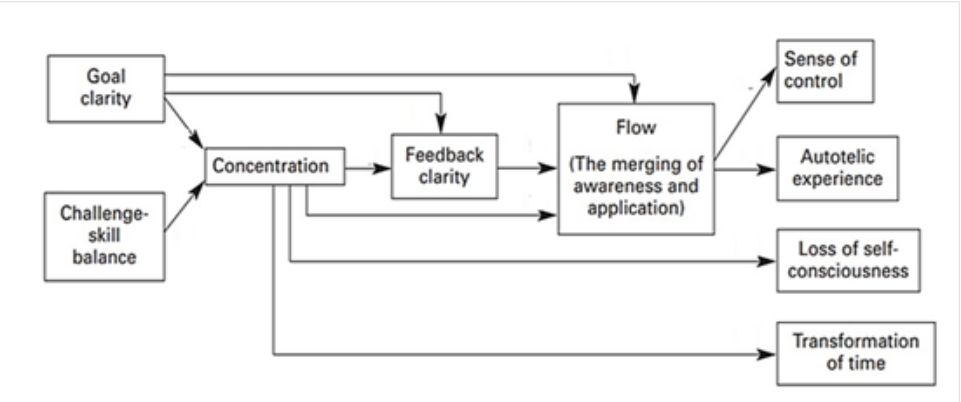

Figure 1. Flow in Knowledge Work

Comparing lessons to games and gaming might, on the surface seem trivial; what more designing them into a game which might seem a monumental task for educators or facilitators. But what if some key learning points or information can be made simpler without being reductive? And these then are tweaked or modified into activities that are like games along with rewards (e.g. obtaining answers or solutions) at different stages, and receiving immediate feedback, preferably from both facilitators and other learners, that indicate some milestone or targets achieved? These need not be overly complicated or complex tasks; though there are three stages which are mentioned more below. To reiterate, these key learning points, once identified, only need to be made accessible and more easily digestible by learners.

Identifying Key Learning Points or Threshold Concepts

The principles behind the action of turning important concepts and points into digestible portions that can be more easily understood (and hopefully) absorbed by learners is not new; and has appeared in many forms and various guises as threshold concepts or threshold learning.[13] It is a helpful reminder to educators and facilitators to first decide the key concepts and points that must be learnt in order for students to successfully progress to the next stage. Simply put, this process differentiates the core or fundamental points from the details. In short, the difference between what is important and crucial from what is 'nice to know but not essential'. It is only through understanding these key points can learners move away from a superficial idea to deeper and better understanding of requisite information and knowledge.[14]

Only from this identification of what constitutes 'threshold concepts' in any key learning can effective scaffolding be done so as to help learners gain crucial information and knowledge. As implied, for effective scaffolding of concepts and ideas, there needs to be an interrogation of assumptions, ideas and beliefs: (i) what is considered crucial and must be learnt (in this particular activity), (ii) what are the underlying assumptions about this (whether commonly held by students and/or facilitators) and their possible impact on learning, and finally (iii) what is actually conveyed or imparted to students.

It is useful here to mention the importance of feedback from learners in this process. It must be acknowledged here that such 'feedback' need not be explicit but can be observed or noted by the facilitator. This can take a variety of forms during the activities: informal types from observations on learner interest shown; note-taking or other actions that denote interest or lack of; types of questions posed by students or their absence; anonymous feedback whether online or through slips of paper; and more formalised types such as student surveys by institutions. Having this feedback or continuous dialogue with students is a step in the right direction and answers the third question mentioned above: what is being conveyed or imparted to students and by implication, if that has been effective.

Nudging Towards the Desired Action

It would be useful to borrow from the field of psychology some useful pointers: first popularised as tipping point(s) but now more frequently or commonly referred to as 'nudge theory'. No matter the term used, the concept indicates that certain factors can make compliance higher for any desired action. Essentially, these factors include making the desired action more convenient, more accessible and easier to follow, hence the higher compliance. There are many documented examples and range from encouraging people to exercise more, to following certain rules of behaviour.[15] One obvious example is the use of the QR code on posters that are pasted prominently in places of high footfall. These make accessing the desired information or taking any action via the website more convenient and easier as opposed to giving people the URL of the website. Similarly, the convenience and ease of tapping bank cards to pay for items have outnumbered cash transactions. [16]

The more pertinent question here is what can facilitators or educators do in order to tip students towards a certain learning point, or make learning even more accessible? Some examples are offered below in Table 1 though these pertain only to materials.

Clear Signposting • Brief instructions – avoiding adverbs and extraneous information • Use of QR codes • Hyperlink websites
Brevity • Adopt principles from Universal Design in Learning (UDL) • Restrict to a two-page single sheet for content • Repetition of key ideas at different stages and intervals
Supplementary • Set reminders for multi-stage complex assignments • No more than 5 additional references, hyperlinked for accessibility • Consider various networks as points of contact for materials/sources

Table 1. Nudges within Learning Environments

It must be noted that sometimes by making something too convenient for students, the outcome might not be desirable especially if this ease and convenience negates or bypasses the necessary effort that allows for the invaluable process of discovery for learners. In other words, to consider if that type of convenience will negate the 'a-Ha' moment that usually takes place only after some sustained thought or action has occurred beforehand. As with any carefully designed lesson, care and consideration should be taken especially if materials used are to be repeated for different groups of learners.

Habituating and Inculcating Positive Action

It is undeniable that the educator or facilitator has the biggest impact in the learning space for students and the implication that a reflective educator or facilitator has a huge role to play in designing and creating an inclusive learning space. This is not to overburden them but rather an acknowledgment that the tasks identified above with regards to teaching and material design can seem overwhelming or daunting. Below are two simple scenarios shared by colleagues that illustrate possible strategies for these types of learning environments.

Scenario 1

One colleague who is rather more technologically-inclined chose to set a simple online quiz with pre-set answers using multiple-choice questions for a research module in a large postgraduate programme. This colleague also chose to design the quiz to offer immediate answers and results upon completion. To make learning more accessible, all answers chosen had a short explanation why they were or were not the best or correct choice. The quiz ran for several days for all five seminar groups within a week. The first two groups did badly in the quiz on the first day, but the next three groups on other days did extremely well. There was a very strong suggestion, as the frustrated and irate colleague discovered, that earlier groups had shared answers despite being asked not to.

Scenario 2

Another colleague in one seminar for the same cohort of students, upon observing the consistent lack of progress in research, issued a challenge to them: if they failed to meet their targets, they must buy a round of drinks for their classmates. The students – to no one's surprise - all met their targets a week later and completed their required research to that colleague's satisfaction.

On the surface, the above two scenarios illustrate different outcomes with two different reactions from educators. However, both offer useful if not drastic 'feedback' for the learning context in terms of design, encouragement (verbal), and instruction (written), and what possible changes and modifications that could be done to encourage effort, enjoyment and learning. In the first scenario, the modification was solely technological: delayed results and answers sent to students via the online settings - while the second was in the instructions both written and verbal, which included the addition of a series of challenges and playful albeit quirky 'penalties' that students seemed to relish.

For educators and facilitators there are many opportunities to make changes, to modify learning points and goals, and to include different styles and elements in teaching and facilitating learning. The inclusion of the above two scenarios – it is hoped - can serve to illustrate the many possibilities open to any reflective educator or facilitator intent on a more conducive learning context.

Looping the Process of Learning

Given all the myriad possibilities, the figure below shows three suggested activities that an educator or facilitator might choose or at least consider. To start, threshold concepts must be identified and made explicit. It must be clear to all what is considered the learning outcomes of key information or key knowledge to be gained or crucial skills to be gleaned. From there, three recommendations are proposed. The first, and arguably the easiest is a simple game or a challenge posed (which can simulate a game). This, it must be noted, is a means to the end of gaining some of the identified threshold concepts.

The second can be loosely termed a partial jigsaw in which learners have to do more analysis, more evaluation or further processing of information. As the term suggests, learners need to put the pieces of information together: this can be to categorise or organise partial information into more discernible and systematic order or forms. The level of difficulty for this second activity will depend on how much information is provided. Is it done to help students to use it as a reference point or as an aid to process or digest more complex information that is part of a threshold concept? At its simplest form, this activity can be a summary of different information or salient facts which learners can identify or label within any particular topic or theme.

The third activity is akin to a thought experiment loosely based on writing by de Bono and since expanded and refined as 'assumption reversal'.[17] For this third activity, educators and facilitators select the final outcome from one identified threshold concept and get learners to upend assumptions by changing set criteria or factors. More complicated and complex that the first two activities, this third one is geared towards advanced learners especially if time is limited. In addition, with some tweaks, this activity can easily be an opportunity to inspire creativity in learners as they begin to debunk, question or overturn 'established' ideas or interrogate preconceived ideas. All three activities are shown in the figure below.

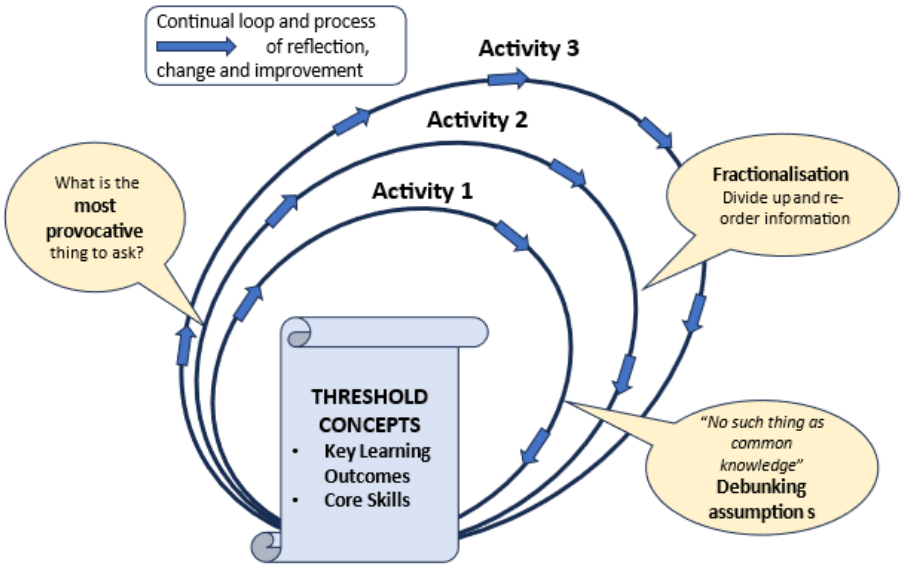

Figure 2. Cyclical Process in the Learning Context

As discussed earlier about 'flow' there must be clear feedback at different stages in each activity for learners to avoid (too much) dissonance which can impede progress in learning, and indirectly reduce effort and motivation. Any element which can help 'nudge' or make learning more accessible for learners would be good though as the slightly cautionary Scenario 1 showed, sometimes too much convenience might be detrimental when more factors are taken into consideration. Finally, as more sharp-eyed readers would note, the use of the term 'Activity' in the diagram is used very loosely as any educator or facilitator can immediately postulate that each has a series of steps or activities for learners if any learning outcome is to be achieved. There is also no limit to how many activities can be devised to increase the number of loops in the cyclical process of learning.

CREATING AND SUSTAINING LEARNING

Making learning more accessible, harnessing emotions and having a positive spillover effect can transform the whole learning process. This is also an opportune time to return to the concept of the reflective educator and facilitator which underpins action research. Here, it would be useful to ask the following three questions in terms of the activity planned: how effective is the activity or learning? What information or point(s) have been absorbed? Does the process require additional or supplementary material or input?

It should be noted that these three questions are non-exhaustive. More questions can be asked pertaining to the design, material or activity itself. For educators intent on generating ideas among students either as the precursor to activities or in the midst of doing these activities, questions such as 'What is the most provocative thing to mention now?' might stimulate further discussion or deeper analysis in thinking.[18]

It might not be obvious but the whole endeavor can be enjoyable for the educator: in designing, devising and creating lessons that offer enjoyment while sustaining a learning environment. Besides, when the ultimate aim is creating and sustaining a learning and conducive environment, there is a re-framing of the effort and time devoted to the entire endeavour. No longer arduous or time-consuming it can become a virtuous circle on its own, elevating the teaching process from the routine to

something more fulfilling if not satisfying. In fact, any form of feedback – especially negative ones - become a useful loop that can generate refinement and improvement for future lessons and teaching. [19]

CONCLUSION

Change is not particularly easy for all and learning can be hard for some. In particular, mastering key concepts and thus progress in learning need not be fraught with problems. Educators can and often wield enormous influence within the learning environment and by making changes and continually improving their teaching environment, they help learners more easily gain crucial knowledge or core skills. Certainly, there are many challenges for the educator and facilitator with pressing demands for time from never-ending institutional commitments. If the opportunity arises, the above recommendations might hopefully trigger some tangible ideas to making changes more feasible and enjoyable for learners. This is important given the changing landscape for institutions with falling and sporadic student attendance, shifting student attention and even higher competition just to attract inquiring minds and attention. This situation is not new and in fact becomes even more problematic when costs are factored in. Although this should not be the primary concern, inevitably it can become one when scarcer resources are diverted. For facilitators or educators tasked with the responsibility to impart or convey key learning points in any module, this is an opportunity to bring creativity and enjoyment back into learning thereby making learning more accessible.

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EMPIRICAL OBSERVATIONS STUDY OF TEACHING TEXTILES DESIGN (UNIVERSITY OF LEEDS): VIRTUAL REALITY (VR) COLLABORATION MODELS IN CREATIVE THINKING PROCESS

Author:
XIMING WANG, PHILIP HENRY

Affiliation:
UNIVERSITY OF LEEDS, SCHOOL OF DESIGN, UK

INTRODUCTION

The case for VR use in fashion textiles

Current VR-based research in fashion explores the potential of the immersive environment to support novice design students throughout their design process. Traditional methods for textile design for fashion fabrics have a potential limited ability to translate between the design repeat pattern and the finished clothing products. Using VR with interactive figure models can strengthen fashion designers' ability to specifically scale and fit garments, by regulating panoramic visualization. The 3D application of VR also allows the designer to shift focus to envisioning the appearance of garments much more effectively than with standard mannequin, better supporting students' design decision-making.[1] Research in the design work also identifies current limitations in VR and the need to better understand the design process and opportunities to develop more effective design tools. VR visual presentation is shown to help fashion designers accurately perceive fabric texture and colour differences and to promote their ability to comprehend texturing layout by high-fidelity models,[2] this work is inspired by virtual access to traditional Chinese and Tibetan costumes, but uses a complex three-stage process: constructing a garment in CAD, then rendering the fabric detail in 3D software, before finally evaluating the design via the user interaction functions possible in VR. Further research supports that VR in fashion design education demonstrates that benefits have been identified in design decision-making and creative collaborations. Firstly, during the design process, VR is beneficial to fashion students' collaboration to communication in exploring production suitability, design creativity and design originality of garment prototypes.[3] Student participants reported that the immersive VR environment expanded their thinking beyond the initial creative scope and supported a greater level of confidence in the refinement of their process. Students also noted that the tools for fashion design need further development to better support the creative process. The VR immersion experience helps fashion students to stimulate their imagination on design coherence themes through immersive research opportunities as well as supporting their design development process with 3D evaluation tools to enhance their inspiration before actual pattern cutting.[4] Interestingly, the design students participating in this study independently suggested that the opportunities to draft patterns and actively design in VR would help support design innovation. Furthermore, compared with a 2D design

environment, garment cuts and 3D fittings on VR 3D models can potentially accelerate design communication and enhance physical spatial awareness.[5] However, expert observers evaluating the project suggested a set of more precise guides to steer the collaboration and technical design understanding to support confident design-making. More generally, using VR technology in education settings has been identified as an effective cost-control and learning acceleration approach.[6] The virtual environment is recognized as offering students the opportunity for greater risk-taking and ambition in their creative work as there are fewer costs and time constraints compared to physical design development. VR technology applications in the fashion industry provide illuminating considerations of the benefit of expanding and collaborating on the creative potential of digital textile design.

Textile Design Decision Making

Decision-making in the textile design process refers to the product formation process according to the designer's expertise and ability of cognizance to ensure that final textile collections are produced consistently as in repeatable.[7] Rational decisions throughout the iterative design process can yield comprehensive benefits. Complementary digital tools in the textile design process support designers in understanding the complex manufacturing processes involved in the design process. This means that with digital assistance, design decisions can be made more accurately, and the end product can easily be modelled to understand repeat pattern layout and manufacturing characteristics to make design decisions. Digital technology is already incredibly well established in printed textile design but is seen as unfamiliar territory by textile designer.[8] Designers require time to learn additional digital skills to support the generation of design decisions. Moltchanova pointed out that part of the design decision depends on the design needs of the customers, as the customer needs to pay for the product, but the final price of the textile design is determined by the customer's desire to buy.[9] Therefore, the factors that influence the textile designer's decision need to take into consideration the suitability of the pattern, the quality of the colour, the quality of the product, and the low price, which are interdependent and affect the designer's decision in terms of the product output.

Aesthetical Value Measurement

Textile design is a process of creating new textile products, this requires considering the value of aesthetics at some stage of the design or throughout the design process. Typically, the textile designer will consider fibre type, material, colour, quality, design form, and aesthetics and needs to fully satisfy the market.[10] The textile designer needs to have a wealth of experience to draw on in the design process and to be able to innovate and translate ideas in a continuous process of reflection, using technology to combine fabrics, patterns and design ideas to ensure that the final design of the textile product is more visual.[11]

Measuring the visual effect of the textile product, the colouring of the fibres on the pattern can be used to identify whether the colour is appropriate for production purposes.[12] By referring to additional production samples, which use the comparison of visual and colouring information, the original textile prototype can be fully identified after printing, informing design decisions to change or adjust the colour parameters if there are differences or issues with the colouring. Using the fabric helps textile designer to see how it applies to the real life product, to learn about the colouring conditions of the pattern and the size of the exterior shape of the product helps the designer to decide on the appropriate pattern and colour features;[13] the designer can determine the style of the design by using the pattern, size and style of the pattern to build a suitable design approach and by using the first prototype draft of the design. In assessing the overall textile structure, the designer gradually decides on the surface pattern design with different fibres, which changes the interaction of fabric and pattern. The designer

will see the textile product, bringing the design concept and materials together. Textile designers are trained in specialist textile production techniques to avoid functional failure of the final textile product.[14] This is an effective means of learning from textile production experience to anticipate and make judgements in the design process, with designers making decisions by measuring design concepts through structured textile manufacturing theory. The research of modular criteria for design solutions-built on equipment information and manufacturing data as reference values for textile design-can assist designers in fully maintaining the viability of their design strategies and can facilitate sound design decisions and decision-making.[15] In printing textiles, the ink printing parameters can support the performance of the textile after printing output. If the designer has sufficient awareness of certain printing parameters, it can assist the designer in predicting and controlling the textile product's appearance.[16]

Furthermore, textile designers' decisions usually are measured by a potential design stipulation, design context, support device, or editing technology to measure objective criteria. An objective and accurate measurement can provide potential applicability and proper usability for the design decision. Virtual reality (VR) technology has promise as a measurable tool for textile design communication. fashion/textile industry is increasingly investing in VR as a tool for visualisation and referencing. Similarly, strong evidence for the successful use of VR technology in the field of textile design education has been demonstrated. The trends of technological innovation usage in the design and textile design industry are inevitably linked to textile higher education, therefore exploring the possibilities of more advanced virtual reality technology to collaborate in higher textile creative design is necessary. While a well-designed textile is usually based on a repeat pattern design layout, the designer is more concerned with the aesthetic audience, the potential market impact, the artistic expression and the care for the design details, which VR can help to visualize during design development. Technology has already supplied advantages and gained strong support in the fashion industry, and therefore VR technology can also be used to potentially support textile designers in establishing a well-collaborated mechanism.

Research questions:

Q1: How do VR immersive experiences assist design thinking and communication in the textile student digital design process?

Q2: How should VR immersive experiences meet the needs and expectations of textile design education pedagogics?

Q3: How do textile students and educators view VR immersive technology as a tool for collaboration?

Methodology

This study is based on Year 3 Textile Design students at the University of Leeds as a case study (Ethics approval reference LTDESN-121). The researcher is part of the Textile Design students and participates in the interaction between the educator and the textile students. Eight textile students (marked as P1-P8) and one educator were included as participants. The study was conducted over one semester (12 weeks in total) and a prototype of virtual reality (VR) was incubated to capture information on key design decisions by tracking students in class as they collaborated and communicated with VR technology, as well as recording information on key design decisions. The VR prototype was a layout of an interior space, and students were enabled to wear headset glasses and a joystick for immersive manipulation. Students were able to edit textile repeat patterns onto the visualised textile product by using the interactive features (e.g. Fig. 1).

Figure 1. Textile student VR in use and VR prototype presentation.

To facilitate the students' engagement with the VR, the researcher provided as much design assistance as possible, as well as virtual reality technology support. Empirical observations were undertaken in this study, and the method is well suited to explaining the potential issues in collective phenomena, and to observing the details at the centre of the situation. Being able to combine multiple sources of practical information in a relatively unencumbered manner provides first-hand knowledge. The method is highly conducive to a more extensive observational assessment of empirical subjects to explain collective phenomena.[17]

Higher Pedagogy of Textile Design

In textile higher education at the University of Leeds, educators require textile designers to have a wealth of experience to draw on in the design process and to innovate and translate ideas in a process of constant reflection, using technology to combine fabrics, patterns and design ideas to ensure that the final design of the textile product is intuitive. This means that tight production deadlines and production costs during the design process can force students (designers) to adopt well thought out ideas to meet the performance requirements of textiles from market research. The textile design process is relatively wide-ranging, and, like many design-led processes, there is no specific format or standard method. There are generic stages that can be repeated in nature or returned to when unique challenges are addressed, or reassessed when new information is required. However, in this textile pedagogy, although the focus is on basic printed textile visual design and pattern design, students are still required to have sufficient independent judgement and insight into the textile market, materials, and aesthetics (pattern, design process, context, tools). Despite being students, they are still expected to make sensible design decisions and effective designs in the learning process of textile design.

Textile Design of VR Communication

In textile design communication before using VR, students still can find massive useful information to refer to in textile research development. During this stage of market research, the creativities are regarded as innovating activities, but relevant insights/information/observations about inspiration, motivation, and developing psychological processes are difficult for the researcher to record. P1, P2, P5 and P8 considered that "there was a flash of inspiration moment that was quickly forgotten." Students P3, P4 and P6, though, would use brainstorming to make quick notes on sketches, while P7 would draw the pattern straight away and print out on the physical fabrics *(Figure 2)*. Creative

motivation essentially is based on the designer's psychological intentions, which means the designer builds a virtual environment in their mind. This mental space will assist them to overcome inner conceptions and thought blocks. Student inspiration is usually iterative and will gradually develop design solutions as they are thought through.

Figure 2. Student P7 prints out pattern sketches on fabrics to test aesthetics.

Besides the inspirational insights, students P2, P3, and P8 use VR Interior prototypes at the preliminary thinking processes to express rational communication to generation insight (*Figure 3;* example of P8 student). Students upload simple stitched or drawing manuscripts of web images into VR prototypes and enhance their thinking about the concepts of the next design by visualising the combinations of 3D shapes and patterns. This is based on creativity and purposefulness and is translated into a visual quality dimension to improved effect through forceful action.

Figure 3. P8 student preliminary design by VR support to final decision.

In the VR communication process, students do not pursue a particular process. Rather, they judge on the function and value of the core design issues based on the value requirements of the target textile product. It also means that students can more democratically tailor the steps of using VR according to their demands, and they are no longer restricted to a particular part of the design programme.

The VR technology collaboration is the gradual transformation of the vague virtual image in design thinking into the final precise product. Immersive experiences in virtual reality (VR) are potential ways to enhance the comparison between the textile design student's inner thoughts and the actual environment imagination, and reflection on design elements and style characteristics. They can upload sketches books, photographs, craft ideas, artwork, geometric figures, silhouettes or nature pictures.

This also shows that the designer's use of the VR environment to contrast will optimize the design itself.

Perceptions of Students and Educator in VR Collaborations

Interviews were conducted with selected students, and students described VR immersive 3D visualisations as useful for communicating the design of aesthetic prototypes for textiles. Student P2 experimented with two different contexts, wallpaper to physical print out, and curtains using VR interior prototypes (*Figure 4.*). P2: "printed onto satin paper. Where this is not the desired material, it has shown that the physical sample still presents the detail and colours within the design clearly. Preferably, this would be printed onto a Grasscloth wallpaper made of a natural fibre such as bamboo or jute which are eco-friendly alternatives to synthetic wallpaper materials.". The VR 3D realism potentially influenced the students' thinking on materials, with student being able to distinguish details between textures and fabrics and ultimately make an appropriate selection. Student P2 finally decided to use the repeat pattern as a wallpaper.

Figure 4. P2 student physical print out and VR present of curtains to final decision.

Student P4 combined physical sampling and VR testing, recording the information in parameter tables *(Figure 5)*. P4: “Putting the design into context using the VR confirmed the decision to keep the print on a small scale. It appears almost like a floral print this way. The image on the bottom VR photo shows the design on a larger scale which looks out of place *(in Figure 5, VR test; Bottom of the first column)*”. This potentially enhances judgement of the detail of the repeat pattern design, where students address potentially problems based on the visual presentation of the VR test.

Figure 5. Student P4’s VR presentation of repeat pattern, physical print out, and final design decision.

Student P5 reflected on the repeating pattern, and she considered production to be an important part of the repeat. P5: “From drawing to CAD and into the VR testing, to printed fabric, the image must be crisp and accurate. The image reproduction on this sample was good but not perfect so the design was

taken back to Photoshop to sharpen”. It seems that the collaboration of virtual reality technology does not affect the other technological software support and may underpin the generation of increased design logic and insights.

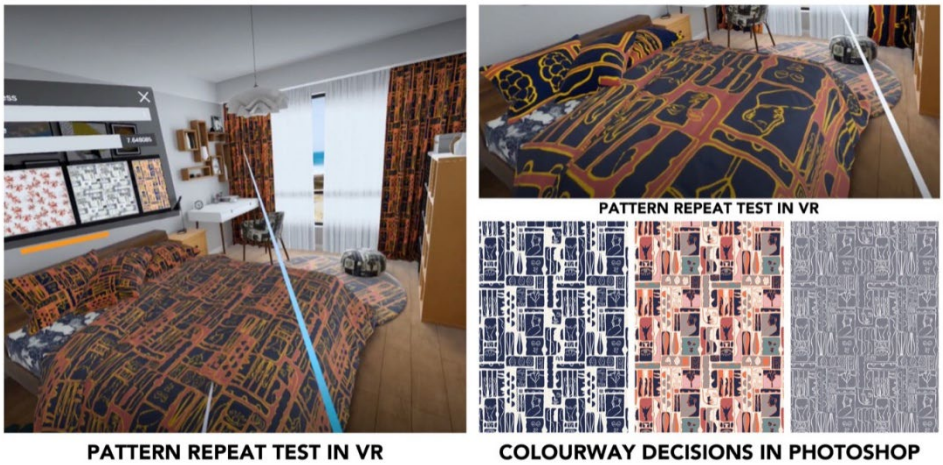

Figure 6. Student P5’s VR test of repeat pattern and final colourway decision.

Educators believe that: "creativity often happens to support the design aesthetics and visual impact, students will evolve in their ongoing exploration and hence change to produce design decisions. With industry textile design, and traditional manufacturing, creativity has to be integrated with the practice of the product, the use of digital technology to create new and accurate design concepts for the generation of creativity increases new opportunities and value, and in turn, students can continue to grow and progress and reflect". This endorsed a further potential view of 3D visualisations of VR technology as virtual alternatives to textile products and provided confidence for further iterations of VR prototypes in this study. In addition, the educator argues, "Contemporary textile design is developing more in the direction of sustainable design. The application of virtual reality technology in this semester is also a useful case to drive students' awareness of environmental friendliness, as students can potentially reduce waste and save design costs by replacing realistic physical samples with VR models".

CONCLUSION

Textile students' visual research experiences are enhanced through increased access to virtual reality (VR) technology, which offers a creative design environment that supports a more ambitious creative process and builds confidence in their decisions, as compared to real-world marketplace design where work is constrained by cost, time and resources. VR facilitates opportunities for working with collaborative students to refine their design concepts with a greater understanding of textile design, the design presentation of repeat patterns, and the visualisation of the correct proportions of the texture product. The 3D immersive experience of VR is shown to support textiles students in exploring their design understanding; however, it is also suggested that there are opportunities to further enhance VR functions with more guidance and support. is conducive to a student's work on the printed textile design process from concept to manufacturing to develop an understanding of how the design process can be improved through VR. Understanding how a student works on the printed textile design process and conducive to developing an understanding of how the design process can be improved through VR.

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MEASURING TEXTILE DESIGN DECISIONS: A COMPARISON OF INTERVIEW IN THE CONTEXT OF UK AND CHINA PEDAGOGY

Author:
XIMING WANG, PHILIP HENRY

Affiliation:
UNIVERSITY OF LEEDS, UK; LUXUN ACADEMY OF FINE ARTS, CHINA

INTRODUCTION

UK and China are both of significant importance in the textile industry in design and manufacturing respectively. The development of British and Chinese textile industries represents the significance of industry development with different focusing points. Due to the saturation of the market in the UK textile industry, textile entrepreneurs locate their factories in areas with low labor costs to ensure stable income, and textile companies encourage their employees to promote the generation of creative ideas to stabilize the organizational structure of the business and maintain an elite environment. And further stress that 'idea generation' and 'implementation' need to be dealt with separately in the UK textile industry; companies cater to the needs of their customers by promoting creative idea generation.[1] Currently, the UK performs as the gathering place and concentrated area of leading fashion brands and fashion designers and is a centre for fashion textile brands and fashion creativity.[2] The UK is also one of the world's most important consumer countries for the fashion industry. With globalization becoming a dominant trend, the British textile industry maximises its resource efficiency as a manufacturer and raw material supplier for textile products by actively selecting countries with low-cost labour and plentiful workers and raw material resources.[3] UK textile design education is gradually transitioning from manufacturing-oriented to a creative conceptual orientation, building creative academic contexts in universities,[4] as well as establishing sustainable design and liberal design academic contexts.[5] In turn, this supports the circulation of new design trends in the textile industry trade; in other words, through the education of designers with a well-developed professional design background, who are able to use design creativity to promote the industry as well as continue to design new products to promote consumer purchases.

In contrast, China, as the most populous and resource-rich developing country, owns low-cost labour resources and a huge amount of high-quality textile raw materials, making it the UK's most important overseas producer and supplier of raw materials today.[6] The Chinese textile sector advocates drawing and manufacturing-oriented educational principles. The strong growth and huge potential of the Chinese textile industry has prompted the Chinese education system to reconsider reforming traditional textile design education, in order to satisfy the new demand for textile design talent driven by rapid development in the contemporary Chinese textile sector.[7] Textile education is the foundation of the textile sector: most on-the-job textile designers have specialised education in the field of textile products. Every year, the many textile and/or fashion graduates in all provinces of China become a

huge talent pool for China's textile manufacturing industry.[8] Employment of recent graduates within textile manufacturing companies supports the combination of textile design creativity and materials and promotes the textile industry's gradual transformation from "traditional manufacturing" to "smart manufacturing".[9]

Consequently, in the above context, textile design education in China and the UK has developed contrasting pedagogical directions. Textile designs in China and the UK are based on different core concerns, as the market demand for textiles influences the future development of the textile industry in both countries. Regarding the UK textile industry, UK textile market must ensure the quality of products to remain competitive and profitable to make steady sales. Driven by the needs of the textile industry, textile designers focus more on creative design to meet the demand of British fashion textile consumers. For the Chinese textile industry, the focus is on quickly cultivating textile designers via an institutionalized education model to guarantee the standard of product manufacturing. This presents an opportunity to gain insight into the direction of textile design education based on the industrial context. This research intends to undertake a bilateral comparison of textile design higher education in the UK and China, especially in the context of the globalisation of trade in the textile market.

Textile design education (The UK and China)

Textile design education in the UK

In textile education, the development of decoration creative abilities is the textile designer's must-have competency in UK education.[10] Creative idea-based development requires designers to have flexible and divergent insights into textile styles and repeat pattern elements. Therefore, pedagogy needs rigorous approaches to train textile designers to develop repeat patterns and organize the construction of new textile pattern decorative elements from multiple perspectives, such as aesthetic value, structure, rhythm, composition, balance and popular symbols.[11] In addition to this, textile students need to have creative thinking and innovative capabilities. Through basic teaching tasks and participation in practical experiences, students perceive the challenges of some complex textile designs and will need to continuously improve their cognitive skills to solve those challenges.[12] Design students are also expected to consider aesthetic value in conjunction with manufacturing, to ensure the textile design can be effectively presented in production.[13] Similarly, the textile designer needs to have an accurate trend forecast and the conceptual judgement to make sure that design elements are cohesive within a collection or range. In summary, designers need to adapt and meet the needs of contemporary textile design. Accordingly, the textile pedagogy and the textile design learning construction and structure are updated and reformed, in response to the changes in teaching needs.[14] Under the guidance of creative research and development-oriented educational principles, the UK textile industry cultivates many creative talented textile designers.

Textile design education in China

Due to the rapid growth of the emerging home textile industry and the establishment of many mechanized factories in China, there is a rapidly and massive increasing demand for garments in the Chinese market.[15] This not only offers great opportunities for further development of Chinese textile design education but also brings the unprecedented challenge of ensuring designers will adapt to job requirements quickly and effectively and skillfully.[16] Therefore, Chinese textile designers trained through professional textile studies are not only highly knowledgeable about repeat patterns but also proficient at embedding design work in product manufacturing and development. There is a noteworthy focus on technical drawing skills in the curriculum, supported by textbooks, which potentially supports students in developing an underlying awareness of design factors. In the decorative drawing aspect, designers need to fully master drawing skills, including sketching,

individual patterns, symmetrical patterns, two-frame continuity and four-frame continuity.[17] In the textile manufacturing aspect, designers need to have a good understanding of the presentation and material structure of multiple decorative styles: Chinese students can build real products to identify the practicability of design aesthetics and they are required to combine jacquard fabrics with traditional patterns as part of the course.[18] Therefore, under the guidance of aesthetics design and manufacturing-oriented educational principles, Chinese textile designers are required to master the above-mentioned skills and express them most directly in textures through painting or fibre structures.
In the textile design education sector, the UK and China also have strong complementarities and broad prospects for cooperation based on their respective strengths and fulfil their respective functions. However, the UK and China are not geographically bordered. The distance between the UK and China is around 8,000 kilometres, but in international textile trade there is a definite link. In textile design education, the UK's increased focus on creative and inspirational design development, and China's concentration on the development of materials for textile product styling and quality, means that there are inevitable advantages for China and the UK. Production and creative design are two significant parts of the textile industry and are closely related to the textile consumer experience. From textile designers' perspective, textile products involve highly detailed patterns and material choices. Textile designers hold a positive and open attitude towards the application of sustainable and innovative technologies to bring the design process and manufacturing process closer together, thereby further improving the effectiveness and practicality of textile product design. In this research, an interview-based method is used in synergy to understand the directions of Chinese manufacturing design and British textile creativity design through textile education and pedagogy. A collaboration of teaching approaches will be beneficial to assist designers in improving the connection between the design proceeding and manufacturability to raise the degree of textile design awareness, thus enabling them to make rational judgements. This research is anticipated to help the textile industry to gain a more in-depth, comprehensive view of the extent to which design education direction can be effectively applied and to adopt more effective strategies for textile designers in future business activities based on specific situations. The results of this research are expected to guide the textile education and industry to maximize insight for better achieving sustainable and prosperous development of the textile industry.

The research aims and objectives:

Aims:

Explore aesthetic value measures of the digital repeat pattern design process in UK and Chinese education, contrasting effective design communication and decision-making measures.

Objectives:

1. To explore how the UK and Chinese differ in textile design pedagogy.
2. To explore UK and Chinese students' internal discrepancies towards textile design communication and decision-making measures.

Methodology

This study documented and comparatively analysed textile pedagogies in the UK and China, in addition to collecting interviews with students on the design process and design decisions of their typical design cases. This included displaying images of typical designs from student design communications to the design process to support readers in gaining a further understanding of performance in terms of design differences. For this study, data collection was carried out at the University of Leeds (UoL) in the UK and at the Luxun Academy of Fine Arts (LAFA) in China,

where four textile design students were interviewed separately, eight in total, all of whom were third-year textile design students. During the interviews, the students were able to present their design work and provide potential design concept descriptions and to provide information for decision-making based on the design concepts. To ensure consistency of the research structure and the entire interview framework, this study chose highly similar programmes for bilateral comparisons, i.e., "Digital Textile Design" at the University of Leeds (UoL), UK, and "Interior Textile Decoration and Design" at the Luxun Academy of Fine Arts (LAFA), China. Due to being a cross-regional study, which requires consideration of cultural differences and the potential risks of COVID-19, this study was approved by the University of Leeds Ethics Committee and approved to support field research (Ethics Reference LTDESN-121). The methodology of this study was designed to discuss the bilateral comparisons of different ethnographic differentiation, i.e. the field survey of ethnographies is broadly capable of demonstrating cultural differences and capturing improvised and informal human activity interactions in different environments.[19] It is beneficial to examine unfamiliar human activity information differences in a semi-structured empirical observation and interview setting, as well as for this study to be able to provide potentially unforeseen contingencies to support a full comprehension of cultural variation and divergence.[20]

Higher Pedagogy of Textile Design (the UK and China)

There is a certain level of innovation in the UK textile studies-based design methods at the University of Leeds. Students design on the digital repeat pattern research to generative, and students' study on pattern sampling motif, confirmed elements, photographs, design/image capture, sketches, LED Colour testing (*Figure 1*), aesthetic usability testing and printed fabric prototypes by pedagogy. Through reflective thinking on the characteristics of research of textiles market objects or products the students use design methods to capture new understandings of the repeat pattern elements, which will be reflected in their pattern design process and self-communications.

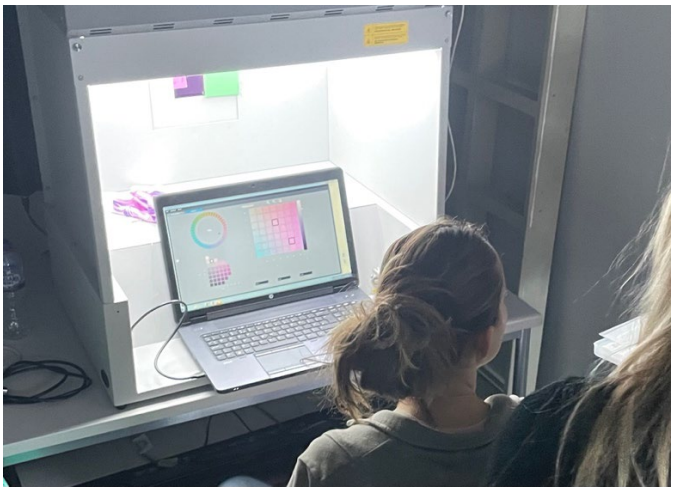

Figure 1. Student using LED colour testing to generation.

With the aid of educators, design students need to reflect on crucial research ideas, the symbolism, motif, and pattern, which emerge as part of various educational programs to develop the competencies. Through projects, the students can enhance their reflection and critical thinking on pattern symbols. They also have the opportunity to use digital technology (i.e. Photoshop, Adobe Illustrator) to edit pattern elements and built up gradually through self-reflection and test for pattern validity: symbols can be extracted and edited using digital tools from convenient digital technology,

to accelerate the design of repeat patterns with full visualisation. These aids testing pattern usability in 3D images and checking the usability of repeat patterns after printing the finished fabric by digital transfer to a fabric printer *(Figure 2)*.

Figure 2. Student's physical fabric samples used to test aesthetics.

Using a camera as a capture tool to extract pattern elements is another highly important way of collecting pattern elements for the students *(Figure 3)*. By capturing key elements for the camera, inspiration is recorded and high-resolution textures, colour sampling, shadow distribution, shapes and constructions are provided. In the early stages of creation, it is a means of the reflective study of elements in things and thinking about pattern design. However, the fact is that the textile design pedagogy at the University of Leeds does not prescribe a fixed design stage for students, i.e. students can identify problems at any design stage and can freely return to a particular step to solve a potential issue. Students are allowed to decide on a design direction and product based on a set theme.

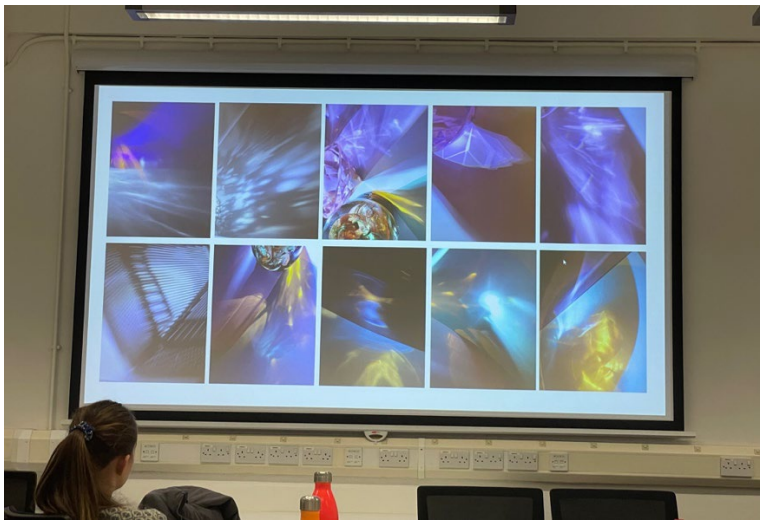

Figure 3. Student collecting photographic material for presentation.

Chinese Lu Xun Academy of Fine Arts textile studies-based design methods also have unique features and focus to satisfy the needs of the Chinese textile industry development. In the early years of textile design, the framework for Chinese textiles focus of the early years of the course based on a 'combined

elements approach', i.e. “graphic composition”, “colour composition” and “three-dimensional composition”, requiring students to have a deep understanding of multiple colour dimensions, to achieve full integration of innovative designing aesthetics ideas.

Textile teaching objectives often focus on graphic textile patterns, developing the textile patternmaker's hand-drawing skills to fully integrate design skills and allowing designers to comprehend pattern structure and visual function better and more efficiently. The repeat pattern theoretical framework was studied during the students’ first year, and although this expertise was drawn from textbooks or pedagogical frameworks, it did have a significant impact on the students' future design cognitions. It appears that the students incorporated the expertise from the aesthetics textbooks to continue to explore and apply it in their future designs.

Students also gain experience in 'fabric modification', 'fabric texture testing' and 'fabric styling' as integrated with traditional hand drawing; through testing the performance of textile dyes on different textile textures to a maximum extent, design students can more efficiently use fabric integrate textile pattern design.

This experience can help Chinese students understand fabrics and materials. As a result, Chinese students can be highly confident in choosing appropriate production layouts and materials for interior textile design in Year 3. In addition, textile students are required to work with local brands in the third year to understand the diversity of materials and the ability to colour them in practice (Figure 4).

Figure 4. Repeat pattern training of textiles Interior textiles.

This type of educational plan usually requires students to receive at least two years of training in textile design, for cultivating students with strong pattern designing capability as well as texture identifying competence.

Students’ communication and decision-making

UK textiles interview (UoL)

Student P1 used an LED Simulator for collaboration *(Figure 5)*: “This can be seen here from digital design to sample. As shown, the LED Simulator was used to print a more representative colour than the dye-sublimation heat press and the colour came out a lot truer to the original. However, the photographs of these samples are also not representative of the true colours as the cameras used to

take the photos alter the colour further." This student potentially understands colour imparted by a fabric with printed colored dyes depends on the characteristics of the raw material and the effectiveness of the dye colour penetration.

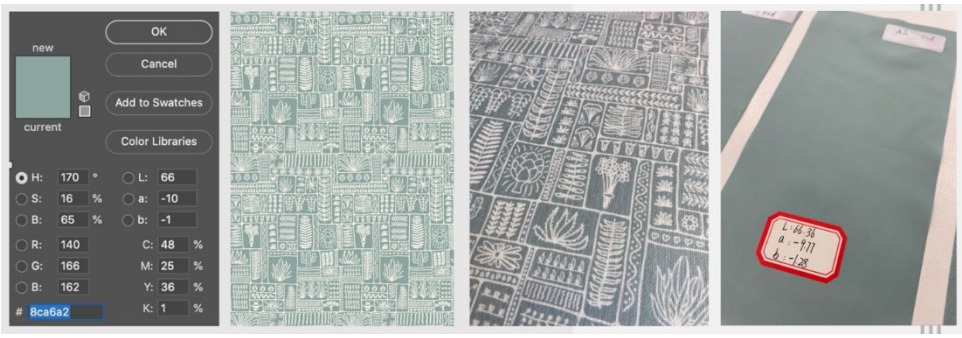

Figure 5. Student P1's use of an LED Simulator for collaboration.

Student P2 used Photoshop for collaboration *(Figure 6)*: "The line quality on the wallpaper samples were not quite as sharp as intended. To solve this problem, the drawings were re-edited in photoshop, smoothing out the jagged lines." Textile designers can establish a relationship between texture and colour through the visual mixing of colour, which will reflect the full extent of fibre colouring in a realistic changing environment.

Figure 6. Student P2's wallpaper samples in contexts.

Student P3 (*Figure 7*) stated: "I try to use the "rules of repeat composition" that require a balance of symmetry of elements, proportion, repeat, and similarity. To reduce undefined elements and motivational awareness". It is of great importance to maintain balance and originality of design elements and decorative motives.

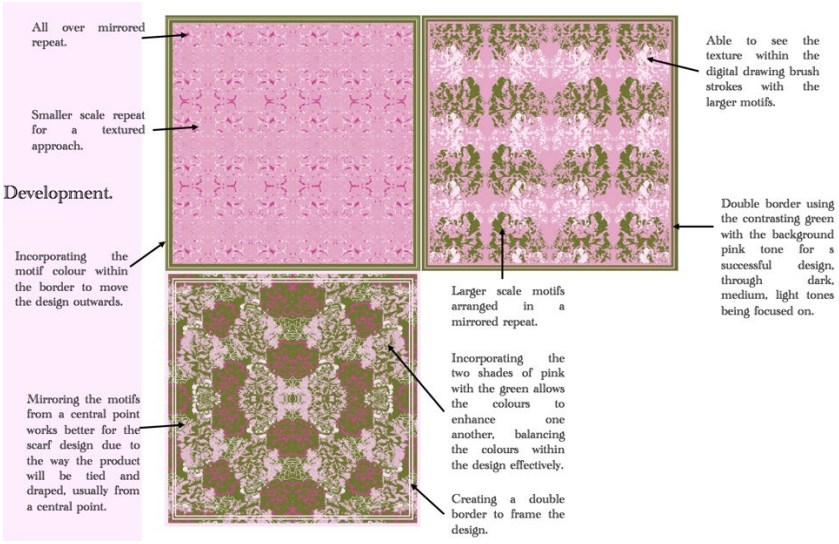

Figure 7. Student P3's design using rules of repeat pattern composition

Student P4 stated: "When textured materials are exposed to the natural environment, and the colour variation that determines the reflection of the fibres is from daylight or artificial light". By this method, this student can make use of the subtle changes in colour and light reflection, which can help to fully investigate the colour distribution of textures and patterns for visualization. In addition, this student can fully utilize Adobe Photoshop to extract and reference colours and test them by printing different materials, comparing differences in colour quality and gloss to distinguish how colours of the same hue appear in different materials. However, once a physical sample fails it is wasteful.

Chinese textiles interview (LAFA)

Student P5 student found that dividing colours into different shapes and proportions can provide a comfortable visual experience for visitors *(Figure 8)*, stating that "a sense of proportion can confer perceived value to the experience through variations in hue saturation, increased colour intensity and high colour purity". Thus, the repeat pattern of both combinations of colour purity contribute to a stimulating and personal sensory experience.

Figure 8. Student P5's design using proportion rules of repeat pattern composition

Students P6 and P7 use a design method where, under the premise of keeping the position of elemental symbols unchanged, the repeat pattern is developed by connecting and adding details to the

position of pattern unit symbols. P6 said: “Elements are staggered high and low, enlarged, and reduced, lengthened lines, or shortened spacing, and combined with complementary colouring combinations, this is a vague definition”.
Student P7 (*Figure 9*) stated: “The harmonious coexistence of patterns can be understood as the motivating expression of decorative effects in design symbols, expressing exactly the identical style and logic in the composition of the composition, including the relationship between adjacent shades, the use of complementary colours, and the proportions of paint blocks".
The rules of pattern composition require a balance of symmetry of elements, proportion, repetition, similarity a reduction of undefined elements, and motivational awareness. It is of great importance to maintain the balance and originality of design elements and decorative motifes. However, it seems that the complexity of setting up a repeat pattern design is necessary for the students to keep practising and express concepts visually through the repeat pattern.

Figure 9. Student P7’s abstract pattern design.

Student P8 mixed colours in neutral or high grey tones; black, white, and grey often enrich spatial levels and harmonize the relationship between tones *(Figure 10)*. "It is important to ensure that the secondary colours play the role of general adjustment when the primary colours play a major role in the overall piece".

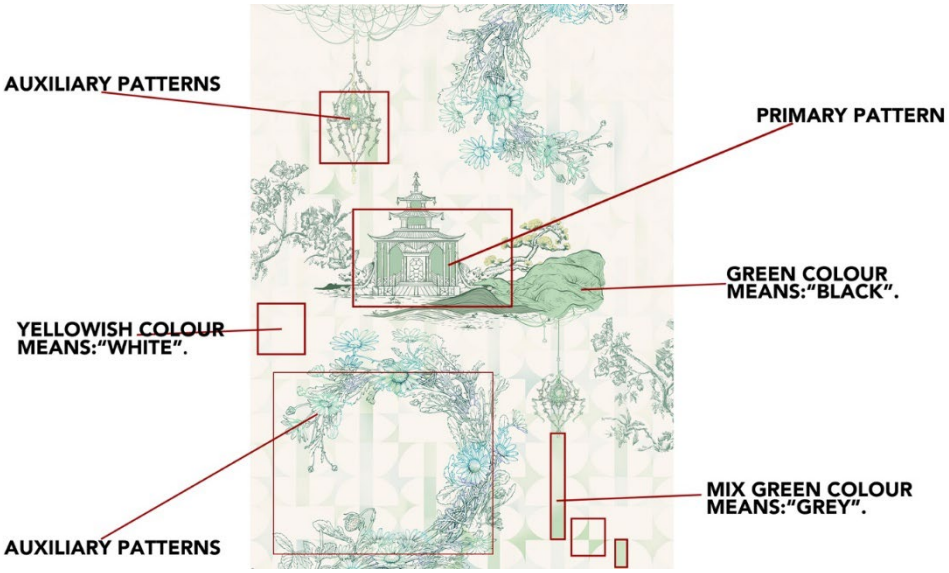

Figure 10. Student P8's abstract, mixed colours pattern design.

In the adaptation of colour, pattern repeat "rhythm" is facilitated by the contrast of shapes and variations in greyscale, hue and purity between colours throughout the pattern Therefore, the colour layout of textile repeat patterns is usually divided into primary colours and secondary colours.

CONCLUSION

Although the textile design education concepts followed by Chinese and British textile sectors serve different market purposes, both seem to fully reinforce a designer's understanding of creative design and products through textile education and concepts. It should be noted that the modern textile industry involves not only design and creativity but also manufacturing and distribution. Therefore, the information and knowledge acquired by students through textile education could not fully meet the comprehensive requirements of products in the market.

In UK textile education, textile design serves consumer groups, and the development of creative ideas appears to be the most appropriate way to help designers gain trust in their designs from the target consumer group. Regretfully, combining the usability between product manufacture and pattern design receives insufficient attention and the above issues may originate from the effectiveness of communication between textile production and textile design. In contrast, in Chinese textile education, textile design seems to be more focused on manuals and the regularization of standard design, which appear to be related to the rapid training of textile designers to quickly cater for manufacturing by way of regulations. In a subsequent study, we should consider repeat patterns in the physical sample process to make more effective judgements, creative decisions, and thoughtful designs that influence their design-forward dynamics.

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HYBRID EDUCATION IN ARCHITECTURAL DESIGN STUDIOS: EXAMINATION OF DIGITAL MEDIA TOOLS IN A TRADITIONAL EDUCATION MODEL IN TERMS OF STUDENTS AND STUDIO EXECUTIVES

Author:
HASANE CEREN CINDIOGLU-YOGSUL, EMEL AKIN

Affiliation:
ATILIM UNIVERSITY, TURKEY; ATILIM UNIVERSITY, TURKEY

INTRODUCTION

Digital media tools have been integrated into design education as in many other fields. Digital media tools such as virtual spaces, electronic learning tools and social media have become an inevitable part of traditional design education. The combination of traditional methods and digital tools in design studios, which is a major part of design education, has created an important intersection; thus, studio training has evolved into a hybrid system. It is inevitable to encounter new problems in the process of integrating studio education, which continues with traditional methods, into digital change. This research aims to examine the potential and problems of hybrid design education in terms of architectural design studios. In line with the purpose of the study, it is aimed to examine the use of digital media in terms of students and studio executives in an architectural design studio that maintains the traditional education model. It is also aimed to determine the tendencies of students and studio executives to use digital media tools, the meaning of digital tools in studio education in terms of students and studio executives, their contribution to education, and their conveniences and difficulties in the traditional model. Similarly, it is aimed to investigate the students' thoughts on the methods and the attitudes and behaviors of studio executives in the hybrid system.

Digital and Social Media

Digital media can be described as all the media produced by using any computational tool such as computers, smartphones, tablets, virtual reality devices, etc. The term ‘digital media’ was introduced by Tony Feldman[1] in two areas that merge day by day: (1) offline media and (2) interactive online media. This second area is associated with the meaning of social media. Social media term is defined by Kaplan and Haenlein[2] as the applications supported by the internet that allow users to interact, contribute, and create content to socialize with each other. Social media applications support people to share, connect, and create broader communities in any fields. The examples of social media platforms include Facebook, Instagram, X (Twitter), Zoom, WhatsApp, Pinterest, etc. Each of them has some specific feature to provide for users. To illustrate, while X (Twitter) sustains a flow by users’ text-based content, Instagram provides a flow by users’ image-based sharing. Social media has emerged as a major topic of study, particularly within education, due to its widespread presence, easy accessibility, adaptability, and ongoing evolution.

Hybrid Design Studio

The concept of hybrid education has emerged with the increasing prevalence of digital media in our lives. Studies on this subject have increased especially during the Covid pandemic period.[3] In our study, the hybrid design studio defines a studio environment integrated with the traditional studio environment, where digital and social media are used synchronously or asynchronously within the scope of the studio. Social media has now become a tool through which students receive support at many points in their educational lives.[4] It is not possible to mention collaborative learning environment for students without considering social media platforms.[5]

DIGITAL AND SOCIAL MEDIA USAGE IN DESIGN STUDIO

According to Cho and Cho,[6] it is not possible to separate the daily and academic usage of social media completely today. However, there are only a few studies that include survey data on usage of social media in the design field. Munoz-Alcantara et al.[7] surveyed 59 design professionals from 12 countries via social networks like Facebook and LinkedIn to explore their use of collaboration technologies. The study revealed that 82.7% of these professionals had used social media tools such as Dropbox, Skype, Google Docs, and Google Drive for online collaboration in the past six months. Additionally, 59.6% frequently used social media platforms like Facebook, Twitter, and WhatsApp for team communication. The research found that social media were the most popular and adaptable tools for collaboration due to their alignment with the social aspects of the design process. Although, social media was not designed for educational purposes originally, it contributes to the collaboration of students and increase the interactivity in the design studio.[8] Popescu's research on building social learning platform named eMUSE (empowering MashUps for Social E-learning) shows the benefits of the using a social media platform which specifically designed and used by architectural students.[9]

In a study by Cho et al.,[10] interior design students used Mural.ly, a social media platform for remote collaboration, in their design studio projects. They completed two projects: one with traditional face-to-face collaboration and another using Mural.ly. The study found that students achieved higher success and felt more confident in their collaborative tasks when using Mural.ly compared to traditional methods. Also, Güler[11] compared the collaborative experiences of design students using Facebook versus traditional studio groups over a 6-week period. The social media group found their learning environment to be more communicative and participatory, with more effective feedback and helpful peer critiques, compared to the traditional group. Güler concluded that Facebook facilitated continuous social interaction, enhancing collaboration even without face-to-face meetings. Cho and Cho[12] also applied a study on social media usage within the interior design students. Their study emphasizes how interior design students naturally integrate social media into their collaborative design process, which they outline through these stages: (a) identifying issues, (b) developing concepts, and (c) progressing in design development. The students favored platforms that supported multiple functions, such as Pinterest (searching and sharing) and KakaoTalk -it is an internet-based communication platform in Korea- (sharing and communicating). Social media with a single function, like Dropbox (sharing) and Instagram (searching), were less commonly used. In evaluating the pros and cons of each platform, Pinterest was praised for its vast image resources, easy categorization, and sharing features. KakaoTalk was valued for its instant communication, ease of access, and synchronization between devices. Email was appreciated for handling large data, and WeChat was noted for its group video chatting feature.

Method

The research examines the impact of digital and social media on the Architectural Design Studio at Atilim University. Semi-structured interviews were conducted with studio students and studio executives. The interviews were conducted with twenty (20) architectural design undergraduate students and ten (10) studio executives. All interviews were held online and recorded as Zoom sessions. Each interview took approximately 30 minutes.

The interview questions have been categorized as (1) digital and social media usage in daily life, (2) digital and social media usage in design studio, (3) impact of the studio executives on students' digital and social media usage for design, (4) contribution of digital and social media usage in the design studio. Questions were asked to the students and the studio executives about how they use the digital and social media in their daily lives. Both groups were also asked whether or not social media contributed to the process of design studio. The data obtained from both the students and the studio executives have been compared and analyzed.

RESULTS

According to the data obtained from the students (1) and the studio executives (2), mostly used digital and social media platforms are Pinterest, Instagram, Facebook, WhatsApp, YouTube, ChatGPT, Discord, X (Twitter), LinkedIn, TikTok. Figure 1 and Figure 2 express the social and digital media usage of the participants.

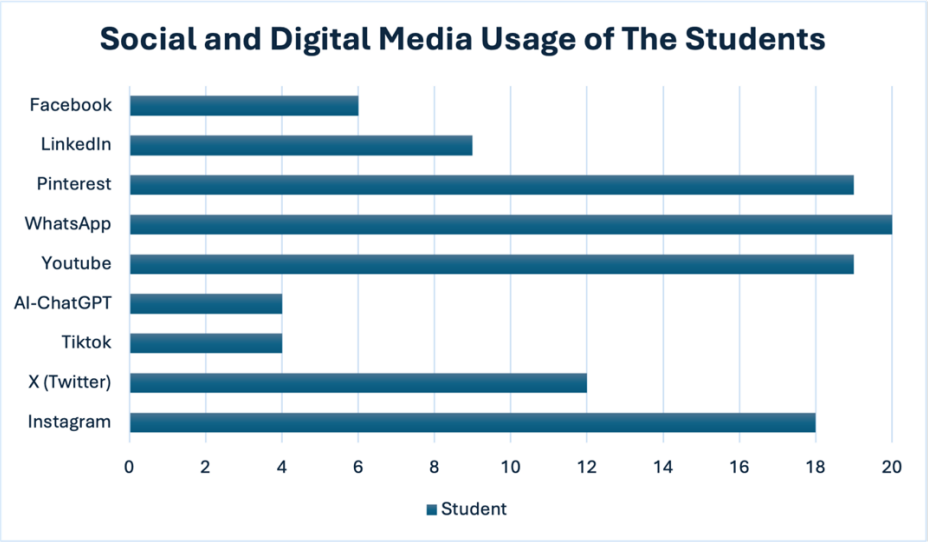

Figure 11. Social and digital Media Usage of The Students

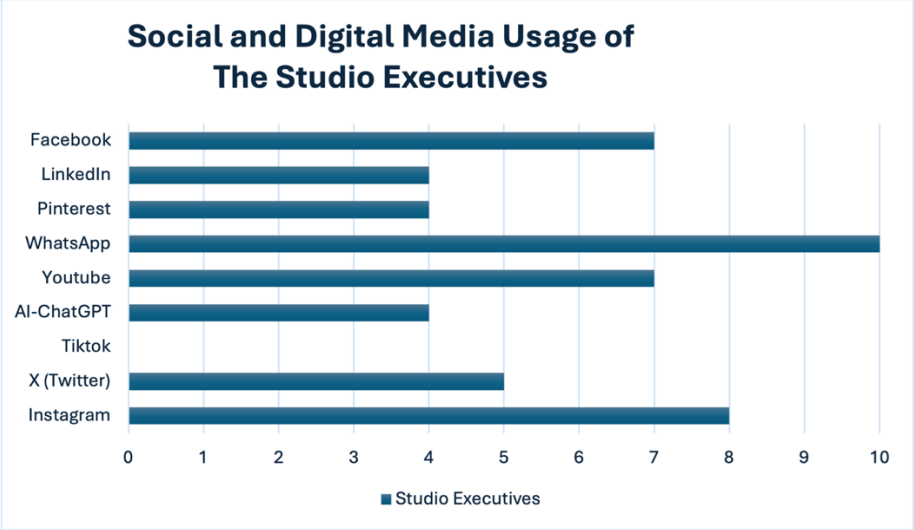

Figure 12. Social and digital Media Usage of The Studio Executives

Students

First, the participant students are asked about their daily usage of digital and social media, then how they use them in their design process and in the design studio. They generally stated that they regularly follow the national agenda (news) and use social media mostly for this purpose. On the other hand, some of them stress the negative impacts of the news on them. These students prefer not to use social media on purpose to avoid the negative impacts. 18 students currently use Instagram to follow architectural accounts, learn program skills, and examine architectural project examples. Five (5) of the students said that they do not use Instagram specifically because they think it takes too much time or distorts their perception. Not surprisingly, this statement came from the female students only. Half of the students use X to follow the agenda. Only one of the students said that she also uses X to follow some architects and architectural firms. Three students explained why they quit using X as loosing highly amount of time and overwhelming because of the national agenda, especially after the Earthquake on 6th February 2023 in Turkey.

LinkedIn was another mentioned social media application. As they are seniors, they use LinkedIn to get information about the market or to expand their network before graduation. Finally, all students use Pinterest frequently to find examples or project reviews although only five of them use it in their daily lives. They use it for things such as recipes or fashion advice. All students stated that they used Pinterest more efficiently compared to their previous semesters. On the other hand, majority of the students stated that they felt inadequate in studying projects and that they needed the guidance of educators. YouTube is another most used social media application for students. Besides the daily usage, they use it for watching the videos which teach how to use programs such as AutoCAD, SketchUp, Adobe Photoshop. YouTube is a learning environment for most of the students. They use social media as a learning tool and find the learning resources mostly through their own efforts, so they are not sure about the accuracy and reliability of the resources. The participant students also mentioned they use some architectural websites such as Archdaily, Dezeen, Designboom, Arkitera (Turkish website on architecture) that were suggested by their studio executives earlier. Unfortunately, the majority of the students still require studio executives' support to examine the architectural projects comprehensively. On the other hand, they admit that they do not prefer to ask the studio executives questions about the sample projects due to a fear of appearing inadequate.

Seven students use AI tools, especially ChatGPT, as digital media. Five of them use image-based AI tools for generating architectural images but they do not present these images to the executives as they fear that the images will not be approved. Significantly, all students who use AI tools emphasized the possible negative impacts of such tools as they make it easier for them to access ready-made information and negatively affect their discovery process. Students are also interested in virtual reality and they think that being able to see and perceive their project in a virtual world is very helpful.
Last but not least, the participant students mentioned that they use multiple monitors and there is always an architectural project example on one of them. As a significant point, one student explained that she does not use Instagram to examine projects because she does not think that the size of a smartphone is sufficient to examine a project completely, and that Instagram is appropriate for working with computers.

Studio Executives

According to the interview results, the studio executives use WhatsApp, mostly for work groups in their professional lives. While two of them do not use Instagram in their daily lives, the rest use Instagram for only professional reasons. Only one studio leader uses Pinterest in the design studio frequently. However, he does not think that students use it correctly. He stated that students do not pay enough attention to what he shares on social media. Two studio executives do not support the idea of using Pinterest or Instagram to examine architectural projects because they think that students spend significant amount of time but they do not understand the projects properly. Instead, they use and recommend architectural websites such as Archdaily, Dezeen, Competition, Arkitektüel, Arkitera as well as the websites of successful architectural firms to examine projects. Four out of ten studio executives use AI tools in their daily lives and encourage their students to use them. The others do not use artificial intelligence at all. Three out of ten studio executives are interested in virtual reality and encourage their students to use it, but the others have no interest in virtual reality.
The studio executives share sample projects with their students via social media, but they do not know if the students study these projects or not as they do not receive any feedback from the students. They explain the reason for the students' silence as lack of interest.

INTERVIEW FINDINGS

The students were grateful to participate in the research, to be listened to and to be understood. It was important for the researchers to hear the sentence "I felt valued because you chose me" from the students. The students listened carefully and answered every question with interest. However, one of the students forced herself to use very cautious and reserved sentences as she was afraid of being "exposed".
The studio executives also cared about their contribution to the research. Some questions had to be changed and some could not be asked at all because they do not use social media. Three of the studio executives did not want to share with us what social/digital media tools they use. They preferred to answer the questions about the design process only. They expressed that they could not communicate with the students well although they are willing to it, and they emphasized the main source of the problem was related to the students. They stated that the student profile had changed negatively over time.
One of the results that supports the above conclusion was also seen in the responses regarding the project examples sent to the students. The studio executives said that most students ignore the examples they send to the WhatsApp groups. On the other hand, they said that students are only interested in the samples that were sent for their own designs and that they ask the teacher how to study the sample project.

EVALUATION

Social media is actively used in the design studio process by students. However, due to their insufficient knowledge and skills, most of them are not able to analyze and interpret the project examples on the social media. Therefore, they are not able to integrate the project examples into their own designs process. Inadequate project review skills of the students can be interpreted as the inability to assimilate the knowledge that should be acquired until the 4th grade.

CONCLUSION

This study supports the idea that digital and social media are used for communication and learning in the architectural design studio. Although social media is used in the design process, it is not possible to talk about its effectiveness and efficiency. More significantly, project examples may have a negative contribution to the design process as long as they cannot be examined or interpreted by the students who lack basic knowledge. If the studio executives provide a social media communication atmosphere with a well-defined and clear target, they will contribute positively to the student's design process. In addition, it is necessary to create environments where students can share and discuss their findings.

This study is thought to be an insightful contribution to further studies on a design studio method that considers the characteristics of today’s students which can be defined as fragility, timidity, insecurity, fast but fragmented seeing and thinking despite effective and fast use of digital tools. Finally, this research is thought to be important as it includes not only the students but also the studio executives.

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ENGAGING CRITICAL ACCESS IN REMOTE AND HYBRID PEDAGOGIES

Author:
ELIZA CHANDLER, MEGAN A. JOHNSON, JODIE SALTER

Affiliation:
TORONTO METROPOLITAN UNIVERSITY, CANADA; DALHOUSIE UNIVERSITY, CANAD;. UNIVERSITY OF GUELPH, CANADA

INTRODUCTION

We began our presentation, *Engaging Critical Access in Remote and Hybrid Pedagogies,* by introducing ourselves and our institutional affiliations. We also offered an image description for ourselves, followed by a land acknowledgement:

I am Dr. Megan Johnson (she/her), and I am the Research Facilitator in the Faculty of Arts and Social Sciences at Dalhousie University in Halifax, Nova Scotia, Canada. I am a fair-skinned white woman with brown curly hair. I am wearing clear plastic-rimmed glasses, a white blazer, and black pants.

My name is Dr. Eliza Chandler (she/her), and I am an associate professor in the School of Disability Studies at Toronto Metropolitan University. I am a white, noticeably disabled woman with short brown hair and dark glasses, and I am wearing a blue dress.

I am Dr. Jodie Salter (she/her), and I teach academic writing at the University of Guelph in Ontario, Canada. I am a white woman with long brown hair, and I am wearing red pants and a black shirt.

We then offered a land acknowledgement, which is a tradition of acknowledging the Indigenous land, its past and present caretakers, and treaty agreements, which are constitutionally recognized agreements between colonial governments and Indigenous nations.

This is Jodie speaking. We would like to begin with an acknowledgement of the unceded Indigenous land on which we are gathered, recognizing that land acknowledgements do not exist in a past tense or historical context: colonialism is an ongoing process. The 2024 AMPS conference site is located on stolen land of the Ramaytush Ohlone Peoples, the original peoples of what is now the San Francisco Peninsula, and the greater Bay Area is the ancestral territory of the Miwok, Yokuts, Patwin, and other Ohlone. Land acknowledgements prompt us to think carefully about relations, individually and collectively, to the land, to Indigenous peoples, and to the processes of colonialism.

For the written version of this paper, we add that we wrote this paper across different unceded territories in the north part of Turtle Island. Jodie was writing from the ancestral lands of the Attawandaron peoples, the stolen lands of the Haudenosaunee and Anishnaabe, and the treaty lands and territory of the Mississaugas of the Credit. Megan and Eliza were writing from Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People. The Mi'kmaq People signed Peace and Friendship Treaties with the Crown, and section 35 of the Constitution Act of 1982 recognizes and affirms Aboriginal and Treaty rights.

As we are offering critical relations to the land, we also want to emphasize that San Francisco continues to be a hotbed for disability rights activism. For its use of human rights frameworks and reliance on legislative reform, disability rights has been heavily critiqued for centring experiences of white disabled people with privilege and its lack of an intersectional analysis. This critique comes from disabled people of color, queer and trans disabled people, and poor disabled people, many of whom are aligned with the disability justice movement. Patty Berne, a founding member of this movement, describes disability justice as "a reaction to the ways that the US disability rights movement invisibilized the lives of peoples who lived at intersecting junctures of oppression – disabled people of color, immigrants with disabilities, queers with disabilities, trans and gender non-conforming people with disabilities, people with disabilities who are houseless, people with disabilities who are incarcerated, people with disabilities who have had their ancestral lands stolen, amongst others."[1] Berne is also co-founder and executive and artistic director of Sins Invalid, a disability justice performance project that centers disabled people of color, queers, non-binary and trans disabled people that was founded in 2004, and works out of Oakland, California. As they describe, "Disability justice activists, organizers, and cultural workers understand that able-bodied supremacy has been formed in relation to other systems of domination and exploitation."[2] If you don't know them already, we'd encourage you to check them out. Their website, Sins Invalid dot org, is where you'll find information on upcoming performances and workshops and watch past performances.

We begin with these examples to contextualize our discussion of critical access in remote and hybrid pedagogies. In this presentation, we will discuss how different ways of understanding and investing in accessibility can inform different ways of practicing access. We demonstrate this dynamic by discussing how critical approaches to access invested in transformation rather than inclusion can lead to innovative and creative access practices. In line with this, we'll begin with an access check in.

Access Check-in

This is Eliza speaking. These are some of the access protocols that we will implement during our presentation:

- We will offer image descriptions of ourselves and our presentation.
- During the Q&A, we will state our names before we speak and say "that's the end of my thought" to indicate that we are finished speaking.
- We will hand out paper copies of our speaking notes to people in the audience.
- Some of our presenters will sit down when they are presenting.
- We invite you to interject if we are speaking too fast or if you want us to explain a term.
- We invite everyone present to "relax" the space. Please move around, stand, stretch, leave and return as needed.

Consider, as you read this article, which of these practices might be most impactful in making presentations accessible to you and your students.

Stories of Access in the Classroom

This is Jodie speaking. In this presentation, we work with the concept of "critical access," which positions access as a critical practice and challenges the notion of access as a universal self-evident good. Grounding these ideas in our own pedagogical work, Eliza will first offer an example of a time when she centered disabled people in her design for accessibility in the classroom and will describe the successes and tensions that arose from these experiences.

Eliza's Story of Access:

This is Eliza speaking. As a disabled professor in disability studies whose courses attract lots of disabled students, I organize my courses in ways that anticipate and welcome disabled, Mad, and Deaf students. I call this a "disability-centered pedagogy." My approach to classroom accessibility tries to strike a balance between attempting to make my courses accessible (and communicating the course's access plan with my students) and understanding that, despite my best efforts, I won't be able to anticipate everyone's access needs. Therefore, I create opportunities for students to share their access needs, and I update and attenuate my access practices accordingly. The way this looks in practice is that I commit to making all of the course materials accessible using captions and image, audio, and visual descriptions. I offer a range of evaluation options, and I teach with a variety of materials, including scholarly articles, podcasts, and videos. At the end of each class, I provide an overview of the next class's activities, giving students time to prepare (e.g., if we will be watching videos, they'll know to bring noise canceling headphones if they need them). I also hold access check-ins with my students at the beginning and a few times throughout the course, and I have a forum, usually a Google Jamboard, where students can state their access needs and reflect on the accessibility of the classroom regularly, anonymously if they choose.

I have quite a few years of experience building and updating my pedagogical access practice in ways that anticipates and collaborates with disabled students. However, I had to mobilize my disability-centered pedagogy in new ways when, in 2021, I began classroom teaching for the first time after the beginning of the pandemic. My university had lifted its mask mandate, and I knew that some disabled and immunocompromised students would not be able to safely participate in in-person learning. So I decided to DIY a hybrid classroom. This approach resulted in a functional, though chaotic, learning space that students could access in person and by Zoom. I had a Zoom call pulled up on multiple platforms, including on my cell phone which I offered to students as a roaming mic. This meant we had to pause to switch audio channels to let students on Zoom speak, which would often result in intense audio feedback when I didn't get the timing quite right. This was not a *relaxed* learning environment, which is something I try to cultivate.

This DIY classroom mobilized access to center students who couldn't be in the classroom. Access frictions arose and were mitigated by the remote access practices in the room. One of the students who has been participating through Zoom came to class in person in the latter half of the course and found that the classroom activity of navigating through multiple platforms was overstimulating and therefore inaccessible. They opted to either wear noise-canceling headphones or return to participating online. My commitment to access did not create a learning space that was fully accessible to all. However, my access plan allowed for a responsiveness and flexibility that met students where they were through a commitment to prioritizing students' access needs along with a recognition that these needs emerge and shift, particularly within a shifting environment, and therefore may not be fully known at the beginning of a course.

(Re)Orientating to Access

This is Megan speaking. Eliza's story demonstrates a commitment to accessibility that we—as disability studies scholars, organizers of disability cultural events, and teachers—each share. Crucially, what she shared also demonstrates that *how* we orient to access determines the practices that emerge and what they can achieve. Critical approaches to access often incorporate "cultural accessibility," which refers to innovative and creative practices born out of disability culture and community that center disabled people instead of providing access for all.[3] These approaches seek to go beyond just inclusion to instead use access to bring about cultural transformation.

For example, on this slide there is an image of a student using a wheelchair sitting in the doorway of a classroom with tiered seating, unable to fully access the room. We might assume that installing a ramp would solve this access barrier for the student, but that approach treats access as *only* a logistical concern and doesn't wholly transform the learning space. Nor does it acknowledge that disabled people experience barriers to access through interlocking forces of oppression which cannot be solved by retrofitting spaces alone.

This is Eliza speaking. The quotes I will be reading are on the current slide. Instead, when we approach access critically, we take access as an opportunity to remake structures and practices with the intention of inviting in difference and work with disabled people and their unique sets of knowledges rooted in lived experience. This approach is what Leah Lakshmi Piepzna-Samarasinha calls "crip wisdom"[4]—a term that describes the ways disabled people "navigate an ableist colonial reality and the ways in which we create beautiful new worlds and forms of resistance."[5] This includes creating innovative and meaningful approaches to access. Such orientations inspire access practices rooted in collaboration, including access check-ins, as we did at the beginning of our presentation, working with "crip time"[6] (a concept we'll describe next), and centering disabled people in our access planning.

Megan's Story of Access

This is Megan speaking. Returning to our question of how we each center disabled people in the classroom, I find one of the most significant ways that I attempt to do this is to work on "crip time"—a term that describes "an inherently adaptable, flexible, and responsive"[7] relationship to time that is needed to fully attend to the diverse and shifting needs of individual "bodyminds."[8] At the start of a semester, working on crip time might involve taking ample time to describe the access options available to students, and soliciting (either collectively or individually) information about their own access needs and desires. Crip time also recognizes that access needs shift or (re)emerge depending on context, and that students' might not know or be able to articulate their access desires right at the start of the semester. Therefore, this approach requires flexibility in deadlines for assignments and in when and how course material is delivered. However, this approach also presents challenges. For example, when assignments are submitted at different times, this accommodates individual students' timelines but creates an unpredictable workload for me in terms of grading. I also experience the challenge of upholding crip time during the semester when we are not getting through all the planned course material; I feel a desire to cover everything expediently. But working through those tensions is part of my commitment to critical access and disability politics in the classroom, because as disability scholar Margaret Price describes, "Requests for accommodation tend to turn on precise measurements of chronological time, but most disabilities don't run on chronological time. They run on crip time."[9]

Jodie's Story of Access

This is Jodie speaking. I teach academic writing and project management programs, and I host an annual week-long writing retreat for 60+ faculty and staff at my university. I deliver this program in a hybrid/hyflex modality, with simultaneous participation online and in physical classroom spaces. This multi-modal delivery exponentially increases my ability to accommodate a multitude of needs, with the virtual option serving those who are immunocompromised, have social anxieties, mobility restrictions, or noise sensitivities, and the in-person attendance affording face-to-face interaction. Some participants express a need to limit screen time and thus choose to attend in person. This year, one faculty member, recovering from a head trauma, chose to attend in-person because I could provide a low-light writing room with windows. Feedback I've received from event participants includes sentiments such as "It was really awesome to be able to attend and feel included as a disabled

person who is not able to leave the house [...] It's just a real pleasure to be in a space where accessibility isn't an afterthought and is something that is centered."

Traditionally, access is tied to politics of inclusion and framed through discourses of disability rights. Through this paradigm, disabled people are invited into the normative world which, in the best-case scenarios, is retrofitted to facilitate our inclusion. Critical access provides a different—more critical and political—framework to think about access, one that's focused on transformation over inclusion**.** This critical lens builds from disability history and activism and broadens our reach and user base. As William Leddy reminds us, "good design is fundamentally a social justice issue."[10]

Critical access practices in our classrooms create space for folks with disabilities to engage in meaningful ways without the need for disclosure or self-identification, and it broadens opportunities for other users who are traditionally marginalized by ableist or normative assumptions. We make space for and engage with folks who we might not have previously realized were missing from our classrooms, and we also account for the access needs of folks with other forms of barriers, such as parents with young children, caregivers, rural, or remote users.

However, the application of a critical access framework does not solve or prevent access tensions. In contrast to this feedback I just shared, the next situation highlights an example of access tension. In 2023, I hosted a hybrid/hyflex academic publishing talk with approximately 100 attendees in-person and online. I began the presentation with a short but comprehensive explanation of our access practices to establish a common understanding of how best to ensure an equitable engagement for everyone in attendance. The majority of the feedback for this event was positive and generous.

However, one participant was frustrated and provided the following feedback on their experience: "*This series would go more smoothly if the technical check could be performed before the formal start of the session, and if we could then move rapidly into the subject of the presentation.*" This participant did not understand that the "technical check" and opening comments about access practices were designed to establish a community understanding to create space and opportunity for everyone to equitably participate. For this participant, the introduction of access practices was perceived as a waste of their time.

Balancing folks' expectations within a limited timeframe can sometimes result in rushing through access practices to accommodate the desires of the presumed majority. However, when we begin to engage critical approaches to access as a default—as an ethos that structures our professional, personal, and pedagogical relationships, we begin to shift from just considering access as inclusion to actually prioritizing real transformation of practice, pedagogies, and spaces.

When we build our access plans to center disabled people and their lived experiences rather than regarding access as a one-size-fits all solution, we anticipate that conflicting access needs will emerge. Anticipating these inevitable "access frictions"[11] helps us create ways to respond in the spirit of collective care and generosity.

CONCLUSION

This is Eliza speaking. By bringing critical access practice into the classroom, we hope to demonstrate that, as Mia Mingus writes, "We don't want to simply join the ranks of the privileged; we want to dismantle those ranks and the systems that maintain them."[12] In taking up this call to action and thinking about the possibilities of accessible pedagogy, we offer the following questions for your reflection:

- What access tensions and frictions have you experienced in your roles and contexts?
- How do you address access tensions and frictions?
- How might you center disabled people in your access practices?
- How do different hybrid/hyflex spaces address and create injustice for users?

● How might you change your hybrid teaching practices through the use of critical access practices?
● How can hybrid delivery change and revolutionize critical access approaches to teaching, working, and programming?

NOTES

[1] "Disability Justice -- a working draft by Patty Berne," Sins Invalid, last modified June 15, 2015, https://www.sinsinvalid.org/blog/disability-justice-a-working-draft-by-patty-berne

[2] "What is Disability Justice?," Sins Invalid, last modified June 15, 2020, https://www.sinsinvalid.org/news-1/2020/6/16/what-is-disability-justice

[3] Megan A. Johnson, Eliza Chandler, and Carla Rice, "Resisting normality with cultural accessibility and slow technology," *Leonardo* 57, no. 2 (2024): 215-220.

[4] Tovah Leibowitz, "Sins Invalid's 'Birthing, Dying, Becoming Crip Wisdom' Features Crip Art, Activism, Love & Liberation," *Autostraddle,* October 13, 2016, https://www.autostraddle.com/sins-invalids-birthing-dying-becoming-crip-wisdom-features-crip-art-activism-love-and-liberation-354749/

[5] Leah Lakshmi Piepzna-Samarasinha, "An Interview with Sins Invalid Performer," interview by Alex Locust, *Paul K. Longmore Institute on Disability*, San Francisco State University, 2016, https://longmoreinstitute.sfsu.edu/archive/interview-sins-invalid-performer-leah-lakshmi-piepzna-samarasinha.html

[6]Alison Kafer. *Feminist, Queer, Crip* (Indiana: Indiana University Press, 2013).

[7] Megan A. Johnson. "Infrastructural Dramaturgy and the Politics of Disability Art and Performance" (PhD diss., York University, 2022), 216.

[8] Margaret Price, "The Bodymind Problem and the Possibilities of Pain," *Hypatia* 30, no. 1 (2015): 268-284.

[9] Margaret Price, *Crip Spacetime: Access, Failure, and Accountability in Academic Life* (Durham: Duke University Press, 2024), 92.

[10] As quoted in Aimi Hamraie, *Building Access: Universal Design and the Politics of Disability* (Minnesota: University of Minnesota Press, 2017), 255.

[11] Aimi Hamraie, *Building Access: Universal Design and the Politics of Disability* (Minnesota: University of Minnesota Press, 2017).

[12] Mia Mingus, "Changing the Framework: Disability Justice," *Leaving Evidence*, February 12, 2011, https://leavingevidence.wordpress.com/2011/02/12/changing-the-framework-disability-justice/, para. 5.

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BEYOND POETIC DWELLING – MARTIN HEIDEGGER'S CONTINUING WARNINGS IN AN INCREASINGLY TECHNOLOGICAL AGE

Author:
CESAR A. CRUZ

Affiliation:
BALL STATE UNIVERSITY, UNITED STATES

Figure 1. "Mortals concede the imparting of their measure to the heavenly. […] The heavenly and mortals each dwell in their own way and alongside one another."[1] Martin Heidegger, 1970. Pictured: The Moon and the constellation Orion, both as seen over Albuquerque, New Mexico (photographs by Cesar A. Cruz).

INTRODUCTION

In their university days, many architects would have likely read "Building Dwelling Thinking" and "Poetically, Man Dwells" (henceforth BDT and PMD), written by the German philosopher Martin Heidegger (1889-1976). Presented as lectures in 1951, these essays popularized the concept of dwelling only after they were published in English in 1971.[2] Numerous authors since then have extended the philosopher's notions on dwelling to promote the importance of place in architectural thinking and practice.[3] The ideas in BDT and PMD are bolstered by other works by Heidegger, such

as the essays "The Origin of the Work of Art" and "The Thing", and the poem "The Thinker as Poet".[4] Unbeknownst to many people interested in Heidegger and architecture, additional works by the philosopher build upon his notions of dwelling and place.[5] Chief among these is a 1970 essay titled "Man's Dwelling".

The purpose of this paper is to go beyond Heidegger's quasi-romantic notions of poetic dwelling – as those notions have been previously interpreted from BDT and PMD – to more pointed warnings regarding technological thinking and its tendency towards unpoetic dwelling. Though the relationship between dwelling and a technological-scientific paradigm has been a part of the scholarship on Heidegger, the link has often been treated as either tangential or only one among several factors worthy of consideration. This paper posits that the relationship was a primary concern to Heidegger near the end of his life. As such, this link is worthy of further scrutiny by anyone interested in Heideggerian dwelling, place, etc. To demonstrate this, this paper relies on works by the philosopher that until recently have remained untranslated and are still largely unknown. These include my own translations of Heidegger's poetry, short commentaries, and the aforementioned "Man's Dwelling". The latter is especially pertinent because it serves as a coda to BDT and PMD. Also, "Man's Dwelling" and other selected works lend this paper three orienting principles: unpoetic dwelling, the adulation of science, and the mechanization of man.

As an illustrative example of the topics presented here, this paper delves into two famous precepts of modern architecture: form follows function, and a house is a machine for living. Generally, however, through this paper we hope to present "Man's Dwelling" as a springboard for additional research and thought on dwelling, the unpoetic, and the technological-scientific paradigm. Our message in the end is this: In an academic and professional era that revolves around technological tools and methods, and in the burgeoning age of generative AI, this paper is a continuing warning against the *uncritical* and *unfeeling* adoption of technological means in the classroom and professional practice. First, however, we need to examine what "Man's Dwelling" tells us today.

"MAN'S DWELLING" – A CODA TO "BUILDING DWELLING THINKING AND "POETICALLY MAN DWELLS"

"Man's Dwelling" has a tripartite organization, albeit a loose one. The essay's first part revisits notions of dwelling that Heidegger first explored in BDT and PMD. Thus, this part is essentially an extension of earlier themes. In the second part, the philosopher delves deeper into the nature of the unpoetic and unpoetic dwelling. In the third part, Heidegger abruptly takes aim at the technological-scientific paradigm. This last part is crucial, as it alludes to dwelling in the modern era, and it connects us to other consequential works by Heidegger. Let's take the essay's three parts in kind.

Parts one and two of the essay deal with the poetry of the German Romantic poet Friedrich Hölderlin (1771-1843). Hölderlin's works were a recurring and strong source of professional stimulus for Heidegger.[6] Most notably, the poet is credited with the poem which is the basis for the essay PMD.[7] In "Man's Dwelling", Heidegger picks up where he left off nearly twenty years earlier, asking why the line "…poetically man dwells…" seems to have gone unheeded over the years. So, Heidegger explores further how Hölderlin intended to use the word "poetic" (*dichterish*) in various poems.[8] In this regard, the philosopher recontextualizes many of the points already made in BDT and PMD, which are:

- It is in man's nature to dwell.
- To dwell is to acknowledge a unique kinship between humans and the world around them.
- In dwelling, we are led in our thoughts and actions to care for places and live in harmony with them.
- Dwelling is a way of thinking, and building is the physical manifestation of dwelling.
- The highest form of dwelling is poetic dwelling, and poetic dwelling is a taking of measure.

▪ To measure is to make an appraisal of one's own life and one's own place in the world.

In his recontextualizing of these points, Heidegger transports us, through Hölderlin's poems, to the Aegean coast in Ancient Greece. In subtle references to the fourfold in BDT (i.e., earth and sky, and divinities and mortals), Heidegger paints a picture of a people who, inspired by the sight of the heavenly beings above them (the sun, moon, and stars), are led to tend to their lands in ways that are beneficial to humans without being harmful to their environment. In one instance, Heidegger relates it so, "In this way a region is kept open for mortals to sojourn within it."[9]

Heidegger emphasizes that the continuous presence of the heavenly remind us of that unique kinship between humans and the world around them.[10] Thus, Heidegger tells us, the sight of the heavens inspires us into the taking of a measure necessary for poetic dwelling (which, as stated above, are two core concepts in BDT and PMD), but only if we are open to it.[11] And therein lies the rub. Every day in our contemporary lives we are less attentive to that which would foster a poetic dwelling. Why? Because the unpoetic is a strong and an ever-present distraction. Consequently, Heidegger turns his attention to the unpoetic, or rather the lack of the poetic.

Continuing to rely upon Hölderlin, Heidegger attempts to get at the heart of the unpoetic through the metaphor of an evil spirit. Like the sun, moon, and stars, this spirit also has its origins in the heavens, but it manifests itself remarkably differently. It is sinister, operating in the dark. It is ill-intentioned and deceitful in its speech. It is a destructive being who, when its deeds are done, leaves behind a physical wasteland. "That which bestows measure," Heidegger tells us, "is not admitted. The region that would be so inclined is instead buried under debris."[12] Thus, the actions of the evil spirit actively and purposefully detract from our ability to dwell poetically. There is much we can draw from this.

The relationship between the evil spirit and humans is not a mutually beneficial one, but rather one-sided and detriment to mortals. There is an ecological and place-bound component, as what remains is a devasted landscape. And lastly is the evil spirit's language, which aims at being cunning and misleading. It is this matter of language that may be the most portentous, as it connects us to other key aspects of Heidegger's work that relate to dwelling. Thus language indirectly ushers in part three of "Man's Dwelling".

The third part of "Man's Dwelling" is brief, occupying just over half of a page of the seven-page essay. Yet despite its relatively short length, it takes the reader in a dramatic turn. Transitioning away from Hölderlin's Romantic-era verses, Heidegger calls attention to certain unpoetic aspects of twentieth century thinking, particularly as a consequence of the widespread adoption of the technological-scientific paradigm. For example, the inspiration of the heavens, which bids mortals towards a poetic dwelling, has been replaced by "an earth that his [man's] machinations leave disfigured." Heidegger likens the evil spirit's duplicitous use of language to "the monotony of language from which everything which is said lies flat: the computer's language of informatics," to which he adds, "The only measure for computing man is the quota."[13] And finally, he writes,

"Much is left to consider, that is, to experience thoughtfully. Next for us to consider is:

First of all, to think about the unpoetic aspects of our world sojourn as such, experiencing the mechanization of man as his fate instead of dismissing it as merely arbitrary and an infatuation. Further, it calls for us to realize that there is no measure on this earth, but rather that the earth can give no measure when it is quantified on a planetary scale, that the earth is carried away in the lack of measure."[14]

I have quoted extensively here because the specific words resonate just as much as the most often-quoted passages from BDT and PMD. Heidegger's expressions in the third part of "Man's Dwelling" are decidedly far from the pastoral allusions from his earlier, better-known works.[15] Here he brings us quite close to our contemporary age, with references to a disfigured earth, computer languages, quotas, the mechanization of man, and an earth quantified on a global scale. These phrases speak to

how the technological-scientific paradigm has transformed the world around us, as well as how we perceive and interact with that world and each other. This, then, is an all-pervasive paradigm, one that reflects our lives today. A transformed, disfigured earth (i.e., polluted and ecologically damaged) is self-evident. Our jobs, forms of self-expression, personal finances, entertainment, transportation, and connections between one another are all mediated, if not dominated, by technological innovations – the internet, e-mail, smart phones, video conferencing, social media, etc. And thus, Heidegger tells us, we have allowed this to happen to us with little thought to its consequences, which is to say our ability to dwell as presented in BDT, PMD, and "Man's Dwelling".

The phrases above are echoed in other works by Heidegger. For example, in a 1969 short commentary on language, titled "Signs", Heidegger wrote,

"What if just once one were to take into consideration the radical inhumanity of today's adulation of science and eventually even admit to it? Every day the pervasiveness of calculating thinking decidedly strikes back at mankind itself and reduces it to that ordered portion of inventory that is the result of a measureless and 'operational' thinking model."[16]

It is not coincidental that this critique – "the radical inhumanity of today's adulation of science" – appears on a commentary on language.[17] The subject of language persists in Heidegger's writings on dwelling because of poetry's close association to the topic. As already indicated, Heidegger's thinking on dwelling emanates from Hölderlin's works, especially as it relates to PMD and now "Man's Dwelling". But more fundamentally is the nature of poets and their work. To Heidegger, the best poets (and poetry) lead us to think. That is because a poet is a master of language, and thus of expressing a poet's interpretations of the world around us and the human condition playing out in it. Put another way, in the same way that a painter like Van Gogh can produce thoughtful, impactful scenes from the everyday, oftentimes moving audiences with the simplest images, so do the most able poets reach us through their mastery of words and the resulting thoughts that reside in our minds.[18] However, when the nature of language is subverted into a model or system of technical rules and operations akin to a scientific or engineering analysis (as Heidegger thought was the case with semiotics and structuralism), clear-eyed seeing and clear-minded thinking are impeded. Then we have crossed from the realm of the natural to the unnatural, from the poetic into the unpoetic. Consequently, our ability to dwell – that is, to adopt in our minds and actions a unique kinship between one another and the world around us – is compromised, maybe even impossible to attain.

The critiques in "Signs" and "Man's Dwelling" are echoed in other, more readily accessible works by Heidegger, though nowhere near as stridently.[19] In a 1966 interview, however, Heidegger's warnings align closely with those in "Man's Dwelling". Heidegger asserts in the interview that what is needed most in an era dominated by the all-pervasive technological-scientific paradigm is thought, that is, the kind of thinking that Hölderlin spurred in him over the years. (Yes, he actually invoked Hölderlin in that interview.) What Heidegger was promoting, in more contemporary terms, was the powers of introspection, critical thinking, and a strong and probing intellectual curiosity or wonderment. In short, he was proposing a poet's mindset, outlook, and abilities – traits that the philosopher would appear to have followed for decades.

And so, a great many concepts are intertwined in these later works by Heidegger – poetic dwelling, the unpoetic, the adulation of science, and the mechanization of man, among others. All of these are in an ongoing struggle for our attention. To be sure, what Heidegger called "the global movement of modern technology" has been, is, and will continue to be an unimpeded influence over our lives, but only if we stop from thinking independently altogether – critically, curiously, and introspectively.[20] This struggle has played out countless times throughout history and in the everyday. One example is the subject of our next section, which deals with two key tenets of the modern architecture movement.

FROM "FORM FOLLOWS FUNCTION" TO A MECHANIZED ARCHITECTURE

Louis Sullivan's "The Tall Office Building Artistically Considered" is coincidentally a great demonstration of phenomenological principles. In the 1896 essay, Sullivan is searching for the essence (a common phenomenological goal) of the multistory, urban, commercial building type. In doing so, he follows a central edict of phenomenology – "to the things themselves" – which is to say that Sullivan is drawing from the physical world from which we are able to apprehend directly. In this case he is drawing from what has been and is being built, most notably Sullivan's own Wainwright Building in St. Louis. Put yet another way, in examining and attempting to define the architectural qualities of this new (at the time) building type, Sullivan relies on the lived experience, a concept at the heart of existential phenomenology.[21]

The most famous outcome from Sullivan's essay is the saying that "form ever follows function". The saying is not only predicated on an aesthetic, organizational, and operational analysis of the building type, it is also rooted in natural and biological analogies. In short, Sullivan's arguments and conclusions are humanistic and almost philosophical perspectives on a modern, technical creation. Subsequently, the link between modern architecture and building function would be inexorably bound together for decades, though not exactly as Sullivan intended it.

In the first three decades of the twentieth century, the humanistic perspectives and natural presuppositions inherent in "form follows function" yielded to a reverence for functional efficiency, machine-like precision, and the productive possibilities of industry. And thus would enter in the mechanization of man and the adulation of science as symbolic bases for grounding the buildings of modern architecture. The lineage of this evolving paradigm began with the factory aesthetic evident in Peter Behrens's AEG Turbine Factory (1908) and three notable works by Walter Gropius – the *Werkbund* Pavilion and Fagus Factory (both from 1914), and 1926's Bauhaus Building complex. Of these built works, only AEG was an actual factory. The others were merely symbolic of or attached to a factory. And in the Bauhaus, the most notable visual link to the factory – the school's studio spaces – were designed as production floors akin to a factory.

Le Corbusier, in promoting an engineer's aesthetic, further leaned into the adulation of science and mechanization of man as bases for architecture. And in doing so he continued to distance building from the spirit of "form follows function". With the engineer's aesthetic in mind, a prolific series of projects and buildings followed, including the overly basic structural frame of 1915's Dom-ino house. The possibilities of this spatial-structural-architectural model were endless, and thus this precise, sparse, and modern building system led to the Citrohan House project (1920), duly inspired by a French automobile. A series of "villas" also ensued. Each of these was a rendition of an austere, almost fully orthogonal, and ambiguously white set of pure volumes, which were articulated though simple solid-void or push-pull formal expressions, and long, thinly-proportioned, horizontal window bands that wrapped unconventionally around each floor. In the midst of all this work came what was perhaps Le Corbusier's *magnum opus*, the 1922 book *Towards a New Architecture*.

In his seminal book, Le Corbusier intersects in strange and obviously unintended ways with both Sullivan and Heidegger, particularly through references to skyscrapers, Greek temples, and the revealing powers of sunlight.[22] However, Le Corbusier's aims, approaches, and outcomes differ greatly from the two other men. So when a key outcome emerges from *Towards a New Architecture* – the saying that "a house is a machine for living" – it is in stark contrast to Sullivan and Heidegger. Instead of the essence of the thing (or the nature, purpose, or intended use for a building) Le Corbusier leans into an architecture that reflects polished and pure forms endemic of a technological and industrial determinism. So, he eschews natural, humanistic, poetic, or philosophical arguments to instead rely heavily on industrial structures and modern transports (i.e., grain silos, ocean liners, airplanes, automobiles, etc.) as optimal ways to mentally conceive of architecture. And in the end, "a

house is a machine for living" turns out to be wholly antithetical to, though almost as famous as, "form follows function".

Criticisms to Le Corbusier's dictum began to emerge in the late modern era. Writing in 1952 and 1953, Frank Lloyd Wright would attack the saying in terms closely resembling Heidegger's "adulation of science" and "mechanization of man".[23] In Wright's mind, Le Corbusier's house-machine fusion exemplified a turn whereby architecture was meant to celebrate principally the technology that underpinned it, instead of technology being leveraged towards the human needs and aspirations that lay in the essence of architecture. This turnabout was a toppling over of modern architects' original aims at redefining architecture. As Wright saw it, the precepts and practices of the modern architectural pioneers of the Chicago School, Prairie Style, and Wright's own Organic Architecture looked to liberate architecture from being tradition bound, and thoughtless in addressing both timeless and emerging building functions, societal needs, and cultural/ regional bents (e.g., America and the Prairie). "Form follows function" was a byproduct of those noble goals. So, Wright assailed not "form follows function" – he saw the concept as sound – but rather the misunderstanding and misapplication of the idea over the lifespan of modern architecture. And, Wright thought, a most unfortunate consequence of "form follows function" run afoul was Le Corbusier's "a house is a machine for living," a sentiment that he decried as "sterilizing", adding that "Until the mechanization of building is in the service of creative architecture and not creative architecture in the service of mechanization we will have no great architecture."[24]

In the postmodern era, others took up renewed critiques of what they had seen "form follows function" evolve into – Functionalism. In 1976, Peter Eisenman recognized the schism between Sullivan's original conception and what followed, as well as what lay behind this shift. His critiques resemble key ideas from "Man's Dwelling". Beginning in the 1920s, Eisenman posits, architecture had adopted "some oversimplified form-follows-function formula," which he further described as a "neo-functionalist attitude, with its idealization of technology."[25] This attitude, Eisenman tells us, was not fully in line with either humanism or modernism, but with positivism – the philosophy at the heart of the objectivity of science. The results of this ideological shift were in part "radically stripped forms of technological production."[26] Similarly in 1983, Christian Norberg-Schulz took aims at Functionalism. The ideology, Norberg-Schulz thought, was predicated by neither "form follows function" nor "the patterns of practical use."[27] It did lead, however, to an architecture unable to meet human needs neither in a truly functional sense nor at a deeper, symbolic level.[28]

CONCLUSION

At the heart of this paper has been the idea that Heidegger's notions on dwelling have an enduring relevance today, though that does not spring forth from the well-known and often cited lectures and essays contained in Heidegger's *Poetry, Language, Thought* and *Basic Writings*. If we were to rely only on those works, or what has been written about them, we could dismiss Heideggerian dwelling as utopian, or as overly dependent on a pastoral rusticity that does not reflect contemporary life. Viewed in those ways, Heideggerian dwelling is nothing more than a vestige of a bygone era in architectural theory. It is a fine sentiment, just not applicable today.

For anyone with a strong interest in Heideggerian dwelling, however, the greatest relevance of the philosopher's writings today is in understanding how the technological-scientific paradigm may impede our ability to dwell poetically. The paradigm is apt to mentally disassociate us from those aspects of our lives that inspire us to live in harmony with our surroundings, each other, and our inner selves.[29] To be sure, there is no undoing the technological innovations that have held sway over the human condition since the Industrial Revolution, through modernity, and into today. But to live in such a world does not necessitate that we blindly abdicate our minds and actions to the adulation of

science, the mechanization of man, a disfigured earth, or the monotony of language. Instead, if we are to heed Heidegger's warnings and Hölderlin's message before him, we should reclaim a poet's outlook in order to experience life more thoughtfully. And the means to do so runs through a host of Heidegger's works, both what is well known already and that which has eluded us until recently.

NOTES

[1] Martin Heidegger, and Cesar A. Cruz (translator), "Man's Dwelling", in *Architecture Philosophy*, Vol. 2, No. 1 (January 2016): 57, 58.
[2] Martin Heidegger, and Albert Hofstadter (translator), *Poetry, Language, Thought* (New York: Perennial Classics, 2001 reprint), 143-159, 211-227.
[3] Influenced by BDT and PMD, generations of architects and scholars have coalesced around the idea that a work of architecture which does not acknowledge and incorporate notions of place does not meet the highest aims of architecture. The most notable example is the Norwegian architect, educator, and writer Christian Norberg-Schulz, whose scholarly output over thirty years was either focused on, largely driven by, or in some way influenced by Heidegger's notions on dwelling and place. His most relevant works include the essays "The Phenomenon of Place" and "Heidegger's Thinking on Architecture", and the books *Genius Loci: Towards a Phenomenology of Architecture* and *The Concept of Dwelling*. In similar manners to Norberg-Schulz, other major contributors to our understanding of Heideggerian dwelling and place include Jeff Mugerauer, David Seamon, and Adam Sharr. In other related fields there are the geographers Yi-Fu Tuan and Ed Relph authors of the influential works *Space and Place: The Perspective of Experience* and *Place and Placelessness*, respectively. Philosophy's closest parallel to Norberg-Schulz has been Jeff Malpas, author of *Heidegger's Topology: Being, Place, World* and *Heidegger and the Thinking of Place: Explorations in the Topology of Being*, among others.
[4] Heidegger 2001, 3-14, 17-76, 163-180. Two other essays worthy of consideration as well, though not as well-known or often cited as the already aforementioned, are "Art and Space" and "Hebel – the House Friend". The former is featured in Norberg-Schulz's works, the latter by both Norberg-schulz and Sharr. An English translation of "Art and Space" may be found in *The Heidegger Reader*. The English translation for "Hebel – the House Friend" may be found in *Contemporary German Philosophy, Vol. 3* (1983) by the Pennsylvania State University Press.
[5] In addition to the centerpiece of this paper, "Man's Dwelling" (*Das Wohnen des Menschen*), other relevant works include the short commentaries "Forrest Walks" (*Holzwege*) and "Signs" (*Zeigen*). See Martin Heidegger, *Gesamtausgabe: Band 13, Aus der Erfahrung des Denkens* (Frankfurt am Main: Vittorio Klostermann, 2002), 91, 211-212. Also, there are the poems "We live in the night" (*Wir leben in der Nacht*), "The Way" (*Der Weg*), "Dwelling" (*Wohnen*), and "Building Dwelling Thinking" (*Bauen Wohnen Denken*, not to be confused with the essay by the same name). See Martin Heidegger, *Gesamtausgabe: Band 81, Gedachtes* (Frankfurt am Main: Vittorio Klostermann, 2007), 97, 167, 282, 328. Taken together with those works mentioned beforehand – i.e., Heidegger's works that are well-known and often cited – these additional works significantly add to those that are usually referenced in the field of architectural phenomenology. And yet other essays, lectures, short commentaries, and poems of potential value to our understanding of dwelling remain untranslated, unknown, and unreferenced in the philosopher's collected works.
[6] The links between Hölderlin's poetry and Heidegger's notions on dwelling, place, technology, and other relevant matters are extensive, giving rise to the argument that to fully understand Heideggerian views on these subjects a person must delve into selected essays and quotes on the poet and his poetry. Of principal importance in this regard are, of course, "Poetically Man Dwells" and "Man's Dwelling". However, drawing from a sample of other writings, Heidegger calls Hölderlin's works "thinking poetry" and "a rich source for a philosophy". (See Heidegger 2001, 93.) Next, Heidegger states, "Holderlin is for us in a preeminent sense *the poet's poet*." (See Martin Heidegger, and Keith Hoeller (translator), *Elucidations of Hölderlin's Poetry*, (New York: Humanity Books, 2000), 53.) And considering the arc of his own life's work and possible legacy, Heidegger adds,
"It is not for me to decide how far I will get with my attempt to think, and in what way it will be taken up and fruitfully transformed in the future. […] My thought stands in an unavoidable relationship to the poetry of Hölderlin. Yet I do not take Hölderlin to be just any poet whose work the literary historians take as a subject next to many others. For me, Holderlin is the poet who points to the future." (See Günter Figal (editor) and Jerome Keith (translator), *The Heidegger Reader* (Bloomington, Indiana: Indiana University Press, 2009), 330.)
[7] Because Hölderlin's poem "In lovely blueness blooms…" (from which the line "poetically man dwells" originates) was not published by the poet himself, there has been some doubt as to its true authorship, level of completeness, and whether to include it in the poet's canon. In the two essays "Poetically Man Dwells" and "Man's Dwelling", Heidegger addresses those doubts so as to then parse the poem and its numerous possible interpretations.
[8] Heidegger examines Holderlin's poems "The Archipelago", "The Journey", and "The Nearest Best". See Heidegger 2016, 56, 58.

[9] Heidegger 2016, 57.
[10] On the continuity of the heavens in mortals' lives, Heidegger writes,
"The heavenly bodies in the poem ["The Archipelago"] refer to things that always have been – 'ones of yore' – as well as to things that shall return in what is yet to come. […] The ancient companions in play bring to 'men sensitive and receptive to it,' the serenity of day and the night's slumber and foreboding. These companions donate constancy to mortals across their lifetimes."
Heidegger 2016, 56.
[11] On mortals accepting a heavenly gift of measure, see note 10 above. Additionally, Heidegger writes, "The heavenly ones were inclined to impart to those on earth their measure", and "mortals concede the imparting of their measure to the heavenly." See Ibid., 57.
[12] Heidegger 2016, 60.
[13] Heidegger 2016, 60,61.
[14] Heidegger 2016, 61.
[15] In contrast to Heidegger's modern references in the third part of "Man's Dwelling", consider the more traditional, historic, or rustic references of, for example, the Greek temple in "The Origin of the Work of Art", the footbridge over the stream in "Building Dwelling Thinking", and the cabin, mountains, meadows, and weather in the poem "The Thinker as Poet."
[16] Heidegger 2002, 211. German-to-English translation is by Cesar A. Cruz, and is previously unpublished.
[17] The link between the critiques of science in "Signs" and computers in "Man's Dwelling" is especially curious, as all interactions with modern science and technology harbor a corresponding paradigm shift in language. Consider how we have communicated with and through technology in the computer age – using punch cards, binary code, programming languages, commands, texts, posts, blogs, chats, tweets, prompts, scripts, emojis, etc. If we are to listen to Heidegger's warnings, then we are conditioned throughout our lives to adapt our relationship to language in accordance with the latest technology, and this would constitute an ongoing abdication to the technological-scientific paradigm.
[18] It is important to note that Vincent Van Gogh, who is helpful with our example here, is also featured by Heidegger in "The Origin of the Work of Art." See Heidegger 2001, 32-35.
[19] The reader may refer to the essays "The Thing", "The Question Concerning Technology", and fittingly, "Building Dwelling Thinking" and "Poetically Man Dwells."
[20] Heidegger, in Figal and Veith, 324.
[21] On issues related to phenomenological philosophy – "to the things themselves", essences, and existential phenomenology – see "Phenomenology", in William R. Schroeder, *Continental Philosophy: A Critical Approach* (Malden, Massachusetts: Willey Blackwell, 2005): 174-205.
[22] In a puzzling snub of Sullivan, Le Corbusier's *Towards a New Architecture* features skyscrapers four times, with nary a mention of Sullivan or his ideas. There is the caution, "Let us listen to the counsel of American engineers. But let us beware of American architects." (See Le Corbusier, *Towards a New Architecture* (New York: Dover, 1986 reprint), 42. Next, Le Corbusier and Heidegger both lean on the Ancient Greek Temple motif and the revealing properties of sunlight for inspiration. However, these commonalities are complex and contradictory at best. Heidegger famously referred to a Greek temple in "The Origin of the Work of Art" as an example of ancient placemaking that in the philosopher's description presages concepts that would recur in "Building Dwelling Thinking". And while Le Corbusier's focus on the Parthenon in one chapter of his book ("Architecture, Pure Creation of the Mind") relates well to Heidegger's notions in "The Origin of the Work of Art", Le Corbusier introduces the Parthenon earlier in the book as an example of standards in architecture, which is analogous to standardization in automobile parts – a cold and calculating assessment that aids in the design and mass production of the modern product. (See Le Corbusier, 133-148.) Lastly, credit is due to the French-Swiss architect in observing that "Architecture is the skillful, accurate and magnificent play of masses seen in light", which is magnificently close to Heidegger's "The sun bestows a clarity that allows all things to shine forth in their uniqueness and give to mortals their measure." (See Le Corbusier, 218; and Heidegger 2016, 56.)
[23] Frank Lloyd Wright, and Bruce Brooks Pfeiffer (editor), *Frank Lloyd Wright Collected Writings, Volume 5, 1949-1959* (New York: Rizzoli, 1995): 45-50, 60-63.
[24] Lloyd Wright et al. *Frank Lloyd Wright Collected Writings*, 48, 61.
[25] Peter Eisenman, "Post-Functionalism," in K. Michael Hays (editor), *Architecture Theory Since 1968* (Cambridge, Massachusetts: The MIT Press, 1998), 237.
[26] Eisenman, *Post-Functionalism*.
[27] Christian Norberg-Schulz, "Heidegger's Thinking on Architecture," in Kate Nesbitt (editor), *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory, 1965-1995* (New York: Princeton Architectural Press, 1996), 437, 439 (n. 49).

[28] Norberg-Schulz, *Heidegger's Thinking on Architecture*, 437-438.

[29] In two of his poems, Heidegger illustrates well the disassociation possible between us and the everyday due to the influence of the technological-scientific paradigm. Both poems speak to the phenomenon whereby the heavens – i.e., the sun, moon, and stars – appear before us every day (weather and moon cycles permitting) but we fail to see them when we look past them, far past them, as our imaginations are carried away with the thought of space travel or the fantasy of science fiction. Today we look farther beyond our own heaves with the aid of space-borne telescopes and digital imagery. The poems are "We live in the night" (*Wir leben in der nacht*) and "Dwelling" (*Wohnen*). See Heidegger 2007, 97, 167. The simple themes in the poems align closely with those in "Man's Dwelling". Translations are by Cesar A. Cruz, and are previously unpublished.

We live in the night
yet do not see the stars,
because unfamiliar to the splendor
what is near becomes distant.

Without merit, unpoetically
man dwells today,
a stranger to the stars,
devastating the Earth.

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BEYOND BOILING POINT: SUPPORTING STEAM IN HIGHER EDUCATION AND THE POTENTIAL OF ACADEMIC HYBRIDITY

Author:
KATHRYN BLAIR, TIA HALLIDAY, SAGE CANNON, LEEANNE MORROW

Affiliation:
UNIVERSITY OF CALGARY, CANADA

INTRODUCTION

Interdisciplinary learning and STEAM models for teaching are becoming more widely implemented[1] and gaining academic attention, both for professional reasons and to prepare students for complex challenges.[2] As these strategies become more prevalent in post-secondary institutions, the question of how to understand students' learning within them becomes more pressing for instructors creating them. The issue is especially challenging as these learning opportunities may be experiential and result in work products that are varied, creative, and project-based, and therefore not directly comparable with one another.

To explore the nature of experiential learning within an interdisciplinary framework, the authors of this paper undertook an in-depth analysis of artifacts of student learning in an interdisciplinary course, combined with analysis of student interviews about their learning. The course was "ART 465: Wearable Design for Mental Health", offered by the Department of Art and Art History at the University of Calgary in Alberta, Canada.

This paper shares the results of this study. After a description of the course and its conceptual grounding, we discuss the design of the study. Then we discuss the results, sharing how the multimodal artifacts of learning provided a new understanding of the students' process, triangulated with their reflections from interviews. Finally, we present challenges and opportunities of working with such artifacts of learning in interdisciplinary contexts.

ART 465: Wearable Design for Mental Health

To investigate learning in an interdisciplinary framework, the research team developed a course that broke disciplinary boundaries in which students would generate artifacts of learning for analysis. The resulting course, ART 465: Wearable Design for Mental Health, was an art studio course open to students from any discipline.

In the course, students developed a working prototype of a wearable device intended to support mental health. They drew on their research skills to inform their designs, worked with entrepreneurial coaches, did several technical projects to scaffold their skills, and implemented their prototype using the Circuit Playground Express platform. At the end of the course, they presented their work, including marketing materials they created, to community members as part of the Nickle at Noon speaker series at the University of Calgary.

Conceptual Grounding

Innovators in the field of wearable technology inspired the topic and content for the course. One such innovator was Dutch designer Borre Akkersdijk, whose work brings together e-textiles and mental health. His electronic blanket helps Alzheimer's sufferers communicate with their caregivers through feeling and touch.[3] Wynnie Chung and Emily Ip's *Wo.Defy*[4] is a somaesthetic,[5] feminist wearable art piece. It senses body biorhythms, helping the wearer gain awareness of their emotional well-being. As an aesthetically sophisticated example of wearable artwork addressing mental health, this work helped connect the course to its fine art roots.

Mind's soft surfaces workshop inspired the approach of having students jump directly into making their own wearable devices.[6] Mind, a UK mental health charity, delivered a workshop for its service users in Nottinghamshire, UK. These co-design workshops helped participants consider the intersection of technology and mental health in their community and focused on reflection and creative exploration rather than skill development.

Møller and Kettley's course for design students in which they created mental-health themed accessories for community members further cemented this hands-on approach where students are invited to jump in early as the one ART 465 should also take.[7]

In creating the pedagogical approach for the course, the research team looked to Seymour Papert's theory of Constructionism. In Constructionism, students build knowledge structures by making their ideas concrete through creation, because making requires problem solving which supports metacognition.[8] Thus, the course had students building functional prototypes, taking their ideas through a full design process from inception to reality.

Constructionism dovetails well with Matt Ratto's Critical Making,[9] as it expounds making as a way for students to extend their reflection with physical prototypes. Creating prototypes helps foster criticality in consideration of the objects being designed.

These points of conceptual inspiration led the team to ensure that the course activities encouraged a sense of play, experimentation, and learning-as-making. To help students be open to experimentation, the course used process-based evaluation throughout, including sketchbooks handed in at the midterm and final milestones of the course.

Academic Hybridity

The course incorporated theory and methods from art, design, psychology, computer science, engineering and entrepreneurialism to help students research, and create their prototypes.

Facilitating the creativity students needed to achieve the above required the teaching team to support students throughout their design thinking process.[10] The course structure allowed the faculty and the media mentors to work in concert with students to help them realize their visions. Students' diverse goals required diverse knowledge and skillsets to achieve. Some of these skillsets were possessed by faculty and media mentors, and some were built by encouraging experimentation and creative inquiry by the students.

To facilitate the integration of these diverse fields, several speakers expanded students' perspectives. These included the University of Calgary's Campus Mental Health team, wearable designers including Kenzie Housego (also a media mentor) and Kathryn Blair (media mentor and member of the research team), artist-researcher working on themes of mental health Razieh Alba (also a media mentor), Dr. Allison Gilmore, Health and Motions Algorithm Specialist at Apple, as well as the Hunter Hub Centre for Entrepreneurial Thinking.

Students' work reflected the different disciplines they were blending, and included the art and design work of creating their prototypes, the technical work of building the prototypes supported by several

scaffolded technical assignments, research on the mental health component of their work, and several business activities including creating marketing materials for their prototype.

Impact of COVID-19

ART 465 was scheduled for the fall of 2020. The onset of the COVID-19 pandemic in spring 2020 necessitated a complete reframing of the course.

Initially, students would have constructed their prototypes at LabNEXT, the maker space in the Taylor Family Digital Library at the University of Calgary, working with Digital Media Mentors employed there. As LabNEXT was closed and the course was moved online, instructors could not utilize those facilities or meet with students in-person.

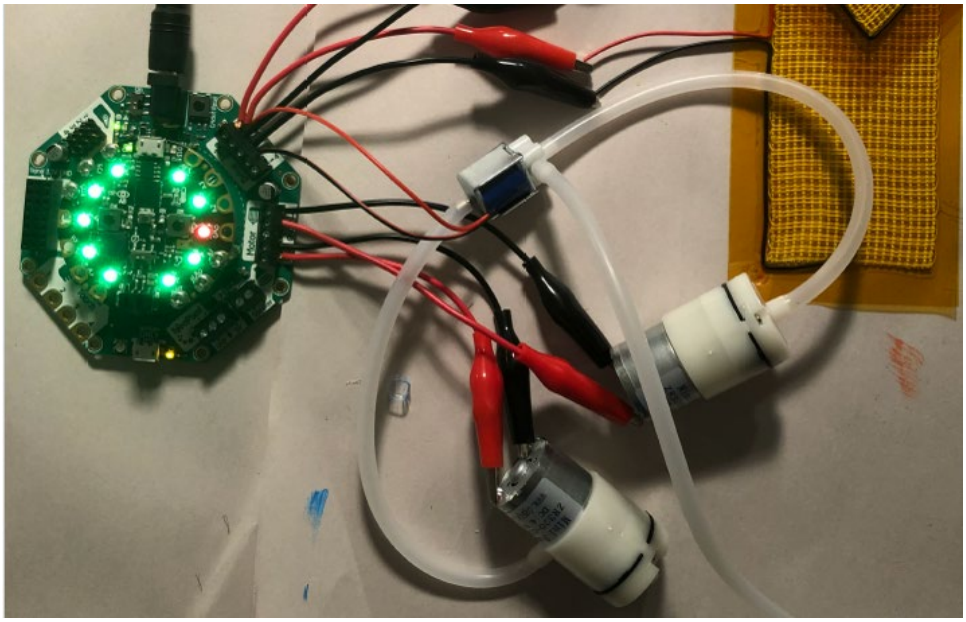

Figure 13. Alex Mai's Circuit Playground Express, connected to an air pump and heating pads

Instead, the research team, which included LabNEXT staff, adapted the technology plan to be accessible for students working at home. The Circuit Playground Express by Adafruit[11] (Figure 1) incorporates a microcontroller as well as several sensors, plus light and sound outputs.[12] Students could program it using a block-based platform, or by writing code.[13] These features made it flexible; students could work with built-in components and use block-based programming or add additional components and work in code to take their prototypes further.

Students were not able to meet with the media mentors or the instructor in person, but they could schedule zoom meetings outside of class time to discuss their projects and work on debugging or solving material problems.

STUDY: LEARNING FROM MULTI-MODAL ARTIFACTS

The spirit of experimentation that undergirded ART 465 and many similar initiatives in post-secondary education leaves considerable research still to be unearthed, particularly within the context of teaching and learning. To help fill this gap, the research team developed a study to understand how learning is cultivated within hands-on, interdisciplinary courses.

ART 465 students created digital portfolios, which included reflective text, process sketches, photos of work in progress as well as documentation of their final prototypes (see Figure 2). These portfolios provided a rich source of data about their thought processes, experimentation, and final designs. By

analyzing student work, the research team was able to gain insight into how students developed their ideas in this interdisciplinary context, and how the structure of the course contributed to their work. Our goal was to find curricular approaches that enable creative strategies which students can use to answer the unknown questions that lay ahead.

Study Design

At the beginning of the course, a non-teaching member of the research team visited the class and provided students with information about the study. Interested students submitted their email to be contacted at the end of the course about contributing their portfolios. When the course concluded, all marking was complete, and the grade appeal deadline had passed, the research team emailed those students a link to a survey gathering demographic data and a file containing their portfolio. The team asked students if they would like to remain anonymous or have their work attributed by name, and conducted semi-structured interviews with them for additional context.

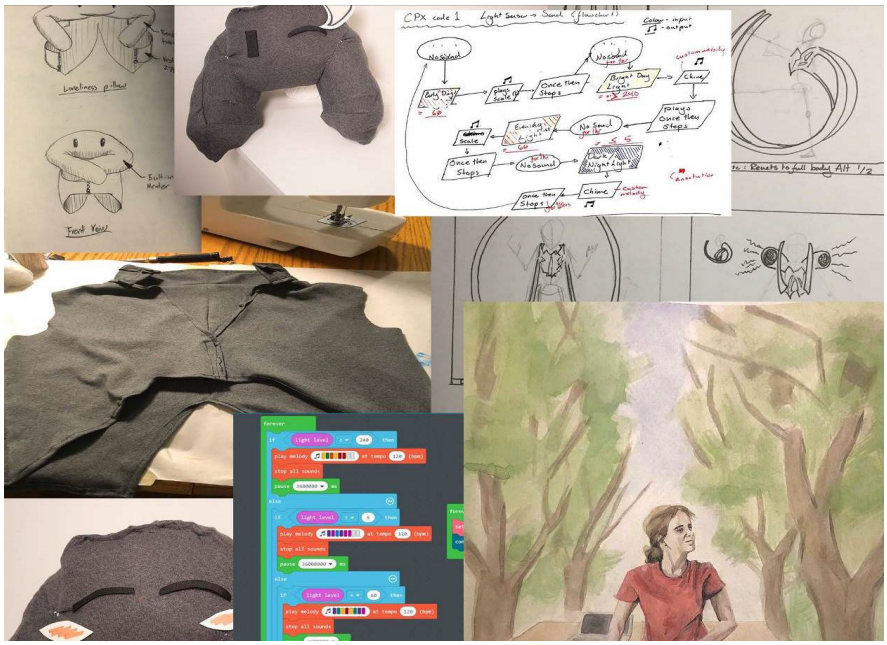

Figure 14. Collage of examples of multi-modal artifacts of learning by Alex Mai and Gillian Coulton

RESULTS

Now we discuss how multi-modal artifacts of learning are advantageous to students and instructors within interdisciplinary courses. We identify how the cultivation of entrepreneurial approaches to the creative design and research process, enabled students to develop skills that include and span beyond work-integrated frameworks of education.[14] Two students contributed their coursework to the study and participated in interviews. One was male and the other female, ages 22 and 25. Both indicated that they would like to be credited by name.

Role of Drawing Practice and Constant Sketching

The course was designed around the use of constant sketching. This practice was intended to get students regularly visualizing their ideas and documenting their creative process.

Each class began with a drawing “warm up” activity, where students spent five to ten minutes working on a visual problem or prompt. Afterwards, students held up their drawings to their cameras to share with the large group, contributing a little bit to the sense of community in the course.

These assignments were graded for completion, mitigating the pressure to create a "perfect" drawing. Avoiding perfectionism was important for emphasizing the utility of drawing to get out and develop ideas, rather than something geared towards a beautiful end-product in this context.
Students used sketching to get their ideas down, communicate, and expand their view of design:
"My sketches were mainly just putting my ideas down […] It's my way of brainstorming. Just put as much information on a page as possible and whatever I took out of my sketches, I try to either use that idea or maybe think about it while I'm planning out my project." (Alex Mai)
"It made it a lot easier for me to communicate to other people of what I'm doing too. If I can show them visually, I can tell them more thoroughly what I'm thinking about for the idea." (Alex Mai)
"I found particularly the anti-design sketches to be very helpful because I felt like they sort of expanded how somebody would think about design, because typically, you're designing for the best and don't always consider the worst. So I do distinctly remember being like, huh, this anti-design is actually very interesting and actually very helpful for thinking about design, […] particularly the design of objects" (Gillian Coulton)

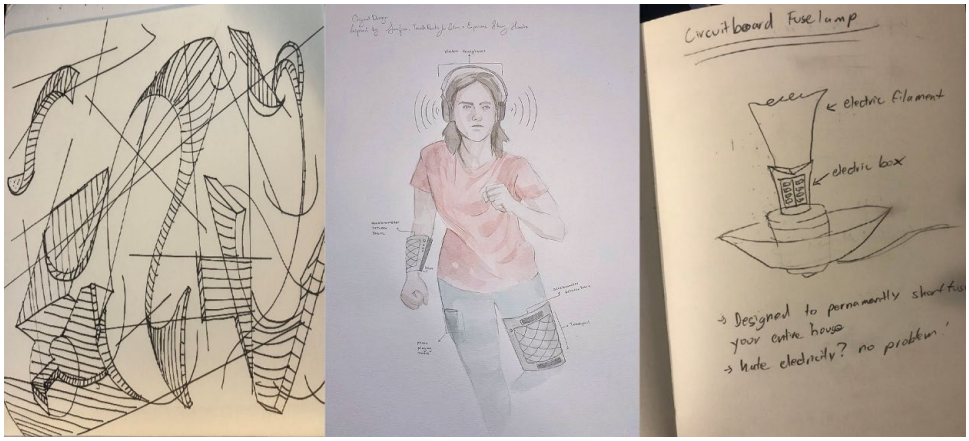

Figure 15. Three sketches by Gillian Coulton and Alex Mai

Flow Charts and Screenshots Showcasing Technical Processes

The ethos of iterative ideation and sketching extended to the course's approach to programming. Students drew sketches and created code flow charts (see Figures Figure 4 and Figure 5). The flow charts were sketches of how students planned to implement their code, which provided a way to think through their plan and iterate on it before moving into the programming environment. These flowcharts also made communication with students easier, so the media mentors could understand their goals and help students reach them.

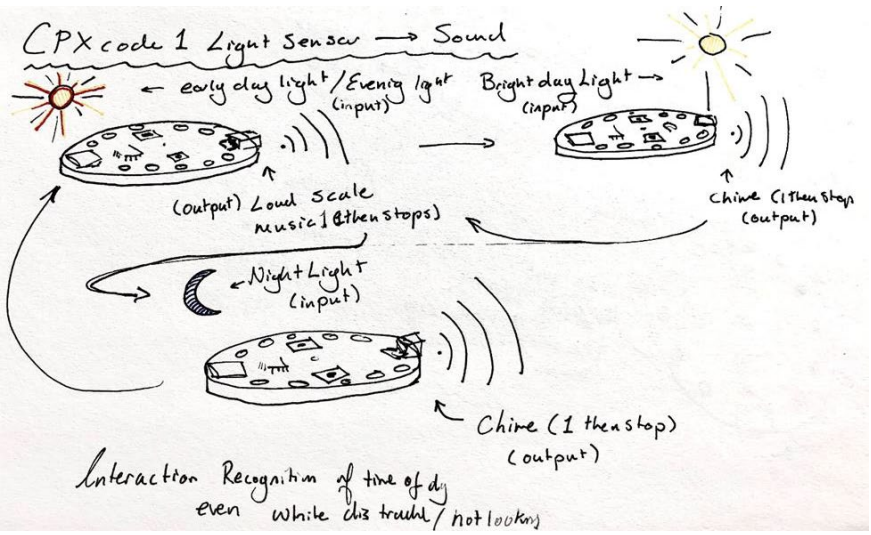

Figure 16. Gillian Coulton's sketch of what she would like their code to do

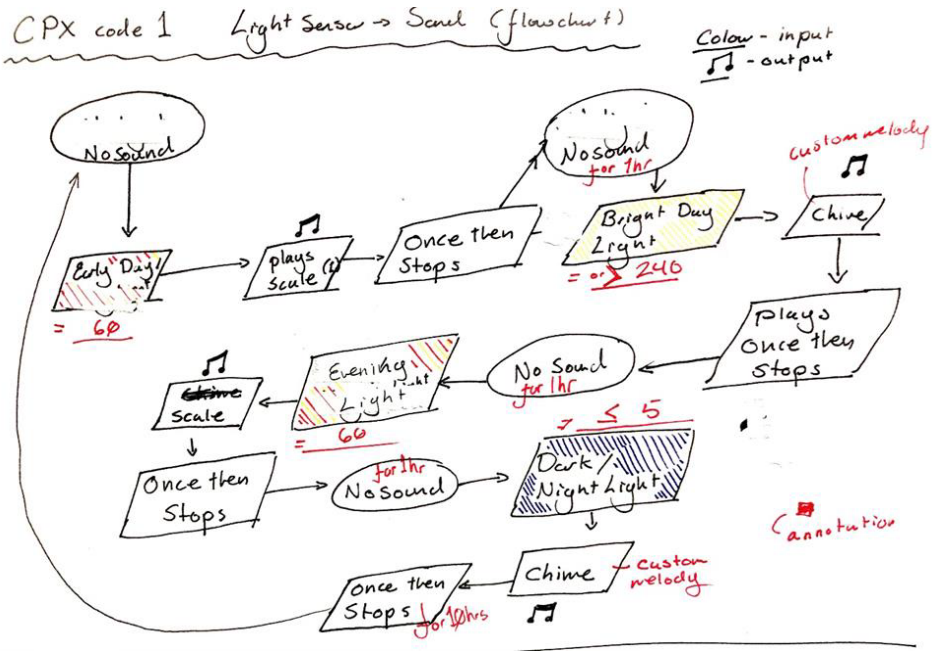

Figure 17. Gillian Coulton's code flow chart for an early technical exercise

Using sketches as a starting point for code helped make getting started less scary. The students already knew how to sketch and could use those skills to get down what they want to achieve, which they can then work toward implementing.

“Showing evidence of work and sketching out your process, is helpful for repeating it, which is kind of important in code.” (Gillian Coulton)

“That was really helpful, those small exercises. I didn't know anything about coding at all, but those small little assignments helped a lot with me figuring out how to properly code the device.” (Alex Mai)

Focus on Process

In the course, students presented artifacts of their learning and the creative process at every stage, from initial ideation sketches (such as those in 6) to final prototype and marketing vision.

Figure 6. Several of Gillian Coulton's initial ideation sketches, as well as a more developed drawing of their prototype.

Students reflected on their work in a midterm and final self-reflection document, where students examined their growth and learning throughout the course. They brought to bear all the work, research, drawing and experiments they had conducted throughout the course.

The reflection documents provided a wonderful "bird's eye view" of the student's creative process towards the development of their fully functional electronic wearable prototypes.

Gillian Coulton presented photos of her in-process prototype development and images of her workspace (see Figure 7). These images provided clues for how the student was approaching their project, enabling the instructors or TAs to provide tips such as new ways to pin fabric.

Figure 7. Photos of Gillian Coulton's in-progress prototype and sewing the prototype

When asking students to provide photos of their workspaces, it's important to acknowledge that students may be living in tight quarters or communal spaces with limited resources. Instructors must respect students' individual situations, access to resources and privacy.

The ability to revisit the breadth of the student's process of skill acquisition and creative design allowed for a deep evaluation of their work in the course. The final portfolio also enabled students to reflect upon and revisit their development in the course. The portfolios were comprehensive documents which showcased students' hard work. They were milestone documents which visually showcased "a job well done".

Figures 8 and 9 show the initial planning sketches for Alex Mai's fully-functional prototype called the "Loneliness Pillow". This wearable design utilized the went beyond the Circuit Playground Express' basic functionality to incorporate heating and inflation. Mai considered entrepreneurial approaches by creating a diagram which explained how the Loneliness pillow functions, and how they might market their design to a possible investor.

Mai said about the process-based components of the course, "I believe the planning phase of the course is essential in creating a functional wearable device. It helps us slowly develop our concepts and ideas and bring them into fruition."

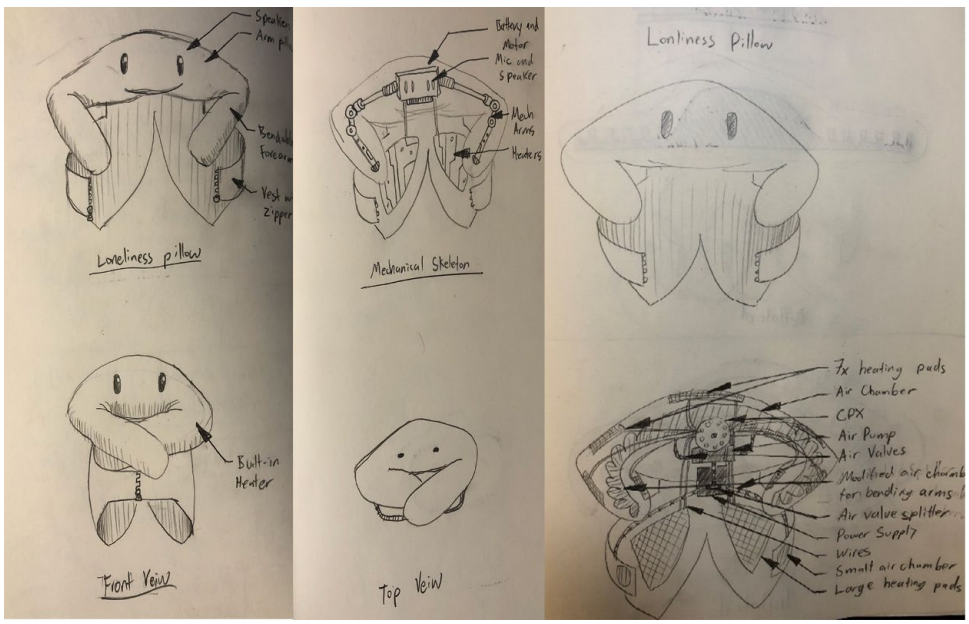

Figure 18. Alex Mai's sketches for his Loneliness Pillow

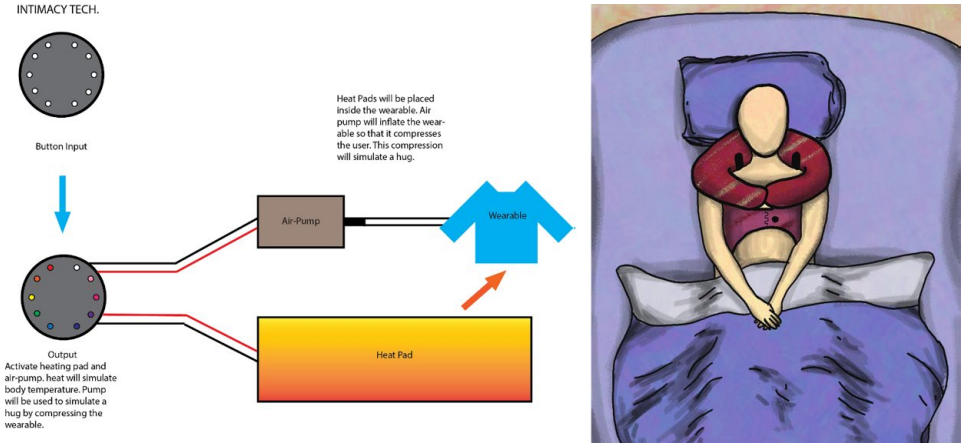

Figure 19. A sketch of the inner workings of Alex Mai's Loneliness Pillow as well as a marketing image

Students found the practice of documenting their process through drawing and using it to both iterate and concretize their ideas helpful. They found that it improved their work, and made their goals easier to achieve. Coulton reflected, "It was about the process, about discovery, about understanding these different things about design, [...] about coding [...] and how these things can influence, affect and maybe create an aid for mental health." (Gillian Coulton)

Presenting to Community

As a crucial component of the course, students had the opportunity to present to or dialogue with many key stakeholders at various stages of their research. This allowed them to get feedback on their work from parties outside the art department and the university, gave them the opportunity to present their work in a professional setting, and was a way of celebrating their accomplishments throughout the course.

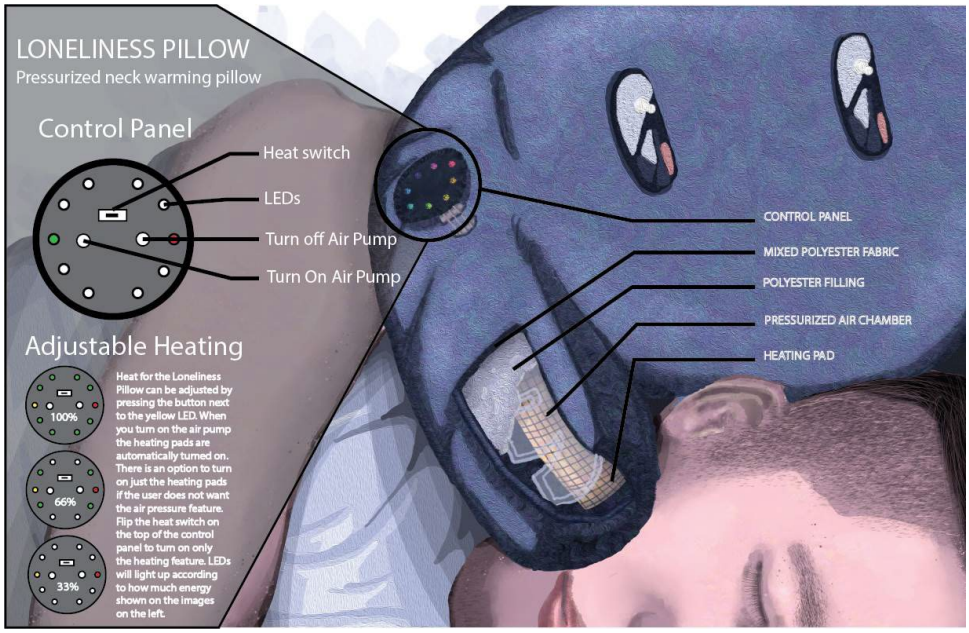

Figure 20. Marketing Material for the Loneliness Pillow by Alex Main which was presented at the Nickel and Noon talk

Students gave a final public presentation via zoom, which featured video of each student's prototype as well as their marketing plans and materials (see Figure 10 for an example). The event was part of the University of Calgary's Nickle Galleries "Nickle at Noon" speaker series. Students' work also caught the attention of university media, which published an article about their prototypes.

Throughout the course and at the event, students had the opportunity to dialogue with both the general public and experts from UCalgary Campus Mental Health, the Canadian Mental Health Association, BME Calgary, the Hunter Hub for Entrepreneurial Thinking, Neuronexus (a local startup), and local and international experts.

These partnerships demonstrate how entrepreneurialism was woven throughout the course. Students considered potential clients while ideating, created a marketing strategy for their project, and presented their work to the public.

Students were anxious to present, but found the opportunity valuable:

"I was definitely very anxious about presenting it, but I was, at the same time, very excited to show my work, because it was something that I wanted to research about for a long time […] I think it went really well, so I'm really happy I did that." (Alex Mai)

"Being able to present research and this experience to a larger audience is valuable because it makes you consider, why did I do this? How did I do this? What does it mean for people who aren't me?" (Gillian Coulton)

CONCLUSION

By collecting and analysing these multimodal artifacts of student work, the research team found that concretizing ideas by creating these documents of process helped make it possible for students to achieve this challenging, transdisciplinary work.

The documents supported communication between students, the instructor, and the media mentors, which facilitated students' ability to realize their designs as they relied heavily on advice and support from the teaching team.

Capturing their process both supported students in taking all the steps needed to scaffold new knowledge from unfamiliar disciplines, but also allowed the instructor to effectively recognize their work and thought processes.

We see strong opportunities for instructors who wish to support their students in challenging and rich interdisciplinary work in using multimodal artifacts of learning in their courses. These documents effectively capture and support students' creative process. They allow students to concretize their ideas, enabling collaboration and reflection. Finally, by making their thought process clear to the instructor, they support comprehensive evaluation that recognizes the depth of work students have done, as final polished pieces do not capture the struggles and problem-solving students went through.

However, there are also challenges associated with using multimodal artifacts of learning as part of assessment in an interdisciplinary course. Marking portfolios with a wide range of content increases student labour as they must document their process rigorously, and the documentation must be evaluated by the instructor. There are privacy concerns that come up as students will be including images of their personal workspaces and the resources they have access to. In an interdisciplinary course like this one, resources of the university are also a concern; is it possible to provide media mentors to help students reach their technical goals?

While the forms that multi-modal artifacts of learning take will be specific to each course in which they are utilized, our research has shown that they are a rich and effective way to capture students' process. This supports better evaluation, as well as better student work.

NOTES

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CO-CREATING THE CAMPUS TO BRIDGE DESIGN THINKING, ACTION RESEARCH, AND PRACTICAL EXPERIENCE DESIGN

Author:
AMY KERN

Affiliation:
METROPOLITAN STATE UNIVERSITY OF DENVER, UNITED STATES

INTRODUCTION

This paper examines the role of implementing a pedagogy with action research (AR) and practical experience design into a popular Design Thinking (DT) course to increase student engagement. Tapping into the student's shared experience on campus, this course prompts cross-disciplinary students to practice methods and skills to benefit their peers in a measurable way. After four semesters of observing the students' successes, constraining the projects to leverage first-hand shared experiences promoted more student investment in and out of the classroom. The project prompt resulted in a significant amount of educational commitment and many quality design solutions to campus infrastructure, product, systems, and spaces. Incorporating evidence from primary and secondary research into their design interventions, the students are motivated to problem-solve and practice empathy while working through the design thinking framework to develop innovative solutions that are evidence based. These outcomes are particularly evident in the rigor students show as they complete and apply the insights learned from assignments to best inform their unique human centered design solutions. These portfolio quality final designs and the results from their research may then be selected to be forwarded to senior leadership on campus for potential funding which inspires, incentivizes, and ensures practical application from the first class onwards.

Interrelated Key Concepts

Action research (AR) methodology helps to direct and drive design through the DT framework with a human-centered focus in this pedological study. AR "emphasizes collaboration between researchers and participants to identify problems, develop solutions and implement changes".[1] Similarly, DT is concerned with "continually considering how what is being created will respond to human needs".[2] Together, they inherently create a compelling narrative for projects that captures the attention of the campus's senior leadership in this study. Students designing and researching *with* and *for* fellow students, brings inclusive, impactful concepts to bear that are provocative and actionable. They meaningfully arise from the student's first-hand experiences and assumptions are verified by other students via multiple AR strategies. AR has been a powerful model for advancing community place-making projects[3] acting as a framework and catalyst for co-creation. Co-creation is a valuable concept and mindset for human centered design projects. "The best way to co-create value is to focus on the experiences of all stakeholders"[4] to provide them with rewarding improved experiences. Additionally,

accessing and providing a platform for student's visions of campus improvements is increasingly valued when planning a campus that aspires to be genuinely responsive to new or unanticipated student needs. The ongoing results of AR in this course have provided relevant and practical designs for campus stakeholder experiences. Although students are encouraged to find feasible opportunities within any design category (product, system, service, or space), emphasis is on analyzing the entire physical or digital experience to understand multiple touchpoints that influence the perception, acceptance, and usability of their proposed design interventions across diverse user groups. Further, practical experience design concepts are taught to frame and supplement AR and DT assignments from a slightly different perspective, reinforcing that "understanding the user journey through a functionality map helps identify pain points, simplifying product to improve the user experience".[5]

Research Setting

In real time, in a place the students know well, and for a community they are a part of, the cohorts in this Design Thinking course practice action research and propose positive changes to their university that benefit fellow students. This study involved observations in-class, interviews, and pedological documentation as tools to follow changes in student learning during and after the improved course over four semesters in two years. Taking theories and making them practical in and out of the classroom has inspired increases in student engagement, problem-solving, collaboration, and confidence over consecutive seventeen-week semesters of the experimental pedagogy described in this paper. Each learning objective was defined to resonate with the course content, industry skills, and project expectations- please refer to Table 1. These objectives share a human centered focus which correlates with both AR and DT and the other interrelated key concepts.

KEY LEARNING OBJECTIVES		
Develop actionable strategies for integrating forward momentum in projects (Time and Project Management)	Evolve insights into innovative designed artifacts with proven value (Analytical/ Qualitative Skills)	Embrace change, course corrections, and lean into failures to practice agility in an ever-evolving industry (Flexibility/ Adaptability)
Principles into projects, empathetic understanding of the needs of diverse user groups (Equity and Inclusion)	Foster teamwork skills and nurture collaborations with a diverse group of stakeholders. (Professionalism/ Team)	Make tangible, envision and communicate the change you want to make (Creativity/ Communication)

Table 1. Student Learning Objectives

The university course's success is deeply dependent on the students themselves. They are the intended beneficiaries of the project's success and co-creation occurs constantly within the confines of the cohort. There are no prerequisites for this upper division course and students from all disciplines are equally welcomed onto teams. Radical collaboration with diverse teams and voices often begets the strongest results. Therefore, different perspectives are sought and surface using the Design Thinking (DT) framework first within the classroom and later with the larger community of campus stakeholders. DT courses naturally draw students who seek a strategy of innovation to tackle problems and so this self-selected cohort is already primed upon enrollment. The context of the course is also meaningful, the campus is commuter, urban and shared by three separate universities and over 40,000 students, faculty, and staff. The university is comprised of many non-traditional students from different backgrounds, ages, cultures, and economic segments. Importantly, the campus is imperfect, siloed, and can be difficult to navigate. It has been proven by students to be fertile ground for problem identification.

Connections to Practice

Students develop practical skills throughout the semester including top competencies which employers look for in college graduates, according to the National Association of Colleges and Employers.[6] Additionally, since selected student projects are taken out of the classroom and brought to senior leadership on campus, in-demand relevant work experience and entrepreneurship is evidenced, providing these students with marketable experience to prepare them for professional work.

Employers are seeing rapid market and field changes. In this climate, a premium is placed on graduates that are agile problem-solvers and excellent communicators. This course amplifies the flexibility of both AR methods and DT mindsets to empower students to craft and communicate empathetic contributions that are practical, purposeful, functional, and evidence based. The most explicitly sought out skills for graduates are iteratively practiced and refined through assignments, discussions, and presentations. Strategic thinking, cognitive empathy, insight mining, teamwork, and growth mindsets are built and reinforced over the semester- see Figure 1.

PEDOLOGICAL METHODOLOGY

Setting the Stage

The first week of class tasks students to declare a theme in which they will design and the specific group(s) of students they will target as their primary users. This is the starting position, and it is intentionally broad. Students should not have a solution already in mind as it is more human centered to find the solution through observation, interview, and collective ideation assignments. The project prompt is simple: How might we design a product, service or space that improves the campus experience for students? The few constraints are to commit to a theme, start not with a solution but with research and a perceived problem, research the context, and review deliverables and project commitments. These constraints tend to fix an uncomplicated path forward at the onset so that students can visualize and launch project research and development. Each theme is described with industry cases to inspire and illustrate the breadth of projects possible and real-world application- as summarized in Table 2. Past student projects are also linked to themes as examples of typical directions students choose to develop after their initial exploratory research.

THEME	CASE STUDY for THEME	Past Student Examples
Health and Wellness	GE's Adventure Imaging equipment	Installations to Connect Students with mental health resources.
Retail and Shopping	Warby_Parker	Vending Machine for Class Supplies. Student Art/Design Retail area.
Food and Dining	UberEats	Farmer's Market/Pop-Up Test Kitchen.
Entertainment and Education	Netflix	Designing Active Classroom with Biophilia/custom furnishings.
Travel and Adventure	Airbnb	Adventure Club: match students with shared interests to guides, experts, transportation.
Outdoor and Recreation	New York community parks	Campus Nature/History Trail.

Table 2. Student Introduction Summary

Course Structure

Each presentation, assignment, discussion, activity, and collaborative session prepares the students to confidently progress with individual primary and secondary research throughout the semester within their chosen 'themes'. The course schedule (Table. 3) is provided for students to look ahead and anticipate what is expected weekly. In this multi-faceted and active learning environment, the students find what works for them and what works for their projects, or they find alternatives quickly and without negative repercussions. The students build on the teacher-led scaffolding and adapt the lessons for their project development independently. This agency, quick agility and problem-solving is highly valued in project management.

Week	Date	COURSE Schedule: * Content and timing subject to revision during semester	Subtopics	Activity/ Assignment	Concententration
Week 1	1/17	Overview course Syllabus, examples & 1st presentation: Why Design Thinking Matters. Introducing the Project Challenge: Learning by doing.		**Homework**: Choose your project theme and student user group.	
	1/19	ICE BREAKERS Brainstorm your theme and user group + Group brainstorming activity Activity for homework introduction (photo Observation activity)		Activity: innovation popcorn session! **Homework**: Photo Observation Assignment: Take pictures of your life & on campus related to your theme upload them onto CANVAS.	Converge vs diverge
Week 2	1/24	Photo Observations due Making insights through OBSERVATION – ethnography. Practice how to listen with your eyes in order to understand what people value and care about. 6 tips for observing. Preliminary activity for persona/scenario building.	Start observing your target audience: Use observation techniques that will help you understand user behavior.	Activity: you'll look at four photos from someone's life. What can you learn about this person through observation? Make note of the what, why, and how of observation. **Homework**: Persona/ Scenario: Write a preliminary Persona for your user & a Scenario that is relevant to your project.	observation
	1/26	Persona/Scenarios due Latent and Unmet needs mining- Informal Contextual Interviews and Analysis Techniques and Tips. Practice "true curiosity" and move past pre-existing judgements and stereotypes about people and the problem. Bad user interviewing skills: Take a look at an interview gone wrong. Define the problem- Choosing "The Right" Challenge- how might we statements (HMW).	Learn how to conduct a great interview so you can get deeper, more honest answers that inspire great insights.	Activity: Better understand the needs of your users by fact checking your assumptions WITH your interviewee: co-create. Compare what you learn about someone when you observe them vs. when you meet them in real life. **Homework**: Share Your Project Story: prepare your story pitch, use visuals to bring your story to life. Consider how you might amplify your audience's connection with the people and the problem through thoughtful visual storytelling. (you'll SHARE SCREEN)	Informal interview
Week 3	1/31	Share Your Project Story presentation due Share your HMW idea in a story slide presentation		Activity: presentations	Storied pitches
	2/2	Presentations Continue & Discussion Break Outs			
Week 4	2/7	Empathy And What is Human Centered Design? Role playing. Learn how to create analogous immersive experiences that get you beyond intellectual understanding to obtain a more visceral sense of another's perspective.	Develop ideas for innovative products and services by keeping your user's needs at the center of the development process.	**Homework**: Immersive Empathy: Design and conduct an immersive empathy experience for your project challenge and document.	Empathy
	2/9	Go beyond brainstorming—learn techniques for coming up with an abundance of innovative ideas. Sketch to Think- rapid visual thinking boot camp		Activity: Ideation session with breakout finale	Empathy

Table 3. Course Schedule: First Month

Evidence Based Requirement and Reporting

The course instruction stresses that 'Ego-Driven' design is far less respected than 'Evidence-Driven' design. Research to verify assumptions, to guild course-corrections, and to understand the latent and explicit needs of users is a stated priority. Most of the required assignments direct students to methodically practice and share secondary and primary research discoveries. Having the campus and the campus community available and ever-present makes the research personal for each student. They tap into their own feelings on campus as they empathize with feelings of different user groups. Ethnographic research assignments materialize as campus observation scavenger hunts, identifying journey touchpoints begins with a personal school day experience map, and a semester's favorite activity has become 'guerrilla testing' solutions with passersby paired with an open BBQ. These

playful and structured activity assignments simultaneously provide rich insights and removes the formality, and intimidation, of research.

To eliminate second guessing from the sometimes-daunting task of visually and verbally communicating ideas with others, students are provided with examples to organize their storytelling. All the pieces that make up their projects unique 'story' are templated and provided at the beginning of the semester. The content of each piece of their final presentation is systematically developed with DT assignments and challenges most weeks during the semester. The culmination is a short final 'pitch' presentation with a clear and persuasive call-to-action for a specific campus change that benefits the student experience. They include a glimpse of how that change might look and feel along with research summaries that pinpoints a value proposition. Additionally, the solution concept must evidence a substantiated student need.

The ability to 'craft clarity' when pitching or communicating developing insights and ideas is exercised early and often so each student can find their own voice and presentation style appropriate for their pitch goals. This helps to reinforce many important professional skills and it gives students confidence to express themselves in a positive and productive fashion.

FINDINGS

Observed Increases in Learning Objectives

Qualitative and quantitative measures via deliverables were analyzed against course learning objectives and compared to similar courses taught in the program. Students demonstrated developed skills and mindsets through assignments and challenges as they worked through the framework and action research methodology. Many DT and AR activities and tools lend themselves towards this end. For example, in this course, students practiced immersive empathy[7] and systematically documented and communicated all beneficial resulting outcomes. Iterative problem-solving was reinforced through the simple, non-linear, DT stages which enabled students to become flexible, embrace ambiguity, and build creative confidence by learning from and leaning forward from failures. This important mindset only resonated with students when being applied towards design concepts they had a self-selected investment in. Project management skills, similarly, resonated more deeply when incentivized and expectations clearly outlined. Report guilds, or templates, helped students familiarize themselves with professional deliverables and track their own progress in reaching their goals within structured deadlines. Along the way, critical thinking skills were amplified and shared.

The educator often noted students helping each other to evaluate, interpret, prioritize, and analyze incoming information from research.[8] This bouncing of initial assumptions off peers at incremental checkpoints built crucial teamworking skills. For example, students worked in brainstorming sessions[9] with affinity diagrams to organize and assess the potential of individual ideas collectively. Also, within the classroom, in constantly changing and evolving teams, students collaborated, communicated, and actively listened with respect during prompted and timed challenges.[10] They were prompted to take turns 'speed-testing' prototypes with follow-up team interviews one-week and prompted to share and discuss a selection of move-forward ideations the next week. Using the team to collect consensus resulted in more human-centered skills and solutions- see Figure 1.

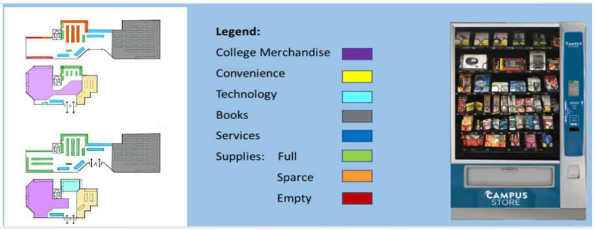
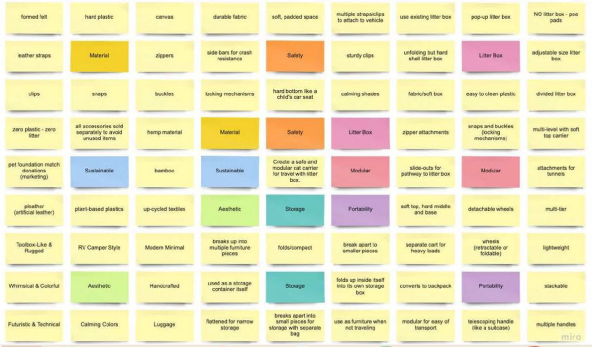
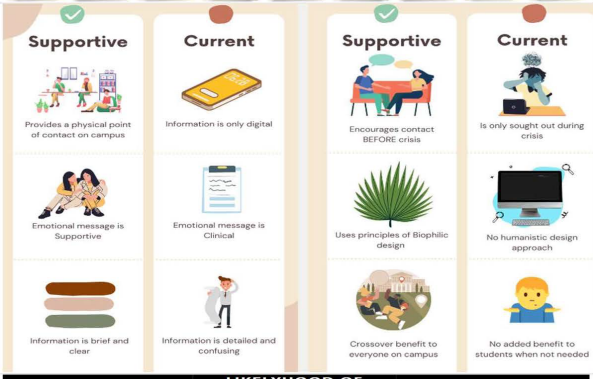
Critical Skill	Assignment/ Challenge	Student Response	Solution Example
Willingness to Learn Equitable/ Inclusive	Insight Report derived from Immersive Empathy Experience	"After putting myself in the 'shoes and places of our houseless neighbors, I experienced the terrain they typically encounter, what they often carry, and how people treated me differently."	
Project Management Goal Identification	Product Requirement Document (PRD)	"To draw in customers, we need competitive weekly deals, strategic locations, informative advertisement and local partnerships."	
Critical Thinking	Affinity Diagram and Lotus Blossom	"By having a physical starting point to rank ideas, it was easy to expand the idea pool with more direction without losing focus on my project goals"	
Teamwork	Evolving, Timed, and Prompted Break-Out Team Sessions	"Together, we identified the factors that had the most positive impact over the current offering and then brainstormed about ways to bring them about. Some people on the team really changed how I thought about the problem"	
Problem Solving	RISK Register and Recommen-dations	"Once I understood all the ways the app could be misunderstood, It was easy to find some better features for usability."	

Figure 1. Summary of Skills, Assignment Prompts, Responses, Student Examples

Student Results

After 4 consecutive semesters in this two-year study, this pedological approach yielded notable student engagement and quality work. Most students (over 92%) met or exceeded expectation on each of twelve assigned deliverables. The average calculated final grade of the 62 students in the study was 89%. This is a marked improvement over student investment in similar design courses (about 78%).

The students, when interviewed and polled, expressed that most of the assignments were clearly defined, fun, and satisfying. Each built upon the others and became important building blocks towards their final project proposal.

Although difficult to quantify definitively, measurable increases in student engagement with the in-class material was also consistently noted. This course limited traditional lectures and, instead, relied on short videos, case studies, and challenges with lively discussions, ample time for clarifying questions, and enthusiastic participation. Students also appreciated that class time was allocated for collaboration. Students reported they quickly learned it's value and began to treasure the input of their peers.

The educator witnessed outstanding and well researched solutions for campus problems. For example, one student sought to better inform others of the mental health care resources available on campus. After many iterations and ideas, her layered solution was a direct result of research discoveries. She grasped a real problem and worked with students to identify different approaches to inform and connect them with resources in non-intrusive, non-judgmental, and pro-active ways. Most students in this cohort had equally actionable project statements with each student tapping into a problem they had experienced first-hand and verified that it was a shared problem not unique to them. They did this with primary and secondary research which proved it a worthwhile project to explore and design impactful solutions for.

External Product

With in-class polling and voting for peer projects that are deemed most feasible, most beneficial, and most needed, students themselves decide on which projects to be selected and forwarded to senior leadership on campus after the end of the semester. This incentive was made clear at the beginning of the semester and is a valued 'prize', not only validating their project's excellence but, as one student said, "instead of just complaining about campus, I knew I had a chance to really make a difference here." Campus leaders, including the university president and her cabinet, have stated appreciation of the research and visions of campus originating from actual students as part of the university's commitment to building equitable community. After development with a network of mentors, the chosen projects, and a summary of all the class's work, has been presented with the president's advisory council for the built environment and infrastructure report. Although no single project has been fully funded and actualized, the student projects and research has been well received and some are under serious consideration for future development.

CONCLUSION

The DT course cohorts displayed observable connection to the content, users, and each other that positively impacted both individual students and their proposed campus solutions. Students in the design thinking course will continue to be challenged to design projects that explore feasible design interventions on campus this coming semester. In the safe and experiential in-class context, students are granted freedom to think outside of normal infrastructure constraints, receive effective scaffolding, and tap into their own campus experiences to refine practical solutions. This is fertile ground for innovation. This structure has afforded students an opportunity to take theoretical concepts into the realm of actionable design planning and grow best practices. They have shown successes in teamwork, pushing boundaries, thinking holistically, and have earned the respect of campus leaders.

To conclude, the motivating action research in the design thinking course has increased student engagement, provided professional in-demand skills, revealed student problems and solutions to strategic campus planners, and instilled confidence to design for change in a complex system of experiences to benefit others. This two-year study is still evolving but after its current iteration and the

positive student outcomes, the course will continue to be refined in subsequent semesters, brought to larger cohorts, and the student projects will continue to be shared with the larger community for formal and funding discussions.

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BEYOND TRADITIONAL PEDAGOGICAL METHODOLOGIES: MODERNIZING THE TOOLKIT

Author:
SYLVIA C. DELUCA

Affiliation:
WENTWORTH INSTITUTE OF TECHNOLOGY, UNITED STATES

INTRODUCTION:

With student engagement continuing to be a challenge in the post-covid classroom, the days of the traditional, rigid, one-way teaching model effectively holding the attention of our students are over. We need new tools to keep the learning environment fresh and energized and our students interested while continuing to learn in new and innovative ways. Some examples are taken from 2 recent semesters in both lecture-based classes and a design studio.

First, a lecture-based History of Interiors class that is typically heavy in testing and writing papers was restructured to utilize project-based learning. The goal being to connect design skills to class content and invigorate what could be a stale environment of basic information transfer. Students stated they learned and retained more with the contextual use of information to do their own analyses or create their own designs based on the given historical period.

In another lecture-based class focused on environmental psychology, an experiential learning workshop was employed to have student experience functioning with a multitude of disabilities rather than just learning about them via lecture. Using this "empathy kit" simulation activity with props to give firsthand experience of having sensory and mobility impairments made learning more visceral and memorable. In one exercise students donned glasses that severely obscured vision to simulate multiple forms of vision impairment like cataracts or macular degeneration while reading. Students struggled and understood the challenges of living with disabilities in a more tangible way that could not have been provided simply by a textbook or lecture.

Lastly, a storytelling exercise was employed to launch a semester design studio to connect how a typical plot arc can help create a stronger design concept and narrative for a workplace project.[1] Students are often too heavily focused on information for their projects to the detriment of their design concept and story arc. Understanding what makes a story compelling could then be woven back into how they developed their design projects with those lessons in mind.

With so many challenges in higher education, adding fresh new pedagogical practices to our toolkit is critical in keeping our students engaged and learning in our classrooms.

STUDENT ENGAGEMENT

Educators are often struggling to connect with students and keep them engaged within the classroom environment. This generation of students learn differently and expect more from their academic experience than just sitting in a room with someone lecturing at them.[2] They refuse to be passive

learners. In order to connect with them in meaningful ways that often means moving outside the classroom setting while also rethinking the methods and activities used within the classroom setting.

The Glass Barrier: Screens and Learning

Students are often distracted by smartphones or hiding behind laptop screens during lectures with their attentions divided. As of 2023, the average daily screen time in the United States is 7 hours and 04 minutes.[3] In a study of 228 children pre-pandemic screen time was 4.4 hours per day and increased 1.75 hours per day in the first pandemic period and 1.11 hours per day in the second pandemic period.[4] Even now, the rates of screentime continue to stay elevated and are unlikely to decrease.

Instructors and administrators see student engagement as a significant challenge with many students reporting feeling unmotivated[5] and disconnected. In a survey of French university students during the pandemic, they said, "I'm not listening to my teacher; I'm listening to my computer. Remote classes give us a lot of freedom, contrary to face-to-face… you're in a room and you feel surveilled, so you feel like you have to work whereas now we're at home, nobody sees what we do."[6] This disconnect can often still be felt like we're still separated by a screen with students forgetting they are in the same room with their instructors.

Before the pandemic standard teaching practices were no longer holding our students' attention and since returning to the classroom, this issue has continued to challenge us as educators. With the constant presence of screens, this will continue to be a struggle that needs to be addressed in how we teach.

MAKING CONNECTIONS

So how do we bring them back and keep our students engaged? The answer is often taking a fresh look at class content and connecting activities and modalities that aren't usually linked together.

When planning class schedules educators now look to incorporate some "out-of-the-box" learning activities to capture students' interest and keep them engaged. These exercises don't have to be radically innovative in nature. Simply making unexpected connections between topics that aren't typically thought of together and giving them more hands-on and project-based learning opportunities in classes can make a significant difference in both engagement and retention.

New Connections and Learning

Our brain is a network of neurons connected by synapses. During learning, these synapses get reinforced, increasing in size and creating stronger connections. In 1949, psychologist Donald Hebb laid out his "assembly theory" that can be summarized by saying "neurons wire together if they fire together[7]". In layman's terms, the greater variety of neurons that fire during an activity the stronger the neural pathway that is created. The idea is that neurons responding to the same stimulus connect preferentially to form "neuronal ensembles", which then increases memory recall.[8] Similar to ideas on neuroplasticity, the more someone does something, the more well-worn the neural pathway becomes and the stronger it gets.

Strong connections are formed during an experiential learning activity because more complex processes require the involvement of many neurons in different areas of the brain, which encourages the process of encoding information in our brains. This means that activities that bring disparate or new things together create a neural pathway more likely to be recalled in the future.

PROJECT-BASED LEARNING: BRINGING HISTORY TO LIFE

One example from a recent semester was restructuring a traditional lecture-based History of Interiors class to include multiple project-based learning activities to connect design skills to class content. This helped invigorate what could have been a stale environment of basic information transfer into an active class where history was brought to life in multiple design projects.

In one exercise, students were asked to design an object of their choice after learning about Art Nouveau. One student designed a hairpin inspired by the movement. Actively using what they learned in a design of their own triggered a great understanding and recall of the period. Another assignment was to design their own chair based on the Art and Crafts movement and William Morris's designs and theories. Two other assignments had them leaving the classroom to survey buildings at the nearby MIT campus and document the many styles found in the Eclecticism inspired Boston Public Library by McKim, Mead and White.

At the end of the class, students stated they learned and retained more with the contextual use of information to do their own analyses or create their own designs based on the given historical period. They also used what they learned from the historical periods in their studio projects in the same semester. This approach seemed to bring history of life more than testing or writing papers had in previous semesters.

EXPERIENTIAL LEARNING: EMBODYING EMPATHY

Another example brought experiential learning to a junior level class that teaches the psychological and social relationship between humans and the built environment. Some class modules highlight the challenges of populations like the elderly and those with a variety of disabilities within the built environment.

Educational philosopher John Dewey felt there was no greater way to learn than by doing. Dewey stated, "There is an intimate and necessary relation between the process of actual experience and education".[9] According to another well-known psychologist, David Kolb, "real learning happens when you have an experience, reflect on that experience, form your concepts and conclusions, and finally test your hypothesis in a real-world situation".[10]

Another one of the basic tenants to Dewey's philosophy is that humans and especially children are inherently social creatures.[11] Everything occurs within a social environment, and this means the social nature of mankind is also critical for education.[12] "The principle that development of experience comes about through interaction means that education is essentially a social process"[13] Teaching by experiential learning is characterized much more by two-way communication, not only between the students and the instructor, but also between the students themselves.[14]

Using Dewey's theory as inspiration, a class period was devoted to age related simulation activities using kits developed by Brock University in Canada[15] that offered props like weighted vests, vision impairing glasses, a walker among other items to give firsthand experience of having sensory and mobility impairments. Cards with mobility or sensory challenges offered scenarios like "Put on the 40-pound jacket and pick up two bags of grocery" to simulate issues with obesity or age related mobility issues. Or donning glasses that severely obscured vision to simulate multiple forms of vision impairment like cataracts, nature yellowing of the eye with age and macular degeneration while reading.

For this exercise, students had to put down their screens to execute the challenging tasks assigned. They had to be completely present, physically and mentally engaged in the activity and work together as a team.

Students' reactions during the activities and after showed a deeper understanding than any lecture could have offered. They struggled with the challenges and were openly struck by the difficulty of

some of the exercises. The activities emphasized the reality of how difficult such impairments can make navigating daily tasks and the effects on quality of life and emotional well-being. Going beyond the classroom using experiential learning and empathy brought a new opportunity to gain knowledge on a much more intimate and visceral level.

One student stated in a final essay about the class "As much as accessibility has been a subject we have been taught to consider in previous courses, witnessing these setbacks firsthand makes it easier to consider what needs to be put in place when designing."[16]

"…doing the empathy kit [workshop] was what will stick with me the most [from this semester]. [W]e think we have an understanding of what it is like to have a disability but performing the tasks in the empathy kit is really eye-opening. I believe this activity will stick with me for a long time. As we discussed in class before, sometimes as designers we find ADA requirements difficult to design with, and a lot of the times designers will only meet the minimum requirements. The [workshop] made me realize we shouldn't always be striving for the minimum requirements." [17]

"These activities showed me what it was really like to have a disability and how important it is to think about inclusive design to all."[18]

STORYTELLING AND DESIGN

Lastly, a storytelling exercise was used to kick off a semester design studio to connect how a typical plot arc can help develop a strong concept and narrative for a workplace project. As stated by Ellen Lupton in Design is Storytelling, "Human beings actively seek and create patterns as we navigate the world…"[19] Good design communicates more that information about site, program and end user data. Good design should engage the user on multiple levels. As designers we are storytellers and "Effective storytellers convey emotion, feeling and personality. They bring characters to life and settings to life.[20]"

The students had to deliver their stories in 3 different ways, as a written essay, in a verbal presentation and visually in a slide show format. This was done to reinforce the lesson that stories can and should be told differently based on the audience and the medium. The storytelling lessons were repeated over the course of the semester to solidify the knowledge and connections made in that first assignment. They were stronger presenters by the end of the summer with many stating that because of the exercise they had a greater understanding of both the importance and relevance of storytelling in design. They also shared that the storytelling exercise in the beginning of the semester made them think about project and concept development differently.

CONCLUSION

With positive outcomes from each of the 3 strategies confirms the theories that we learn more deeply when we are actively doing and making new connections. Of the strategies discussed none is radical in and of itself. It's the juxtaposition of things not typically done or seen together that gives the novelty and freshness to what could otherwise be ordinary.

By bringing history to life by using it as an inspiration to design something, those neurons "fire together" and are more likely to "wire together" and be recalled in the future. The whiplash curve of Art Nouveau will be remembered far longer when used in designing a hair pin than if just read about in a textbook.

Experiential learning and embodying a variety of physical obstacles teaches a student not only what Universal Design is, but why it's so important. After experiencing a fraction of the day-to-day hardship of life with a disability, they then understand that the goal should not simply be to meet codes and regulations but to make life better for all through design. Theorists John Dewey and David

Kolb were both proponents of the great value of active and social learning and this type of exercise confirms that to be true.
With educators struggling against a lack of student engagement and the ubiquitous presence of screens, we need to continuously add to our pedagogical tool kit to breathe new life into our classes.

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CLOSING THE EDUCATIONAL DIVIDE: THE SIGNIFICANCE OF ACADEMIC MENTORSHIP IN GLOBAL INDUSTRY ENGAGEMENT

Authors:
CECILIA HEFFER, NICOLA HARDCASTLE

Affiliation:
UNIVERSITY OF TECHNOLOGY SYDNEY, AUSTRALIA

INTRODUCTION

This paper presents two distinct industry-student-led initiatives that sit alongside a formal university design curriculum. The aim is to initiate a discussion about the advantages and challenges encountered by two design academics while facilitating industry mentorships alternative to curricula. The first is The D&AD New Blood Awards (UK), one of the largest competitions for emerging creatives in partnership with some of the world's leading brands, including BBC, Google, and Netflix. The second is an Artisan Global Studio program taking students to urban and remote textile workshops in India. The paper explores situated cognition theory as a methodology for off-site learning to promote intangible soft communication skills difficult to impart in academic settings. As a result of shared findings, a hybrid learning model has been conceived that shifts hierarchies and promotes adaptable approaches to industry engagement in education.

The Design School Model

The research for this paper was conducted at the Design School at the University of Technology, Sydney, Australia. The campus stands on Gadigal land and is located in Sydney's Creative Industries Precinct. The Design School is part of a leading university offering engineering, law, business, and humanities and is rated as one of the top-ranking institutions in Australia. As a result, entry into the design program is competitive, requiring high matriculation rather than portfolio interviews. Consequently, students are driven by academic grades as a measure of their design skills and acumen. As noted above, as educators, we have identified a knowledge gap in studio-based learning. While grading follows rigorous procedures, there are intangible soft skills within an academic system that are critical for students to acquire yet hard to quantify. By soft skills, we refer to communication, critical thinking, adaptability and the ability to respond to feedback. These skills are transferrable and taught within curricula; however, as educators we have observed they remain an academic exercise for students. This aligns with a recent survey conducted by the consultancy firm Deloitte, which reports that a gap in soft skills is a more critical deficit than technical ability. Further, Deloitte asserts there is a growing demand for partnerships between industry and universities. [1]

Currently, the design curriculum is structured around theoretical, studio and professional practice subjects. In studio classes, students are given a design brief with a series of tasks designed to conduct

independent research, develop concepts, and engage in critical thinking. The brief is usually embedded with a technical design component/challenge (see Figures 1 and 2 below).

Figure 1. Visual Communication brief. Figure 2. Fashion student working independently in the studio.

Each week, students present their work to a design tutor for feedback to develop and refine their ideas and designs. Exposure to the industry is mostly provided through guest lectures, panel critiques and, in some cases, a special project. While this mode of teaching is highly successful, experience with the industry is largely passive. To gain professional experience, students take on internships. Internships, however, can vary; at worst, they are exploitative and at best, students gain an understanding of their industry and, in some cases, employment. In response to this knowledge gap, the authors independently facilitated unique mentorship programs alongside core curricula. This paper shares how an alternative model for industry-student engagement in education emerged through the discoveries made by two academics when comparing their respective industry mentorships. The model shifts the focus away from assessments and tutor-student hierarchies to student-mentor relationships in a professional environment.

THE CASE STUDIES

The paper compares two distinctive industry-student mentorships. The first delves into the dynamic D&AD New Blood Awards, one of the largest international design competitions for emerging creatives. Nicola Hardcastle, Senior Lecturer in Visual Communication, introduced the competition in 2017. The competition is an opportunity to exhibit student talent by responding to real-world briefs concerning relevant social concerns (see Figure 3). The second case study, facilitated by Cecilia Heffer, Senior Lecturer in Fashion and Textiles, takes students to remote and urban artisan textile workshops in India. The Global Studios are funded by UTS Global Short Programs and have been running since 2012. In an intensive two-week textiles workshop, students work directly with the artisans, learning the intricate craft of weaving, hand knitting and woodblock printing. Despite language barriers, the experience is transformative; students gain first-hand insight into ethical challenges in offshore production/labour and the complexities involved in sustainable practice in the fashion system (see Figure 4).

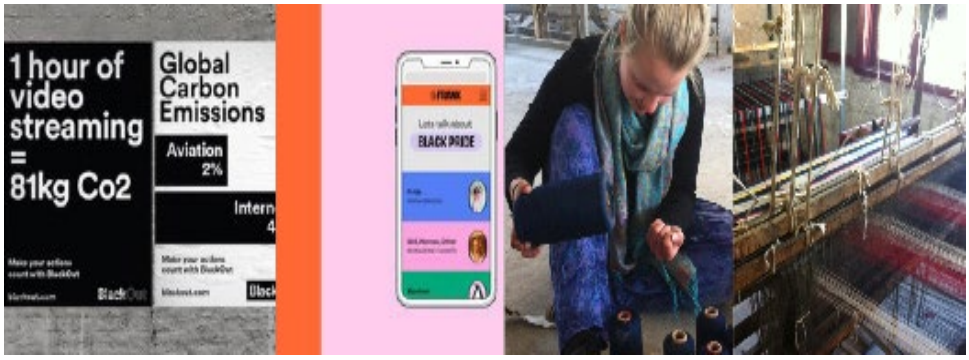

Figure 3. Visual Communication D&AD awards.
Figure 4. Global Weave Studio, Kullu Karishma

The Industry Mentor Model

The research for this paper emerged through an affiliation with an Industry Service Group established at the University of Technology Sydney, Australia. The group is comprised of a diverse range of disciplines, from Industrial Design and Visual Communication to Fashion and Textile Design and was tasked to collect data to visually map industry engagement in the design school. Hardcastle drew from her area of expertise to create a visual map of industry engagement for each program, starting with the D&AD New Blood Awards (UK) (see Figure 5).

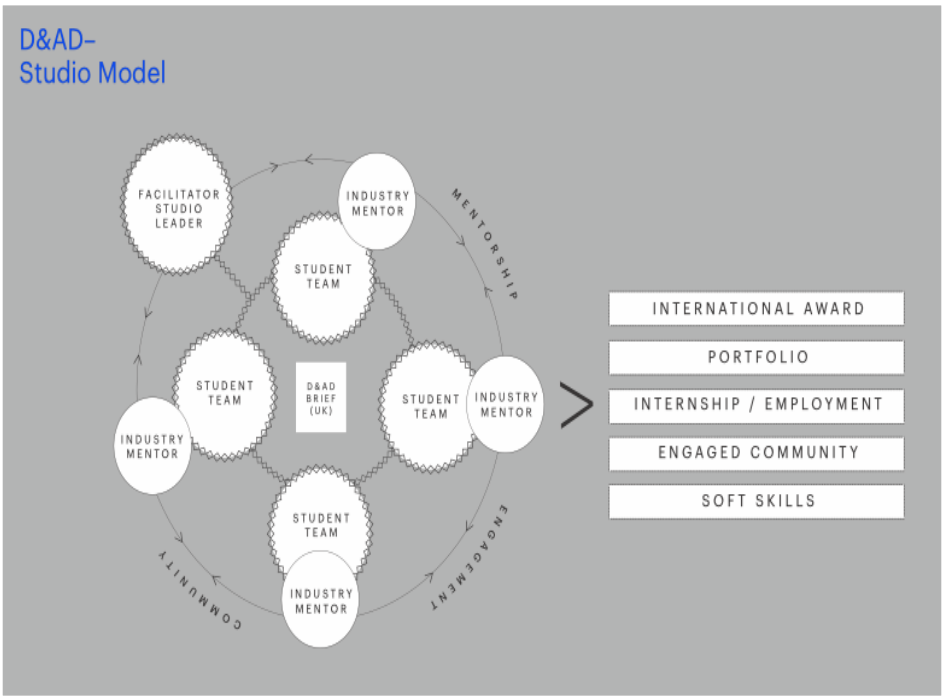

Figure 5. Visualisation of the D&AD Studio Model © Hardcastle

In this model, the focus is on relationships between teams of professional industry mentors and students as emerging designers. The student teams gain feedback from their mentors on a specific D&AD brief. The educator (Hardcastle) facilitates this relationship; however, it is not the point of authority for the student, nor are grades the measure of success; an external international design panel judges the projects from submissions worldwide. Outcomes include international recognition and

strong design portfolios, which have led to internships and employment. The model creates a professional space for students to gain experience working on a 'live brief' as they would in industry. When it came to visually mapping the India Global Studio as an external industry engagement, the authors discovered that despite coming from different disciplines and facilitating mentorships in different countries, the student learning experience was comparable. The authors saw value in developing this as a new model for industry-student mentorships in education. To do this, they framed their analysis and comparison of each case study through the theory of situated cognition, which asserts that students learn in response to their physical and social environment.[2] Specifically, they sought to establish how a professional environment authentically engages students, provides meaning and insight and enhances soft communication skills that prepare them for the creative industries. [3]

RESEARCH METHODOLOGIES

The research methodologies for this paper have adopted qualitative and quantitative methods. These include ethnographic personal narratives collected from students and mentors, and formal UTS student feedback surveys (SFS).[4] Participant observation between students and mentors has been collected through note-taking, written reflections, and documentation (with permission) through photography and video.[5] The student feedback survey (SFS) is an anonymous formal process aligned with Australian higher education standards and aligns with the UTS 2027 Strategy.[6] Statements from the surveys have been collected from 2012-2024. Additional verbal statements have been collected from students, guest designer mentors and artisan studios in India. While each student's experience and discipline are distinct, their cumulative experiences have proved to be consistent and provide a valuable endorsement of the hybrid model of professional practice proposed.

D&AD NEW BLOOD AWARDS

As noted above, Hardcastle has introduced the D&AD New Blood Awards (UK) as an industry-student-led initiative for Visual Communication students at UTS. The competition is one of the largest of its kind for emerging creatives, providing an opportunity to exercise and showcase their talents through briefs set in partnership with some of the world's leading brands (see Figure 6). The awards aim to prepare emerging creatives for the professional world with real-world briefs to bridge the skills gap between university and industry. Areas of practice include graphic design, digital design, copywriting, animation, and illustration.

The Student Team

Hardcastle runs the competition as a 'special project' outside of the regular Visual Communication curriculum. Strategically positioned at the end of the academic year, this six-week program allows third-year students to complete their undergraduate degree before moving on to a final specialised honours degree or entering the industry. The selection process to enter is competitive based on the design merit, level of engagement, and program fit, in which four teams of five student designers are selected. The students are briefed about the D&AD Young Blood program in December, preparing for a January start date. The competition has evolved into a community where previous alumni are invited back to share their insights and experiences. Hardcastle has observed that providing a competitive entry point genuinely motivates students, and completing the program fosters resilience. This aligns with the theory developed by Professor Angela Duckworth in her book Grit: The Power of Passion and Perseverance, which asserts the value of tenacity as a soft skill.[7]

Figure 6. D&AD winning entries.

The Mentor Team

The mentor team is comprised of designers at the top of their careers. The designers are genuinely invested in the next generation of talent and view mentoring as a way of giving back to their industry. Each year, D&AD releases fifteen industry "real briefs" set by clients and judged by industry creatives.[8] Hardcastle makes a selection of these based on social merit. The student's skill set is paired with the expertise of the industry mentor. Over the course of the program, Hardcastle observes the team dynamics; as the brief progresses, mentor pairings change to gain a different perspective.

A subtle but important aspect of the program is setting up a professional design studio that moves beyond a classroom. A space is allocated within the university for students to set up designs and gain feedback from their industry mentor sessions (see Figure 7). The mentors in turn, appreciate a neutral meeting place and a break from their own busy week and studio pressures. A Slack channel supports communication between mentors and student groups. This industry-standard communication tool offers more personal interaction than the university email system and creates an online community. Hardcastle's approach aligns with the above-mentioned theoretical position of situated cognition in learning, whereby intangible soft communication skills are learnt through 'real' engagements.

Figure 7. D&AD feedback session in the studio.

Redefining the educator's role in design education and industry practice

In this model, the role of the educator as sole authority in the classroom is redefined. Traditional hierarchies shift as the focus turns to industry-student relationships. Students are accountable to an outside professional mentor and to their team. The role of the facilitator in this new model is nuanced; the objective is to create the conditions for soft communication skills (teamwork, briefing, feedback, ideation) to be fostered in a safe, professional environment. A pertinent point is that before entering

academia, both authors came from established design practices. Having in-depth industry experience enables them to bridge the gap between education and industry, which is founded on an understanding of the requirements of both.[9] The proposed model comes with a different set of challenges; while the design mentors are experts in their field, they are not educators. Feedback is often direct and to the point, which students can find confronting. To manage relationships, Hardcastle organises pre and post-studio debriefing sessions that, while time-consuming, keep the program on track.

Hardcastle has observed that students thrive in the program, gaining autonomy and essential soft communication skills such as critical thinking and team building. Importantly, this approach enables students to see how the mentors brainstorm ideas between themselves and critique each other constructively. Over the six weeks, a healthy, supportive and engaged community is built through the commitment and generosity of the mentors. The student's ideas are validated in a professional environment where they have a voice.[10]

ARTISAN TEXTILE GLOBAL STUDIOS

The second industry-student initiative presents a Global Studio that takes fashion and textile students to remote and urban artisan studios in India to learn textile crafts. The program has been running since 2012, led by Senior Lecturer Cecilia Heffer and former colleague Alana Clifton-Cunningham, and funded by UTS Global Mobility Programs. The initiative was conceived by Julie Lantry, director of a non-profit organisation called Artisan Culture, who was concerned about the decline of artisan practices and communities. Lantry's vision was to expose emerging designers (students) to artisan craft production as a means to promote future relationships in the Indo-Pacific region.[11] The importance of disseminating artisan crafts more broadly is even more crucial now, given the impact on communities caused by COVID-19.[12] The Global Studio collaborates with Kullu Karishma, a weaving business situated in the Himalayas, and Tharangini, a Woodblock Print studio based in the busy IT city of Bangalore (see Figure 8). Both studios run sustainable practices and ethical employment of their artisans. Tharangini, for example, is the only artisan studio in India to have ISO 26000 Sustainability certification and the NEST Ethical Artisan Seal and is working towards carbon-neutral processing by 2024.

Figure 8. Student at Tharangini Woodblock Studio and their indigo-dyed cotton discharge print.

The Student Team

The Global Studio is an intensive two-week workshop in which a team of 12-14 students are paired with a team of artisans to develop either a weave or print collection. The program is embedded with core UTS outreach goals that aim to enhance a sense of global citizenship. Additional funding is provided to students who are eligible for extra financial support. Some students, for example, have never travelled outside of Australia, and participating in these artisan workshops has consequently

been transformative. Students are selected through an interview process, and a written application in which they outline why they are interested in Indian artisan crafts and how they see the cultural exchange will benefit their education as designers.

The Artisan Team

The artisan teams in both studios, Kullu Karishma and Tharangini, are made up of both men and women whose roles are defined. The women knit and are experts in colour and dye, and the men weave or woodblock print. A brief is designed by Heffer in consultation with the studio Directors that follows a methodical itineray. As with Hardcastle's model of working, Heffer steps back for students to gain insight into a real-life working studio. Each morning, she briefs the students on the day ahead and oversees their progress; however, the focus is on artisan-student relationships. What is fascinating is that complex technical demonstrations are imparted to students by the artisans despite language barriers. Students are on a high learning curve to convey their ideas while learning about cultural sensitivities. Engaging in a completely new set of cultural soft communication skills is an invaluable experience for students as they will need to navigate offshore production as designers in Australia.

In these studios, extraordinary relationships begin to unfold as students and artisans share photos of their families on their iPhones. There is a lot of laughter and good humour in the space. Students gain insight in a tangible, personal way into the stories of the artisans/people who make their clothes.[13] Heffer has observed that the experience for students is transformative, affording them a more comprehensive understanding of the complexities involved in ethical labour practices and the challenges of sustainable production exemplifying the value of situated cognitive learning. In return, the artisans, according to Padmini Govind, Director of Tharangini Studio, feel validated by the enthusiasm and interest students from a university all the way from Australia show in their work.[14]

Findings

When comparing both off-site, industry-student-led initiatives, the authors observed that a key common factor is how these experiences empower students. As they gain insight, student confidence grows, becoming inspired about how, as designers, they can authentically influence the world around them. In both cases, the experience of working in a 'live' professional environment imparts an understanding of their future roles within a system and an identity within a design community. Students mature in the way they communicate through this human-centred approach. The value of the proposed model is that it is transferrable across disciplines, creating a collaborative learning environment that is both flexible and responsive. Given the rapidly changing and challenging landscape in education, the model is a unique offering to an evolving university ecosystem.

The impact of this approach is measured not only by positive feedback from participants but also through external recognition. For example, UTS is recognised as the most awarded design school in Australia in the D&AD New Blood Awards.[15] Similarly, students who have participated in the Global Studios have gained sponsorships, won awards and launched their own labels (see Figure 9). The most critical finding is supported by industry needs, whereby soft communication skills are sought in graduates over technical ability.[16] The model offers a new way forward that creates collaborative learning environments that ensure educational programs remain relevant and dynamic, continuously evolving to meet industry needs.

Figure 9. Karishma Sponsorship Alicia Minter-Hunt, Alex Enticknap, digital illustration, weave.

CONCLUSION

The model for off-site learning proposed in this paper offers a transformative approach to design education. The application of situated cognition theory provides a valuable framework for understanding how off-site learning environments foster intangible soft skills—such as communication, adaptability, and critical thinking that traditional curricula do not fully capture.

The above discoveries support the importance of a hybrid flexible model of learning through industry mentorships. While the proposed model can be demanding, the authors see value in adopting this mode of learning as a way of bridging the gap between education and industry. The outcome of this program is multifaceted and significant. Participating students gain invaluable real-world experience, enhancing their portfolios and professional networks. The mentorship and feedback structure fosters critical thinking and cultural sensitivities, preparing students for successful careers in the design industry. Teams learn to work collaboratively, taking on roles and responsibilities beyond the academic structure, which fosters self-direction and alignment with industry practices. Furthermore, the program strengthens the university's reputation and industry connections, creating a dynamic bridge between academia and professional practice.

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Julie Lantry and Alana Clifton (Global Studio)
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UTS School of Design students

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EXPLORING FOOD LITERACY BEYOUND THE PLATE: THE CONCEPT OF FORMATION AND LITERACY IN RELATION TO EATING IN AN EDUCATIONAL SETTING

Author:
MIKKEL JACOBSEN

Affiliation:
UC COPENHAGEN, DENMARK

INTRODUCTION

Literacy is a frequently used term in the context of most Western society's educational institutions. It is probably just as often a concept that in the same context creates a certain amount of confusion and explanatory difficulties. For what is literacy, specifically, in theory and in practice? This has been a focal point in my PhD dissertation.[1] One conclusion of my research on the practice of literacy, or described as *formation* in this paper, is that formation in an educational setting takes place in social arenas (spaces) with some form of common text that binds individuals together. Formation is not like grammar or equations, something you can expect the students to study individually as part of the standard curriculum. It always evolves in the context of sociality. This paper has a particular focus on the formation surrounding food or, more specifically, the formation that evolves from eating together.

The concept of formation

The concept of formation refers to the societal and institutional process where individuals, through interaction with their surroundings, are shaped into being a citizen—a human. It is a process where a person develops intellectually, emotionally, socially, and culturally.[2] According to the philosopher Erasmus of Rotterdam, humans are not born but made. One is not born "formed"; instead, one is cultivated or formed through upbringing, education, and environment, along with the attributes and skills acquired along the way.[3]

Formation takes place in a transgression in a social act,[4] and a central conclusion is that if formation is to be part of an educational practice, educators must create arenas for it to evolve. Particularly arenas that encourage sociality (to develop sociability). To understand this hypothesis, I draw on media science and an understanding and separation of media and text.[5] For example, the cinema is the medium, and the films we watch are the text, and the same applies to the spaces of institutions. In the classroom, the blackboard is a medium, and what is conveyed there is the text. In daycare, a medium for formation can be the table where we eat or play; the food, crayons, paper, and toys are the text. The sandbox, the wardrobe, etc., can also be viewed as arenas of formation where we meet and are mediated through common purposes and activities. The texts can be more or less identifiable for the individual child, and the same can be said about the medium itself. Not all students, for example, learn equally well in front of the blackboard. The question is how educators within pedagogical practice

create formative arenas from institutional spaces. Arenas where children can evolve through socialization and where we are more equal than, for example, in front of the blackboard.
A conceptualization of the elements of formation can be divided into three categories.[6]
1. Subjectification
2. Qualification
3. Socialization
The first understanding of formation is subjectification, where the child is formed when given room to unfold. The educator's role in this formative act is to help the child find their way of being in, and meeting, the world. This perspective takes a child-centric approach to formation.
The next understanding of formation is qualification, where the adult shapes the child, providing knowledge and skills so the child can act. This is an adult perspective, where didactics, learning, and development play a significant role.
The final understanding of formation is socialization, meaning the child is formed by finding the right way to meet the surrounding environment and being an active participant in society.
All three elements of formation can be found in institutional life, preferably blended, and sometimes one understanding of formation is more in focus while the others are in the background. For educators, it is essential to be aware of which formative perspective is in action and what is important in the situation and for the individual child so that the educational professionalism does not lose the child's perspective.[7]

FORMATION THROUGH FOOD AND EATING

Food formation can be described as the knowledge, experiences, and encounters that children gain when they explore, produce, or prepare meals. Within food sociology, particularly two theoretical understandings stand out. One by the German sociologist Georg Simmel, who focuses on the significance of sociability in the meal, the social codes associated with eating together, and a sense of social rhythm.[8] The other by the French sociologist Claude Fischler, who highlights the importance of eating the same food, because through taste, history, and culture in the individual dish or produce, we find common ground.[9]
Food formation is based on the understanding that food and meals are not just about satisfying hunger or merely have a nutritional value. Fischler describes it as: "When one eats alone, it is not perceived as 'a real meal,' since the social aspect is a central part of the meal."[10] He points out that eating the same dish plays a crucial role in establishing the meal as a social structure.[11] As breaking bread, he describes the meal as commensality, which etymologically originates from the Medieval Latin commensãlis (com: together + mensa: table).[12] Fischler builds on Simmel's theories about the sociality of meals, expanding the theories to not only focus on the meal itself but also on the food, particularly shared food, as an identity-former and social marker—a formative (inter)action in a social arena. The meal is a gathering point both at home, in institutions, and in residential facilities where eating is a recurring activity every day.
There are interesting differences in the two understandings: is it the food that binds us together (the dish, the culture, the history, etc.), or is it the community in and around the meal? A community that, ever since the first circles around the first fires, has brought people together with the meal as a social arena where much more than food is exchanged. Just as a physiological need to eat and drink, humans also have cultural and social needs. Therefore, meals also function as a collaborative community,[13] where humans, in a social transgression, mirror themselves in each other and meet on the egalitarian premise of needing to eat and drink, but also a social premise that the individual is formed in social arenas. Based on Simmel, it is further emphasized that the meal can create and build bridges between people who do not have special common interests. The meal not only satisfies the palate and spirit but

also embraces diversity in its mitigating and mediating community. A focus that seems particularly fruitful considering late-modern individualization tendencies and how this is expressed in our food culture and nutritional focus. What can be described as food tribalism.[14]

The Theoretical Framework

The ontological question of my research[15] concerns which parts of the educator's world we wish to investigate (e.g., eating as a pedagogical activity in primary and secondary schools, daycare, etc.), and epistemologically, this is investigated through a phenomenological-hermeneutic approach with a qualitative research design. This includes studying teachers' understanding of theoretical concepts such as (food) formation, literacy, self-determination, co-determination, and democracy, as well as their ability to use these theoretical concepts as a meaningful part of their educational practice.[16] More specifically, formation through food and with the meal as a social arena and eating as a pedagogical act. A framework of formation in everyday life.

In everyday pedagogical practice in daycare and schools, many conscious and planned processes and activities occur, but the act of eating, which takes place in the daily environment, and in what could be described as routine pedagogy, is equally important for the child's formation as more didactically planned activities with specific academic purposes. The meal, in this optic, is perceived as an arena for co-learning and unintended learning,[17] and the act of eating as a formative activity,[18] fostering dialogue and mirroring between adult/child and also dialogue between child/child, which the adult can observe from the sideline. It can even foster a certain sociocultural sense of place or belonging, where a given physical space transforms into a social place through interaction and relationships, mediated through food and eating.

In both observations of practice and through qualitative interviews with teachers, my studies have shown that eating as a pedagogical activity, with a level of teacher involvement and an overall focus on the meal as a medium for the children's general and common formative evolvement, is an important and meaningful formative arena where conversations can arise with and among children.[19] It's a formative and educational time and space that fosters dialogue, where the children can elaborate and share feelings and experiences. As one teacher, who spend time eating with her students, put it in an interview:

"I think the [eating] time is the children's. They sit and talk about what they did yesterday, what they're going to do tomorrow, and what they'll do during recess—just normal conversation. They sit at four-person tables, so they can sit and talk. And I observe that they make playdates. If there's a class of 28 children, they forget each other if they're not sitting next to each other or don't already play together—so they discover each other in new ways. I could easily read a story […], but when we eat—we eat—and talk."[20]

In other words, it's a time and space for the students (and the teacher) to mirror themselves in their surroundings and experience a sense of social rhythm or belonging.[21]

The Concepts of Food, Formation and Literacy

Food and formation, and food and literacy, are concepts that, on one hand, contain different interpretive possibilities, but, on the other hand, are closely connected. Benn et al.[22] emphasize the importance of distinguishing between the two concepts (food and literacy/food and formation) to understand them together, supported by Warde,[23] who describes food as a universal, often unreflected activity, that contains highly meaningful aspects of life.

Food is defined in this context by the Public Interest Civil Society Organization as an expression of values, culture, social relationships, and self-determination.[24] Additionally, it is emphasized that

eating together strengthens our cultural identity, ownership of our lives, human dignity, and personal development.

A description of the literacy concept is found in UNESCO,[25] where it is described as the goal of education, as having literary insight and being well-educated.[26] In recent years, the concept has extended into other areas beyond the literary, being used, for example, in the context of health literacy. In the USA, Canada, and Australia, the concept has been used since the 1970s in public health programs at a preventive and health-promoting level.[27]

Regarding health literacy directed towards a school context, Evers describes the concept as:

"The capacity of an individual to obtain, interpret, and understand basic health information and services, along with the competence to use such information and services in ways that enhance health. Health-literate citizens are critical thinkers, problem solvers, and self-directed learners."[28]

This understanding aligns with WHO's broad health concept.[29] It is not only about the absence of disease but also about quality of life or what is referred to in WHO's original health definition as both mental and social well-being. An understanding that extends beyond seeing health solely in terms of physiological or biomedical conditions.

The way we eat and what we eat constantly changes, as does our cultural, political, and scientific understanding of food. A concept like food literacy has emerged from these different understandings of food.[30] It is used, for example, to describe political aspects related to food as well as nutritional, competence-related, and culinary aspects. In this context, it is emphasized that food literacy should be seen in a larger context than the individual aspects mentioned above, where, for example, nutrition should be perceived more as a positive consequence of food literacy.[31] Hence, the focus is in this paper, on a more *general formation* rather than literacy.

Formation can include an understanding that individuals are educated to understand the world, not just to be able to read "the rules," but also to have the skills to comply with the rules or sociocultural codes. To understand the world, we must have some skills to read it.[32] What we read in the meal is the food (e.g., knowledge of ingredients), but also the people we share the meal with and, in a dialectical context, the sociocultural setting we are in, and in this context, the educational institutions.

To summarize the concept of food formation, it can be understood as knowledge, skills, behavior, and personal qualities and as: "knowing, doing, sensing, wanting, and caring, all together as being practical and prudent at a personal level but also regarding food and eating together with others in everyday life."[33]

CATEGORIZING DIFFERENT FOOD DISCOURSES

Based on the perception of food and the meal, being text and media, teachers are central facilitators of this formative arena that sets during the act of eating, and therefore the focus of this research is also on their practice around and theoretical understanding of formation. The act of eating as a pedagogical activity, as a socializing event, and as an arena of formation is emphasized, moving beyond just focusing on nutrition and health regarding food in educational institutions, which otherwise seems to dominate the attention of society, experts, parents, and politicians. Based on a review of scientific literature on food and meals in general, and more specifically in schools, the following tendencies emerge.[34]

The understanding of food and meals can generally be divided into three categories:

1. Diet and Learning: Focus on nutrition and learning, including finding a connection between, for example, healthy school meals and students' academic development.
2. Sociality and Meals: A focus on the social practice around food where the meal is perceived as a social arena.

3. Food Literacy: A specific focus on how competencies and knowledge are built up through, for example, the work and skills in a kitchen around the pedagogical meal or other learning in connection with food and meals.

Pedagogical Profession Formation

Relevant to a study of pedagogical approaches and understandings of formation are descriptions of what can be described as a *profession formation*[35] versus the more general formation as described by Wolfgang Klafki and others.[36] Profession formation in a pedagogical context is based on educational theories such as Gert Biesta's work on education, democracy, and formation, which describes formation as both a goal and a process in educational work.[37] A professional practice where formation is not just a goal in itself but an active, ethical, and reflective approach to how we become human.

From a philosophical perspective, a teacher is not necessarily or automatically "formed" by their own education and not necessarily automatically "forming" the students through their education. It is a process that focuses on the individual's *identity formation*, and in this context, also the individual teacher. These differences can be examined through concepts of individual and social identity, which can illuminate the connection between profession formation and identity formation.[38] On what level is the individual teacher's practice and understanding of formation and education based on respectively: *private, personal,* or *professional values*? This might be specifically present when it comes to food and eating in schools. Research points out that teachers often take a more private or personal approach to eating or the role that food plays in schools rather than a professional one.[39]

Formation is thus also an overarching concept in the broad sense of enlightenment in an educational framework.[40] Specifically, through the concept of the pedagogical meal and the formative act of eating. In continuation of this, it is also interesting to investigate the understanding and professional identity formation of pedagogues and teachers. And to consider food formation as an activity that takes place in a social and educational context and not just individually at home in the kitchen. The question is, how is formation, understood as formation through food and eating, expressed in a professional pedagogical practice? This was a focal point in my PhD project, where a central hypothesis was that the idea of food formation has changed from an earlier focus on rationality and utility (diet, nutrition, calorie counting, and individual intake and regulation) to a late modern focus on reflexivity and sociality (understanding of community, enjoyment, social and cultural significance, identity, and recognition).[41]

A pedagogical profession formation (the formation and education of teachers) deals with the understanding and practicing of formation in a professional and social framework, where educators create common arenas for learning, social skills, and enlightenment through food and eating. And to quote the late great Georg Simmel and to sum it up: "Of all that is common to human beings, the following is what they have most in common: they must eat and drink."[42]

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THAT'S KAMP!: SPECULATIVE LANDSCAPE ARCHITECTURAL APPROACHES TOWARDS QUEER MEMORIALIZATION IN MELBOURNE

Author:
BRENT GREENE

Affiliation:
ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY (RMIT), AUSTRALIA

INTRODUCTION

The associations between design studio pedagogy and memorialization practices offer a unique scenario to analyse and understand LGBTIQA+/Queer histories in tertiary education settings. This paper discusses an innovative pedagogical approach towards producing Queer memorial concepts in St Kilda (Melbourne, Australia), which formed part of a collaborative landscape architectural design studio. The approach incorporates Queer Ecological theory, community consultation and creative techniques to produce novel memorialization concepts for St Kilda, which acknowledge the (oft forgotten) historical narratives of its Queer community.

This paper is structured in three parts. The first section discusses the studio's philosophical positioning in Queer Ecological theory and its application to the design of Queer memorials. The second part introduces the context of St Kilda and provides a brief overview of its evolving Queer heritage during the twentieth and twenty-first centuries. The final part of the paper introduces the studio pedagogy. It explains how landscape architectural design students engaged with Queer narratives and ecological theory through the studio learning experience and creative methods such as photo essays, diagramming, computational modelling and simulation to produce memorial design concepts. By incorporating and combining these methods through a landscape architectural studio pedagogy, this research seeks to extend academic discourse around memorialization practices that reference Melbourne's Queer community and challenge the contemporary homogenisation of St Kilda's urban landscape through gentrification.

Evolving Perceptions of Ecology: Scientific and Philosophical

Ecology is a discipline that emerged in Europe during the nineteenth century and was defined as a scientific investigation into the "relationship of the organism to the environment."[1] European scientists operating regionally and internationally examined how taxa evolved and sustained themselves in their surrounding environments. Notable investigations include Lamark's early explorations into how species adapted to their surroundings in response to environmental pressure[2] and Lyell's investigation into the influence of geological processes on existing ecological communities.[3] These nineteenth century ideas began an ongoing discussion concerning the performance of ecological communities and provoked new theoretical positions such as the notion of equilibrium and Darwin's theory of natural selection.[4] While principles of ecology were debated most

scientists were unified in regard to what types of spaces were best suited for research. Intact environments – or sites considered unmodified by humans – were seen as best suited for ecological investigation as the processes that that impacted their development had not been disturbed by human actions.[5] Consequently, Western perceptions of 'pure' and untouched ecosystems were elevated above alternative ecological typologies – such as disturbed urban spaces invaded by exotic plants and animals – which understood as tainted by mainstream culture.[6]

Queer Ecology

During the 2000s scholars such as Matthew Gandy, Kate Hogan and Andil Gosine[7] explored associations between the aforementioned values and perception of queer people and disturbed urban environments to establish novel ecological values. Similar to Queer theory, which challenges traditional ideas of sexuality and gender,[8] these authors argue for fluid and open-ended approach towards understanding marginalized communities and urban ecological conditions, which confront the status-quo of heteronormativity.

Considering the moral perspective, Hogan argues that "the language of ecological protection has been especially problematic for centuries. Gay men, lesbian women and transgender individuals have been characterized as pollution, treating the moral fabric of society."[9] This view is shared by Gosine, who suggests that "non-reproductive homosexual sex has also been represented in dominant renderings of ecology and environmentalism as incompatible and threatening nature as homosexuality was associated ion the degeneracy of the city."[10] Alternatively, by combining queer theory with ecological frameworks, Gandy repositions disturbed urban conditions and programs positively, stating that modified traits "do not play a clearly defined role… they represent a series of arenas within which human creativity and the sexual imagination are radically combined."[11] Queer Ecological theory, therefore, challenges the ecological status-quo by interpretating uncontrolled, disturbed and 'undesirable' systems in novel ways. This theory allows designers – including landscape architectural design students – remarkable flexibility in interpretation ecological principles and values. What might be considered undesirable through scientific frameworks, such as biological invasion, can also be interpreted as a fundamental performance of an ecosystem where ecological morals are questioned, and self-directing systems celebrated.

Before introducing St Kilda, it is necessary to clarify how Queer Ecological theory was harnessed through this studio pedagogy. Importantly, Queer Ecology was understood as an organisation of plant communities that emerge autonomously within the landscape, disrupting the aesthetic and ecological status quo of urban space. This included unplanned weeds in a maintained public park in addition to unruly (or abandoned spaces) that are ecological, aesthetically and programmatically distinct to gentrified, a position that is reflective of the previously introduced work by Gandy, Gosine and Hogan.

ST KILDA'S EVOLVING QUEER HERITAGE

St Kilda (Figure 1) is located 7 km from central Melbourne on the traditional lands of the Yalukit Willam clan of the Boon Wurrung people, who have lived and cared for this Country for up to 40,000 years.[12] Following British settlement in 1835, the colonial government dispossessed the Boon Wurrung from their lands, which set the foundation for the suburb's urbanization during the nineteenth and twentieth centuries.[13] St Kilda developed into one of Melbourne's densest suburbs, the demographic of which shifted in response to city's economic fortunes.[14] In lucrative decades, St Kilda housed Melbourne's wealthiest citizens, who erected Victorian mansions and terraces along tree-lined and bay-fronted boulevards. Alternatively, in times of economic distress, grand buildings were converted into rooming houses, one-bedroom apartments and private hotels that influenced the

suburb's bohemian reputation – establishing it as a safe haven for minorities, including LGBTIQA+ people.[15]

Figure 21. A photograph of Luna Park (left) and the Palais Theatre (right) landmarks of St Kilda. Photograph by B Greene 2021.

Multiple queer-friendly spaces and expressions emerged in St Kilda from 1835 onwards, reinforcing the suburb's significance to Melbourne's LGBTIQA+ community. A notable example includes the St Kilda Sea Baths (Figure 2), a bathing facility that historically segregated visitors into single sex areas, which facilitated encounters between homosexual (and often closeted and married) men.[16] The Prince of Wales Hotel – Melbourne's oldest surviving gay bar – became a popular drinking spot after opening in 1937 and hosted a renowned drag night named Pokey's until 1992.[17] Similarly, Greyhound Hotel hosted extravagant drag-queen shows until its demolition in 2017 and public parks such as the Catani Gardens (Figure 3) and Peanut Farm Reserve that were known locations for cruising and prostitution.[18]

Figure 22. A photograph (circa 1940s) showing men bathing nude and playing cards at the St Kilda Sea Baths. Port Phillip City Collections.

Figure 23. A photograph of the Catani Gardens (foreground) with central Melbourne in the distance. Photograph by B Greene 2022.

Phase 1: Applying Creative Methods to Analyze St Kilda's Queer traits and LGBTIQA+ Experience

Within St Kilda are numerous queer conditions that mirror the descriptions outlined previously by Gandy,[19] notably unkempt plant communities, abandoned architectural elements and spaces. To analyze the extent of St Kilda's queer traits, the studio pedagogy utilized photo essays and temporal diagramming. The photograph and drawings shown in Figure 4 examined the ecological and cultural performances of this marginalised space - revealing that unruly processes (such as unplanned plant growth) thrive in this landscape. The study was complimented by speculative diagrams, which

communicated how the site's queer traits might be adjusted through gentrification that would aim to 'correct' and 'control' unplanned scenarios such as the growth of queer plants.

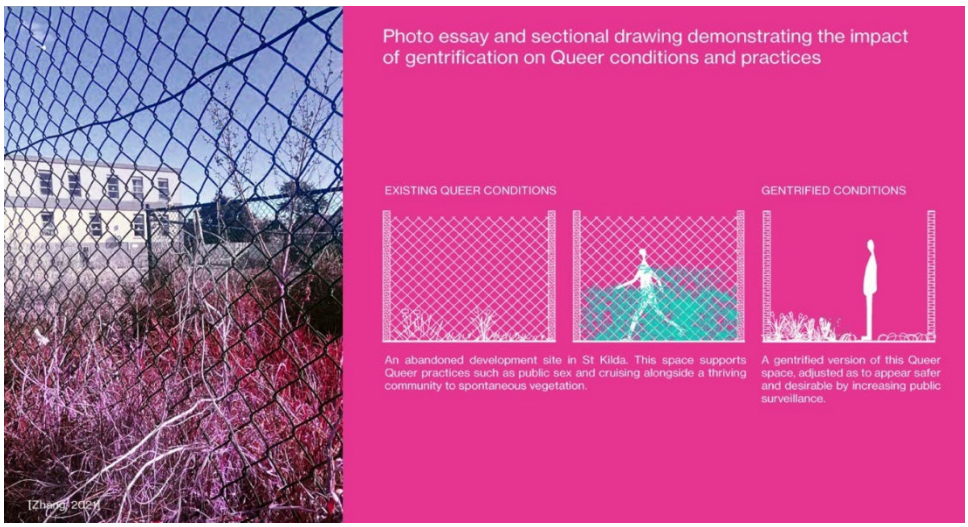

Figure 24. A photograph of an abandoned site in St Kilda (left), what was the original home of the Greyhound Hotel – an important LGBTIQA+ social venue demolished in the 2010s. Photograph and diagrams by S Zhang 2021.

Following these preliminary studies, studio participants engaged in a co-led workshop with Dr Catherine Barrett from Alice's Garage.[20] Critically, Dr Barrett sourced information from cis-gendered gay men, lesbian women and trans people who shared details of their lived experiences – of their journeys from a place of grief to a place of pride. The sharing of these stories encouraged students (some of which had no prior knowledge of queer communities) to study unfamiliar narratives and interpret them through paper modelling, drawing and topographic experiments.

While stories were drawn from diverse LGBTIQA+ sub-groups[21] common themes were identified between the individuals, notably experiences of anxiety, social isolation, resilience and acceptance. *Celeste, for example, described her experience of transitioning as "anxious" and "isolating", stating that for "the first twenty-five years of my life I was the image of what my loved ones wanted me to be…. I had to let that go. I grieve for the loss of that. There is also growth" (community consultation workshop, April 12, 2021). Similarly, *Bridget – who came out at 45 after a heterosexual marriage and having children – noted that "I didn't really want to come out but there I was, realizing I was a lesbian… I had to live an authentic life. I was a wonderful heterosexual person. I was loved. I was surrounded by a great circle of love. And then I came out… I realised – suddenly – I was different and of less value to some. That was so tough" (community consultation workshop, April 12, 2021). These particular reflections demonstrate that Celeste and Bridget experiences of coming out produced similar emotional and experiential responses despite belonging to disparate LGBTIQA+ sub-groups.

Responding to Celeste's and Bridget's reflections, students produced a series of "fabulous drawings" and models. This technique, as described by Lawson, includes "highly speculative drawings" that allow ideas to "flourish and develop"[22] in innovative and unexpected ways. For example, Figure 5 interprets Celeste's and Bridget's life journeys through a series of free-flowing lines and an undulating paper model. These initial explorations were refined through speculative topographic experiments that aimed to formalise the "fabulous" interpretations through scaled section elevations, as depicted in Figure 6. This topographic gesture – albeit highly speculative – is designed to instill responses such as anxiety and comfort at the human scale. In this hypothetical scenario, the

topographic design allows a non-queer person to experience feelings similar to those as described by Bridget and Celeste.

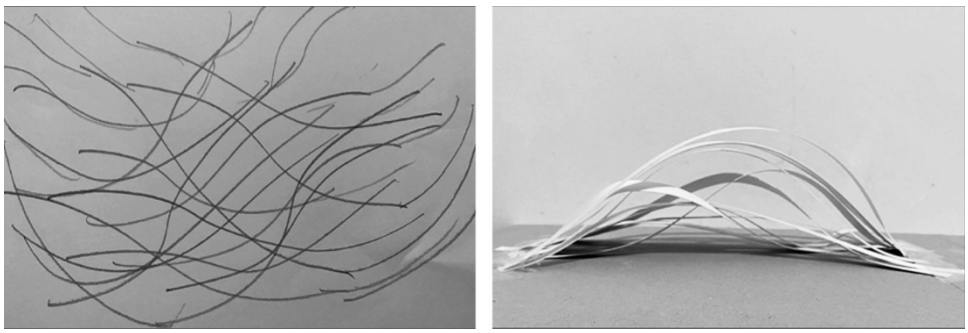

Figure 25. A "fabulous" drawing (left) and paper model (right) inspired by Celeste's transitioning experience. Drawing and model by S Zhang 2021.

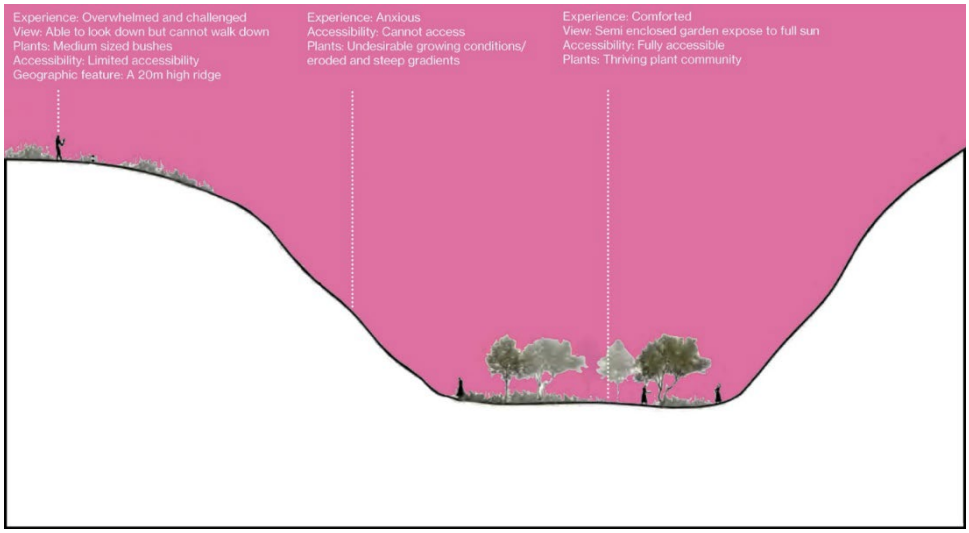

Figure 26. A conceptual topographic design (shown in section elevation) inspired by the aforementioned fabulous drawing and paper model. Drawing by S Zhang 2021.

After assembling and experimenting with knowledge from site observations, fabulous drawing, community consultation, precedent[23] and literature studies, the second phase harnessed the 3D modelling and digital simulation programs Rhinoceros and Grasshopper to test and refine the memorial concepts. Computational techniques were utilised to build upon previous studies as they offer a framework to swiftly (and precisely) experiment and evaluate foundational features of landscape architectural practice[24] – in this instance the relationships between topography, ecological flows, plant growth and succession. The following section discusses this approach with reference to a student project titled Shifting Paradise: A Memorial to Transgender Experience.[25]

Phase 2: Iterating though Computational Modelling and Simulation

During the iteration phase, students experimented with topographic design to develop new drainage patterns, design novel site lines and spatial configurations, which express the LGBTIQA+ experiences that were shared in the community consultation workshop. In this example (Figure 7), flow channels were developed with the assistance of a Grasshopper plug-in, which allowed for the strategic design of water collection and retention areas. These explorations were further refined through sun and shade

analysis that revealed the memorial's novel ecological conditions such as high and dry areas as compared to wet and low zones.

The capacity of the model to reveal the memorial's micro-climatic conditions guided this student's planting plan. Plants were selected and allocated to zones of the memorial that exhibited ecological conditions conducive to the specified plant communities, including a micro-woodland, and open grassland, a wild rose garden, a sunflower field and a butterfly garden. Importantly, many species selected for the memorial were inspired by St Kilda's existing queer plants, which were observed during the photo essay exercise – notably *Brassica rapa, Solanum nigrum, Avena fatua, Conyza bonariensis* and *Stellaria media* – that were left to succeed in response to uncontrolled site conditions and adjacent environmental processes.

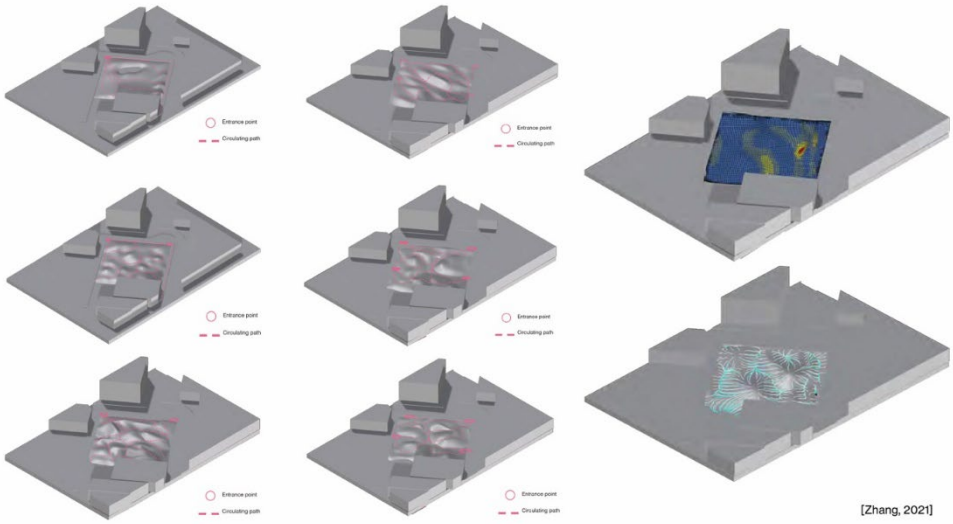

Figure 27. A series of computational experiments of the memorial's topographic traits, which considered the impact of undulation on human experience, water flow, light conditions and plant growth and succession. Drawings by S Zhang 2021.

Shifting Paradise: A Memorial to Transgender Experience

The final design for Shifting Paradise presents a dynamic landscape architectural proposal that utilises the site's evolved topographic features to support and celebrate the development of a queer ecosystem within a new memorial in St Kilda. The constantly evolving design is strategic in its incorporation of queer plants and ecological processes and systems, such as water flow, succession and unmaintained areas, to honor the suburb's queer heritage and the narratives derived from its LGBTIQA+ community – especially Celeste's transition experience. This concept is expressed through a variety of queer plants that evolve in unexpected ways across multiple years and seasonal cycles.

The Shifting Paradise's ecological performance is planned to diversify user experiences. Hard scape materials such as stone pavers encouraged a circulation experience around the memorial rather than a direct linear path from the site boundaries, as shown in Figure 8. Users' experience is in itself transitional, impacted by unplanned (and unmaintained) plant growth that emerge among the cracks of the stepping stones. These designed micro-climates perform in diverse ways in response to Melbourne's seasonal cycles, which emphasises the notion of dynamism, evolution, growth and transition. In summer, the LGBTIQA+ community and their allies are encouraged to tend the sunflower garden as a means to engage notions of pride through planting, care and maintenance.

Alternatively, in winter the planting design shifts as organic materials die and become dormant, a metaphor for the concept of grief.
The memorial's evolving spatial and ecological qualities are representative of Celeste and Bridget's experiences, whose life stories demonstrate their high degrees of resiliency and self-understanding. The design establishes a novel memorial typology in St Kilda that reveals the suburb's queer heritage (ecological and build environments) by engaging Queer Ecological theory and associated conditions through design. By working with this theory through creative methods and iterative processes, the studio pedagogy has generated memorial designs that challenges St Kilda's ongoing gentrification and process of renewal.

Figure 28. Two renders showing how seasonal shifts impact the memorial's ecological and experiential qualities in summer (left) and winter (right). Drawing by S Zhang 2021.

CONCLUSION

This brief discussion of the That's KAMP! design research studio pedagogy reveals exciting potentials for producing novel memorial concept designs, which celebrate the lived experience of Melbourne's queer community. By foregrounding Queer Ecological knowledge through memorial design, the studio and learning experience not only demonstrate the agency of landscape architectural practice in conserving traits of the St Kilda's LGBTIQA+ heritage in an era of gentrification but aims to resolve the underrepresentation of queer histories in the suburb's public open space. It is critical to reflect on this pedagogical approach as it presents a transferable studio model for other educational settings that engage with queer communities – among other marginalized groups – through design. It reinforces the necessary importance of making public realms accessible to all cultural subgroups, so that their histories are acknowledged alongside forces that shape the urban landscape, in this instance, gentrification.

NOTES

[1] Haeckel 1866 cited in Chris Reed and Nina-Marie E. Lister, *Projective ecologies* (New York, NY: Harvard University Graduate School of Design, Actar Publishers, 2014), 13.
[2] Charles Lyell, *Principles of Geology; Being an Attempt to Explain the Former Changes of the Earth's Surface, by Reference to Causes Now in Operation* (London: Jogn Murray, 1832); J Lamarck, *Philosophie zoologique. Duminil-Lesueur. Philosophie Zoologique, Ou Exposition Des Considérations Relative À L'Histoire Naturelle Des Animaux* (Paris: Dentu et L'Auteur, 1809).
[3] Lyell, *Principles of Geology; Being an Attempt to Explain the Former Changes of the Earth's Surface, by Reference to Causes Now in Operation*.
[4] Charles Darwin, *On the origin of species by means of natural selection : or, The preservation of favoured races in the struggle for life* (John Murray, 1859), Non-fiction. https://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=cat00006a&AN=melb.b2687180&site=eds-live&scope=site&custid=s2775460.
[5] Gilles Clément, "The Emergent Alternative," in *Architectural theories of the environment : Posthuman territory*, ed. Ariane Lourie Harrison (New York: Routledge, 2013).
[6] Noël Sturgeon, "16 "The Power is Yours, Planeteers!" Race, Gender, and Sexuality in Children's Environmental Popular Culture," (Ithaca, NY: Rutgers University Press, 2020), 263.
[7] Hogan and Gosine's arguments are sourced from Catriona Mortimer-Sandilands and Bruce Erickson, *Queer ecologies : sex, nature, politics, desire*, 1st ed. (Bloomington, Ind: Indiana University Press, 2010). See this publication for additional perspectives of Queer ecology.
[8] "OED: Oxford English Dictionary," 2024, accessed 12 August, 2024, https://www.oed.com/search/dictionary/?scope=Entries&q=queer+theory.
[9] Hogan Katie, "Undoing Nature: Coalition Building as Queer Environmentalism," (Indiana University Press, 2010), 241.
[10] Gosine Andil, "Non-white Reproduction and Same-Sex Eroticism: Queer Acts against Nature," (Indiana University Press, 2010), 154.
[11] Gandy, Matthew. "Queer Ecology: Nature, Sexuality, and Heterotopic Alliances." *Environment and planning. D, Society & space* 30, no. 4 (2012): 727-47, 34
[12] Gary Presland, *Aboriginal Melbourne : the lost land of the Kulin people*, Rev. and updated ed. ed. (Forest Hill, NSW: Harriland Press, 2001), 1.
[13] For further information on St Kilda's Aboriginal heritage and the impact of British colonization on this landscape, see Meyer Eidelson, *Yalukit Willam : The River People of Port Phillip / Meyer Eidelson* (St. Kilda, Vic: City of Port Phillip, 2014).
[14] Presently, the suburb is home to 20,000 people, whose ancestry is predominately Australian, British or Italian. See "St Kilda (Vic.) 2021 Census All persons QuickStats," Australian Bureau of Statistics, 2021, accessed 24 June, 2024, https://abs.gov.au/census/find-census-data/quickstats/2021/SAL22343.
[15] Richard Peterson, *A place of sensuous resort : buildings of St Kilda and their people*, St Kilda historical series ; no. 6, (Balaclava, Vic: St Kilda Historical Society, 2004), 1.
[16] "St Kilda: Australian Lesbian and Gay Archives History Walk 2019," Australian Queer Archives Incorporated, 2019, accessed 24 June, 2024, https://queerarchives.org.au/app/uploads/2020/10/History-Walk-2019-St-Kilda.pdf.
[17] Peterson, *A place of sensuous resort : buildings of St Kilda and their people*, 93.
[18] Archives, "St Kilda: Australian Lesbian and Gay Archives History Walk 2019."
[19] Gandy, Matthew. "Queer Ecology: Nature, Sexuality, and Heterotopic Alliances." *Environment and planning. D, Society & space* 30, no. 4 (2012): 727-47, 34
[20] Alice's Garage is a social enterprise empowering older LGBTIQA+ people promoting healthy LGBTIQA+ ageing. For more information about this enterprise, visit https://alicesgarage.net/
[21] Including gay men, lesbian women, trans women, asexual and bisexual people.
[22] Bryan Lawson, What designers know (Oxford [England] ;: Elsevier/Architectural Press, 2004), 43-44.
[23] Precedent studies were central to this studio's pedagogy. Studio participants analysed the following memorials designs, concepts and processes as part of their learning process, including The Homomonument (Amsterdam 1987), the Sydney Gay and Lesbian Holocaust Memorial (Sydney 2001), An Anti-Memorial to Heroin Overdose Victims (St Kilda 2001), Pink Triangle Monument (Sitges 2006), The SIEVX Memorial Project (Canberra 2007)

Memorial to Homosexuals Persecuted Under Nazism (Berlin 2008), The Legacy Walk (Chicago 2012), Transgender Memorial Garden (St Louis 2015) and the AIDS Quilt (global, ongoing).

[24] Jillian Walliss et al., "Pedagogical foundations: deploying digital techniques in design /research practice," *Journal of landscape architecture (Wageningen, Netherlands)* 9, no. 3 (2014): 82, https://doi.org/10.1080/18626033.2015.968421.

[25] Shifting Paradise: A Memorial to Transgender Experience is by Sylvie Zhang. The author thanks Ms Zhang and all studio participants for their sensitivity in navigating this studio's subject matter.

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RE-JIGGING: LESSONS OF DESIGN/BUILD CURRICULUM IN A VIRTUAL WORLD

Author:
BRUCE WRIGHTSMAN

Affiliation:
MCEWEN SCHOOL OF ARCHITECTURE, LAURENTIAN UNIVERSITY, CANADA

INTRODUCTION

The 'Design/build' experience has been a valued and widely adopted pedagogy within architectural curricula in architectural programs across North America, utilized in the effort to address perceived deficiencies in design education, vis-a-vis the integration of building technology and construction.

The conventional education of architecture students privileges independent engagement through studio-based design exercises that focus on scale drawings, renderings, and models in which drawing and construction are typically seen as separate acts.[1] By contrast, design/build represents an opportunity to unite the optic and haptic aspects of architecture, by integrating the hands-on manipulation of material with the realities of gravity, tolerance, craft, etc. These haptic latent lessons represent an equally valuable, fundamental type of knowledge that is distinctly divergent from the conventional educational focus on formal design skills and book learning. The process of design and construction requires that the architect to make near-constant adjustments as they negotiate the ever changing and evolving context. Engaging these conflicts in real time defines the profession of architecture.

While academia does not currently embrace the real-time conflicts of practice, the question is not without precedent. Hands-on learning advocate John Dewey presents a debate between static and active learning. Dewey states that education is not an affair of 'telling' and being told but an active and constructive process.[2] In his book *Democracy and Education* Dewey's concept of an active learning model links vocational study with the goal of learning to make intelligent choices.[3] Instead of seeing vocational education as a limited, or limiting enterprise defined by repetitive completion of tasks as in myopic technical training, Dewey championed a vision for haptic education that, "…would prize freedom more than docility; initiative more than automatic skill; insight and understanding more than capacity to recite lessons or to execute tasks under the direction of others."[4] This thinking on academic integration is rooted in an accepted contextual reality that is not static thus ever changing.

Advocates of academic design-build programs suggest a direct link between Dewey's "trained imagination and resourceful skill for expert action in a complex society" in the full-scale building projects.[5] For instance, the McEwen School of Architecture at Laurentian University in Ontario, Canada, developed the 'Ice Station' project (Figure 1), as temporary installations integrated into first-year design studio. The project links the fall and winter semesters to align with the challenges associated with building on frozen lake conditions in the cold northeastern Canadian climate. Regardless of scale and complexity, the fixation with the 'making or building' portion of the

experience highlights what is viewed as the most valued learning outcome. It presents hands-on projects, not just design/build, as the architectonic *what*; the thing itself. It also raises an inescapable question and challenge for architectural education as a whole: Is learning "to make" enough?
This question of "What *is* making?" and its pedagogical value in architecture took a challenging, but probably necessary shift during the COVID-19 global pandemic, when in-person design/build studio projects scheduled for the fall 2020 and winter 2021 semesters were cancelled and replaced with entirely remote online studios.

CURRICULAR JIGGING

Design theorist Axel Kilian has defined learning as "*the interstices of the understood and that, which is yet to be discovered"*.[6] The value in Kilian's statement is that it views the opportunity of learning as an autonomous act, where a student's attention is at the core of the constitutive process. Often making sense of something is more about problem finding than it is about problem solving.
Traditionally, students work to obtain knowledge, build skills, and generate conceptual understanding through orchestrated lessons plans and constructed contexts, with the teacher and students working together toward them. This is the agency of curriculum, where the learning setting is full of structural jigs enacted on the students on behalf of the teachers and school. It sets up a perception of academic success that is beholden to just the content covered in class and limits choice making and planning, thus ignoring latent lessons that a student may discover on their own. These latent or self-initiated and discovered lessons are invaluable to student learning and a common source of knowledge learned through design/build projects.

Figure 1. Ice Station Village at Ramsay Lake, 2022

In a typical design/build projects a jig is often required to make a detail or component. A detail must be critically explored before it can be replicated multiple times with an elevated level of precision and craftsmanship. This may require the design and production of a jig. Jigging is a term used in the production of mass-produced objects where jigs (i.e., tools) are made and used to create other parts with great frequency and precision. Matthew Crawford states that jigs stabilize a process, and in doing so, lighten the burden of care by reducing degrees of freedom a person must contend with.[7] This concept can be taken out of its manual fabrication context. Crawford compares "jigs" used by skilled craft workers to simplify their tasks to cultural constraints that simplify moral choice. Conventional architectural education privileges independent engagement, creating curricular jigs through studio-

based design exercises of abstraction or simulacrum, focusing on scale drawings, renderings, and models. Rarely in the learning criteria are students exposed to the messy realities of the professional world (such as in an architectural practice) that occur in the grey zones 'between the lines' of the black and white rules prescribed through learning objectives, which are tethered to quantifiable student performance criteria dictated by accreditation.

Jigs are an example of how we use our environment as an extension of our minds, to confront contingencies.[8] So, in the case of remote online teaching, fabrication labs and shop tables must be replaced with dining room tables and bedroom desks. In skilled action, learning must occur at a deep level. It does not always follow prescribed procedures, relying instead on an iterative practice through trial-and-error, where failure and adjustments are required and essential to the learning. By acquiring skills, we acquire new motivations and a new space of reasons for action. This motivation for discovery is fostered through an engagement of contingencies of the world we occupy. Hands-on learning projects allow students to engage the optic and haptic aspects of architecture through the hands-on manipulation of material and the realities of gravity, tolerance, craft, etc. Students must confront these realities in addition to their own limitations, which require them to develop physical jigs on their own to help them navigate decision-making and discover possibilities. The challenge we are presenting for educators is "*how do you create hands-on learning projects that can be taught remotely online, yet still allow students to engage these haptic and latent aspects of architecture?"*

Questioning craft

Design/build curriculum offers unique challenges that traditional book learning does not. In a hands-on building project, students are immersed in a material world and confronted with the realities of gravity, material tolerance and the language of builders as quite different from their own. Making something is hard, regardless of whether it is a small model or full-scale design/build project. Craft is an essential learned skill in architecture school. From its design process to final execution of the work, craft intensely scrutinized.

To do good work means to be curious, to investigate and to learn from ambiguity. To assess what connotes good craft goes beyond a place where craft is simply a line item on a grading rubric. Craftsperson-like attitudes are vital. To teach attitudes is to create a culture as opposed to an expectation and to create a way of being as opposed to a technique.[9] The task is one that requires persistent, repetitive action that in turn breeds familiarity, proficiency, and a deep awareness of facets of craft; it requires time and patience. Going over an action again-and-again enables self-criticism.

Figure 2. Wood kits were organized into sets, packaged, and mailed to each student

Traditional classroom education often fears repetitive learning as mind numbing for students and not effective. However, skill development does not have to be reliant on traditional design/build projects to be most effective, it should depend on how the implementation of repetition builds skill and craft.

I coordinated a first-year design studio project titled 'Form and Space'. The project merges physical model making, digital modeling, and hand drawing to examine the reciprocity of interior space with external form. Traditionally taught students would use wood scraps from the shop to explore the relationship of form and space. The fall 2021 studio was taught remotely via Zoom and the assignment was modified to become a physical/digital hybrid. Wood kits comprising 24-25 wood blocks were mailed to students several weeks prior to use in order for them to create small physical models for the assignment, shown in Figure 2. This required many faculty hours for purchasing and assembling cardboard boxes, packaging up the wood pieces and setting up the delivery with a shipping company to send to each student, including overseas to international students.

The students used the wood blocks sent to them and explored ways of arranging/interlocking them, developing multiple iterations, and photographing the process. The design process followed a series of explorations and reviews allowing students to arrive at a formal strategy they felt was the strongest. They then measured and re-created the model digitally using Rhino digital software to explore the sectional aspects of the physical models they explored. They finished the assignment through hand drawings exploring the light and material qualities of the spaces they created through the physical modelling process, shown in Figure 3.

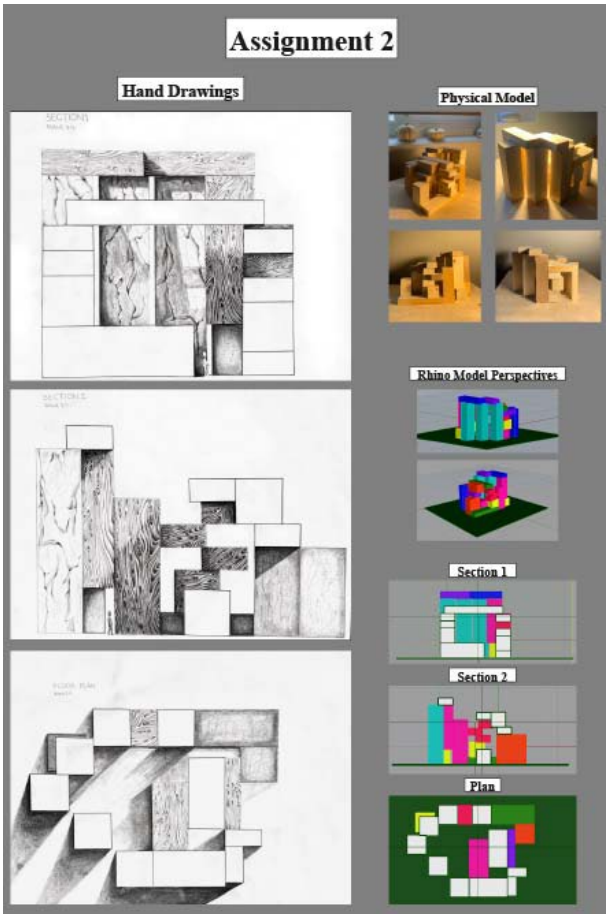

Figure 3. Form / Space physical and digital hybrid model project

One of the biggest challenges of teaching the making project online was assessing craft. The models created by each student were photographed and presented as .pdf or .jpg files on digital whiteboards. The quality of the physical models covered a broad range of success depending on the quality of the lighting, the skill of the photographer, and the care they took to curate the shot. This resulted in an assessment based on the ability to curate the *intent* of craft because it could not be accurately assessed in the actual physical model. In a digital context, the essence of craft as applied in its current in person pedagogical context within architectural curriculum was essentially lost. Diminishing the learning experience and limiting the skill building required in architectural education.

The physical act of making recognizes that for design to be successful, it needs to function in a system of contexts, where real-time information and context feedback are embedded into core learning objectives; creating a feedback loop to engage these conflicts is key to the project's learning outcomes. For the architecture students, it promotes tactile improvisation and creative jigging which allows them to exercise their inventiveness and generate unique design responses students may not have otherwise realized on their own.

The Form/Space assignment took a different approach to craft. Creating a 'craftsperson' like approach where students moved from physical to digital models, each informing the other; the form/space assignment allowed the students to think and make at the same time. While craft in the traditional skill-learned development could not be fully assessed, the agility of the 'craftsperson' could.

World-renowned architect Renzo Piano describes his working methodology: "You start by sketching, then you do a drawing, then you make a model, and then you go to reality – you go to the site – and then you go back to drawing . . .you do it . . . you redo it . . . you redo it again.".[10] This merging of

thinking and making as a simultaneous act is not unlike the craftsperson's approach. Piano's view of craft is quite different than the view of academia; the focus is on process through repetition, iteration, and decision-making, rather than the created object itself.

LATERAL INTEGRATION

In *Architecture: The Story of Practice* Dana Cuff challenges the academy by suggesting that, "…the nature of studio work must be revised to better prepare students for collaborative practice. Specifically, studio problems that require teams to solve them and studio problems that require negotiation with actual clients or consultants will help teach collaborative skills."[11] Architecture is a practice of integration. The ability to identify issues, discover opportunities, and integrate shifting demands is essential to the practice. Without a strong architectural presence, the authority of the designer diminishes. The more informed as designers we are about the factors that affect what can be made, the greater the opportunities to make suitable architecture. This integrative nature is notoriously difficult to model in an academic curriculum, and equally difficult to evaluate. Illustrated in Figure 4, the structure of conventional architectural curriculum mirrors silos lacking true integration. Core architectural courses, such as Structures, Materials and Method, and Environmental Systems are developed and taught as independent courses with their own specific learning outcomes and teaching methods, even though knowledge from each directly influences the others in the design process.

In his book Integrated Buildings, Leonard Bachman argues: "Integration is about bringing all the building components together in a sympathetic way…where components "share space, are aesthetically resolved, and at some level…have to work together or at least not defeat each other".[12] Bachman's argument requires a broader systems-thinking approach, often lacking in traditional pedagogical approaches. Architecture students, like architects in practice, need to visually see the outcomes of their decisions, and to learn when and where those decisions are, or are not, effective. This requires feedback of information to occur - a latent opportunity for learning by addressing shortcomings and adjusting decision-making accordingly. Often the chance to address integration within undergraduate education is relegated to capstone studios at the end of the design stream. However, technical curriculum in architectural education, typically introduced in the early half of design education, is rooted in integration, yet taught separately from the design studio. Content taught in structures, building construction and environmental systems courses is interconnected, but neither is allowed to bleed much into the other's domain. The concept of the curricular jig can be developed which allows the blurring of these edges between traditionally disparately taught courses. Bridging technical courses such as structures with the design studio can create feed-back loops of information, exposing conflicts and opportunities in a truly integrative way.

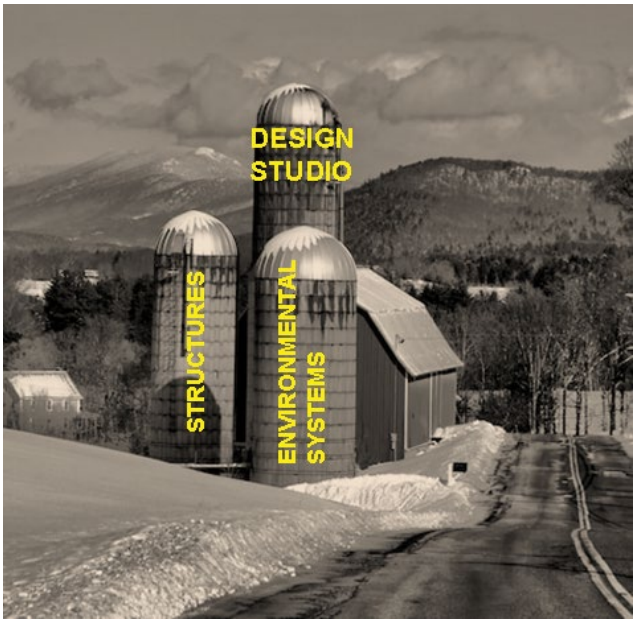

Figure 4. Traditional integration in architectural curriculum

During the fall 2023 semester, I took a unique approach for teaching Structures. The teaching approach attempted to break down traditional silos of learning, co-mingling the learning objectives of two third year courses on Architectural Structures and Design Studio, through an integrative design project that bridged both courses. Working with the Design Studio coordinator, a studio project was set up that would expose students to a process more reflective of practice, where structural design and building design are truly integrated. The teaching model built a feedback loop into the design process, necessitating students to identify design conflicts, and to discover opportunities in one class that were needed to address issues in the other.

The challenges of creating this integrated project were significant. Each course had different numbers of contact hours, with Studio meeting three times a week, and Structures just once per week. Calibrating how the project would move between labs each week for the semester was a key part of those challenges. Illustrated in figure 5, the project had multiple parts extending through the semester, divided among phases of Schematic Design, Design Development, and Analysis. The process and learning objectives for both classes remained separate, yet both classes shared the underlying design. The phases took place as a series of weekly submissions, building up to a final submission, specified by the respective class.

Creating a feedback loop, in order to engage the conflicts between the courses that challenged traditional lesson planning, was key to the project's innovation. Despite the complexity of the process, it was successful in promoting tactile improvisation and creative jigging, allowing students to exercise their inventiveness and generate unique design responses not otherwise realized on their own in the Studio alone (Figure 6).

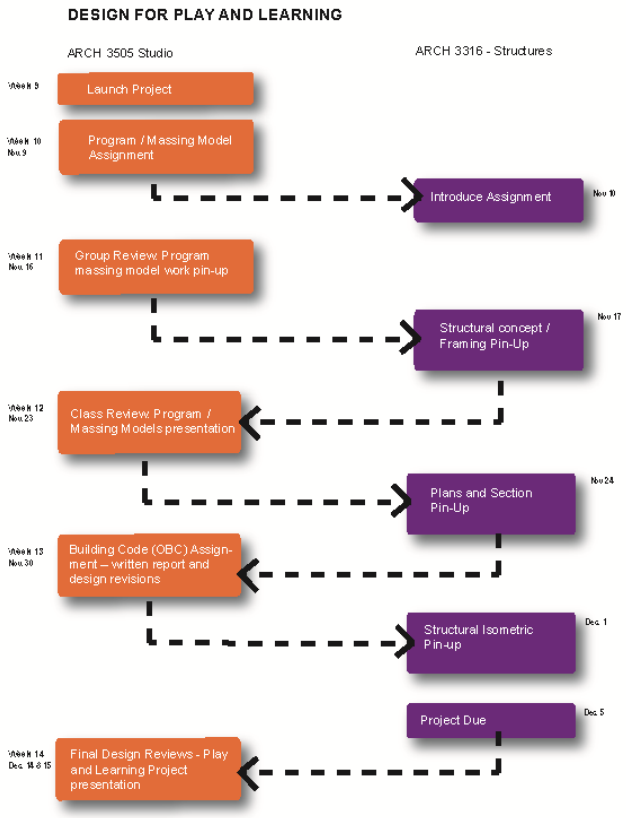

Figure 5. Re-jigging third year architectural curriculum

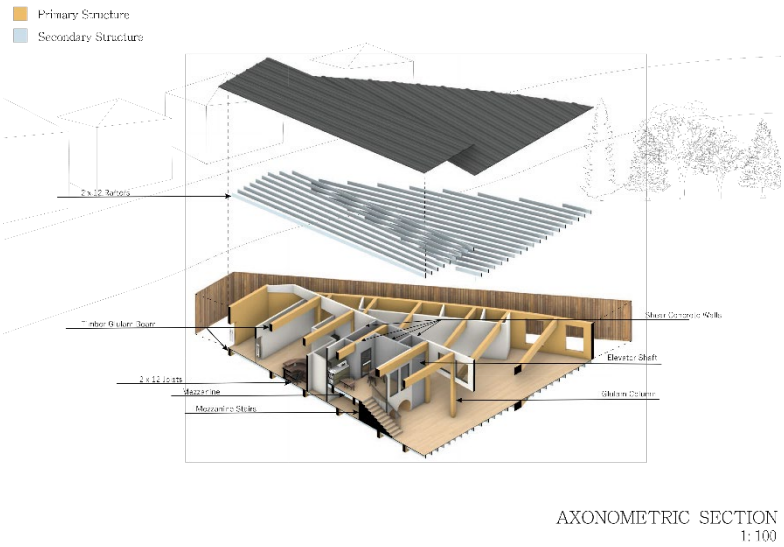

Figure 6. Final design drawing

CONCLUSION

The COVID pandemic had a profound impact on education: how we teach, what we teach, and the Design Studio environment itself. Academia has traditionally been slow to change, relying steadfastly on teaching methods and curriculum that is tested and proven to achieve academic agenda and accreditation goals. The pandemic required us to re-think curriculum, delivery methods and final requirements in the design studio. It presented even more challenges for design/build projects and

hands-on learning education.

In our current post-pandemic setting, we should not forget lessons we confronted, and reflect on our roles as educators in what was a radically different, but vitally important virtual classroom experience. This paper examined the inherent challenges of teaching design/build pedagogy in a remote online learning environment. It looked into meanings for craft and skill-based learning. This ongoing research explores making and hand-on learning environments that could be retranslated into learning opportunities in a virtual classroom. The intent of the ongoing research is to elevate the discourse of how we assess and critique hands-on-learning and the role 'making' plays in architecture, where students can be exposed to the full range of potential, or latent, lessons embedded in the design/build pedagogy, and find ways develop student's skills and foster student agency.

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IDENTIFYING TRANSFORMATIVE & INCLUSIVE DESIGN SOLUTIONS FOR DIVERSE LEARNING STYLES IN POST-COVID WORKSPACES

Author:
THARIQUE DE SILVA

Affiliation:
UNIVERSITY OF IDAHO, UNITED STATES

INTRODUCTION

The COVID-19 pandemic spurred a significant transformation in work environments,[1] compelling workplaces to swiftly adopt alternative solutions to safeguard employee health and safety. In the collaborative realm of architecture and design, interactions among employees, clients, and contractors underwent drastic changes. Traditional in-person meetings for reviewing drawings or selecting materials and finishes shifted to virtual experiences heavily reliant on internet connectivity.[2] Apart from the logistical challenges of remote work, there was also a notable absence of social and personal interactions crucial for fostering workplace culture and community. Despite these drawbacks, this period served as a pivotal moment for both employees and employers to reassess workplace strategies, particularly in the context of interior architectural spaces, aiming to better meet the evolving needs of the workforce.

Context

In the November 2013 issue of their magazine, the prominent architecture & design publication METROPOLIS[3] posed the following question on their cover page: "How will we work in 2020?". The subtext here noted that this edition would be "envisioning the new office landscape" (Blum, 2013) – little would they know about how the world took a turn at the end of 2019. Even the most ambitious iterations of future-thinking design environments captured some iteration of modularity and collaboration that attempted to pivot away from the sea of cubicles that had become so prevalent towards the end of the 20th century. While many firms had begun to explore some of these changes to alleviate employee stagnancy in the workplace, the COVID-19 pandemic and resulting workplace mandates stopped these changes in their tracks. Employers scrambled to reach some level of normalcy in the office environment by either staggering workdays, requiring certain precautionary measures for in-person interactions, or otherwise attempting to phase people in and out of the office. This was driven in part by the need to justify the expense toward office space leasing rates – which could take up a good chunk of overhead in larger cities – and make use of the facilities that were present in workplaces. This was an uphill battle; once adjusted to the new modes of working from home, employees began to realize that there was no need to expend the hours spent commuting back and forth where they could instead achieve the same or higher levels of productivity from the comfort of their home. As such, the transition back into the workplace around two years later was met with a lot

of resistance. Workers employed strategies such as 'quiet quitting' to get out of the need to return to a physical workplace, and instead leveraged their skills with the job market that was now widely accepting remote workers in all manner of industries.

How Designers Work

In architecture and design, the primary consideration for how space is developed is driven by the impact towards the health, safety, and well-being of the user. In office and workplace environments, this still largely remains an ambiguous spatial solution that is the remnant of a bygone era of design and furniture sourcing. Companies seemed hesitant to make any changes to the interior office environment because, after all, 'if it isn't broken, why fix it?', even with all of the novel research regarding the benefits of biophilic design[4] and the like. This all changed with the pandemic, and after an approximately two-year period of working remotely, employees were now in a prime spot to negotiate the conditions of their 9 to 5. Workers found out that the specific conditions that they had arranged within their homes – designed specifically with their own comforts and preferences in mind – served as a much better ecosystem for getting work done: the comfort of one's own couch or seat at the dining table, the ability to listen to your own music or the sounds of nature when opening up a window or the door to a backyard, and the familiarity of your favorite mug. In a design practice where the stifling of creativity and productivity can sometimes come from within – the very office environment that one works at – there is much relevance to exploring how we can provide the optimal working conditions that want to keep employees in the workplace without them feeling like they are sacrificing something that goes further than the job. The shift to remote work also uncovered information about management in the workplace. In office settings, the culture of the office environment invariably shifts more towards the management of employees, rather than the management of projects. This undoubtedly puts unneeded stress upon the worker, where they might feel that this level of watchfulness stems from a lack of faith towards their working methodologies rather than the collective time and action that could be spent towards moving a project forward. With the variety of ways in which employees still successfully completed their work remotely, there was also the realization that the lack of forcible oversight might have drastically contributed to their efficiency and productivity.

As such, there was a need to research and implement actionable solutions that made people want to return to the office without giving up the freedom and flexibility that remote work provided. First and foremost, however, it was imperative that there be a structured categorization of what employees felt was missing, so that those needs could be addressed in the office. Educational settings have made strides to formulate tailored environments that match individual learning preferences, but the corporate sphere has largely remained stuck in traditional office layouts, many of which inhibit creativity and productivity among employees: some of these iterations are captured in Figure 1. The structure of the cubicle[5] has long been an archaic solution to workplace design, but the efficiency and cost to the employer has allowed it to remain prevalent in many office settings. Additionally, while larger firms and employers might have the financial means to implement changes to the office much faster, these types of considerations are lost when looking at smaller practices. The delicate balance of profitability, expenditure, and the other variables included in running a small to mid-sized firm could very well mean that data-supported office remodels will fall to the wayside. However, there are many diverse working styles[6] that people lean towards without even realizing it, but there is a lack of data regarding what that looks like, or how it can be specifically implemented in workspaces to provide specific benefits to productivity, efficiency, and happiness. As such, the need to accommodate for these diverse working styles needs to be one of the primary factors that employers lean on to prove to their employees that they are taking actionable steps to ensure the wellbeing and productivity of

everyone returning to the office. As a start, data can be extrapolated by adapting a common differentiator of learning styles called the VARK model.[7]

Figure 1. 'Workplace Evolution', sourced from the website of Hellmuth, Obata, & Kassabaum (H.O.K.)

The VARK Model

The VARK model was created by Neil Fleming in 1987 to further document the varieties in which students learned and applied new information. The general concept behind the formulation of this methodology was that the largely standardized methods of teaching and learning in educational environments did not provide the highest level of success and retention for students. Instead, Fleming categorized four primary categories that provided more detail regarding learning strategies – visual, auditory, reading/writing, and kinesthetic. This approach allowed for more attention and engagement from students, as they were able to naturally gravitate towards a strategy that they were familiar with – either inherently or through prior learning processes.

This becomes quite interesting when translated into the work setting. As it stands, the typical cycle of employment post-graduation follows the path of a student receiving a degree, finding a job, and – based on their experience in work environments relevant to this new avenue of employment – some form of entry level work where they have a bit of time and space to become familiar with these new processes. Specific to the field of architecture, these entry level tasks might look like picking up redline comments on a set of drawings, assisting with finish and material selections for client meetings, or otherwise working under the guidance and direction of a project manager. The issue, however, is that all considerations made towards the furthering of an individual's education while in an institution of learning gets lost when they transition into the environment of work and application of practice. There is no support to enhance employee efficiency and further learning once they have left school and entered the workforce. As such, the VARK model serves as a fascinating starting point to develop the new morphology of office space design as it relates to the varieties of working methods that employees adapted to, became accustomed to, and realized worked for them in a much more successful and productive manner. It also allows for the categorization of certain sensory criteria that

might affect an office worker, with the potential for uncovering more information about our neurological responses[8] to our surrounding environment.

The VARK questionnaire version 8.02, issued by VARK Learn Limited, organizes their survey in terms of experiential scenarios that one might find themselves in. This is not all too removed from the experience of inhabiting or working in a space and served as a good point of inspiration for the formulation of the questions noted above.

As such, survey questions for the VARK model can be adapted, reformatted, and hybridized with the inquiries regarding workspaces to now become specific questions and conditions regarding the indoor office environment. Questions might typically investigate methods that people lean more towards when attempting to learn something, like the following sourced directly from the VARK 8.02 questionnaire:

I want to learn about a new project. I would ask for:

a. examples where the project has been used successfully.

b. an opportunity to discuss the project.

c. diagrams to show the project stages with charts of benefits and costs.

d. a written report describing the main features of the project.

In this case, the application towards what is being learned is clearly defined, and the options for achieving a result are documented as well. Using a similar structure, a series of relevant questions were formulated to serve more towards documenting working styles that are influenced by how people learn. The initial iterations of those questions are noted below for each relevant category, along with a summary of the translation from learning to working style.

Visual Spaces

Visual learners prioritize information presented through visual aids like charts, graphs, and diagrams, as these aid their comprehension and learning process. Access to material libraries and collaborative spaces support project-specific tasks and provide a holistic view of ongoing projects. Factors like dynamic lighting and versatile monitors in dedicated work areas further contribute to employee productivity. When developing survey questions for this group, emphasis was placed on identifying common visual features across different office environments and work settings. Below is an example of what a question for this category might look like:

1. When setting up your office workspace, what visual elements do you prioritize for efficiency and comfort?

a. Arranging your desk or workspace to maximize natural light and minimal glare

b. Positioning your computer monitor at eye level and adjusting your chair / desk to reduce neck and spine strain

c. Using color-coded filing systems and storage solutions to minimize visual clutter and organize documents

d. Having a clear view of your coworkers and any immediate common or collaborative areas if you need to assist with or coordinate work

Auditory Integration

Auditory learners excel in processing information through active listening, favoring spoken explanations, discussions, lectures, and verbal instructions. Office environments benefit from having acoustic strategies like soundproofing and background noise management to enhance concentration and collaboration. Creating audio-friendly meeting spaces and communal social zones help to maintain a balanced work environment. Successful furniture solutions integrating acoustic elements

into seating, tables, phone rooms, and lighting contribute to both functionality and aesthetic intent within office design. A related question for this category can take the form of the following:
1. When working remotely, how would you create an auditory environment conducive to concentration and productivity?
a. Establishing a dedicated workspace away from household noise and interruptions
b. Setting boundaries with family members or roommates to minimize disruptions
c. Using headphones or earbuds to block out external noise during virtual meetings
d. Adjusting your work schedule to capitalize on times of day when ambient noise is minimal

Reading/Writing Zones

Individuals that fall under this category prefer to learn through written words. They typically do much better with writing out information, taking notes, and reading textbooks. This translates well to being provided with written instructions and benefitting from written summaries or outlines. Established areas suited for reading/writing learners promote focused research. Features like quiet zones, ergonomic furniture, and adjustable lighting contribute to a conducive work environment for someone to be able to read or write with efficiency and clarity. Here is a good base question for consideration towards building data on this topic:
1. How do you prefer to take notes or capture ideas during meetings or brainstorming sessions?
a. Writing notes by hand in a notebook, or on sticky notes
b. Typing notes on a laptop or tablet for easy reference
c. Using digital tools for mind mapping or note organization
d. Recording verbal discussions for transcription or later review

Kinesthetic Empowerment

Kinesthetic learners engage the best through hands-on experiences and physical activities. They prefer to actively engage with the learned material through experiments, demonstrations, or other interactive methods. In addition to that, specific design considerations could be implemented to ensure a productive approach to the tasks at hand – this can be done through the implementation of standing desks, flexible seating arrangements, and designated movement spaces within the office. Questions within this category allow for a deeper investigation into office layout transformations[9] to accommodate kinesthetic learners. The question below starts to capture the direction of research into this category:
1. When collaborating with colleagues or clients, how do you convey design concepts and ideas effectively?
a. By involving them in hands-on activities such as model making or interactive workshops to encourage participation and feedback
b. Through digital presentations or virtual walkthroughs that allow stakeholders to visualize the designs in three dimensions and provide input
c. By preparing detailed drawings or renderings that communicate the design intent and key features of the project
d. Using verbal explanations and discussions to convey design concepts, supplemented by visual aids such as sketches or diagrams

The Questionnaire

This process was further developed to include a combination of relevant criteria that served to answer a specific question about working environments. The final draft of the questionnaire is represented below, with the answer items ‘a’ through ‘d’ relating to visual, auditory, reading/writing and

kinesthetic work applications, respectively. Though there are eight questions addressing working preferences, supplemental questions that serve as anonymized data-gathering points for criteria such as age, period of employment and demographic data will be included as well.

1. When it comes to organizing your workspace, what elements do you prioritize the most for efficiency and comfort?

a. I prioritize arranging my desk to maximize natural light and minimize glare, which will in turn help me to focus and reduce eye strain

b. I find that using noise cancelling headphones or desk-separating acoustic partitions are more helpful in managing auditory distractions. This allows me to concentrate better on tasks without being disturbed by surrounding noise.

c. I keep essential documents or reference materials readily accessible in labeled folders or binders. This helps me to stay organized and efficient with my work.

d. I prefer to have a comfortable ergonomic chair and a spacious desk to move around freely. Physical comfort is essential for me to maintain productivity throughout the day.

2. In a busy office environment, how do you manage distractions to stay focused on tasks and the work at hand?

a. I find that creating a visually calming workspace with minimal clutter and distractions helps me to stay focused on tasks

b. Using noise cancelling headphones or ambient sound generators allows me to block out distracting noises and concentrate on my work

c. I designate specific times for focused reading and writing tasks, in an effort to minimize interruptions and maintain concentration

d. Taking short breaks to stretch or move around helps me to stay alert and avoid feeling restless during long periods of desk work

3. How do you prefer to communicate ideas or collaborate with colleagues in a team setting?

a. I prefer to use visual aids such as diagrams, charts, or drawings to convey complex ideas more effectively

b. I prefer to participate in verbal discussions or brainstorming sessions to exchange ideas and receive immediate, in-person feedback from colleagues

c. I find that written communication, such as emails, memos, or redlines, useful for conveying detailed information or providing updates on projects

d. I prefer to have hands-on collaborative activities where team members can physically engage with materials or prototypes to generate ideas

4. When transitioning to remote work, how do you ensure effective communication and collaboration with your team?

a. Utilizing video conferencing tools with screen sharing capabilities to help me maintain visual engagement during virtual meetings and presentations

b. Participating in regular conference calls or virtual meetings to ensure that there is clear verbal communication of projects and alignment with team objectives

c. Collaborating in shared online documents or project management platforms allows for efficient written communication and document sharing

d. Incorporating interactive virtual workshops or team building activities that can foster engagement and collaboration among remote team members

5. How do you adapt your working style to different environments, such as office spaces, remote work setups, or collaborative workspaces?

a. I tailor my workspace to maximize visual comfort and productivity, whether in a traditional office setting or working remotely.

b. I adjust my auditory environment to minimize distractions and optimize communication, regardless of the work environment
c. I utilize various written communication tools and strategies to stay organized and efficient in different work environments
d. I incorporate physical movement and ergonomic considerations into my work setup to ensure that I am comfortable and productive wherever I am working
6. When faced with a challenging task or problem at work, what approach do you typically take to find a solution?
a. I would analyse the problem visually, often sketching out diagrams or mind maps to visualize different solutions and their potential outcomes
b. I would engage in discussions with colleagues or mentors, seeking diverse perspectives and leveraging verbal communication to brainstorm ideas and strategies
c. I would conduct thorough research and review relevant literature or documentation to gather information and inform an approach to solving the problem
d. I prefer to dive into hands-on experimentation or trial-and-error approaches, actively testing different solutions or prototypes to find the most effective outcome
7. How do you prefer to receive feedback on your work performance or projects from supervisors or peers?
a) I appreciate feedback that includes visual examples or demonstrations, allowing me to see specific areas for improvement and visualize suggested changes
b) Verbal feedback delivered in a constructive and supportive manner, either in a one-on-one conversation or team meeting, would help me understand areas for growth and development
c) Written feedback with detailed comments or suggestions provides clarity and allows me to review and reflect on specific aspects of my work and performance
d) Interactive feedback sessions that involve hands-on demonstrations or simulations, where I can actively engage with the feedback and make immediate adjustments, are the most beneficial to me
8. How do you stay engaged and productive during long design sessions or workdays?
a) I surround myself with visual inspiration, including mood boards, artwork, material samples, and design references, to stay motivated and focused
b) I listen to music, podcasts, or ambient sounds to create a conducive working environment and maintain concentration
c) I organize my thoughts and tasks through written lists, schedules, and notes, ensuring that I stay on track and meet deadlines effectively
d) I take regular breaks to move around, stretch, or engage in physical activities to recharge and maintain energy levels throughout the day

CONCLUSION

This ongoing research has provided valuable insights into the diverse working preferences within environments of architecture and interiors, influenced by the visual, auditory, reading/writing, and kinesthetic (VARK) learning styles. The formulation of this survey questionnaire has identified various documentable strategies that could quantify how interior architects and designers can enhance productivity, creativity, and collaboration. The questionnaire is currently undergoing its final review procedures, and it will be issued out to smaller architectural offices in the Pacific and Inland Northwest areas. One notable result from the initial testing sequences of this questionnaire has been the need for neurodivergent[10] considerations when assessing employees returning to the office. The realm of neurodivergence intersects greatly with both learning and working styles, and edits will be adopted into later versions of this document. As our understanding of the ever-changing needs of the

employee evolves through the societal challenge of COVID-19 and beyond, embracing a holistic approach to prioritizing employee well-being will remain crucial for advancing workplace practices.

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WRITING IT UP AND WRITING IT DOWN: NOTATION FOR INTERDISCIPLINARY RESEARCH

Author:
MICHAEL A.R. BIGGS

Affiliation:
UNIVERSITY OF HERTFORDSHIRE, UK

THE PROJECT

The "Speaking, Writing and Picturing" (SWaP) project investigates originality and innovation, and how creativity, novelty, and "the new" can be facilitated. More specifically, it investigates the intersection of two theories that appear to limit our ability to conceive or express radically novel content, i.e. linguistic relativity and writing systems. As a result, the project problematizes how originality and innovation are possible given these conceptual and expressive constraints, and what to do about it.

The theory of linguistic relativity impacts on our ability to think outside the box. This theoretical problem, sometimes inaccurately referred to as the Sapir-Whorf hypothesis,[1] does not "determine" what we can think based on our native language, but it does imply that the structures of our language influence the way we think about the world and how they mediate our lived experience. In terms of our project's intellectual relationship to this theory, we assume the weak relativity thesis of the Edinburgh School[2] and the structure-centered approach to empirical investigations,[3] in which we find connections with the philosopher Wittgenstein's observations about aspect-seeing.[4]

The theory of writing systems – both conventional writing and other discipline-specific notations such as maths and music – impacts on our ability to communicate novel ideas and to make connections between what we already know, and the radically new. Maths and music are discipline-specific notations that have been developed to encode a narrow subset of human experience and as a result they are often poor at operating beyond their disciplinary boundaries. For example, although we can describe birdsong in words and text, linguistic description falls far short of capturing the phenomenological experience of hearing it. Even notating birdsong in Western staff notation only approximates to the content, despite its aural rather than linguistic mode, because staff notation has developed around the needs of instrumental performance. It does not have the capacity to record the non-instrumental, atonal sound qualities of birdsong, even in the creative hands of composers such as Messiaen.

In terms of our project's intellectual relationship to the theory of writing systems, on one hand, we note the advantage that increasing disciplinary focus brings increasing explicitness. For example, mathematical and logical notations have been developed to make explicit what is often only implicit in verbal renderings of mathematical problems. Mathematicians and logicians work by operating with these signs, to render perspicuous what is hidden by ordinary language. On the other hand, mathematical and logical notations are completely symbolic, and their coding must be learned, i.e. one cannot infer the meaning of the signs from their form. This brings the disadvantage that any extension of the sign system within the domain must be undertaken formally, comparable to the

formal admission of new words into the lexicon by the language academy, e.g. Real Academia Española.

THE NOTATIONAL DIMENSION

The research presented is a pilot study of the notational dimension of the problem of how originality and innovation is possible, and how to mitigate the effects of linguistic relativity and our mono-disciplinary habits of language and thought. When we are embedded in a discipline or a social context, we become enculturated and therefore blind to alternative conceptual paradigms. For example, in the UK in the 1970s, it was normal practice for female production-line workers to be paid an hourly rate that was less than for their male counterparts for the same job. What, you might wonder, was the context that normalized the connection between the compensation for labor and the category of gender? Even in 2023, despite the issue of equal pay being first raised in 1888, the UK gender pay gap was estimated by Pay Justice to be 18%.[5] Surprisingly, inequality is still enshrined in law, where in the UK the statutory minimum wage for under-18s is half that for over 23s.[6] Given our overall research aim of facilitating both awareness and change through originality and innovation; can notational systems be analyzed in ways that render perspicuous our cultural habits and identify the potential of innovative writing systems to express the radically novel content and outcomes of interdisciplinary research?

Wittgenstein thought that these kinds of enculturated assumptions about how things "must" be, underpinned many misconceptions about how we operate with words, and how we understand the world.

What we are supplying are really remarks on the natural history of man: not curiosities however, but rather observations on facts which no one has doubted, and which have only gone unremarked because they are always before our eyes.[7]

His strategy for overcoming the problem of linguistic relativity included the use of images that reveal how we have blind-spots to alternative ways of seeing "the facts".

A rectangle can be made of two parallelograms and two triangles. Proof:

A child would find it difficult to hit on the composition of a rectangle with these parts, and would be surprised by the fact that two sides of the parallelograms make a straight line, when the parallelograms are, after all, askew. It might strike him as if the rectangle came out of these figures by something like magic. True, he has to admit that they do form a rectangle, but it is by a trick, by a distorted arrangement, in an unnatural way.

I can imagine the child, after having put the two parallelograms together in this way, not believing his eyes when he sees that they fit like that. 'They don't look as if they fitted together like that.' And I could imagine its being said: It's only through some hocus-pocus that it looks to us as if they yielded the rectangle – in reality they have changed their nature, they aren't the parallelograms any more.[8]

These blind spots become more apparent when we operate across or between disciplines. Interdisciplinarity introduces new, previously unexpressed world views, not simply new elements requiring supplementary vocabulary. In response, we are not advocating a strong linguistic relativity thesis – that these new interdisciplinary domains are therefore inconceivable, but a weak relativity thesis – that we need to overcome our current habits of thought and language, and expand our conceptual space to accommodate these new concepts. The problem is therefore how to facilitate this conceptual expansion, and for this paper we focus on the notational dimension: on how we write down, write up, draw, or otherwise annotate our ideas.

THE METHOD

We approached the problem through an analysis of two dimensions of notation: semiotics and pragmatics. From the semiotic perspective, we noted above that sign systems which are heavily symbolic benefit from depth of communication but suffer from lack of breadth of application. This is a consequence of them being closed systems of discrete signs with formal or conventional uses. This may be contrasted with the flexibility, but shallowness, of an iconic system such as Isotype,[9] in which the meaning of new signs can be inferred by the user. As a result, iconic systems can be applied in novel situations and with new referents, whilst maintaining their semiotic implication. We labelled this semiotic axis "symbolic-iconic". From the pragmatic perspective, we noted there was a range of transferability of sign systems, from broadly applicable systems such as true writing, i.e. writing of the spoken word and its ability to describe the content of many domains; to the very narrowly constrained system of symbolic logic, i.e. the glyphs of symbolic logic do not have uses beyond logic (and mathematics according to Frege). We labelled this pragmatic axis "intrinsic-extrinsic".

Writing it down

We took 18 varieties of notation and scored them on a relative scale (±5) on the independent variables of symbolic-iconic and intrinsic-extrinsic, shown in the table below (sorted on symbolic-iconic).

name	*label*	*(-5) symbolic-iconic (5)*	*(-5) intrinsic-extrinsic (5)*
symbolic logic	Log	-5	-5
maths	Mth	-5	-4
true writing (e.g. English)	TrW	-5	5
proto writing (e.g. Cuneiform)	Pro	-4	-3
shorthand	Srt	-4	3
staff notation (music)	Mus	-3	-4
Feuillet dance notation	Feu	-3	-3
Sutton movement notation	Sut	-2	-2
graphic scores (music)	Gra	-1	0
Mayan script	May	-1	3
Egyptian hieroglyphs	EgH	0	-1
Laban dance notation	Lab	2	-2
semasiography	Sem	2	3
orthographic projection	Ort	3	1
diagramming	Dia	3	2
Mixtec picture-writing	Mix	4	-3
airport signage (Isotype)	Air	4	2
representational drawing	Drw	5	4

Table 1.

"Iconic" signifies that the elements in a notational system have some level of visual similarity with what they represent, which means that when new signs are introduced, users can infer their use from precedents within the system, e.g. road signs, airport signs, etc. Representational drawing is a paradigmatic case in which each production is unique and yet it can be decoded owing to its iconicity or indexicality, and the user's accumulated experience of interpreting two-dimensional images. Hence representational drawing scores +5 on the symbolic-iconic axis, i.e. high iconicity.

"Symbolic" signifies that the elements in a notational system have low iconicity. True writing,[10] which is the normal practice of writing a language such as English using the Latin script (Unicode 0000-007F), is a familiar and paradigmatic example of a symbolic notation. This is revealed by observing that the forms of the script do not indicate their phonetic or syllabic equivalents, and that the system must be explicitly learned and cannot be inferred from its appearance: "a code can be either learnable or comprehensive, but it cannot be both."[11] Hence true writing scores -5 on the symbolic-iconic axis, i.e. very low iconicity.

"Extrinsic" signifies that a notational system is applicable beyond discipline-specific boundaries and tends towards broad completeness (also called comprehensive: the ability to document all kinds of data). True writing/language is widely regarded as complete, although it has limitations in documenting phenomenological content such as colour and sound. Extrinsic systems tend to be broadly applicable but lack nuance and disciplinary specificity/granularity. They have breadth but lack depth. The ability of true writing to document a diverse range of multi-disciplinary content results in a score of +5, i.e. very high extrinsicality.

"Intrinsic" signifies that a notational system is discipline-specific and not readily deployed beyond its disciplinary boundaries. A notation may even restrict the range of possible content that can be recorded, e.g. in music, staff notation cannot document all types of sound, or even some types of non-Western music. Intrinsic systems tend to be very specialized and hence narrowly complete, i.e. complete only within its discipline. They have depth but lack breadth. Intrinsic notational systems risk becoming deterministic of content rather than facilitating the documentation of novel types of data and will tend to operate normatively. Hence logical notation scores -5 on the intrinsic-extrinsic axis, i.e. very low extrinsicality.

Writing it up

To establish the relative positions of the data points on the axes, we fixed Egyptian hieroglyphics [EgH] as a datum point near the center of the chart. It scores 0 (neutral) on the symbolic-iconic axis because, despite being pictorial in appearance, the operation of the sign system depends on the phonics of the initial consonant of the name of what is depicted in Egyptian, i.e. an abjad-like rebus.[12] We took this to indicate an equal operation of symbolic and iconic modalities. On the intrinsic-extrinsic axis, Egyptian hieroglyphics score -1, i.e. slightly intrinsic, owing to the focus of the notational system on religious and ceremonial documentation on monuments, in contrast to the subsequent development of hieratic and demotic as a tool for description that could be applied more widely to record information.[13]

It should be noted that it is the relative position of each writing system rather than the exact numeric score that informs the present research. Thus we were simply seeking a distribution of notational systems according to their position on the semiotic and pragmatic scales that we had identified.

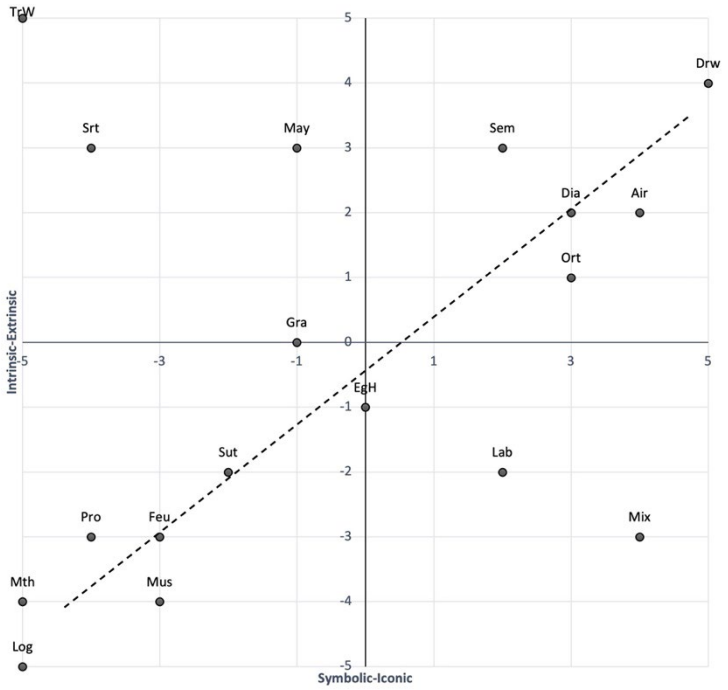

Figure 29. Scatter graph of writing systems

We notice from the resulting scatter chart that, although the sample is admittedly limited, there are more symbolic systems than iconic systems in the intrinsic quadrant. Symbolic systems tend to be intrinsic, sometimes referred to as "motivated", because they develop around in-depth documentation for a specific discipline, e.g. staff notation of Western music [Mus]. They tend not to be applicable beyond their disciplinary boundary, which is revealed by the trend (plotted diagonal line) from lower left quadrant (symbolic-intrinsic) to upper right quadrant (iconic-extrinsic). The clustering in the lower left quadrant implies that communication beyond disciplinary borders is frequently, but not universally, sacrificed in favor of notational granularity and depth, i.e. most but not all the examples lie on the plot line. The polar case in the lower left quadrant (symbolic-intrinsic) is symbolic logic [Log].

Conversely, iconic systems have the extrinsic advantage of being able to be interpreted in novel situations but may suffer from a lack of specificity owing to the limited capacity of iconic communication to express modality. This is also to be expected since iconic systems are highly transferable across domains but suffer from a lack of specificity/granularity, as implied by weak modality. The polar case in the upper right quadrant (iconic-extrinsic) is representational drawing [Drw].

We also notice that some forms of writing are more extrinsic than others. These occupy the upper left and upper right quadrants of the chart. Atypically, true writing [TrW], which is our ability to discuss and write our thoughts in words, is both symbolic and extrinsic. Although true writing is sometimes strained, it is sufficiently complete, for example, for Einstein to describe curved space and for Whorf to describe Hopi concepts of time.[14] In the upper quadrants one also finds representational drawing [Drw]. Drawing is iconic and moderately complete but lacks the modality and therefore the degree of extrinsicality of true writing [TrW].

There are also interesting, outlying points on the chart that represent exceptions to the expected trend, i.e. these less expected combinations lie in the opposite quadrants to those indicated by the plot line. The lower-right quadrant (iconic-intrinsic) contains Mixtec picture-writing [Mix]. Despite the Mixtec

writing system being very pictorial, the "lexicon" consists of a limited set of icons that only superficially depict what is occurring, and in practice most of the content is symbolized as "the essential documentary evidence for history", i.e. propositionally.[15] Perhaps in this sense, Mixtec picture-writing may be compared to neumes in music notation which are *aides-memoires* for music that has already been learned aurally.[16] As a consequence, surprisingly, the Mixtec writing system largely functions symbolically despite its iconic appearance.

The chart also reveals a difference between the Mixtec [Mix] and Maya [May] writing systems. According to Sampson, Maya script is complete within the bounds of Mayan spoken language owing to its supplementation of logographic elements with phonetic notation.[17] On the other hand, Mixtec picture-writing is a primarily logographic system, with additional limited phonetic and mathematical elements that serve to spell out the names and dates that identify individuals and places. Thus, there is little descriptive content in the Mixtec system itself. As a result of our observations, we speculate that logographic systems tend towards propositional content.

CONCLUSION

We are taking three key ideas forward that seem to warrant further research. The first is that logographic systems tend towards propositional content. They are therefore limited to applications in which they make assertions about the real world which are either true or false. For example, if an airport sign indicates that passport control is straight ahead, it either is or it isn't. The iconic sign does not describe anything modal. The second is that intrinsic notational systems operate normatively. The more complete and mature the symbolic sign system, the more it determines what is annotated. In other words, if we cannot write our discipline-specific content in, for example, symbolic logic, or mathematical notation, or staff notation, then it is not what our culture calls logic, or mathematics, or music, respectively.

Let's remember that in mathematics, the signs themselves do mathematics, they don't describe it.[18]

The distribution shows that true writing (ordinary written language) is a sufficiently abstract system that it can describe almost anything, so why not use it for everything? Wittgenstein cautions us that we are frequently misled by language into wrongly believing that the logic of our language is the logic of the world. So, although we can say almost everything in words, those words may be infelicitous, i.e. unfaithful representations of reality. The advantage of mathematical and logical notations is that they can only annotate what is possible in mathematics and logic; indeed, according to Wittgenstein the sign system determines what constitutes mathematics, i.e., the sign system is normative. Unfortunately, although mathematical and logical notation is therefore felicitous, we cannot say everything with it.

In interdisciplinary research, we are trying to extend and annotate our knowledge beyond its disciplinary boundaries without constrained by our notation, i.e. thinking that the "limits of our notation are the limits of our world".[19] Although a disadvantage of iconic notation is its lack of specificity, an advantage is its denotative iconic or indexical connection to its reference. Therefore, a third outcome of this project is the conclusion that the optimum expressive and communicative space on the chart for "the new" is somewhere in the middle of the upper right quadrant. It is above zero on the intrinsic-extrinsic axis, which implies broad applicability for writing down innovative content, and it is above zero on the symbolic-iconic axis, which implies liberation from the normativity of symbolic notation for writing up innovative content.

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HYBRIDITY OF A LEARN AND EARN MODEL: MAPPING ACADEMIC PROGRAMS, LABS, AND APPRENTICESHIPS

Authors:
JEFFREY C. SUN, ANNIKA BENNETT, D'NEIKA LOPEZ, TAYLOR L. PRATT

Affiliation:
UNIVERSITY OF LOUISVILLE, UNITED STATES

INTRODUCTION

Earning a wage during college in a field related to one's college major, or "learning and earning," has attracted government policy interest in the United States to address college outcomes, workforce development, learner preparation, and college costs. Using participatory action research methods, this project examined the effects of a design thinking approach on the development of innovative learning and earning experiences for 4,000 apprentices. It poses the research question: What key contributions emerge when drawing on design thinking for the development and implementation of a comprehensive apprenticeship program? Alternatively, what are the realized benefits from using design thinking to establish and refine a learn and earn model?

Drawing on situated learning theory, the authors provide insights on how the contextual policy and organizational nature around the growth of the learn and earn approach illustrate the significance of design thinking, particularly in the areas of what scholars have dubbed "legitimate peripheral participation."[1] This study highlights three major findings – (1) the role of academic and industry alignment, (2) the design strategy of presenting value to the academic units, and (3) the strategic focus around equity centered pathways. Collectively, these features contribute to the intentional and intersecting experiences of learning, life, and work through hybridity of learn and earn models via college apprenticeships.

APPRENTICESHIPS

Approaches and Value

Apprenticeships are employer-driven, earn-and-learn experiences used as a strategic tool to recruit, train, and retain a skilled workforce.[2] Built on seven distinct pillars, U.S. apprenticeships are industry-led and combine classroom learning, on-the-job application, and mentorship in a paid experience that leads to a relevant credential, all in a safe working environment.[3]

All apprenticeships are centered around competencies of an occupation in which related technical instruction (RTI) and on-the-job training (OJT) are closely connected to support the development of required occupational skills. While each program must include the same components, the apprenticeship can be designed as time-based, competency-based, or a hybrid of the two.[4] In a time-based apprenticeship, the apprentice must complete a preset number of OJT hours, a minimum of 2,000 hours in the U.S. In a competency-based apprenticeship, progress and completion are measured based on successfully demonstrating proficiency in identified skills through articulated and

measurable competencies. Finally, hybrid programs combine the two approaches, requiring a minimum number of hours and the demonstration of skill proficiency. Training components may be arranged to maximize flexibility of program design and align with the capabilities and needs of the employer hosting the apprenticeship.

Apprenticeships add value to employers, learners, and education providers. Employers benefit from apprenticeship programs through improved recruitment and retention rates that lead to decreases in hiring costs. For instance, 93 percent of apprentices continue their employment after program completion.[5] Additionally, the U.S. Department of Labor (U.S. DOL) estimates the return on investment of apprenticeships to be $1.44 for every dollar invested.[6]

For apprentices, many of whom are from underrepresented populations, such as women, people of color, military veterans, and people with disabilities,[7] apprenticeships provide paid experiences that directly relate to their programs of study, allowing them to apply what they learn in the classroom to real-world experiences while earning a livable wage. Moreover, apprenticeships allow learners to graduate with little to no debt, which is a tremendous advantage compared to their peers who are also trying to offset rising college costs.[8] The data suggest that apprenticeships, as a learning design option, offer significant returns to college students.

Finally, education providers and faculty can utilize apprenticeships to gain access to industry partners, develop a strong pipeline of new and diverse students, and improve retention and graduation outcomes. A recent report found that 80 percent of students in a manufacturing apprenticeship graduated with a college degree compared to 29 percent of students who had not engaged in an apprenticeship program.[9] In addition, an apprenticeship is designed to connect with industry, encouraging greater alignment between academic program offerings and workforce needs. In essence, the design ensures college academic programs adequately prepare learners with industry-relevant skills.

Hybridity Effects

Apprenticeships, by their foundational characteristics, blend learning and work for career preparation. The hybridity effect of apprenticeships refers to the combination of academic learning and its application through paid OJT, which combine “learn and earn” experiences. Nowadays, many college students already have a job while they are pursuing a degree; however, it is oftentimes unrelated to their program of study. The structure of an apprenticeship eliminates this disconnect between academic studies and work-based experiences; apprenticeships connect academic studies to a career pathway by enhancing the learners’ skill development and application of classroom theory to the workplace. In addition, apprenticeships potentially improve the employability of learners as they receive training consistent with industry standards and organizational needs, making the transition to full-time employment more seamless.

MODERN APPRENTICESHIP PATHWAYS TO SUCCESS

Project and Intervention Role

The need for a modern approach to recruitment, training, and retention coupled with the opportunity to achieve greater alignment between higher education and industry have led to the design of the Modern Apprenticeship Pathways to Success (MAPS) program at the University of Louisville, which ran from 2020 to 2024. The MAPS program is a U.S. DOL grant project to develop and expand apprenticeships in healthcare, advanced manufacturing, and information technology in Kentucky and southern Indiana. As a collaborative effort among a U.S. research university, three community colleges within a state system, employers, and community organizations, MAPS built the infrastructure for apprenticeships that lead to improved education and career outcomes for program

participants, particularly women, underrepresented minorities, and military-connected individuals and their families.

Design Elements

Through a series of design thinking exercises, MAPS developed two strategic pathways to developing and delivering apprenticeship programs: Academic apprenticeships, which utilize academic curricula and capitalize on existing work-based learning structures, and community-based apprenticeships, which utilize standalone curricula and credentials (i.e., industry certifications). With no existing structures in place, MAPS work with employers to build these programs from the ground up.

Each program includes the following elements of apprenticeships:[10]

(1) **paid on-the-job training (OJT):** learners receive structured OJT that provides the context for knowledge learned in the classroom while earning a progressive wage.

(2) **career-aligned related instruction**: academic courses are mapped to competencies of identified occupations to ensure learners acquire the skills aligned with industry standards.

(3) **mentorship**: each learner gets paired with an experienced professional who provides support, encourages skill development, and imparts institutional knowledge.

(4) **industry-recognized credential:** learners earn a credential to certify program completion and signal proficiency in required skills.

(5) **policies and practices:** all programs must ensure equal employment opportunity and a safe working environment.

While the general design features follow the U.S. apprenticeship model, the design thinking approach to create these apprenticeship experiences focused on people-centered, iterative processes that drew on user experiences (e.g., as learners, supervisors, academics), industry insights, and community organizations. Restated, stakeholders drove the apprenticeship designs. Design thinking generally consists of five phases conducted by the design team: (a) employs empathy perspectives to gather data from users by observing them in an effort to understand the users' needs and experiences; (b) takes those empathy lessons to define the problem with clear constructs about the terminology; (c) brainstorms potential solutions that are inclusive and innovative; (d) develops an initial design through a prototype; and (e) tests the feasibility and refines the design as needed through a smaller-scaled experience with a goal of continuous improvement.

With those five phases in mind, the MAPS program team employed empathy-driven methods to gather insights into the needs, challenges, and goals of each stakeholder group (e.g., supports apprentices needed, academic expectations of faculty, and the preparation the employers sought). Then, the team brainstormed ideas to design the type of apprentice supports and experiences to meet various career pathways, so the MAPS program would be a "learn and earn" model. Following the ideation phase, the MAPS design team constructed a prototype. Current or potential apprentices and employers' interests of remaining both relevant and responsive to real-world demands remained at the core of the design process and inquiry. Finally, the testing and improvement phase occurred throughout the project, consistent with this study's participatory action research approach.

THEORY AND RESEARCH

Situated Learning Theory

Situated Learning Theory (SLT) frames learning as processes through which individuals engage in "increasing participation in communities of practice," emphasizing the pivotal roles of social and cultural contexts.[11] Within STL, the concept of legitimate peripheral participation (LPP) encapsulates these processes through which newcomers become a part of a particular community of practice. Knowledge and knowing are defined within a specific context, enabling participation in certain tasks

and activities. At the same time, this knowledge is situated within the community of practice and is iteratively (re)negotiated.[12] As newer practitioners learn from and collaborate with veteran practitioners, practices are shared, adapted, and reproduced to integrate newcomers. LPP frames learning as "an evolving form of membership," through which newcomers gradually increase their knowledge and skills toward "full participation" in the community of practice.[13] Thus, STL views learning as a contextualized, participatory, collaborative, and relational process rather than a purely individual cognitive process.

Research Design and Methods

Given STL's emphasis on people, communities, and collaboration, the researchers utilized a participatory action research (PAR) design.[14] PAR is a research approach in which researchers and participants engage in iterative cycles of exploration, reflection, and action to collaboratively learn and develop plans of action that address problems of interest within a community.[15] These activities are best characterized as "braided" rather than discrete activities.[16] This study focused on designing learning and earning interventions aimed at improving practices, addressing real-world issues, and cutting educational costs. The researchers of this project needed a design with flexibility, responsiveness to changes, and appropriate means to collect the volume and quality of data needed. These characteristics of the research design were critical as there were 4,079 apprentices from multiple sites.

Data collection incorporated a multi-layered approach. In addition to semi-structured interviews and focus groups with stakeholders, the researchers engaged in continuous journaling and note-taking to capture ongoing reflections, observations, and insights throughout the implementation of the apprenticeship program. In regular meetings, the researchers reviewed and revised the collected data to address problems and improve the program. Also, the researchers systematically monitored the performance of the apprentices to identify patterns in skills development and fill gaps that may have emerged. These observations enabled the researchers to actualize real-time effectiveness of the program and improve outcomes.

FINDINGS

The findings of this study elaborate on the significance of "designs" associated with mapping of academic programs, infusion of work-experience "laboratories," and application of an apprenticeship model. The authors observed three significant findings: (1) the role of academic and industry alignment, (2) the design strategy of presenting value to the academic units, and (3) the strategic focus around equity centered pathways – as critical features to the program design success. Collectively, these features contribute to the intersecting experiences of learning, life, and work through hybridity of learn and earn models such as college apprenticeships.

Finding 1: Academic and Industry Alignment

The MAPS program effectively integrated academic curricula with real-world occupational competencies, ensuring that learning occurs within the specific contexts where it will be applied. This alignment was instrumental in creating pathways that are both academically rigorous and professionally relevant, providing learners with immersive, practical experiences that reflect their future work environments.

This finding is best illustrated through the program's competency mapping process. During this design stage, the MAPS team established clear connections between academic coursework and the skills required in various occupations. When examining 12 academic degrees across disciplines (e.g., engineering, business, public health), the team developed employer-tailored learning plans for 26

occupations taking the blended perspectives of students as apprentices and employers as mentors to the industry induction. This design approach ensured that the education provided was directly applicable to the workplace, fostering a deep understanding of professional contexts among learners.

For example, the mapping of job roles such as a Director of Operations for a manufacturing company aligned with a graduate degree option for a master's in human resources and organizational development. Similarly, the position of a Training and Development Specialist at a healthcare company aligned with a bachelor's in organizational leadership and learning degree. This intentional design feature facilitated the development of apprenticeships that lead to degrees, ensuring that the learning model was practical, academically enriching, and grounded in real-world practice.

Moreover, the design thinking process called for greater transparency in career progression. Notably, apprentices wanted clear career trajectory options. In response, the MAPS program outlined the experiences, education, and skills required at each step of the career ladder, which led to apprentices sharing that the design empowered them to envision and plan their career paths with confidence. Further, they expressed that this approach demystified professional development and helped them understand the trajectory of their growth within an authentic context.

Finding #2: Value to the Academic Units

The MAPS team considered empathy mapping across stakeholders, including college faculty. The findings revealed the significance of demonstrating the substantial value that participating academic units received through their involvement in apprenticeship programs. The design reinforced messaging about how the apprenticeship programs enhanced the relevance and applicability of their courses and program curricula. The integration of apprenticeship pathways brought a new dimension to academic programs, connecting theoretical learning with hands-on, practical experience within communities of practice.

Accordingly, when the MAPS team established a corporate partnership agreement (CPA) between an academic unit and an employer, the agreement formalized the relationship and created a robust framework for collaboration. The CPA outlined the benefits for each party, reported on the apprentices' performance, and generated areas for the academic unit to consider – including research grant opportunities with the employer, apprentice successes that were likely associated with academic learning, and areas to build other applied experiences such as exposure to advanced technologies that were not available at the university.

These design elements also led to strengthened confidence from employers that the academic units were not only focusing on non-operational theory or content with little utility to practice. For example, one academic department had such high performing students, who sought apprenticeship experiences, that the employer enrolled 130 students in 13 different career-track apprenticeships. Through the careful and articulated designs for this employer, the apprentices were able to showcase how they could bridge the gap between education and employment. The apprentices engaged with academic material in meaningful, work-related contexts and vice versa.

Feedback from employer partners has been invaluable in shaping course content and learning outcomes. The academic unit recognizes their value to the industry, and they become more motivated to modify their academic programming, so the curriculum and courses are more dynamic and responsive to industry needs. In essence, they embrace the continuous improvement cycle, recognizing the value of their academic unit in the present as well as the need for minor adjustments to remain relevant and valued to industry.

Finding #3: Equity-Centered Pathways

Equity, inclusion, and belonging represented an overarching foundational principle of the MAPS program and U.S. apprenticeships. Equity served as a guide for the development of the federal Registered Apprenticeship Programs (RAPs), so the programs were implemented with opportunity and accessibility as cornerstone outcomes, especially for those apprentices from minoritized and underserved communities. By using a design thinking approach to apprenticeship development and implementation, the stakeholders took steps to embed an equity focus into every aspect of the program. This contribution was most noticeable in the MAPS staff, the college professors engaged in the project, and the employers. These groups raised questions and proposed program features that placed previously overlooked populations of students in traditional employment and education systems as visible and supported through apprenticeship placements, developmental opportunities, mentoring exchanges, and the use of wrap-around services.

The design exercises also led to expanded equity-conscious elements. For instance, the stakeholders of the MAPS program sought federal apprenticeship pathways within underserved community organizations. This effort offered transitioning incumbent workers, who held low-wage positions, educational opportunities with higher-paying roles as apprentices. These apprentices benefited from certain design features such as transparent career lattices that outlined the necessary experiences, education, and skills at each step. Moreover, these apprentices gained new access to education from apprenticeship opportunities that were linked to college degrees or industry-recognized credentials with wide application such as certifications in information technology and healthcare. The design elements led to equity-centered features to advance minoritized populations through new or upskilled careers as they engaged in meaningful, real-world tasks that fit the learn and earn model over a range of occupations— including cybersecurity support technician, operations director, nursing assistant, and community health worker.

DISCUSSION AND CONCLUSION

The design is everything. Although that lesson may be obvious in some cases, the MAPS program demonstrated how the design, which consisted of the hybridity of learning, life, and work via an apprenticeship program, transformed the education/work relationship.

The participatory action research approach in this study illuminated the significance of the design, demonstrating Situated Learning Theory as appropriate for studying the effects of design on the success of learn and earn models. It not only revealed the effects of contextual learning to support career development relevance and transferability through its design, but it also demonstrated the effects of communities of practice to share common interests and engage in a process of collective learning. This aspect of the inquiry made clear that learning is a process in which participants, including all stakeholders, engage with industry practices, norms, and values as part of the learning. This study highlighted the learning process for employers, college professors, the MAPS team, and apprentices. However, the presence of the communities of practice only scratches at the surface of the effects of the design thinking contributions to the MAPS apprenticeship program. STL, more significantly, drives home the role of the legitimate peripheral participation to account for the engagement of the stakeholders, including the apprentices, as they move from the periphery of a community towards becoming more central participants. The design contributions facilitated apprentices moving to the center in gaining access to the industry and career pathways. The design contributions also facilitated employers' learning and engagement to find ways to better mentor apprentices, link to colleges, and apply industry lessons to the college curriculum. Similarly, the design contributions facilitated college faculty learning and engagement to recognize their value and roles such as fulfillment from their students' job placements, relationships with employers to improve

the curriculum, and exploration of innovative projects including grants and industry research contracts.

Further, the design features improved apprentice retention at the college and employing company. Apprentices felt the demonstrated investment in their advancement, not just as employees, but as members of the industry community and career pathway. They recognized the investments as the design features operationalized holistic support services, such as mentorship, career counseling, childcare services, transportation supports, and potential financial aid supports, contributing to the academic and professional growth of the apprentices. These design efforts reduced learning and working barriers, so the user experience rested on personal and professional development aspects. In other words, the design approach created an opportunity for apprentices, employers, and college faculty to better integrate learning, life, and work.

NOTES

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HARMONY IN HUES: NAVIGATING WORK-LIFE BALANCE FOR CREATIVE PARENTS IN THE UK'S HYBRID LANDSCAPE

Author:
ALICE MARSHALL (VALE)

Affiliation:
UNIVERSITY OF DERBY, UK

INTRODUCTION

In the intricate dance of contemporary life, creative parents in the UK are navigating a crossroads as the hybrid work landscape unfolds. The evolving nature of work brings both nuanced challenges and exciting opportunities, particularly for artistic minds striving to balance their professional and family lives. This paper delves into the impact of the hybrid world on work-life balance for these individuals, focusing specifically on the implications of UK policies and the unique experiences of artistic professionals.

This paper explores the interplay between professional endeavours and family life, and it acknowledges the transformative potential of hybrid work models. It highlights the fluid schedules and the integration of virtual and physical spaces that have become hallmarks of the modern workplace, offering unprecedented possibilities for remote collaboration. However, this new flexibility also introduces trade-offs, such as blurred boundaries between work and home and the impact on spontaneity that fuels artistic inspiration.

The University of Derby, situated in the heart of rainy England, serves as the backdrop for this research. As an academic at this institution, I, Alice Marshall, aim to bridge the gap between theoretical exploration and practical application. The insights presented in this paper are not only relevant to current professionals but also to the students I mentor—our future creative minds—who will inevitably face similar challenges in their careers. This lived experience as a creative parent provides a valuable perspective that enriches the academic discourse and equips aspiring artists with practical knowledge for their professional journeys.

The Crossroads of Creative Parenthood

I am a parent of two young girls. They are aged four and one (so, yes, I am in the 'trenches' of parenthood – as they say!) But I am also a full-time Dance Academic. This is a juggle that is hard, a juggle that even my twinkle toes struggle to keep on top of. This balance of work and family life is not specific to my subject area, or even my job, this is a balance that any working parent must deal with, but as a performing artist there are elements of my work that do not fit neatly into nursery and school hours. When I am touring my evenings become my work, when I am presenting at a conference that is over-seas, yet again my evening is my day. This added layer of complexity leaves little room for potential artistic innovation and zaps energy away from the next game of 'princesses'.

But the change the world has seen since the COVID-19 pandemic has brought a new dimension to this layered approach to life. Hybrid working has its pros and cons, but personally it has provided me with an extra 'tool' in which work, and family life balance allows for my creativity to have time to grow also.

The Creative Hybrid Landscape

Hybrid working in the creative industries is emerging as a significant trend across the world, blurring the lines between traditional employment and self-employment.[1] This hybridisation is particularly evident in cultural and creative sectors, such as design, where workers navigate complex employment relationships.[2] The creative industries have long been associated with flexible work arrangements and self-expressive ideals.[3] However, these hybrid work patterns can reinforce gendered dynamics and traditional notions of work, challenging the progressive narratives often associated with creative labour.[4] Recent case studies suggest that implementing hybrid working models within a clear people strategy can positively impact collaboration, team working, recruitment, retention, and employee engagement.[5] Such approaches may also contribute to leadership development and rebuilding confidence among younger workers affected by COVID-19 lockdowns.[6] As the creative industries, in particular, continue to evolve, hybrid working presents both opportunities and challenges for workers and organisations alike in many countries. This research does highlight the rapid growth in this area across the creative sector and it is evident that the UK is at the forefront of this evolution.

The Hybrid Landscape in the UK

Research on hybrid working in the UK has been extensive, particularly in the wake of the pandemic, which accelerated shifts in work patterns. Before the pandemic, remote and hybrid working were gradually gaining traction. However, the onset of the pandemic marked a significant increase in these practices. At the height of the crisis, nearly half of the workforce in the UK found themselves working from home at some point.[7] Although these numbers have decreased post-pandemic, they remain substantially higher than pre-pandemic levels, indicating a lasting shift towards more flexible work arrangements.

The transition to remote and hybrid working has had impacts on both individuals and organisations. For workers, the ability to balance professional responsibilities with personal life has seen marked improvement, contributing to enhanced job satisfaction and overall wellbeing. Productivity levels have shown variability, with some employees thriving in a home environment free from office distractions, while others miss the structure and social interaction of traditional workplaces. For organisations, this shift has required a re-evaluation of company culture and operational strategies, with a notable difference observed between sectors. Public sector entities have been more inclined towards adopting flexible working arrangements compared to their private sector counterparts.[8]

A 2023 report by the Chartered Institute of Personnel and Development (CIPD)[9] highlights the growing demand for flexible and hybrid working. Despite many employers embracing these models, there remains a considerable unmet demand among employees. This gap highlights the evolving expectations of the workforce and the need for employers to adapt. The UK Government's proposal to grant employees the right to request flexible working from the first day of employment is poised to further increase these requests, reflecting a shift towards more employee-centric policies.

The future of hybrid working appears robust, with more than 80% of firms having adopted some form of hybrid model, predominantly because of the pandemic.[10] While there is an ongoing push from managers and senior leaders to encourage a return to the workplace, the consensus is that hybrid work should be retained as a best practice. This approach not only caters to employee preferences but also positions organisations as progressive and adaptable in a competitive job market.

Legislation and reforms are pivotal in shaping the implementation of hybrid working. Current UK laws, alongside prospective reforms, aim to enhance flexibility and meet the growing demand from employees. These legal frameworks are designed to improve staff retention and attract new talent, ensuring that the workforce remains dynamic and motivated.[11]

These findings suggest that hybrid working will continue to be a significant aspect of the UK's work landscape. Ongoing research and policy discussions are crucial to optimising hybrid working arrangements for the benefit of both employees and employers. For those interested in more detailed information, reports from the UK Parliament's Parliamentary Office of Science and Technology (POST) and CIPD, provide valuable insights into the evolving hybrid work environment.

But where do the creatives fit within this data analysis? And more specifically where do the Creative Parents sit?

The Creative Industries Hybrid Landscape in the UK

Research on the impact of hybrid working in the creative industries has gained significant attention, highlighting the evolving dynamics within this vibrant sector. Creative UK's Annual Report for 2022-23[12] outlines that the UK's Creative Industries have grown faster than the wider economy over the past few years, and there is an argument that this is due to the Hybrid world that we now live in.

The pandemic dealt a significant blow to the creative sector in the UK. Instead of experiencing the predicted growth, the sector's Gross Value Added (GVA) fell by 25% in 2020[13] compared to pre-pandemic levels, a decline twice as severe as that of the overall UK economy. This stark impact shows the vulnerability of the creative industries to global disruptions and the need for resilient and adaptable working models. With the increase we now see in the creative industries economy it is fair to say that Hybrid working has been a blessing in disguise.

Those encounters with other artists to spark innovation are now easier to facilitate. I can now reside in the UK whilst collaborating with fellow colleagues from across the world, we could argue that this is helping all our industries evolve faster. Hybrid working presents both opportunities and challenges for the creative industries, however. It has the potential to enhance creativity, productivity, and wellbeing among professionals, but it also requires ongoing research and adaptation to fully harness its benefits.

But as a creative parent, has hybrid working suddenly made our already un-defined working hours, even more fluid? Yes, I want to engage with a fellow dance artist who resides in New Zealand, but I am up three – nine times a night with a teething one year old. A late-night call will not reflect me at my best.

THE CREATIVE PARENT

As part of my ongoing research, I have created an organisation called The Creative Parent. This is an initiative offering symposiums, support, and research tailored for parents and carers working in the creative industries. It aims to build a community, provide valuable resources, and address the unique challenges faced by creatives juggling professional and caregiving responsibilities. On our Creative Parent socials, we instigated a Padlet collation on the pros and cons of Hybrid working.[14] The following outcomes emerged from this investigation.

The Gust of Opening Doors

1. Fluid Schedules

As creatives we often naturally navigate fluid schedules, where the boundaries between work and personal life can blur. The flexibility of hybrid work models allows us to adapt, but it also demands discipline. A fluid schedule does allow for many to take on more work in and around the hours that

parenting demands. The discipline lies with the individual to stop the flow when their wellbeing and family life demands it.

2. Integration of Virtual and Physical Spaces

The virtual canvas merges seamlessly with the physical studio. Creative parents toggle between Zoom meetings and sketchbooks, between spreadsheets and watercolour palettes. This in-person and online interaction means there are times where you can engage with your practice and those in your field, whilst juggling a baby on your knee.

But how can we create a harmonious blend, where the digital and tangible coexist without discord?

3. Remote Collaboration

In the hybrid landscape, collaboration transcends office walls. Creative minds collaborate across time zones, sharing ideas through screens. In my own work I have been fortunate to work with artists that are from across the world, and I have never personally met them. Pre-hybrid working, this notion was there, but not well practised. As I have young children, I am unlikely to jump on a plane to the other side of the world to spark an artistic connection, but I certainly can hop on Zoom as my husband battles with bathtime.

The Gentle Closing of Doors

As doors open to new possibilities, others gently close. As with every new way of working, there are of course negatives that emerge. As creative parents, these negatives often affect not just ourselves, but also our family. As a collective we found the following to be the main cons at present:

1. Time Management

Time management becomes an art form—a delicate brushstroke that allocates minutes to family, hours to creativity, and moments to self-care. With the fluidity of Hybrid working, you are in danger of always being at work. There is something to be said for the traditional module of walking out of the office and leaving your work at work. As Creatives, not often a way we are used to working, but with Hybrid life our already fluid approaches become dangerously continuous. How do we as creative parents wield this palette of priorities?

2. Blurring Boundaries

The home studio blurs the lines between work and personal life. The same space that witnesses' bedtime stories also hosts brainstorming sessions. How do we delineate these realms without losing our sense of self?

3. Spontaneity

The hybrid landscape, while liberating, can dampen spontaneity. The impromptu walk in the park, the chance encounter with inspiration—they become rarer. How do we preserve the serendipity that fuels our creativity?

CONCLUSION

As a collective of creative parents, we realised that it is up to us to make sure that Hybrid working does not dictate our lives, that we allow it to boost our creativity and work, and we embrace it as a tool, not a way of life.

As a creative academic I am fortunate to witness how Hybrid working boosts my research, my pedagogy and my creative practice. I personally feel that this way of working has enhanced my career

and allowed for me to have a family at the same time. Opportunities that would have been hard to navigate in person with a family schedule to consider, have been undertaken because an online option was available.

My creative outputs are now far more readily accessible to the wider world. I am currently generating a dance for film funded by Arts Council England, which is to be showcased in Baby Loss Awareness Week (October 2024) This work uses my personal story of losing two babies on my way to motherhood, an aspect of parenthood not so easily discussed. This film will be able to reach a larger audience because of the way we now are all used to disseminating knowledge and work. This project seems to be an amalgamation of the multiple roles I play. Its topic is at the heart of parenthood, it is embodied through my art form, it is captured for a digital world, and it will be distributed through platforms that have emerged because of the hybrid way we now live.

The Hybrid landscape in the UK is ever evolving. I for one look forward to seeing how it enhances, and how the next innovation will allow for more creative outputs and permit working parents to navigate life and work more seamlessly.

As the hues of creativity blend with the demands of a hybrid work environment, let us seek harmony. Creative parents, and professionals alike—may our symphony resonate with balance, nurturing both our artistry and our families.

NOTES

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INNOVATION LABS FOR LEARNING LANDSCAPES

Authors:
KARIN HARATHER, CHRISTIAN KÜHN, CARLA SCHWADERER, RENATE STUEFER

Affiliation:
TECHNISCHE UNIVERSITÄT WIEN, FACULTY OF ARCHITECTUR AND PLANNING, AUSTRIA

INTRODUCTION

The "Arbeitsraum Bildung" research team at the Faculty of Architecture and Planning at TU Wien is developing novel educational spaces at the interface between education, art, architecture and society. Spaces for thought, action and design currently lacking in existing (educational) structures are developed, implemented as models and tested by users. This article presents two innovation projects that were selected for implementation as part of funding programs of the Austrian Research Promotion Agency (FFG). The artistic spatial research project **"BiB-Lab / Innovation Lab for Learning Landscapes in Motion"** was launched in the fall of 2021 with the aim of creating three different spatial lab settings in Vienna's largest municipal housing estate. The Bus-Lab, a mobile multifunctional studio space in a converted municipal bus, is temporarily stationed in public spaces offering extracurricular creative programs for young people. The School-Space-Lab comprises several neighboring schools whose spatial facilities no longer meet current requirements of hybrid teaching and learning. In participatory processes, the BiB-Lab team develops spatial test settings and cost-effective spatial interventions together with architecture students and the school community. Vacant stores in a shopping center were activated in the Neighborhood-Lab as open educational spaces where the university and the community learn from each other.

As part of the FFG program "Young Talents for the Energy Transition", a co-creative innovation lab on climate protection and climate change adaptation is currently being developed and was launched in the fall of 2023, building on the experience of the Bib-Lab. "**HOPE Space Lab # Educational landscapes in a changing climate"** is a mobile, modular space laboratory for artistic initiatives and experiments, where educational institutions and the surrounding city become the "tool-box " with which to work, funded by the Climate and Energy Fund Austria. There are five interlinked innovation projects, work on different spatial scales and social framework conditions, that both build the infrastructure of the lab in co-creative processes and generate benefits and content in the context of artistic spatial interventions together with the users. The result is a pioneering laboratory in the innovative fields of climate protection and climate change adaptation that offers educational opportunities for young people at eye level. The educational offers will first be tested in schools and neighborhoods before finally touring Austria.

BIB-LAB / INNOVATION LAB FOR EDUCATIONAL SPACES ON THE MOVE

The BiB-Lab / Innovation Lab for Educational Spaces in Motion addresses the importance of spaces and environments in educational processes in and out of school and researches them using aesthetic and artistic methods and tools. The sensitization of learners and teachers to the spaces physically

surrounding them, to existing (spatial) qualities, potentials or deficits – both in the school buildings themselves and in the surrounding semi-public and public areas – represents a central task area. Through the participation of learners, teachers and any other users in collaborative space appropriation and spatial design processes in different living lab settings, (spatial) needs can be identified and negotiated, and further design measures can be developed.

The article provides a project description of the activities launched in fall 2021, which essentially include networking work while setting up laboratories in different surroundings. The project is being carried out as part of the Austrian Research Promotion Agency's (FFG) "Innovation Labs for Education" program, co-funded by the Innovation Foundation for Education (ISB), set up and operated by a research team from the Technische Universität Wien (TUW) "Arbeitsraum Bildung" and scientifically supported by a research team from the University College of Teacher Education of Christian Churches Vienna/Krems (KPH). In a broad-based three-year cooperation process, new models of creative thinking, action and design spaces have been developed in Vienna's largest municipal housing estate, the Per-Albin-Hansson-Siedlung in the 10th district, to complement the program of existing (educational) structures. In a process of analytical and at the same time low threshold and playful examination of the existing spatial conditions and through the joint experimentation and research of the BiB-Lab team (consisting of teachers and students from the fields of art, architecture, spatial planning and education) with pupils and teachers from the four project partner schools as well as interested residents, a network has been created step by step that functions in the sense of the Viennese "Bildungsgrätzl" which are long-term collaborations between schools and kindergartens anchored in a district with other local institutions from the fields of (adult) education, youth and social work, sport, culture and health.[1]

The BiB-Lab was designed with three laboratories in order to create as many different test settings as possible for our art and design-based research during the three-year project period and to make them available for innovation projects that were developed and implemented in collaboration with external project partners. These three different laboratory situations are now presented in more detail in the following section. In addition, the BiB-Lab website provides a good overview of the variety of settings and activities.[2]

BUS-LABORATORY – MOBILE LABORATORY WITH CHANGING LOCATIONS IN THE PROJECT AREA

The Bus-Lab is a converted former public bus that was used temporarily in the Per-Albin-Hansson-Siedlung project area. This laboratory is mobile and was stationed to provide impetus, to make the BiB-Lab project visible in the district, to provide information and to create an additional space for the innovation and participation process with artistic-creative programs and architectural mediation offers that can be used seasonally, especially during the summer months. The multifunctional interior design of this bus-lab was created by architecture students in the 2016/17 winter semester as part of a design.build master's project (supervisor: Peter Fattinger, together with Karin Harather and Renate Stuefer). The bus extension and infrastructure were financed with the prize money from the "SozialMarie 2016 – Prize for Social Innovation".

From May 2017, this bus-laboratory, originally named as "Studio.DISPLACED", served as a spatial resource for experimental design: It was initially stationed in the "OPENmarx" urban laboratory of the Faculty of Architecture and Planning, TUW.[3]

In 2019/2020 it was used as part of the ICH BRAUCHE PLATZ! project in three Viennese urban development target areas of the International Building Exhibition IBA_Vienna to serve as a platform and base station for artistic spatial research with children and young people.[4]

Figure 30. Bus-lab as platform for appropriation of public space, by BiB-Lab Team, Vienna 2022/2024

In the BiB-Lab project, the Bus-Lab was used as a "pop-up urban laboratory" and as a highly visible, low-threshold information platform and contact point to raise awareness of the abundant public outdoor spaces available in the settlement area, in particular the green spaces, as freely accessible educational spaces that can be used by all generations, and to make them visible and tangible. So the Bus-Lab functioned as a meeting point and contact point for creative space exploration, appropriation and mediation: In addition to interesting facts about the BiB-Lab, the interior offered a multifunctionally equipped workshop-room with a cozy lounge area at the back, a sound system and a large screen that folds out from the ceiling, with a mini-kitchen, fixed and temporary workplaces as well as generous work surfaces and storage spaces for a pool of materials that were needed for creative-artistic activities and outdoor interventions.
In consultation and coordination with project partner organizations (partner schools, youth center, residential partners, retirement home), an individual and low threshold program has been developed as part of our university teaching and research activities. Architecture students, who took the subject “Social learning in creative processes” had the task to design and supervise a range of programs, workshops for school classes as well as low-threshold informal leisure activities for the school-free vacation months July and August – using the premises of the bus laboratory and, above all, the surrounding public space for creative appropriation of space. Target groups for the Bus-Lab were the school classes of nearby partner schools on the one hand and the residents of the estate of all ages on the other.

Figure 31. The inside of the Bus-Lab, by BiB-Lab Team, Vienna 2020

SCHOOL-SPACE-LABORATORIES – EXISTING PREMISES OF THE FOUR PARTNER SCHOOLS

Four partner schools, a sports secondary school, a music and IT secondary school, a bilingual secondary school and an elementary school, located in the Per-Albin-Hansson estate, Wendstattgasse 3–5, functioned as school-space-laboratories with the aim of thinking about education and space (formal and informal spaces) together, recognizing their interaction and designing educational processes in a sustainable and innovative way. After all, redesigning and reconfiguring spaces does not always require rebuilding, but often just rethinking.

Figure 32. Temporary test-settings at the School-Space-Lab, by BiB-Lab Team, Vienna 2022

The initial aim of setting up, installing and operating the School-Space-Labs is to focus, stimulate, enrich and, if necessary, change the mindset of the target groups, in this case the school users, from school management, teachers and pupils to the cleaning staff, with regard to spatial issues, needs and (change) potential: The targeted and reflective examination of the school space and the school environment becomes a learning topic, and the cross-sectional subject of architecture and urban space is made tangible for both educators and pupils through a variety of interdisciplinary topics.[5]

Figure 33. Participation in progress at the School-Space-Lab, by BiB-Lab Team, Vienna 2023

By means of creative improvisations and (temporary) designs test settings were built up in the existing spatial structures of the partner schools to point out previously unused (spatial) resources and possibilities for collective as well as individual appropriation of space and for exploring through joint creative research with the target groups and analyzing their potential. On the one hand, the scientific

and artistic expertise of the BiB-Lab project team is incorporated here, and on the other hand, students are also actively involved in the joint research and design process as part of university teaching.
In addition to these BiB-Lab activities innovation projects were launched in cooperation with the University College of Teacher Education Vienna/Krems and the University College of Teacher Education Styria. The School-Space-Lab was used to test how these prototypical settings, which rethink and design the existing school spaces not only as learning spaces but also as living spaces with corresponding qualities of movement and recreation for after-school care, can prove themselves in a specific educational *and* spatial context and what findings can also be transferred to other existing schools.
The target groups were the users of the respective partner schools as well as external school classes that are integrated into the project as part of innovation projects.

GRÄTZL-LABORATORY – STORE VACANCY ACTIVATION IN THE SHOPPING CENTER

Two vacant business premises in the small shopping center "Kleines EKAZENT" in the Per-Albin-Hansson estate, located nearby the partner schools on Alma-Rosé-Gasse, were rented as BiB-Lab project rooms. As so-called "Grätzl-Labor" (a typical Austrian term that can best be translated as "neighborhood laboratory") they formed the spatial basis and creative platform for educationally relevant test settings and innovation projects outside the existing school premises of the four partner schools, which are located in the immediate vicinity, only 150 to 300 meters away.

Figure 34. In front of the Grätzl-Lab, by BiB-Lab Team, Vienna 2022

As part of the temporary interim use until mid-2024, the Grätzl-Labor offers fixed location work and experimentation spaces for educational innovation and is also to be established as a low threshold contact point, event and meeting place for young and old as the project progresses: The aim of the Grätzl-Labor is to bundle synergies through the networking of existing educational and leisure activities in the district and to establish new offerings that have been lacking to date. By means of intergenerational and multicultural space design and use programs, pupils from the surrounding schools and residents of all ages are invited to become involved in the joint research and design process as experts on their neighborhood and their everyday lives and to learn with and from each other. This activation of vacant space provides an extracurricular space at a frequented location in the residential area and in the immediate vicinity of the partner schools, so that the overall BiB-Lab

project of successively building an innovative educational district with the involvement of as many participants as possible can be implemented with a high public profile and in direct contact with the target groups.

As the Grätzl-Labor consists of two separate first floor business premises that can also be connected to each other, the premises are very well suited as a workspace base for the BiB-Lab team on site, for university courses, for exhibitions and as an extracurricular safe space for (young) people. It turned out that the regular presence of the BiB-Lab team and the students who are involved via courses is essential to ensure the necessary openness, accessibility and usability of the project space for the target groups. To bring university research and education in this disadvantaged area generates a wide range of added value and offers new perspectives, especially for young audiences.[6]

The target groups here are also the school classes of the partner schools but above all pupils who drop in during free periods and interested residents of all ages.

Figure 35. Inside the Grätzl-Lab during a workshop session, by BiB-Lab Team, Vienna 2024

HOPE #SPATIAL LABORATORY FOR EDUCATIONAL LANDSCAPES IN A CHANGING CLIMATE

Our project is to set up and operate an innovative co-operative space laboratory for artistic experiments and research. In today's world, uncertainty about the future is the only certainty that awaits our children. The adult generations have not acted or have acted too slowly or too ineffectively. The result is unpleasant, unsightly and threatening. The built environment, and therefore educational facilities and school routes, cover many areas that have led us to climate change and dwindling biodiversity. We provide children and young people an innovative laboratory for experimentation and research to recognize and perceive problems in their immediate environment, to enable scope for action and creative experience in development processes, and to initiate self-education processes to proactively shape the energy transition. We need to expose children to reality, allow them to have the courage to change, promote their knowledge, talents and skills so that they can harvest future perspectives through the laboratory of HOPE.[7]

Figure 36. Participatory group action at a playground: Bird Games, by HOPE Raumlabor, Vienna 2024

We are transforming the school, school environment and school routes with and by pupils and students into a utopian educational facility, a "palace of hope". Together we contextualize current discussions about mobility, public space and the built environment (upcycling, bicycle urbanism, active mobility, adaptive urbanism, placemaking, soil sealing and land use ...) regarding the climate crisis and climate adaptation, to analyze them theoretically and apply them practically. For instance, the street area will be converted and used as a novel classroom – an innovation lab – over the planned duration. In the public space of the neighborhood, we first practice the art of “noticing” by perceiving and documenting (space-forming) actors in the neighborhoods with all our senses. How and by whom is the public space in the neighborhood used and created? Who helps to shape the neighborhood and how does the design influence our relationships in and with the built environment? Are there spaces for social connection and climate-friendly places? Key topics include the effect of different materials and objects on users, the potentials and conflicts of functional space divisions, microclimatic specifics and their creatures as well as electromagnetic waves and digital spaces that shape neighborhoods and are shaped by them.

Figure 37. Speed dating: pupils and students exchange ideas, by HOPE Raumlabor, Vienna 2024

Together with architects, researchers and "characters in residence" – specialists and artists – solutions for climate protection will be developed and brought into society. This experimental spatial laboratory will become a living lab in which climate protection and climate change processes will be directly explored in spatial 1:1 models and with co-creative methods. This enables students to realize their own ideas, design and build mobile micro-architectures through their own craftsmanship and as part of a creative and artistic team. Together we are searching for perspectives and solutions to protect the planet and our future in the face of climate change.[8]

The results flow into unusual application-oriented mobile, topic-specific exhibition modules. These hands-on objects will also be developed to make spatial and urban processes and the flow of (energy) resources visible and tangible in a larger radius.

The young ones can direct their attention to current, often still hidden problems. Prepared and accompanied, the young people confront parts of the population in public space that criticize their everyday life, their needs and perspectives for a good future. Realizations on site and intervening in a concrete situation sharpen the ideas based on reality. It is not uncommon for alternative action models and strategies to emerge. Together, art, architecture and education develop a model innovative spatial laboratory for new educational paths and new forms of teaching and learning as seeds for the future.

We are assuming joint responsibility for a change in building culture and offer children and young people the opportunity to become part of this development. The future spatial laboratory HOPE and the city of Vienna with its schools and educational landscapes are the “tool-box" that pupils use to work on a wide variety of problems. These are investigated and researched experimentally by the children. Creative activity and exploratory play can provide opportunities and participation processes for serious, forward-looking co-responsibility.

This raises very practical questions: Do cold air currents reach this place at night and how can they be directed? How much rain falls on the school roof, where does it go and how could we use it? How is this wall constructed, where do the materials come from, what do they do and can they be recycled? What does "soil for all" and land sealing mean? How can my school become a "wild school" in which species-rich vegetation communities, wild animals and insects become part of the anthropogenic school space? If I had the space of a car parking lot at my disposal as a child, what would I do with it?

These are some of the questions we are asking. Where talking about climate protection and climate change processes is limited, architecture becomes a form of communication to deal with the future.
We think in cycles, make natural daily processes visible, and look for sustainable solutions. Adaptive architecture, materials open to definition and workbenches (e.g. green room: cooking with the sun including a small green sewage treatment plant for grey water purification and raised beds where edible plants are planted and cultivated) form the basis of a pleasurable aesthetic design open to definition, on which the pupils and students build this utopian palace and make the interaction of space and action tangible for themselves and the visitors.

Figure 38. Reclaiming street space: Street Car_mäleon + Bamboo Nest, by HOPE Raumlabor, Vienna 2024

SUMMARY

The main focus in both living lab projects is less about implementing cost-intensive conversion measures and more about changing mindsets, raising awareness and rethinking processes, and questioning routines and values: For example, recognizing the spatial potential of 1970s school architecture, the generous outdoor and green spaces in the residential area and the diverse, community promoting space appropriation and spatial design options – especially for afternoon care. With these space labratories innovative educational spaces are developed in a participatory manner, based on university research and education, and tested as part of innovation projects in order to establish models of a sustainably effective educational space culture in existing (urban) spaces.
Both projects aim to establish both school and extracurricular learning settings in the form of innovation labs in the school environment, in which education, in contrast to targeted learning, is understood as an open and creative process of self-reflective debate. The long-term goal is to promote creative work with participatory thinking and action spaces and thus stimulate innovation processes in the field of education – both for children and young people as well as for the residents of the estate. With the development and establishment of the innovation lab settings, ideas, instructions and models for future educational spaces have been worked out that enable participation and co-design.
The result is an educational space that is constantly changing both internally and externally, which visitors to the laboratories can also experience as a product and process outside of regular school operations and use as a supplement to the curriculum. The experiences in this field of experimentation are carried out into the world by children and visitors.

NOTES

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[2] "Aktuell", BiB-Lab / Innovationslabor für Bildungsräume in Bewegung, accessed July 22, 2024, https://bib-lab.at/.
[3] "Home. Standorte. OPENmarx", DISPLACED (2015–2020), accessed July 22, 2024, http://displaced.kunst.tuwien.ac.at/?page_id=747.
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BETWEEN ACADEMIA AND WORK
THE CHANCE OF A NEW PROJECT FOR A HUMAN SOCIETY

Author:
NATASCIA BOBBO

Affiliation:
UNIVERSITY OF PADOVA, ITALY

INTRODUCTION

An interest in the connection between academia and work aroused because we already have a chance for a new project about human society, not a market society. We all know that the transformation of the economy after the end of Fordism, characterised by the abandonment of standardised production, in favour of a customised one,[1] has given rise in the last 30 years to two specific socio-economic models, that are the knowledge economy[2] and the neoliberalism ideology.[3] In the last 30 years, knowledge has become an asset that can be bought and sold to the highest bidder. Since the primary school children and youth buy it by earning education credits. When they became adults, they trade them for wages. More and more, Academies are driven by the Ministries of Education to turn all learnings into quantifiable credits. A good number of credits is a prerequisite for human capital that can be sold on the labour market. The higher the number of credits, the higher the value of human capital.[4] We talk about credits like we are bankers, but we are educators! We are doing exactly the opposite of what Freire suggested. When Paulo Freire wrote about the Banking Education,[5] he couldn't have imagined that educators would agree to count credits to ratify students learning. Instead, that is exactly what we're doing. We are building human capitals forgiving the concept of cultural capital. The cultural capital is the number and quality of cultural experiences a boy or a girl can have thanks to his or her background (that are defined by family belonging, social class, gender, ethnicity, country of residence, etc.).[6] This background contributes to the building of a personal identity. But, since we pretend not to know that the acquisition of credits depends on the amount of cultural capital each student already possesses, before entering our classroom, we perpetuate a symbolic violence against all those young boys and girls who don't have cultural capital in their back.[7] The second social economic model that infiltrated our society, is the neoliberalism ideology, which starts from the Anglo-Saxon culture, especially after the Protestant Reformation. In this culture, the idea of vocation becomes central: vocation is the duty to express one's talent the best of one's ability as a service to one's community. This means that everyone has an ethical duty to use those gifts that God has given him/her for the service to the community. But it is a short step to the ethic of the contemporary capitalism. According to this perspective, those who don't achieve a good social position are guilty not to have done enough, that recall too much the idea of social Darwinism according to which, whoever wins has the right to win for the development of human civilization. But the logical consequence of the same perspective is that it is right for those who are fragile or imperfect to lose.[8] According to

Harry Giroux,[9] the neoliberal ideology is one of the most pervasive that humanity has known, because its truths and narratives can influence the economy of a country as well as its political and social dimensions. In the last century it has managed to infiltrate and influence every kind of human relationships: parent-child, teacher-students, doctor-patients, and so on) reducing the formers to producers of something and the latter to consumers of what the formers produce, better if the consumers are paying consumers. It is as if everything has been infiltrated by the ideology of free market, of giving to get. But if you can give something, you can't have anything.

THE NEOLIBERAL ACADEMY IN ITALY

In Italy, these two models have given rise to a neoliberal Academy, which is mainly oriented towards the production of human capital, forcing young people to learn how to compete in a meritocratic system.[10] Politicians, economists and leaders of industries size every opportunity to urge young people to choose not the course they prefer, but the one that will give them the better chances to find a job right after graduation. Particularly, they push young people to choose the STEM courses instead of any other degree paths. In Italy, indeed, there is a barely drive towards STEM and in this perspective the Italian government issued some guidelines ratified by a specific law[11] stating that they aim to develop and strengthen the digital and innovative skills in all school cycle from kindergarten to high school to increase the enrolment in tertiary STEM curricula, especially among women. In the guidelines we can find the following justification for their issuance: "The STEM approach assumes that the challenges of an increasingly complex and constantly changing modernity can only be met with an inter-disciplinary perspective that allows for the mixing and contamination of skills from different disciplines (science, mathematics with technology and engineering), the interweaving of theory and practice, and the development of new skills, including transversal ones". There are no words for humanistic disciplines. The Ministerial Decree n. 184 issued at 2023-09-15, stipulates that, starting from the academic year of the 2023-2024, public and private schools in all cycles, will update the three-year plan of educational offering by providing actions dedicated to strengthening STEM skills. Both the Circular of the Minister of Education and Merit[12] and the STEM-Week have been widely reported by the national press, with no distinction between the right- and left-leaning press.

THE TWO FLAWS OF THE NEOLIBERAL INSTRUCTION IN ITALY

This model of academy has some flaws: the first, according to Sullivan,[13] is that it can push young people only towards the goal of a job, a good and remunerative job, exposing them to the dynamic of the terrific deal which leads them into a spiral of dissatisfaction. The terrible deal is the idea that it is right to try to buy something at the lowest possible cost, forgetting that today this low cost means the exploitation of someone else, but tomorrow this same exploitation could become the mine. This idea of consumption at the lowest price, is often associated whit the syndrome of consumption-dept-consumption.[14]

Another flaw in this model of academy is the government's effort to focus the education system as much as possible on the STEM disciplines, thus risking building a society of illiterate men and women. This is because the introduction of more and more didactic hours dedicated to the STEM disciplines can only mean that many hours of didactic of the humanistic disciplines, such as grammar, literature, history, philosophy, etc., will be lost. Of particular concern is the loss of grammar and literature and the loss of history didactic hours, because losing the chance to understand our history, as well as not learning to think and express our thoughts in a language that others can understand, is the way to produce a society of powerless people, deprived of the rights and the chances of human growth. For Italian history, in particular, there are two deep wounds that, if not known and understood, can damage the growth of our young people: the fascist regime and black terrorism. The

former refers to the dictatorial regime that characterized our society in the interwar period. The second is the period called the years of lead, in which subversive right-wing groups terrorized Italy from 1967 to 1980.[15] Nevertheless, as academic teachers, we have in our classroom students that know very little about the fascist regime and don't know at all about events of the leaden years, because in high school, teachers often can't go much further than the second word since they have no time to do it. Often, many other subjects are quickly presented at the end of the fifth grade. In this way, our students can know very well the medieval period starting from the Longobard invasion, as well as the Florence Rinascimento, as well as the Risorgimento, that is the historic period in which our country was unified under the Kingdom of Savoy, but they ignore the terroristic attacks with which the leaden years started, that happened in Fontana Square of Milan, at the Bank of Agriculture[16] or the attacks which ends that sad period of our history, at the Bologna Station.[17] So, they have few means to notice if the fascism or the terrorism forces are coming back. According to Giroux,[18] the loss of historic awareness can have some reactionary consequence with the progressive loss of individual freedoms and basic human rights. The loss of memory can lead to a false consciousness with the loss of the ability to think critically and the legitimization of ideological hegemony.

The cut of hours of grammar or literature disciplines in favour of STEM ones can have others negative consequences for the growth of our youth: the risk to make and to keep our students unlettered.

The results of the INVALSI[19] test, which was implemented in Italy to assess students' skills at a different school level, are particularly significant of our students' level of learning in writing and comprehension of our language, that is Italian. The Italian National Assessment System established 5 levels of learning objectives for the Italian language, ranging from a spontaneous use of the language to a mastery of the Italian vocabulary and grammatical rules. In the graphic n. 1, the results assessed at the fifth year of high school at the end of the 2022/23 academic year in different instructional pathways are evidenced. The blue line regards to the high school, which is based on the classical instruction, inspired by the Greek paideia. In Italy this kind of high school is called Liceo and it is the preferred pathways for those students who will continue their studies at the university grade. The red line regards to the technical Instructions,[20] and the green the professional one.[21]

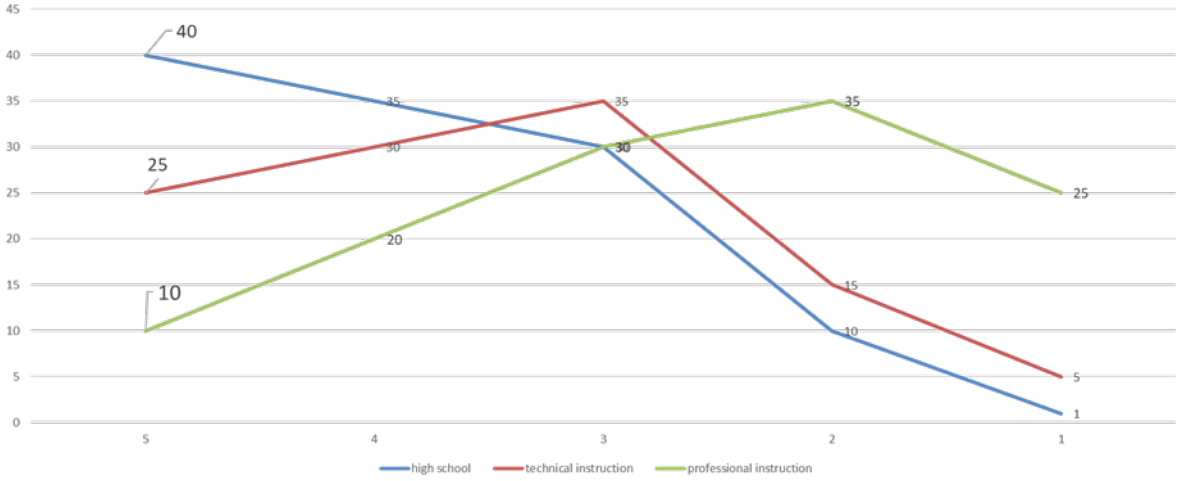

Figure 1. Levels reached at the INVALSI test by the Italian high school students

As shown in the Figure 1, the 40% of the Liceo Students reach the highest level of assessment (the fifth), whereas this level was reached only by the 25 % of the students attending at the technical institutes and the 10% of the students attending the professional schools.
Figure 2 shows the INVALSI test results for foreign students. The red column refers to Italian students, the dark blue to first generation immigrants and the light blue to second generation immigrants.

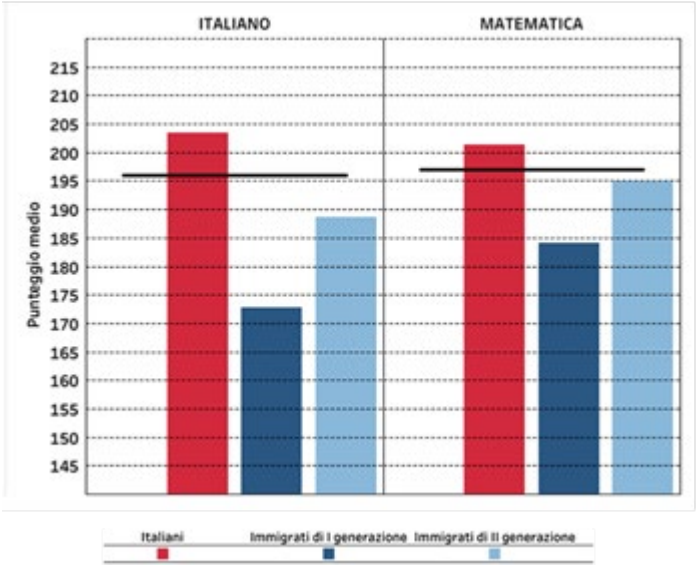

Figure 2. INVALSI test results for foreign students

The Italians are the best prepared in both Italian and mathematics, but as can be seen, the differences between the native Italians and the migrants have changed in an interesting way: The Italian students achieve better results in Italian than in Math (204/202 scores), the second-generation migrants achieve a lower result in Italian than in Math (188/195 scores) and the first-generation migrants achieve a very lower result in Italian than in Math (175/184 scores). This result can be understood both by the difficulty for the migrant to learn a language as complex as Italian, but, perhaps, even by the fact that in our school the scientific discipline starts to have a greater and greater attention by the teachers, on the wave of the Ministry demands.

THE ITALIAN ROOTS FOR A BETTER LINK BETWEEN WORK AND ACADEMIA

The democratic school of Lorenzo Milani

Italy is the country of Lorenzo Milani. Lorenzo Milani was born in 1923 into a wealthy and very big family: his grandson was a famous archaeologist and numismatist, and his father was a chemical with a passion for literature. His mother was students of James Jois. Even if his parents were agnostics and anticlerical, at the end of the high school, Lorenzo decided to lose his richness and made a symbolic suicide,[22] becoming a catholic priest. He built at Barbiana, a remote village in the Apennines, a school, an example of democratic school based on the principle of the public sphere, on peer education and on the principle that it is wrong to make unequal equal.[23] He was well aware of the importance of a child's cultural background for academic success, especially for those who, as children of farmers, have no cultural capital on their back. The mission he chosen was to give a chance to the children of the Apennines farmer, very poor children. This chance is to give them cultural capital by learning the Italian language and culture. We do not know if Milani ever read

Freire, but the importance of the word as a means of reading the world critically was part of his pedagogy.
But nobody is a prophet in his own country: Lorenzo Milani died of cancer at the age of 67, at a time when the Italian judiciary was trying him for the crime of apology of desertion for daring to invite military priests to support objection to a mandatory military service.

Education as a hegemonic relationship and the betrayed capacitating state

Antonio Gramsci (1891-1937),[24] Marxist philosopher, journalist, political activist and member of the Italian Parliament since 1924, since 1926 was incarcerated in the fascist prisons for nine years and died at the age of 46 for the bad condition in which he was obliged to live. He stated that every educational relationship is a hegemonic because, as adults and educators, we can force our students to study something or something else, to acquire some values or someone else. So, we are aware of our duty not to be the seller of competences but to be educators of human being.
Martha Nussbaum, a contemporary philosopher and academic, together with Amartya Sen, an Indian economist, stated that a country can't be define rich on the amount of its GDP (Gross Domestic Product) but only on the basis of the capability opportunities it is able to offer to its citizens.[25]
At the end of the Second World War, the Italian Constituents, a group of politician who collaborated to write a constitutional chart of our New Democratic Republic, well aware of the events of the nazi-fascism dictatory, state some foundational principles. The third article of our Constitution states: "It is the duty of the Republic to remove economic and social obstacles which, by effectively limiting the freedom and equality of citizens, prevent the full development of the human person and the effective participation of all workers in the political, economic and social organization of the country".
What is not so easy to understand for most Italians is how a country that has in its democratic roots, born after the terror of Fascism, the preconditions for a capacitating State, that was the birthplace of Antonio Gramsci, the thinker who forged the idea of hegemony, and of Lorenzo Milani, who was able to show that it is possible to educate children and make them aware of their rights and duties as citizens of a world, not a town or a nation, can forget all this, yet we seem to be forgetting all this day by day, guided by a neoliberal ideology that sees STEM as the solution to all our ills.

TO CONCLUDE: SOME SUGGESTIONS FOR AN ACADEMY ABLE TO BUILD PEOPLE AND NOT WORKERS

As educator and academic, I am aware that is necessary to do something to contrast this dangerous trend. Nussbaum[26] stated that without getting your youth to be able to empathize with the fragility of others, without teaching our young to think freely for themselves, to be critical about what is taken for granted, without these three things democracy could not survive. I believe that we should allow our students to acquire critical attitude towards any taken for granted knowledge combined with a concern for the suffering of others, through some critical literacy workshops in which literature, art and poetry can become the key to rebuilding a society or humanity. According to Giroux,[27] critical literacy is a pedagogical approach based on the assumption, emphasized by Freire and Macedo,[28] that any text, as well as any reality or context, is seldom neutral as it carries particular perspectives of meaning. For this reason, and being aware of the need to support our young people in learning to fully understand a text or context through a critical interpretation, a series of workshops are proposed that are able to offer students emotional and empathic experiences on the one hand, and on the other hand, to let them understand the complexity of reality, to the point of seeking their place in a world as active agents of transformation and humanization. Only to give some suggestions, we can use:

- a poetry that describes the weariness of being as fragile as a disabled person.

- a musical piece to let our students understand the complexity of human suffering.
- a picture to teach the beauty of fragility and inspire our students to respect what they're not.
- a film to show what it means to live under a dictature letting young people not to take for granted their freedom
- a romance to let young people understand what war and death is, letting them understand they are not a video game.
- some press from newspapers with a different political or social perspective to teach our students to think by their mind, not to be passive to what other say or states.

We have to teach to our students to respect themselves and the others, as the first step to build a democratic country where everyone has the chance to be human, before being a productive agent of our economic market.

It seems that it will be art, literature, music, poetry and other forms of human expression that will save the humanity and the democracy of our countries more than any STEM skills. This is a duty we as academic educators can no longer shirk, no matter what discipline we teach, or we will teach. It is more worthwhile to build up democracy than an economic marketplace, for democracy is the condition of every other human action, including work.

NOTES

[1] Simon Clarke. "The crisis of Fordism or the crisis of social-democracy?" in John Cunningham Wood, Michael C. Wood (eds.) “Henry Ford: Critical Evaluations in Business and Management” Routledge, 1990: 252-76.
[2] Lawrence Busch. Knowledge for sale: The neoliberal takeover of higher education. Cambridge Massachusetts: MIT Press, 2023, preface
[3] Beth Mintz. "Neoliberalism and the crisis in higher education: The cost of ideology." American Journal of Economics and Sociology 80.1 (2021): 79-112.
[4] William M Sullivan. "Vocation: where liberal and professional educations meet." Paper at the fourth annual conversation on the liberal arts (2004).
[5] Paulo Freire. Pedagogy of the oppressed (revised). New York: Continuum 356 (1996): 357-358.
[6] Pierre Bourdieu. “The forms of capital." The sociology of economic life (2018): 78-92.
[7] Paulo Freire. Pedagogy of the oppressed (revised). New York: Continuum 356 (1996): 357-358.
[8] Jonathan JB Mijs. "The unfulfillable promise of meritocracy: Three lessons and their implications for justice in education." Social Justice Research 29 (2016): 14-34.
[9] Henry Giroux. “Critical Pedagogy in the Age of Fascist Politics." A Development Education Review (2023), p. 160.
[10] Massimo Baldacci. La scuola al bivio. Mercato o democrazia? Vol. 1. Milano: FrancoAngeli, 2019.
[11] Law n. 197, issued at 2022-12-29, art, n. 1, comma 552,
[12] this is the name which was assigned in 2021 by the new Italian Government to the precedent Minister of Education
[13] William M Sullivan. "Vocation: where liberal and professional educations meet." Paper at the fourth annual conversation on the liberal arts (2004).
[14] Al Gini. "Work, identity and self: How we are formed by the work we do." Journal of business ethics 17.7 (1998): 707-714
[15] John Foot. "The Years of Lead. Memory, history, journalism, victims." Modern Italy 28.3 (2023): 260-267.
[16] This attack happened in 1969 and left on the ground 17 killed and 88 injured
[17] This attack happened in 1980, on the ground 85 killed and 200 injured
[18] Henry Giroux. On Critical Pedagogy. London: Bloomsbury USA Academy, 2020.
[19] INVALSI is an acronym for “Istituto Nazionale per la Valutazione del Sistema Educativo di Istruzione e di Formazione” which translation is: National Institute for the Evaluation of the Educational and Training System
[20] In Italy, there are the following paths: mechanical, chemical, electronic, computer studies, agriculture, marketing, construction, graphics, transport, tourism, fashion, etc.
[21] In Italy there are the following paths: agriculture, fishing, industry and handicrafts, technical assistance, environmental restoration, commercial services, food and wine, cultural services, health and social work, dental technician, optician
[22] Peter Mayo. "Critical approaches to education in the work of Lorenzo Milani and Paulo Freire." Studies in Philosophy and Education 26 (2007): 525-544.
[23] Lorenzo Milani, and Scuola di Barbiana. Lettera a una professoressa. Milano, Edizioni Mondadori, 2017.
[24] Antonio Gramsci, and Frank Rosengarten. Letters from prison. Vol. 2. New York: Columbia University Press, 1994.
[25] Martha C Nussbaum. Creating capabilities: The human development approach. Harvard University Press, 2011; Amartya Sen. Commodities and Capabilities. Oxford: Oxford University Press, 1999.
[26] Nussbaum, Martha C. Cultivating humanity: A classical defense of reform in liberal education. Harvard University Press, 1997.
[27] Henry Giroux, and Grace Pollock. The mouse that roared: Disney and the end of innocence. Lanham, Maryland U.S.: Rowman & Littlefield Publishers, 2010
[28] Paolo Freire, and Donaldo Macedo. Literacy: Reading the Word and the World, Routledge, 1987

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ENHANCING ENGINEERING EDUCATION: INTEGRATING CHATGPT IN PROJECT MANAGEMENT FOR INDUSTRY-BASED CAPSTONE PROJECTS

Authors:
ANJANEY THAKUR, CHI-TSUN CHENG, OLGA TROYNIKOV

Affiliation:
RMIT UNIVERSITY, AUSTRALIA

INTRODUCTION

The dynamic landscape of technology is transforming how the businesses of today work, which in turn, also influences the learning environments. This fusion of education principles and industry opens the door to a reinvented professional world. As such it is paramount for the graduates to be work-ready and be able to apply modern technologies in their work. This necessitates to investigate the practical viability and applicability of such technologies in real-world environments as well as in higher education context to enhance project-based learning for a technology-driven future. This study explores the integration of AI by blending project management principles with the potential of emerging technologies.

LITERATURE REVIEW

The literature research explored academic databases and collected information from peer-reviewed works of research. Below table shows the literature approach performed. Selection criteria:

- Inclusion – Published in 2019-2023; English language; Peer-reviewed journal articles; Application of AI in PM, Technology-focused or related projects.
- Exclusion – Published before 2019; Not in English; and Not Peer-reviewed journal articles; No AI application in PM; Education, construction projects and such.

Topic	Search Terms
Artificial Intelligence	"artificial intelligence", or "machine learning", or "AI", or "AI-driven", or "deep learning", or "AI-based", or "AI-enabled".
Project Management	"project management", or "PM", or "technology-focused projects", "technology project management", or "project management 4.0" or "project management processes".
Modifiers used	"intelligent", or "optimization", or "applications", or "solutions" or "integration", or "adoption", or "Industry 4.0", or "automation".

Table 1. Literature Study criteria

Project Management (PM)

Effective PM is necessary for proving how a project adds value to the organization's potential. It also guarantees that the PM team will diligently plan and execute the project's scope, strategy, delivery timeline, and associated financial aspects. Businesses employ a range of efficient project management strategies, particularly the Waterfall and Agile PM philosophies.[1] Knowing the PM philosophies will lead to a deliberate focus on investigation of areas where artificial intelligence (AI) integration and analysis may yield the most benefits.

Artificial Intelligence (AI)

AI technology is widespread and pervasive in today's world, reaching an abundance of users in a variety of domains. It has been categorized into 3 types:

1. Analytical AI (characteristics of cognitive intelligence, to predict based on past actions)
2. Human-inspired AI (emotional and cognitive intelligence)
3. Humanized AI (social, emotional and cognitive intelligence, capacity for self-consciousness).

All these systems are distinguished by their ability to learn from historical data. Moreover, the learning methods used to train AI include.[2]

- Supervised Learning (link inputs to labelled outputs)
- Unsupervised Learning (label inputs only)
- Reinforcement Learning (make series of decisions to impact the output variable).

This sets the stage for further advancements discussed in the coming sections.

Natural Language Processing (NLP), Large Language Models (LLM) and AI Chatbots

NLP is a significant AI technology that is well-known for its capacity to analyse human language automatically. It combines linguistics, mathematics, and computer science to translate spoken words into instructions that computers can follow. Text preprocessing, text representation, model training, and model assessment are the four standard phases in NLP.[3] Furthermore, the creation of AI-driven applications and continuous improvements in NLP have led to the development of LLMs. These are sophisticated systems that incorporate state-of-the-art NLP methods into large-scale computational frameworks, allowing them to interact meaningfully and fluently with humans.[4] AI chatbots are one of the useful applications of these developments. An AI chatbot is a piece of software that mimics spoken or written human communication. AI makes it feasible for chatbots to become "intelligent" enough to handle data, resolve issues, and complete jobs without human supervision.[5]

Finding a link between AI and PM Processes

The explorations into AI applications for PM falls under three categories.[6]

- Data Driven Project Management (DdPM) is combining approach of AI with Big Data and Analytics – it includes well-known statistical and mathematical methods as "Analytical Hierarchy Process" (AHP), "Critical Path" or "Chain analysis," "Program Evaluation and Review Technique" (PERT), "Earned Value Management" (EVM), and "(Lean) Six Sigma." In the effort to "forecast outcomes based on historical data," DdPM makes use of these methods as well as analytical AI technologies that use predictive analytics and supervised learning.
- AI platforms for PM extend traditional DdPM with neural networks – such platforms are created with the help of Supervised and Unsupervised learning. A direct use of this was suggested to automate routine tasks, planning and forecasting control elements of PM.
- Project Management Bots (PMBs) are intelligent software agents with ML and NLP specifically designed for PM. Their capability lies in functioning as "multi-agent systems" where linked agents

cooperate to accomplish shared goals.

The progress in AI chatbots make them quickly identify patterns with little help from humans. This makes it easier to assess if AI chatbots can handle repetitive tasks like setting up meetings, reminding people of their given tasks, and providing regular updates. Furthermore, if those tools have access to data from ongoing and finished projects, they may utilize that information to assess the choices made and provide invaluable insights, assisting projects in overcoming difficult decisions and unanticipated challenges.[7]

And according to a 2019 analysis by PricewaterhouseCoopers (PwC), stated that AI would enable a drastic change for project management in five key areas: "Business Insights, Risk Management, Human Capital Optimization, Performing Tasks, and Active Support".[8]

Expected Impact of AI Adoption in areas of PM	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Timesaving		✓	✓	✓	✓		✓	✓
Integration Management	✓							
Cost Management/Finance	✓	✓		✓	✓	✓	✓	✓
Quality Management	✓	✓			✓		✓	
Scope Management/Requirements/Goals & Objectives	✓	✓	✓		✓	✓	✓	
Schedule Management/Organization	✓	✓	✓	✓	✓	✓	✓	✓
Resource Management	✓	✓			✓		✓	✓
Communication Management	✓	✓			✓		✓	
Risk Management	✓	✓	✓		✓		✓	✓
Procurement Management	✓	✓						
Stakeholders/Partnership	✓	✓					✓	
Change & Transformation		✓			✓		✓	✓
Design		✓						
Source(s): Table by authors								

Table 2. PM Impact Areas [9]

PM Process	N	%
Initiating	**14**	**26.92%**
Cost prediction	7	13.46%
Risk prediction	4	7.69%
Schedule management	3	5.77%
Planning	**21**	**40.38%**
Effort estimation	13	25.00%
Human resource management	3	5.77%
Requirements management	3	5.77%
Team formation	1	1.92%
Scrum adoption prediction	1	1.92%
Executing	**7**	**13.46%**
Effort estimation	3	5.77%
Communication management	1	1.92%
Technical Debt prediction	1	1.92%
Execution control	1	1.92%
Risk prediction	1	1.92%
Monitoring and Control	**10**	**19.23**
Defect prediction	7	13.46%
Performance evaluation	1	1.92%
Scrum adoption prediction	1	1.92%
Maturity prediction	1	1.92%

Table 3. AI and PM Processes[10]

The above tables highlight the relevance of research conducted to identify the areas of AI automation for PM lifecycle phases and processes. This analysis assisted in narrowing down the PM planning phase to be the most suitable for AI.

Project Planning phase with AI

Several studies indicated the high potential of profound effect by AI to be in planning[11] and estimating.[12] An in-depth investigation found that "almost all the processes related to scope management can be benefited by AI".[13] Their results highlight a critical role that AI applications may play: the automated generation of a work breakdown structure (WBS), which lists the activities that need to be accomplished throughout the course of a project. AI is also capable of dynamically prioritizing tasks, which meant it could be used with both agile and waterfall techniques.[14] This clarified the one element in the planning phase – WBS(s) to be highly suited to test with AI.

RESEARCH AIM AND OBJECTIVES

This study aims to explore the integration of ChatGPT in the form of a PM AI-chatbot through the context of project-based collaborative learning within an Industry-based Capstone Project for final-year undergraduate engineering students.

The objectives of this study were to:

- develop a methodology for evaluating ChatGPT's usefulness to engineering project management.
- to assess ChatGPT's capacity to help with the planning stage of the Capstone Project.

The selected industry-based capstone project for this study was "The development of an Industry 4.0 data collection, processing, and visualization system specifically designed for smart manufacturing".

The primary objectives of this project were to implement multiple Industry 4.0 technologies to boost productivity and provide new capacities for process monitoring and control. Two conceptual approaches and potential prototype designs were being considered for this project: one included an intrusive setup for data collecting, while the other was non-intrusive. Under this project, one student assumed the role of a project manager to identify ways to streamline PM activities through the integration of an AI chatbot.

METHODOLOGY

By building on the understanding obtained from the literature review, this experimental study expands and adopts a proactive approach to investigating the application of AI chatbot during the project's planning stage. One such task that closely relates to AI chatbot's skillset is the automated development of WBS, as was identified through literature review.[15] Leveraging on the advancements and general acceptance of ChatGPT, an LLM that OpenAI created, this commercial AI-chatbot was chosen for this study.

Experiment Elements

1. Work Breakdown Structures (WBS): The WBS is a hierarchical representation of the whole scope of work that the project team must do to meet project objectives and generate the required deliverables. It offers a means of visualizing high-level responsibilities and illustrates the division of project deliverables into work packages. In-depth project task definitions are provided at every descending WBS level.[16]

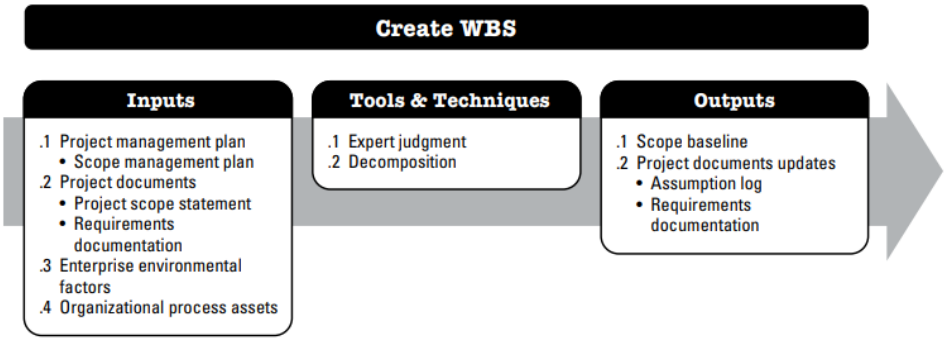

Figure 39. Steps to create a WBS[17]

2. Only the "Project Scope and Requirements Documentation" part of the Project documents were considered as inputs for this study to provide the WBS as output. It was also assumed that the scope for the selected project would have remained the same and the remaining inputs would not have influenced the project.
3. The professional standards that were adopted to conduct the experimental study were:
- Foundational Standards – which are relevant to all types of projects: A Guide to the Project Management Body of Knowledge (PMBOK).
- And a set of Practice Standards – which are industry/international standards: Practice standard for Work Breakdown Structure – ISO 21511:2018.

4. ChatGPT: It could implement complex NLP techniques within massive computing infrastructures capable of performing optimizations based on human feedback without the need of additional training. This technique that uses human input on generated text to directly enhance a language model is termed as "Reinforcement Learning from Human Input" (RLHF).[18] Moreover, to

optimally utilize this and improve the input used by the AI, an approach for prompt engineering was followed. Building on the advantages, the development of the automated WBS using ChatGPT versions 3.5 and 4.0 was carefully charted in the form of prompts.

Experimental Study Approach

1. Case Study: Raw Capstone project data – meeting notes about requirements, scope and planning with industry partners, project proposal – was collected. With the help of content analysis, data was organized and fed to ChatGPT to summarize and articulate information for project needs in the form of "Case Study Analysis" document.
2. Scope and Requirement Analysis (RA) Document: With the use of "Case Study Analysis" document and tailored prompts, ChatGPT generated Scope and RA for the project, which was subsequently checked for repeated content and vague contexts to get more precision and refinements.
3. WBS Generation: With the precisely defined Scope and RA, and specific prompts, ChatGPT's two versions (3.5 and 4.0) generated their respective WBS(s). Vagueness was assessed based on the WBS(s) alignment with the project – scope, specifications of work elements and incorporation of identification codes.
4. Manual WBS: A third WBS adhering to ISO 21511 and PMBOK standards was crafted by the student project manager.
5. Comparative Analysis: The above process created three separate WBS(s). These were captured for a comprehensive comparative analysis. For this, customized criteria with a set of expectations, was developed in compliance with ISO 21511 and PMBOK standards. These criteria addressed the specific elements that needed to be considered while evaluating the WBS(s). To verify the authenticity of the material produced by ChatGPT, multiple qualitative factors were also added to the criteria.
6. Sample of Assessors: Two professors with expertise in project management and three students working on the project were among the assessors.
7. Assessment Analysis: A quantitative analysis was conducted on the feedback provided by the assessors on the WBS(s). The WBS specimen that received the greatest score (i.e., was deemed most satisfactory) was selected as the best WBS. To expand on viewpoints on each WBS, thematic breakdown was conducted using the qualitative analysis responses.

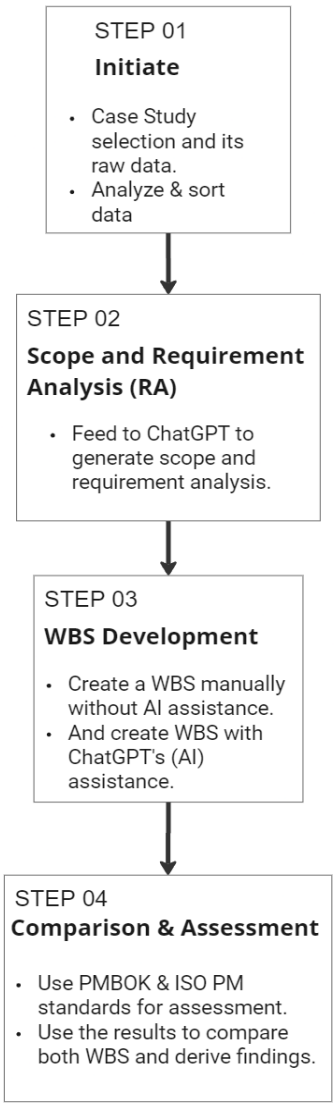

Figure 40. Approach for the experimental study

Comparative Analysis Criteria

This was created using ISO 21511:2018 and PMBOK.

1. Qualitative

1.1. Replies are coherent with the questions asked.

1.2. Precise & exhaustive answers (without repetitions and generic preambles).

1.3. Expert Judgement: Level of degree of knowledge of the project management concepts shown.

2. WBS

1.1. Structure and organization of the WBS.

1.2. WBS reflects the technical complexity, size, and other information, as deemed necessary for the scope.

1.3. Degree of decomposition of the deliverables is appropriate.

1.3.1. Phases of project life cycle or major deliverables can be used as second level decomposition.

1.3.2. Lower-level components are necessary and sufficient for completion of the corresponding high-level deliverables.

1.3.3. Work elements are decomposed to the level needed to manage the project components.

1.3.4. Work elements in the WBS define the structure of the work and not the processes involved in accomplishing the work.
1.3.5. Each parent element may have zero child elements or at least two child elements.
1.3.6. WBS should eliminate any overlaps by providing that a deliverable is represented in only one work breakdown structure element.

Response Ratings[19]:
1 – Unsatisfactory
2 – Partially Unsatisfactory
3 – Partially Satisfactory
4 – Satisfactory
The threshold was set at 3 – Partially Satisfactory.
This approach set out could be easily modified with the updated standards and customized for adaptability for new experiments with AI in PM.

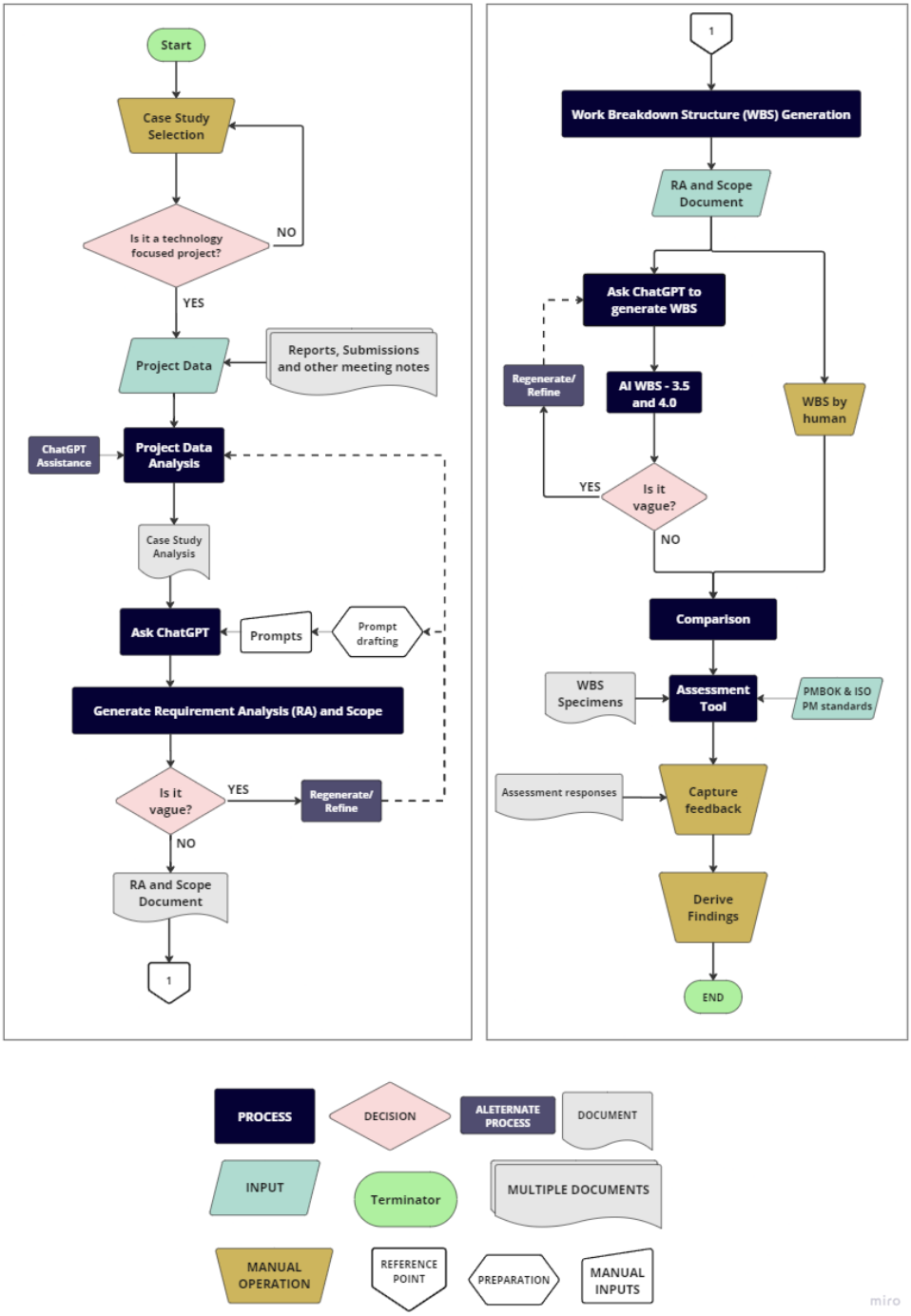

Figure 41. Experimental Study Design flowchart

RESULTS

Based on the project data that was acquired, a succinct narrative (Case Study Analysis) was generated that contained the contexts of the problem and the solutions, their designs, research questions, prospective findings, and objectives. To make the content easier to comprehend, ChatGPT was used to reword and condense it.

The RA and Scope were elicited from ChatGPT using two inputs: the Case Study Analysis and thoughtfully crafted prompts. The prompts were designed to guide ChatGPT in developing the RA

and Scope. It was observed that the responses to the same prompts varied because GPT-4[20] is significantly more advanced and accurate than 3.5 as per OpenAI.[21] Even though the responses were produced in a matter of seconds, GPT-4's response effectively laid out the information that was required and would function as a foundation for the project from the outset. This was useful in comprehending the difference between both GPTs and their conversational skills. And therefore, GPT-4 was also used to generate the scope and RA.

The result of the prompt engineering method made sure that all pertinent information was included for RA which covered the essential project requirements, including critical details like budgetary constraints, project timeframes, and necessary team information. The initial project needs were expedited – by ChatGPT i.e. driven by AI – by automatically extracting this crucial data.

The student project manager, having the coursework experience in project management, did create the "Manual WBS" which complied with the PMBOK and ISO standards, however, inexperienced with Industry 4.0, lacked greater detailing for certain phases of the project.

Level 1	Level 2	Level 3
1. Analysis of the Facility	1.1. Overall Facility's Mechanism Analysis	1.1.1. Analysis of Existing Efficiency Measurements System
		1.1.2. Factory Layout Analysis
		1.1.3. Furnace Schematics Analysis
	1.2. Employee Behavior Insights	
2. Solution Proposal	2.1. Brainstorm for Feasible Solutions	2.1.1. Invasive Prototype Solutions
		2.1.2. Non-Invasive Prototype Solutions
	2.2. Concept Generation for prototypes	2.2.1. Concept development for Prototypes 1 & 2
		2.2.2. Concept validation for Prototypes 1 & 2
3. Prototype Construction	3.1. (Invasive) Prototype 01	3.1.1. Configuration Design
		3.1.2. Prototype Construction
		3.1.3. Initial Testing
	3.2. (Non-Invasive) Prototype 02	3.1.1. Configuration Design
		3.1.2. Prototype Construction
		3.1.3. Initial Testing
	3.3. Develop & Document Performance Metrics data for both prototypes.	
4. Optimal Prototype Selection	4.1. Compare Prototypes 01 & 02 metrics data	
	4.2. Select the Optimal Prototype	
	4.3. Stakeholder Approval for Optimal Prototype	
5. Prototype Implementation	5.1. Field Testing of the chosen Prototype	
	5.2. Validate the Prototype Implementation	
6. Closing	6.1. Presentation & Final Report	
	6.2. Complete Handover Formalities.	

Table 4. Manual WBS by student project manager

Identical prompts were utilized when the two WBS(s) – 3.5 WBS and 4.0 WBS – were created.
For the 3.5 WBS, the 4th iteration was selected. Identification numbers were not used in the very first generated WBS structure. The testing stages were not fully covered by the 2nd iteration's WBS. Few tasks that were outside of the scope were included in the 3rd iteration.

Level 1	Level 2	Level 3
1. Project Initiation Phase	1.1. Project Planning	1.1.1. Define Project Scope & Objectives
		1.1.2. Identify Stakeholders & Roles
		1.1.3. Develop Project Schedule and Milestones
		1.1.4. Allocate Budget and Resources
	1.2. Project Kick-off	1.2.1. Conduct Kick-off Meeting with Project Team
		1.2.2. Obtain Access to Furnaces and Facilities
		1.2.3. Confirm Data Privacy and Security Measures
		1.2.4. Set Communication Plan with Stakeholders
2. Prototype Development	2.1. Prototype 1 (Invasive) Development	2.1.1. Conduct Concept Configuration for Invasive Prototype
		2.1.2. Procure Necessary Components and Equipment
		2.1.3. Assemble and Test Invasive Prototype
	2.2. Prototype 2 (Non-Invasive) Development	2.2.1. Conduct Concept Configuration for Non-Invasive Prototype
		2.2.2. Procure Necessary Components and Equipment
		2.2.3. Assemble and Test Non-Invasive Prototype
	2.3. Prototype Documentation	2.3.1. Create Detailed Documentation for Each Prototype
		2.3.2. Document Design, Components, and Testing Procedures
3. Data Transmission and Analysis System	3.1. Central System Development	3.1.1. Design the Central Data Storage System
		3.1.2. Develop Data Reception and Storage Mechanism
		3.1.3. Implement User Interface for Data Display
	3.2. Analytics and Reporting	3.2.1. Develop Data Analysis Algorithms

	Module	3.2.2. Create Insights and Analytics Reports
	3.3. Testing and Integration	3.3.1. Test Data Transmission from Prototypes to Central System
		3.3.2. Integrate Analytics and Reporting Module
		3.3.3. Verify User Interface Functionality
4. Testing and Evaluation	4.1. Prototype Testing	4.1.1. Conduct Accuracy and Efficiency Testing for Prototype 1
		4.1.2. Conduct Accuracy and Efficiency Testing for Prototype 2
		4.1.3. Document Test Results
	4.2. Comparative Analysis	4.2.1. Compare Test Results of Prototype 1 and Prototype 2
		4.2.2. Select the Optimal Solution Based on Analysis
	4.3. Field Testing	4.3.1. Prepare for Field Testing at IXL Metal Castings
		4.3.2. Implement the Chosen Solution in the Industrial Environment
		4.3.3. Collect Data and Monitor Performance
		4.3.4. Document Field Testing Results
5. Documentation and Reporting	5.1. Project Documentation	5.1.1. Compile Comprehensive Project Documentation
		5.1.2. Prepare Progress Reports for Stakeholders
	5.2. Final Report	5.2.1. Create a Final Report Summarizing the Entire Project
		5.2.2. Include Recommendations for IXL Metal Castings
6. Project Closure	6.1. Project Review and Evaluation	6.1.1. Review Project Objectives and Deliverables
		6.1.2. Evaluate Project Success and Lessons Learned
	6.2. Project Handover	6.2.1. Hand Over All Project Deliverables to IXL Metal Castings
		6.2.2. Conduct Project Closure Meeting with Stakeholders
	6.3. Post-Project Assessment	6.3.1. Conduct a Post-Project Assessment for Continuous Improvement

Table 5. ChatGPT 3.5's WBS

The initial iteration of ChatGPT 4.0's response was selected as specimen for the 4.0 WBS. The project's constraints were followed in specifying the work elements in this WBS, which conveniently also included identifying codes.

Level 1	Level 2	Level 3
1. Project Initiation	1.1. Stakeholder Meeting	
	1.2. Project Scope Approval	
	1.3. Initial Resource Allocation	
	1.4. Feasibility Assessment	
	1.5. Kick-off Meeting	
2. Research & Feasibility Analysis	2.1. Data Collection	2.1.1. IXL Operational Metrics
		2.1.2. Employee Behavioral Metrics
		2.1.3. Existing Solutions in Market
	2.2. Feasibility Report	2.2.1. Invasive Methods
		2.2.2. Non-Invasive Methods
3. Prototype Development	3.1. Invasive Prototype (Prototype 1)	3.1.1 Design
		3.1.2. Hardware Assembly
		3.1.3. Software Development
		3.1.4. Initial Testing
	3.2. Non-Invasive Prototype (Prototype 2)	3.2.1 Design
		3.2.2. Hardware Assembly
		3.2.3. Software Development
		3.2.4. Initial Testing
4. Data Analysis Engine	4.1. Data Collection Module	
	4.2. Data Analytics Module	4.2.1. Data Pre-processing
		4.2.2. Insight Generation
	4.3. Reporting Module	4.3.1. Real-time Dashboard
		4.3.2. Historical Reports

5. User Interface (UI) Development	5.1. UI Design	
	5.2. Front-end Development	
	5.3. Back-end Development	
	5.4. User Acceptance Testing	
6. Testing & Validation	6.1. In-house Testing	6.1.1. Prototype 1
		6.1.2. Prototype 2
	6.2. Field Testing	6.2.1. Prototype 1
		6.2.2. Prototype 2
	6.3. Performance Metrics Comparison	
	6.4. Stakeholder Validation	
7. Documentation	7.1. Technical Documentation	
	7.2. User Manual	
	7.3. Final Project Report	
8. Project Closure	8.1. Stakeholder Debrief	
	8.2. Lessons Learned	
	8.3. Final Report Submission	
	8.4. Resource Re-allocation	
9. Post Project Review	9.1. Conduct Review Meeting	
	9.2. Document Lessons Learned	
	9.3. Archive Project Documentation	

Table 6. ChatGPT 4's WBS

The RA and Scope was assessed as per the criteria mentioned in the methodology. The evaluation was critical since it served as input for the generation of the WBS(s). The assessment described how effectively the generated content reflects the project's requirements and background data. Each assessor's responses for Q1 – 3.8 and Q2 – 3.6 indicated that the RA and scope were rated above the predetermined level (3/4). As a result, it's evident that both components are deemed acceptable and have the necessary inputs to employ in the creation of the WBS.

To guarantee that every response was equitable, the specimens were arranged at random.

- Specimen 01 – 4.0 WBS
- Specimen 02 – Manual WBS
- Specimen 03 – 3.5 WBS

Assessor No.	Q1	Q2		Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	TOTAL (Q3-Q10)
1	3	3	WBS Spec-1	3	4	3	3	4	4	3	3	33
			WBS Spec-2	4	4	3	4	4	4	4	3	37
			WBS Spec-3	4	4	4	4	4	3	3	4	38
2	4	4	WBS Spec-1	3	4	3	4	3	4	4	4	36
			WBS Spec-2	4	4	3	3	3	4	4	4	37
			WBS Spec-3	4	4	4	4	4	4	4	4	40
3	4	4	WBS Spec-1	4	4	4	4	4	4	4	4	40
			WBS Spec-2	4	4	4	4	4	4	4	4	40
			WBS Spec-3	4	4	4	4	4	4	4	4	40
4	4	4	WBS Spec-1	2	3	2	2	2	4	3	1	22
			WBS Spec-2	2	3	2	2	1	3	3	2	22
			WBS Spec-3	4	3	3	3	1	4	4	2	30
5	4	3	WBS Spec-1	3	4	4	4	3	4	3	3	34
			WBS Spec-2	3	3	4	2	3	2	3	3	29
			WBS Spec-3	4	4	4	4	4	4	4	4	40

Table 7. Assessment results

Q3. “WBS reflects the technical complexity, size, and other information, as deemed necessary for the scope.”
Q4. “The first level decomposition reflects either phases of the project life cycle or major deliverables. Does the specimen satisfy this requirement?”
Q7. “Work elements in the WBS define the structure of the work and not the processes involved in accomplishing the work.”
Q10. “Expert Judgement: Level of degree of knowledge of the project management concepts shown. How satisfactory is it?”

Table 8. Selected assessment criteria questions

Q3 and Q10 were given double weighting because of their significant role in embracing the overall elements of the whole WBS.

Averages Scores for WBS (Q3 to Q10)	Avg
Specimen 01 – ChatGPT 4.0 WBS	33
Specimen 02 - Manual WBS	33
Specimen 03 – ChatGPT 3.5 WBS	37.6

Table 9. Average scores

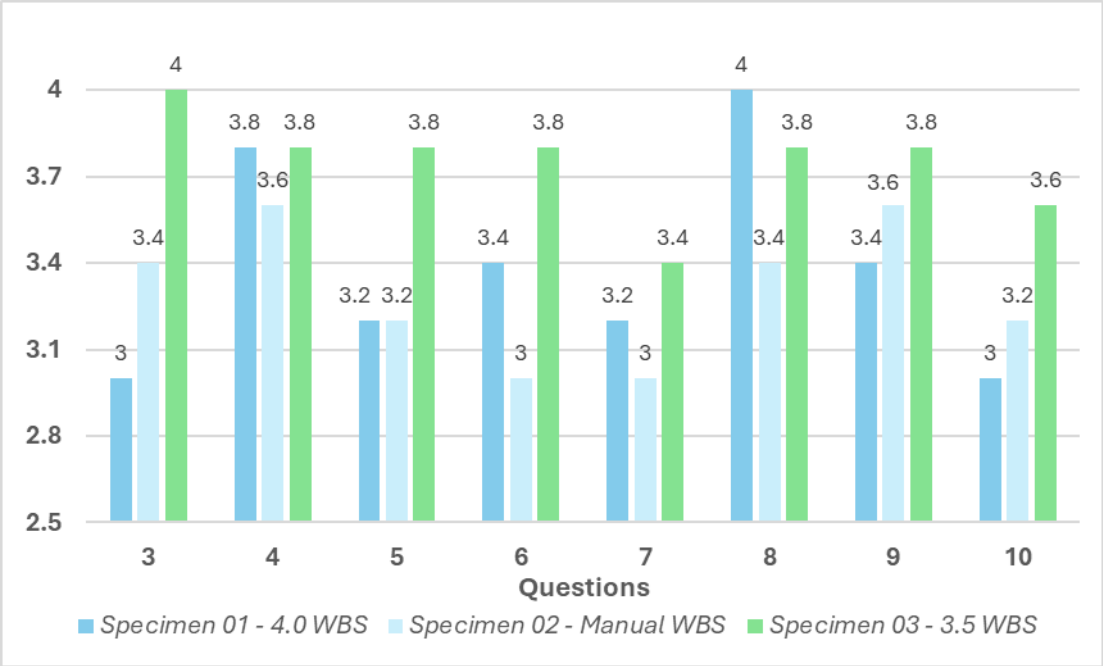

Figure 42. Individual scores for the specimens

Based on the responses by the assessors it could be determined that all specimens were satisfactory. In particular, specimen 03 (3.5 WBS) scored the highest, majorly contributing to the fact that it scored overall best for Q3 and Q10 which had double weightage. The average scaled down rating was 3.76 / 4 which was higher than the threshold value.

The other two specimens also averaged above the threshold value – 3.3 / 4.0 rating. In reference to questions Q4, 6, 7, and 8, which dealt with the specifics of the organization of the WBS, ChatGPT 4.0 produced a specimen that was more satisfactory to the human equivalent. With a focus on WBS complexity and project management principles, questions Q3 and Q10 revealed that Specimen 02 (Manual) outperformed Specimen 01 (ChatGPT 4.0). By preventing deliverable duplication, the Manual WBS simplified project component identification and prevented phase outcomes from being repeated. While specimen 02 lacked relevant technical information, although it followed industry rules more precisely than Specimen 01 did, it was noted as "more understandable than Specimen 1" by an assessor. Thus, the results helped determine the range and usability of ChatGPT in the specific PM task of WBS creation.

DISCUSSION

The process of establishing the project's needs and scope requires a detailed grasp of the complexity involved. This step is essential to project management methodologies. According to the study results, ChatGPT showed a good understanding of the project and skilfully described the project's main requirements and scope. The high scores for RA and Scope also indicated that ChatGPT 4's capabilities with minimal supervision were comparable with human PM. This is consistent with the findings indicating the importance of AI in scope management and requirements.[22] Throughout the four iterations for 3.5 WBS, which led to a version that accurately met the project requirements through refined prompting also underpins how crucial prompt engineering is for enhancing LLM outputs.

The difference in the scores further illustrated how challenging it is for an individual to create a WBS as detailed and well-rounded as ChatGPT, an exhaustive LLM with extensive training in a wide variety of subjects, when that individual may not have the requisite background or expertise.

Although AI may assist in the early stages of creating project requirements and high-level plans, it is evident that AI's competence in this task depends on the caliber and accuracy of human-provided inputs, in line with the literature discovered.

CONCLUSION

This study demonstrates how AI could be used to automate PM activities within learning environments and potentially in the industry. The RA, Scope and WBS(s) that AI generated showcased the computational power while also highlighting the crucial interaction between AI and human contribution. After some adjustments, the approach used here could provide a useful platform for further AI research in project management.

"AI augments project managers, not replaces them"; this as a recommendation paves the way for human-AI cooperation for the future. Therefore, although ChatGPT is a helpful tool for developing ideas, its outputs need to be carefully reviewed and improved by a professional, a project manager in this case, to guarantee its correctness and efficacy.

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REVITALIZING TRADITION: A DESIGN PEDAGOGY'S IMPACT ON LOCAL COMMERCE AND COMMUNITY ENGAGEMENT

Authors:
SUSANA BARRETO, MARTA NESTOR

Affiliation:
FACULTY OF FINE ARTS, UNIVERSITY OF PORTO, PORTUGAL.
IADE, EUROPEAN UNIVERSITY, PORTUGAL

INTRODUCTION

This study delves into a pedagogical exercise conducted in December 2014, wherein BA Communication Design students from the University of Porto collaborated with five local businesses—Costa Real, Casa Januário, Casa Lima, Carvalho Baptista, and Casa Natal—to revamp their Christmas window displays. With the rise of shopping in malls impacting local businesses, this article aims to shed light on the initiative that contributed to promoting local purchasing during the most crucial time of the year for businesses—the Christmas season.

The research methods encompassed observation and direct examination of the displays. Interviews and feedback sessions with students, business owners and clients provided additional qualitative data.

Findings highlight the exercise's outcomes, emphasising community engagement as local shoppers came together, lending objects and fostering a sense of community. Students gained practical experience working directly with businesses, applying communication design principles in real-life settings.

In conclusion, revisiting this study a decade later reveals not only the positive impact of the 2014 pedagogical exercise but also its enduring relevance. The lessons learned from this initiative continue to resonate, advocating for the importance of community engagement, practical skill development, and the positive impact of design education on local economies.

LITERATURE REVIEW

Retail context in 2014

In Porto, as in other cities, traditional retail experienced a significant initial shock with the advent of what became known as modern retail. The introduction of supermarkets and hypermarkets in the 1960s and 1980s, followed by shopping malls in the 1990s, led to a wave of closures and forced adaptations among the remaining businesses. However, the subsequent crisis in urban retail proved to be more complex. This crisis reflected not only the ongoing expansion of shopping malls but also the rise of e-commerce, which small, aging teams struggled to integrate. Urban transformation was further accelerated by tourism, which triggered rapid and significant changes. For instance, in a city with 220,242 inhabitants in 2014, there was "a 165.85% increase in passengers at Francisco Sá Carneiro Airport between 2009 and 2018, with arrivals surpassing 6.5 million in 2019."[1] This growth

spurred investment in tourist accommodations, driving up land prices and rental values. What was seen in 2014 as a lifeline amid local customers' weak purchasing power turned into a scenario of tourist pressure, causing closures among businesses unable to compete or cater primarily to tourists. These shifts presented an opportunity for design approaches to facilitate the adaptation of traditional retail to the evolving urban and commercial landscape.[2]

Design and Retail

The perspective of Design, as a humanistic discipline focused on material culture, is particularly adept at analysing retail transformations. Designers occupy a privileged position, being both consumers and producers of visual products, capable of understanding and working with ideas expressed through materialized objects, with reflective activity integrated into their operational roles.[3]

As Jonathan Baldwin and Lucienne Roberts posit, consumption is intrinsically linked to cultural values, serving as a reflection of these underlying principles. Consequently, "we need to borrow from semiotics to view consumption as a language."[4] When this perspective on consumption is aligned with the significance and relevance of simulating “real” environments during the training of designers,[5] the rationale behind this pedagogical exercise becomes more apparent.

In Porto, signs of a growing connection between Design and street retail were already evident. Beyond the window display contests promoted by the city council, this connection extended to public art interventions and initiatives from Design schools. Notable among these were the *Troca-se por Arte* (2010–2012)[6] and *Vitrina* (2012–2018)[7] projects. The former promoted artists through interventions in traditional shop windows, while the latter contributed to revitalizing Porto's downtown retail by creating window displays in commercial spaces, a task carried out by students of the Master's program in Communication Design at ESAD. With this project, Andrew Howard, course director at ESAD, sought to exemplify the creative potential of the union between design, retail, and the city.

METHODOLOGY

Description of the Pedagogical Exercise

The pedagogical exercise involved designing Christmas window displays for a selection of historic shops in Porto, engaging three key participants: (i) students from the BA Hons Design Communication program and the Faculty of Fine Arts, University of Porto; (ii) Porto Paralelo; and (iii) shops located within the historic perimeter of Porto. Students were organized into groups, each assigned to a specific shop to decorate for Christmas 2014. Additionally, two groups focused on the merchandise and web presence of the initiative.

The initial step was for the students to visit their assigned shop, meet the owners, and gain an understanding of the shop's identity and clientele. The shop owners were previously briefed about the initiative by Marta Nestor, a spokesperson for Porto Paralelo and co-author of this paper. During their visit, students learned they had a budget of 20 euros for the decoration and could request to borrow or exchange artifacts from participating and new shops.

Observation and Direct Examination

Before developing their proposals, students conducted a thorough examination and maintained direct contact with their selected shop. They reviewed Christmas decorations from previous years, examined artifacts and memorabilia connected to the shop, and conducted informal interviews with the shop owners and clients. This initial interaction revealed a concern: while shop owners were eager to enhance their window displays, they were hesitant to entrust their valuable showcases to graduating students.

These fieldwork sessions were followed by feedback sessions at the faculty, where each group shared their challenges. Teachers worked to reconcile the differing visions. Students documented their observations with photographs, short videos of the process, and notes. This documentation was utilized in feedback sessions to provide a comprehensive understanding of the fieldwork and to facilitate knowledge sharing among the class.

Data Collection and Analysis Methods

The data collection involved:

1. **Field Observations:** Students documented their observations through photographs, videos, and written notes during their visits to the shops.
2. **Interviews:** Informal interviews with shop owners and clients provided insights into their expectations and concerns.
3. **Feedback Sessions:** Regular sessions at the faculty where students presented their findings and discussed challenges with teachers, allowing for collaborative problem-solving.

The collected data were analyzed through qualitative methods, focusing on identifying common themes and patterns in the students' experiences and the shop owners' feedback. This analysis helped to inform the final designs and ensured they were aligned with both the educational objectives and the shop owners' expectations.

CASE STUDY

Shops' Selection

By the time of this project, there were several shops in need of the intervention we have implemented. However, we had to choose only five cases to intervene with the five groups of students. In this sense, the criteria for selection were based on:

1. Proximity to the faculty: allowing students to visit and work there with the minimum waste of time or constraints associated to accessibility.
2. Low level of business formality: places where there isn't already a window dresser, that is already a trust relationship established between the business owner and Porto Paralelo, and, also, the working teams aren't too big, facilitating the articulation with the students.

Taking these criteria, we have selected the shops to apply the shop window projects and assigned the five teams.

Implementation

Shop #1 - Casa Januário

A fine grocery store founded in 1926, Casa Januário initially specialised in selling coffee, cocoa, and tea. Over time, it gradually expanded its offerings to include other products such as biscuits, rice, and flour, catering to the needs of housekeepers. Years later, Casa Januário found its niche in wines and products for confectioners, while continuing to offer its original products. Remarkably, the store still uses its original coffee grinders.

Figure 1. The four windows of Casa Januário's project. Source: Authors, 2014.

The team assigned to this shop, consisting of five members, found it challenging to work with four small windows, as opposed to the usual single large display space. The ideation phase proved chaotic, with the students struggling to finalize a concept. To overcome this creative block, they were encouraged to explore old working tools and graphic materials, such as packaging and brand identity artifacts. The results of this investigation were surprising in both number and variety, leading to the creation of four windows that showcased pieces of the shop's history, turning the display into a street-facing museum.

Figure 2. A detail from Casa Januário's project, where it can be seen the historical objects. Source: Authors, 2014.

Shop #2 - Casa Natal

A century-old grocery store founded in 1900, Casa Natal is renowned for the quality of its codfish, which inspired the name of the business. "Natal" means "Christmas" in Portuguese, and codfish is the main dish of the holiday. At the time of this project's implementation, Casa Natal had a completely different appearance from what it has today, lacking the charm of its golden years.

Figure 3. The overall view of Casa Natal's project. Source: Authors, 2014.

This was the most challenging case. Not only did the manager limit the scope of the intervention to the bare minimum, but the four team members, who were not Portuguese, also struggled to make the most of the traditional seasonal food products. The solution in this case involved using the shop window glass and price tags as the primary surfaces for intervention, leaving the arrangement of the products to the manager's discretion. Although the project was less noticeable from a designer's perspective and less exciting for the students, who would have preferred more creative freedom, the result was appreciated and praised by the store's regular customers.

Figure 4. A detail from Casa Natal's project, with focus on the labels design for pricing and the lettering on the window. Source: Authors, 2014.

Shop #3 - Carvalho, Batista & Cª, Lda

A hardware store founded in 1953, which at that time had three nearly adjacent shops on the same street. The shop selected for this intervention was the original store, which still features a wooden balcony with hundreds of drawers containing screws and other products. This business is also notable for its close ties to architecture, as the owner is an architect, and the renowned architect Siza Vieira (Pritzker Prize winner) was a regular visitor who designed pieces there during his youth.

This case was particularly interesting as it was the only shop that had never decorated its windows for Christmas. This is largely due to the nature of its inventory, which primarily consists of tools and other building supplies, with only a few items, such as kitchenware, that might be considered suitable for gifts.

Figure 5. The overall view of Carvalho Batista's project. Source: Authors, 2014.

The group assigned to this shop faced an additional challenge related to the dimensions of the display area, which was wide and required a layered intervention. Their concept was to create a Christmas scene featuring a sleigh and a tree made of various products. However, working with a three-dimensional arrangement proved difficult, resulting in too much empty space, and the final construction was challenging to interpret. The display failed to clearly convey either the festive theme or the products and their prices. In this instance, we, as tutors, had to step in to assist the students in refining their solutions, adapting their ideas to better meet the shop's needs.

Figure 6. A detail from Carvalho Batista's project, showing the final ideal of a Christmas village. Source: Authors, 2014.

Shop #4 - Casa Lima

Casa Lima, a handbag and leather goods store, is the oldest within this group, founded in 1877. Originally, it sold canes and umbrellas, later expanding its offerings to include travel bags, handbags, and other related products. In 2014, Casa Lima operated three shops in downtown Porto, but the location where we conducted our intervention no longer exists, as it was converted into a hotel lobby. A noteworthy aspect of this case was the involvement of two generations of the family, each with different reactions to the proposal. The mother was more cautious about the intervention, while her son was enthusiastic about exploring new possibilities.

Figure 7. A detail from Casa Lima's project, with the song verse that inspired the window concept. Source: Authors, 2014.

This group, consisting of three members, was the most invested in the project. In addition to creating an original theme inspired by a Portuguese song verse about immigrants returning home for Christmas, they also enhanced the window display's spatial characteristics to improve the legibility of the final presentation. To achieve this, the students constructed wooden panels and lined them with light-colored fabric, which reduced the visual confusion caused by having two glass panes (one facing the street and another separating the display from the store's interior). The students also borrowed products from other nearby shops to enrich the composition, including items not sold by Casa Lima, and in return, they provided publicity for these stores by identifying them in the display. Although this was the most well-executed project, the shop owners ultimately decided to revert to their usual decorations before Christmas.

Figure 8. The overall view of Casa Lima's project. Source: Authors, 2014.

Shop #5 - A. Costa Real

A handbag and leather goods store established in 1938, this business was renowned not only for selling its products but also for its expertise in repairing luggage and other items. It received numerous repair requests from other shops and even airports. As this type of service was becoming increasingly rare, it was crucial to enhance its visibility.

In this project, the group of three students initially searched for Christmas decorations and other historic objects within the shop but found limited options to integrate into a final solution. Nevertheless, they incorporated the available objects in a creative and unconventional manner, allowing the shop owners to view them in a new light with fresh possibilities. The students also addressed the challenge of space legibility by installing a white floor, which provided greater contrast with the products, and by creating curtains made of fabric strips. This solution not only served as a visual barrier but also took into account concerns about the lack of light inside the store.

Figure 9. A detail from A. Costa Real's project. Source: Authors, 2014.

The product display followed a traditional approach, featuring a wide variety of items and numerous elements. However, after the project was completed, the students noticed that the shop owners gradually added more elements to the composition, bringing the display closer to their usual arrangement, where the floor is barely visible.

Figure 10. The overall view of A. Costa Real's project. Source: Authors, 2014.

FINDINGS

Outcomes of the Window Display Revamps

Overall, the exercise was successful for both the shop owners and the students. For the students, in their final year, it provided a valuable opportunity to interact with real-life clients and apply communication design principles. By 2014, many shop owners were over 65 years old and had been creating Christmas window displays for many years, catering to a friendly and loyal clientele.

While the shop owners expressed willingness to update their approach, they found it challenging to move away from their traditional practices, such as displaying all available purses with a "the more, the merrier" mindset. In contrast, the students aimed for a cleaner and more metaphorical design, leading to some initial conflicts. This intergenerational interface presented a significant challenge but ultimately proved to be a major learning experience for the students.

From the shop owners' perspective, the experience was also beneficial. The initiative received media coverage, including from national TV, which brought considerable attention to the participating shops. Although customers appreciated the cleaner window displays, some shop owners added a few more elements after the students' departure, demonstrating a compromise between the two different design visions.

One notable exception was "Casa Lima," which withdrew from the exercise. Initially cooperative and supportive of the project, they enjoyed the final result. However, as the Christmas shopping season intensified, they noticed a decline in foot traffic, which they attributed to the new window display. Given that Christmas accounts for 50% of their annual income, they decided to revert to their own decoration by mid-December 2014. This highlighted the tension between innovative design and traditional sales practices in historic shops, where over-the-counter sellers play a crucial role in customer interaction.

Community Engagement and Object Lending

The exercise fostered community engagement, allowing students to interact with various shops to borrow artefacts for decoration purposes. This exchange of objects created a sense of unity among local shops, with owners visiting each other's displays and lending items. This interaction not only facilitated a collaborative atmosphere but also sparked a friendly competition among the shops, each aiming to have the best-looking window display and hoping to be selected for national broadcast interviews.

The overall outcome was a compromised yet enriching exercise that bridged two distinct visions and fostered a sense of community and collaboration among historic shops in Porto

CONCLUSION

This study examined a pedagogical exercise conducted in December 2014, where BA Communication Design students from the University of Porto collaborated with local businesses to revamp their Christmas window displays.

Implications for Future Pedagogical Exercises

- **Enhanced Collaboration between Academia and Industry:** long-term partnerships with local businesses and organizations should be fostered to build a robust connection between academia and industry. Encouraging interdisciplinary projects can provide a holistic approach to solving real-world problems, leveraging diverse expertise to create innovative solutions.
- **Focus on Community Engagement:** It is essential to involve local communities in the design process to ensure cultural relevance and maximize social impact. Inclusivity should be a priority, with a focus on considering diverse perspectives and needs to create more equitable and effective design solutions.
- **Emphasis on Practical Experience and Applied Learning:** real-world projects should be integrated into the curriculum to provide students with hands-on experience. Structured feedback and reflection sessions are crucial to enhance learning, allowing students to critically evaluate their work and understand the impact of their designs.

By incorporating these strategies, future pedagogical exercises can significantly enhance student learning, strengthen community ties, and creatively address modern challenges.

NOTES

[1.] Pedro Chamusca et al., “População Flutuante e Gentrificação,” in Geografia do Porto, ed. José A. Rio Fernandes (Porto: Book Cover Editora, 2020), 145.
[2.] Marta Nestor, “Loja-museu: origem, consequência e resposta à patrimonialização comercial. O caso do Porto” (PhD diss., Universidade do Porto, 2021), https://repositorio-aberto.up.pt/handle/10216/139303.
[3.] Jessica Helfand, Design: The Invention of Desire (New Haven: Yale University Press, 2016).
[4.] Jonathan Baldwin and Lucienne Roberts, Visual Communication: From Theory to Practice (Lausanne: AVA Publishing, 2006).
[5.] Steven Heller, ed., The Education of a Graphic Designer, 3rd ed. (New York: Allworth Press, 2015), 26.
[6.] “Troca-se por Arte,” Troca-se por Arte, accessed August 8, 2024, http://trocaseporarte.blogspot.com.
[7.] ESAD, “Projecto Vitrina: 12 Montras, 12 Intervenções,” accessed August 8, 2024, *https://www.esad.pt/pt/archive/projecto-vitrina-12-montras-12-intervencoes*

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OVERCOMING CHANGE-BARRIERS THROUGH STORYTELLING-BASED SCENARIOS: A PARTICIPATORY APPROACH FOR (TEACHING) INNOVATION

Authors:
MARCO S. MAFFEI, HANNE BIRK

Affiliation:
UNIVERSITY OF ST. GALLEN, SWITZERLAND

INTRODUCTION

Tempora mutantur, nos et mutamur in illis
(The times are changing, and we are changing in them.)
Author unknown

The (super-)complex world(s)[1] we live in have a lot to offer: not only are there plenty of challenges but also a wide range of opportunities. The ability to proactively determine an organization's course and quickly adapt to changing situations has become a critical factor for success.[2] However, navigating change is anything but simple, because the future is volatile, uncertain, complex, and ambiguous[3] – and starts now. Disruptive technologies such as GenAI tremendously speed up this dynamic. In the light of this, the guiding questions to develop our Storytelling-Based Scenario[4] Approach (SBSA) as part of an innovation project at the University of St.Gallen were the following:

- How can we break the mold of action-reaction-sequences to welcome proactive foresight?
- How can we foster work culture(s) with a view to overcoming change-barriers and empowering strategic agency?

Both vantage points share a common goal: to provide leaders and change agents with an empowering and powerful tool for driving change initiatives.

In line with one of the main foci of the conference,[5] namely 'hybridity', the methodological design we have created transcends disciplinary limits. While rooted in the professional cultures of change-management on the one hand, and narratology on the other, it constitutes a truly synergetic transcultural approach, as will be exemplified in the following. First, we will present which dimensions are to be addressed in overcoming change-barriers, as condensed in the so-called 'Change Cube'. Second, we will introduce the SBSA, and third, sketch the relevant narratological foundations to point out the potential impact of the SBSA on the specific Change Cube dimensions.

Especially due to the complexity of change and the limited space available, this contribution reflects on the SBSA from a specific perspective, namely the theoretical foundation and methodological design constituting an effective set-up. In consequence, other aspects, such as the detailed explanation of the narratological background and paradigmatic examples for actual writing prompts or the presentation and discussion of case studies are out of scope of the present paper.

OVERCOMING CHANGE-BARRIERS

The world sucks. The world is awesome. Both of these statements are true. Even in that paradoxical world, your attitude is in your control.
Andy Ellis[6]

Overcoming change-barriers signifies a constructive approach towards change, showing a sincere openness to adapting to new situations, where change is not only acknowledged but also genuinely embraced. In this context, embracing change means coping with both external and internal drivers of change within an organization. This requires an attitude of readiness to learn and grow from the possibilities arising by change, rather than resisting or fearing it. In essence, the focus is not on non-resistance but on active participation in transformation.

The Change Cube

Developing such a change-welcoming mindset poses a significant challenge to organizations. As several estimates show, about 70 percent of change initiatives fail to achieve their goals, prevalently due to employees' resistance.[7] Such resistance manifests itself in various forms, ranging from passive to active, and occurring at the individual as well as at the team or organizational level.[8] Absenteeism, high turnover or power plays are examples of these (see Table 1).

Symptoms of Resistance		
	Passive	**Active**
Individual level	Absenteeism Lack of enthusiasm Inattention Perplexity Lack of engagement	Opposition Negativity Counterargument Criticism of superiors Agitation Complaints Excuses for passivity Refusal to work
Team or organizational level	Tense work atmosphere Indecisiveness High sickness rate High turnover	Employee conflicts Scapegoating Cliquish behavior Power plays Irony or cynicism Dominating pessimism

Underlying Causes of Resistance to Change	
Individual Factors	**Situational Factors**
Lack of confidence	High information ambiguity
Low self-stability	Lack of participation
Increased stress	Low work comfort
Uncertain feelings	High cynicism and organizational silence
Lack of need for achievement	Lack of employee support
Weak disposition towards change	Poor organizational culture
Little motivation	Increasing job insecurity
Fear of failure	Lack of information adequacy
Holding a low self-efficacy and autonomy job	Lack of communication adequacy
Little affective commitment	

Table 1. Symptoms and Underlying Causes of Resistance to Change (own Illustration based on Kleist and Maetz, Widerstände, and Damawan and Azizah, Resistance to Change)

The issue organizations face is the initial subtlety of resistance symptoms, which tend to manifest and escalate gradually, making early detection a difficult task which has already been established by Lawrence.[9] Compounding this problem is the observation that these various symptoms are attributable to disparate underlying causes, categorized into two clusters:[10] individual and situational factors such as fear of failure and increasing job insecurity (See Table 1).

As a result, it can be stated that the intricate array of symptoms and diverse causes create a complex situation in which it is not easy to take specific countermeasures. However, as Frey et al. demonstrated, the main reasons of resistance to change can be ascribed to four specific shortcomings: lack of knowledge, capability, motivation, and lack of permission/obligation.[11] In the context of change initiatives, these four categories can be outlined as follows: lack of knowledge pertains to a deficit in comprehension regarding the present and future states. Lack of capability addresses the insufficiency of transforming the current situation into the envisioned. Lack of motivation denotes a shortage of drive for change, e.g., due to an unfavorable cost-benefit ratio, low commitment, or apprehensions regarding personal losses due to change. Lack of permission/obligation encompasses the indications perceived from peers or superiors suggesting aversion to change.

In addition to the prevailing complexity, it is imperative to acknowledge another factor: the dualistic nature of change processes, wherein change is happening both in the visible, formalized “on-stage” area, and in the less conspicuous, informal and dynamic “off-stage” area.[12] According to Homan, traditional change management approaches tend to prioritize on-stage interventions, such as formal plans and strategies, while neglecting the complexity and influence of off-stage behaviors. Further, he points out that these off-stage dynamics significantly shape the outcomes of change initiatives and therefore merit greater awareness from leaders and change agents.

Regarding overlapping change initiatives, special attention must be paid to the issue of change fatigue, the impression that too many changes are taking place. Change fatigue shows a positive correlation with feelings of exhaustion and turnover intentions, while displaying a negative correlation with organizational commitment.[13] To avoid excessive exposure to trendy management policies demanding constant change, Bernerth et al. suggest two measures: proactively taking “the pulse” of employees to identify potential negative stress reactions and deliberating carefully before implementing any change initiatives. Therefore, asking for the employees’ opinions and making balanced decisions at C-level are vital because they are suitable indicators for (re-)establishing a dynamic flow equilibrium between instability and stability which according to Kruse is the main task of strategic change management.[14]

In sum, three different dimensions relevant to spotting and overcoming change-barriers can be identified:

- Empowerment, referring to knowledge (know why, how, what, who, when, where), ability (can do), motivation (want to), and permission/obligation (be allowed to/should do);
- Area of action, differentiating between on- and off-stage;
- Agency, focusing on the portfolio of current and future change initiatives to manage change fatigue and maintain the balance between instability and stability.

In other words, if we address these three dimensions, change initiatives are highly likely to achieve their goals. We took this into account when developing the SBSA in collaboration with the management of the Vice-President’s Board of Studies and Academic Affairs at the University of St.Gallen, Switzerland.

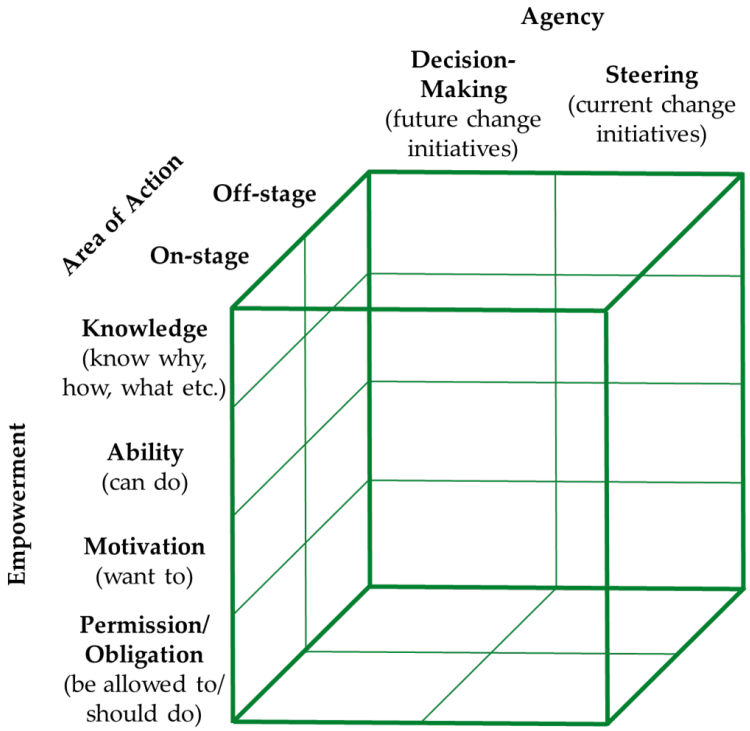

Figure 1. Change Cube (own illustration)

The Storytelling-Based Scenario Approach (SBSA)

Did you ever wonder how it is we imagine the world in the way we do, how it is we imagine ourselves, if not through our stories.

Thomas King[15]

In developing the SBSA, the intent went beyond answering the guiding questions and addressing the three dimensions of the Change Cube. It was equally important to design a straightforward and sustainable implementation tailored to the relevant stakeholders. Essentially, the SBSA provides a lean yet powerful tool for leaders and change agents aiming to drive meaningful change initiatives.

Inspired by Schoemaker,[16] and according to his recommended process for developing scenarios, the SBSA consists of the following ten steps:[17] **1. Collect Data**: begin by gathering data strategically relevant to the social system (organization) and its environment.[18] **2. Identify Basic Trends**: reveal and develop retro- and prospective trends. **3. Frame Scenarios**: once trends and patterns are identified, frame corresponding scenarios defined as 'hypothetical snapshots in the future'.[19] **4. Prioritize Scenarios**: prioritize the scenarios according to their relevance to the organization and its corresponding sphere of influence. **5. Check Scenario Data**: identify the relevant stakeholders and indicators for an early detection of the potential manifestation of each scenario. **6. Narrate Scenarios**: narrativize the scenarios from diverse stakeholder perspectives using the specifically developed writing prompts. **7. Consolidate Scenarios**: synthesize the various stakeholder perspectives and derive sociocultural findings. **8. Cluster Options**: develop a robust basis for decision-making by clustering, prioritizing, and operationalizing the options mentioned by the stakeholders. **9. Make Decisions**: with a solid decision-making foundation in place, convene a steering meeting to come to appropriate decisions. **10. Take Care of Pending Tasks**: conclude each iteration by addressing pending tasks, encompassing the execution of decisions, monitoring the scenarios, and ongoing

reflection and refinement of the process. This final step also ensures the continuous improvement and adaptation of this approach.

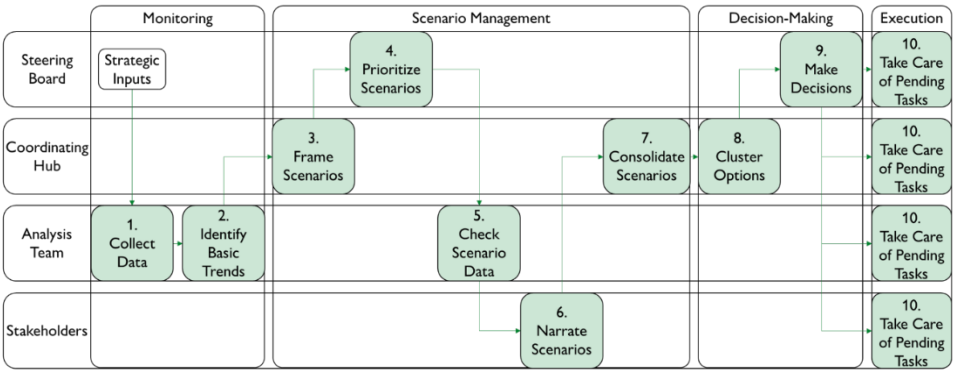

Figure 2. Process of the SBSA (own illustration)

As figure 2 shows, the ten steps are grouped into four phases, monitoring, scenario-management, decision-making, and execution, and worked out by four parties, the steering board, coordinating hub, analysis team, and stakeholders.[20]

In reference to the process described above and growing out of the narrative nucleus mentioned in step 3, it becomes clear that from a narratological perspective step 6 and step 7, the interpretation of the diverse stakeholder inputs, require a deeper theoretical foundation. This constitutes the underlying deep structure not only for the context-relative, formulation of specific writing prompts[21] but also for the whole spectrum of the functional potentials of the scenarios. Parenthetically, it needs to be stated that the actual interpretation of the scenarios can be carried out on a surface level in lean, resource-saving procedures.

The consolidation step relies mainly on 'close (and wide) reading' methods[22] based on the application of the (multimedial) narratological toolbox and thus also on attempts at thorough, culturally sensitive, lean 'thick descriptions'.[23] Thus, not only individual but also socio-cultural functional potentials of the narratives can be identified. As a necessary complement to the concepts of 'close/wide reading' and such 'thick descriptions' (reception), the production side of the SBSA is based on inviting participants to employ 'close/wide writing' methods aiming at 'thick productions', i.e., on the writing of complex narratives reflecting their respective socio-cultural environment, so that decentralized knowledge can be reintegrated.

In consequence, the SBSA requires a specific theoretical basis sketched out in the following:

1. Relying on a semiotic and constructivist concept of culture,[24] scenarios can discuss socio-culturally relevant, current topics, they have an imitating (mimetic) 'image character', they are answers, insofar as they respond to foreseeably relevant questions in the future and express our ideas and concepts of reality, but in return they make new things conceivable, imaginable, they are creations, and can thus influence and change our thinking and therefore also our actions.[25]
2. This line of argument is necessarily based on a specific assumption regarding the relationship between narrative forms and functions of narrative texts and their interdependence with cultures. It is precisely the concept of the 'semantization of literary forms', the idea that narrative forms convey (cultural) meaning, that form is content, that makes the analytical categories of narratology of structuralist origin fruitful for cultural studies – and the questions at hand.[26]
3. Precisely the resulting historical and cultural contextuality and relativity of narrative forms and functions lead directly to the conclusion that no clear form-to-function or function-to-form mapping can be assumed.[27] Rather, the relation between narrative forms and functions is a complex, mutually

polyvalent, and dynamic relationship, the description of which must take into account changing cultural, social, political, historical and epistemological conditions of the production and reception processes. Thus, the interpretation of fundamentally ambiguous narratives/scenarios requires a high degree of caution: no effects but only functional potentials can be sketched. If necessary, it is thus advisable to re-invite stakeholders and/or interpretation experts for further clarification.[28]

On this theoretical basis the actual composition of the scenarios can be further discussed. The actual scenario set-up relies on the full scope of narratological categories[29] because as complex narratives, as 'thick productions' as possible are aimed at.[30] As soon as the narratives are read, the focus shifts away from the structural dimension of the scenario narration towards their functional potentials.

The Impact of SBSA on the Change Cube Dimensions

I was told, at extremely regular intervals, "You should try to write about things you know about." And I would say, But I do; I know about Orion, and dragons, and imaginary countries. Who do you think knows about my own imaginary countries, if I don't?

Ursula K. Le Guin[31]

A vast scope of functional potentials is covered by the SBSA: they reach from empowering effects on an individual level to more socio-cultural functional potentials on a communal level. In addition, they encompass both areas of action, on-stage and off-stage. Furthermore, narrated scenarios may strengthen agency, in the present, for actual steering issues at hand, and for the future, when strategic decision-making is required.

Not limited to but more palpable on an individual level, acts of participatory storytelling create and affirm **empowerment**. In particular, the potential of stories to transform heterogeneous experiences and events in time into a plausible and coherent form, means that the authors can experience their command over their own knowledge.[32] As narratives allow the "relation of events unfolding through time"[33] and construct continuity and consistency, they are attributed a specific identity-constructive potential, but they can also create new meaning and enhance knowledge. Moreover, they are a vital means of deep learning because they facilitate new information to be embedded in cognitive frameworks (thereby transforming them) and thus support sensemaking processes. Furthermore, in the actual process of being told, narrativized scenarios offer the immediate author feedback that the author is 'being able to tell', that the author has something to say.[34]

But this is not the only source of motivation that is empowered by this approach. Straub argues that in narrative meaning-making processes heterogeneities are not necessarily homogenized and contingencies are not dissolved, rather, sensemaking and identity constructions drawing on narratives can be characterized as being open and inconclusive.[35] According to Straub working with narratives of one's own allows authors to experience contingency "not as a mere threat to present conditions" but "to interpret it as an opportunity for freedom".[36] This means not only that an approach based on storytelling can contribute rather immediately to the flourishing of a culture embracing change but also that it has an explicitly motivating impact by reducing fear and insecurities.

Closely correlated with this encouraging, motivating potential of narrated scenarios is also their impact on 'voicing', on the permission/obligation to speak and write, on being allowed to narrate one's own identity constructions, to make one's own sense. But the idea of 'narrative identities' being empowered by storytelling-based scenarios goes even beyond the individual scope. As Eakin puts it "the self is dynamic, changing, and plural."[37] The latter aspect, that of the plurality of the 'self', which describes the socio-cultural constitution of individual narrative identity, offers points of reference for specifying the cultural conditionality of individual identity designs. Identity concepts are by no means isolated constructs of an autonomous self, and therefore they are not to be understood as structurally

equivalent across faculty or team cultures. The very narratives that self-constructions refer to are inextricably shaped by cultural narrative schemas.[38]

Due to the interplay of narratives, the structures and content patterns of which are provided by the individual's cultural environment and due to communicative social interactions, the focus of identity construction shifts away from the "'I' of the individual" to the "social processes going on 'between' people".[39] Accordingly, the self-design is firstly not singular, but plural, and secondly, the narrative self-design of individuals is a culturally conditioned narrative identity that arises in each case in a social context: "all identity is relational".[40] In other words, storytelling-based scenarios may empower authors to feel allowed to raise their voice but in doing so they never only speak for themselves, rather the voicing of a heterogenous diversity of, e.g. team and faculty cultures, is welcomed.

Up to now the focus has been on the actual narrating of the scenarios, the 'close/wide writing', i.e., the individual storytelling process itself. But the functional potentials of 'thick productions' only come full circle if the scenarios enter the discourse, if they are talked about in the participating communities (in both **areas of action**, on-stage and off-stage).[41] How storytelling-based scenarios can help to overcome change-barriers on-stage as well as off-stage can be illustrated by transferring Zapf's functional model of literature as cultural ecology into the context of change management.[42] Zapf's premise is that "literature functions in analogy to an ecological principle […] within a given culture".[43] In other words, "imaginative literature […] can be described in its functional profile in such a way that it acts like an ecological force within the larger system of cultural discourses".[44] In consequence, two main hypotheses on the functions of literature within the discursive network of a culture can be identified: according to Zapf, literature functions, on the one hand, as a sensitive faculty for negative cultural developments, as a report on cultural dimensions that have been marginalized by dominant discursive systems.[45] On the other hand, literature acts as an agent of creative renewal by articulating precisely that which has been suppressed or ignored, thus reviving plurality, diversity and dynamic development. The interplay of these two modes constitutes Zapf's triadic functional model of literature, which consists of the concept of literature working as "cultural-critical metadiscourse", "imaginative counter-discourse", and "reintegrative interdiscourse".[46]

The first functional potential of narratives is that of a cultural-critical metadiscourse:[47] storytelling-based scenarios can provide the opportunity to reveal critical positions, to voice grievances, to ask uncomfortable questions and thus bringing off-stage discussions on-stage. This also means that the hypothetical snapshot of the future will tend to uncover weak points in the present or outline developments that are perceived as critical, thereby supporting both dimensions of **agency**, present steering and future-oriented decision-making.

The second mode, the imaginative counter-discourse, is based on "a counter-discursive staging and semiotic empowering of what is marginalized, neglected or repressed in the dominant cultural reality system."[48] In this respect storytelling-based scenarios can, e.g., narrate alternative ideas, convey innovative imaginations or complementary fringe concepts that would have gone overlooked because they usually remain off-stage. In other words, innovative options, previously unnoticed in the current agency, i.e., marginalized perspectives in the present (relevant steering issues) or perhaps even hopes (relevant for decision-making processes) can be introduced into the discourse and thus become tangible.

The third functional mode of literature, the reintegrative interdiscourse,[49] highlights transcultural hybridity and heterogeneity and can be described as the dialectic, dynamic and unharmonious synthesis of the first two discursive modes. If storytelling-based scenarios call into doubt, e.g., certain strategic decisions while presenting alternative ideas at the same time, these narratives can play a vital role in potential negotiations and reconciliation processes between on-stage and off-stage change processes, present and future.

CONCLUSION AND OUTLOOK

Keeping these insights in mind the SBSA meets both the guiding questions and all dimensions of the Change Cube. Above and beyond, it is possible to identify specifically two focus areas in which the SBSA is especially strong, in other words, these are the dimensions in which the approach can complement other change management strategies best, namely 'future-oriented participation' as well as 'engagement in off-stage contributions'.

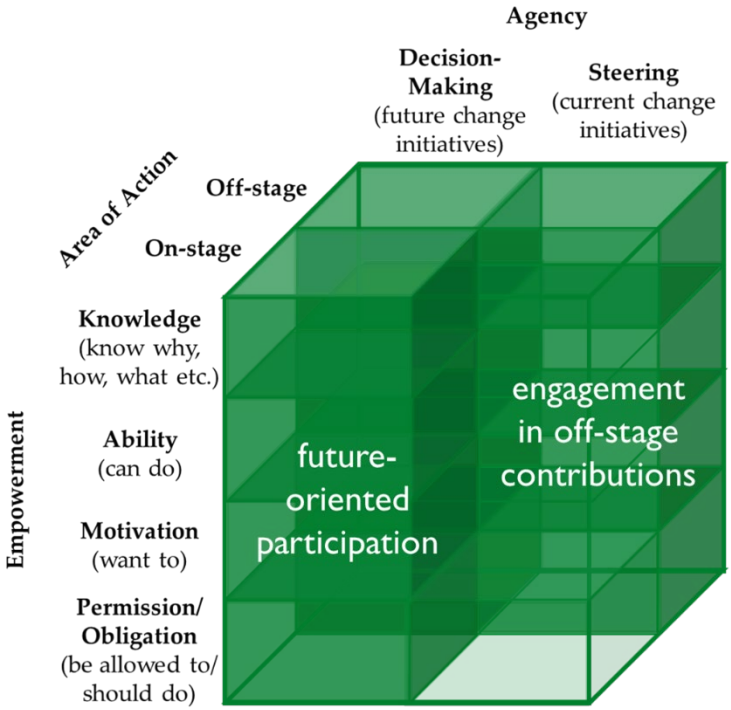

Figure 3. The Impact of the SBSA on the Change Cube Dimensions (own illustration)

It is necessary to highlight once again the decisive relevance of participation. Referring to the 'principle of participation', according to which "group members more readily accept new ideas and new work methods when they are given the opportunity to participate",[50] it is obvious that participation, particularly within a psychologically safe workspace,[51] has strong empowering effects which transcend both areas of action and are immediately relevant for agency now and in the future. Furthermore, returning to the original vantage point of (super-)complex worlds, it becomes clear that the collaboration and cooperation processes implied in SBSA need to go beyond any single university. This is why this paper presents an invitation to join us in preparing for the uncertain future.

NOTES

[1] Ronald Barnett, “University knowledge in an age of supercomplexity,” Higher Education 40 (2000): 409–22.
[2] C. Shawn Burke, Linda G Pierce, and Eduardo Salas, *Understanding Adaptability: A Prerequisite for Effective Performance within Complex Environments* (Amsterdam: Elsevier JAI, 2006).
[3] Judith Hicks Stiehm and Nicholas W. Townsend, *The U.S. Army War College: Military Education in a Democracy* (Philadelphia: Temple University Press, 2002).
[4] In the present context, a scenario is defined as a ‘hypothetical snapshot in the future’, see also Uwe Götze, *Szenario-Technik in der strategischen Unternehmensplanung* (Wiesbaden: Deutscher Universitätsverlag, 1991), 36–9.
[5] Learning. Life. Work – San Francisco (AMPS 2024), June 10-12, 2024.
[6] Andy Ellis, *1% Leadership: Master the Small, Daily Improvements That Set Great Leaders Apart* (New York: Hachette Books, 2023), 6–8.
[7] See, e.g. John P. Kotter, *Force for Change: How Leadership Differs from Management* (New York: Simon and Schuster, 1990), 9; Michael Hammer and James Champy, *Reengineering the Corporation. A Manifesto for Business Revolution* (New York: Harper Collins, 1993); Malcolm J. Higgs and Deborah Rowland, “Building Change Leadership Capability: ‘The Quest for Change Competence,’” Journal of Change Management 1, no. 2 (2000): 116–31.
[8] Sebastian Kleist and Heike Maetz, “Widerstände im Change Management,” in *Change-Management – Facetten und Instrumente*, ed. Gerhard Schewe (Hamburg: Kovac, 2003), 53–8.
[9] Paul R. Lawrence, “How to deal with resistance to change,” Harvard Business Review 32, no. 3 (1954): 49–57.
[10] Ahmad Hafizh Damawan and Siti Azizah, “Resistance to Change: Causes and Strategies as an Organizational Challenge,” Advances in Social Science, Education and Humanities Research 395 (2020): 49–53.
[11] Original is in German, translated and paraphrased by the authors. Dieter Frey, Marit Gerkhardt and Peter Fischer, “Erfolgsfaktoren und Stolpersteine bei Veränderungen,” in *Veränderungen in Organisationen*, ed. Rudolf Fisch et al. (Wiesbaden: VS, 2008), 281–99.
[12] Thijs Homan, “The Inner Side of Organizational Change: Thijs Homan. TEDxAmsterdamED,” Video Summary and Q&A (2017), accessed February 25, 2024.
https://www.vexplode.com/en/tedx/the-inner-side-of-organizational-change-thijs-homan-tedxamsterdamed/.
[13] Jeremy B. Bernerth, H. Jack Walker and Stanley G. Harris, “Change Fatigue: Development and Initial Validation of a New Measure,” Work and Stress 25, no. 4 (2011): 321–37.
[14] Peter Kruse, *Next Practice – Erfolgreiches Management von Instabilität. Veränderung durch Vernetzung* (Offenbach: Gabal, 2015), 150.
[15] Thomas King, *The Truth About Stories: A Native Narrative* (Minneapolis: University of Minnesota Press, 2005), 95.
[16] Paul J.H. Schoemaker, “Scenario Planning: A Tool for Strategic Thinking,” MIT Sloan Management Review 36, no. 2 (1995): 25–40.
[17] The following sketch represents an illustration of the process by exemplifying what the individual steps could be, e.g. in the context of ‘rising absenteeism of students’ at a university.
1. Collect Data: The main question is, which courses/institutes are affected by absenteeism and to what extent. The team carries out interviews with heads of institutes and lecturers and tries to find out whether there is a similar situation at other universities.
2. Identify Basic Trends: The absenteeism phenomenon is positioned in a timeline, e.g. the team analyzes its development since the Covid pandemic.
3. Frame Scenarios: This steps requires the formulation of the concrete focus of the problem: “Students no longer attend classes or attend them significantly less often (physically/on-campus). Exam performance can be achieved at least as well without class participation as with active class participation.“
4. Prioritize Scenarios: Now the focus of the scenario is localized in an input-process-output model. In this case absenteeism is anchored internally in the study process within the institutes (not within the realms of administration or services) and may be then be prioritized by the steering board.
5. Check Scenario Data: Then relevant stakeholders and indicators need to be identified. Which lecturers/institutes should be addressed and what early warning data can we obtain, e.g. from course evaluations?
6. Narrate Scenario: The narration is carried out in a forms survey that collects the relevant information from the stakeholders.

7. Consolidate Scenarios: The team carries out a 1:1 synthesis of results without any loss of information. Interpretation processes happen only on a socio-cultural level, e.g. with a focus on the influence of absenteeism on group dynamics in the course or on lecturer motivation.
8. Cluster Options: In this step the actual basis for decision-making is created. Consequently, the most urgent need for action is identified, e.g. a) the creation of a course-specific/institute-specific hands-on catalogue of measures to strengthen face-to-face teaching or b) the development of corresponding blended learning strategies. Then the operationalization process is devised and the question "who does what by when?" is answered; this may refer to the collaboration of specific teams with the envisaged presentation of results by a certain deadline.
9. Make Decisions: This step represents the decision on the desired course of action by the steering board: a) and/or b)
10. Take Care of Pending Tasks: This loop includes the quality management of the steps 1.-10. See figure 2.

[18] Niklas Luhmann, *Systemtheorie der Gesellschaft* (Berlin: Suhrkamp, 2017), 17-18.

[19] See also Uwe Götze, *Szenario-Technik in der strategischen Unternehmensplanung* (Wiesbaden: Deutscher Universitätsverlag, 1991), 36-9.

[20] In this context, the relevant stakeholders are those being involved in the scenario or able to provide information on the scenario.

[21] This step will not be discussed here, as indicated before.

[22] Ansgar Nünning, "Close Reading," in *Metzler Lexikon Literatur- und Kulturtheorie: Ansätze – Personen – Grundbegriffe*, ed. Ansgar Nünning (Stuttgart: Metzler, 2013), 105. While 'close reading' can be defined as text-centered, 'wide reading' represents a complementary approach focusing additionally on socio-cultural contexts.

[23] Clifford Geertz, *The Interpretation of Cultures: Selected Essays* (New York, NY: Basic Books, 1973).

[24] In this sense, narrative texts (scenarios) are, on the one hand, to be understood as semantized manifestations of the material dimension of culture, in which, among other things patterns of thought, imaginary worlds and concepts of reality express themselves in culturally and historically variable ways, so that an analysis of the texts allows conclusions to be drawn about cultural orders of knowledge; on the other hand, narrative texts also generate concepts of reality as 'ways of worldmaking' (Nelson Goodman, *Ways of Worldmaking* [Indianapolis: Hackett Publishing, 1978]) and are actively involved in the process of cultural meaning formation. See Ansgar Nünning, "Literatur, Mentalitäten und kulturelles Gedächtnis: Grundriss, Leitbegriffe und Perspektiven einer anglistischen Kulturwissenschaft," in *Literaturwissenschaftliche Theorien, Modelle und Methoden: Eine Einführung*, ed. Ansgar Nünning (Trier: WVT, 1995), 173–97. It needs to be stated that Posner's semiotic concept of 'culture' can easily be transferred into the context of tertiary education and could be directly applied to 'faculty cultures' or 'team cultures'. See Roland Posner, "Kultur als Zeichensystem: Zur semiotischen Explikation kulturwissenschaftlicher Grundbegriffe," in *Kultur als Lebenswelt und Monument*, ed. Aleida Assmann et al. (Frankfurt: Fischer, 1991), 37–74.

[25] In other words, the functional potential of scenarios to proactively point out options for action is based on the poietic character of narratives. This insight also directly demonstrates the reliability of the methodological approach: as the scenario technique correlates with one of the most fundamental cultural practices of humanity, namely 'narration', it is possible to rely on its forms and functions as much as on storytelling itself. See Ernst E. Boesch, "Homo narrator – Der erzählende Mensch," Handlung, Kultur, Interpretation 9 (2000): 205–30.

[26] As Nünning formulates: "If one accepts the central idea of a semantization of narrative forms, any literary and cultural historian who wants to address ethical, social, or political issues raised in or by narrative texts can profit from the application of the toolbox that narratology provides for the analysis of narrative fictions. Content and form, ethics and aesthetics are, after all, more closely intertwined than structuralist narratologists have tried to make us believe." Ansgar Nünning, "Towards a Cultural and Historical Narratology: A Survey of Diachronic Approaches, Concepts, and Research Projects," in *Anglistentag 1999 Mainz: Proceedings of the Conference of the German Association of University Teachers of English*, ed. Bernhard Reitz et al. (Trier: WVT, 2000), 361.

[27] In other words, a specific narrative form, such as e.g. an I-narration may hint at a whole spectrum of even divergent functional potentials, such as 'personal involvment and engagement or maybe being a strong element in a we-formation' or it may represent 'opposition and contrast or singularity'. See Vera Nünning and Ansgar Nünning, "Von 'der' Erzählperspektive zur Perspektivenstruktur narrativer Texte: Überlegungen zur Definition, Konzeptualisierung und Untersuchbarkeit von Multiperspektivität," in *Multiperspektivisches Erzählen: Zur Theorie und Geschichte der Perspektivenstruktur im englischen Roman des 18. bis 20. Jahrhunderts*, ed. Vera Nünning et al. (Trier: WVT, 2000), 31 and Astrid Erll and Simone Roggendorf, "Kulturgeschichtliche Narratologie: Die Historisierung und Kontextualisierung kultureller Narrative," in *Neue Ansätze in der Erzähltheorie*, ed. Ansgar Nünning et al. (Trier: WVT, 2002), 84.

[28] This is due to the fact that as each recipient brings in their own interpretation approaches/expectations/ cognitive perception habits. There is no clear assignment between form and content. Monolithic and thus necessarily simplifying attributions of meaning cannot be reliable.
[29] Such as, e.g., differentiating the levels of narration, narrative situations, time structures, spaces vs. places, perspective structure, etc.
[30] In this context the relevance of 'narrative voice' can be commented on as a paradigmatic example. Drawing on Lanser's typology of narrative voices (1992), it is possible to wonder, whether an 'authorial voice' conveys the impression of an omniscient, detached certainty about future developments or whether a 'personal voice' marks involvement, immediate experience and concern, perhaps also anxiety about future developments, thereby bringing the "'privileged arena' of conflicting discourses right inside our heads." Salman Rushdie, "Is Nothing Sacred?" in *Imaginary Homelands: Essays and Criticism* 1981-1991 (London: Granta, 1992), 426. If a 'communal voice' is employed in the narration describing an imagined future, the storytelling-based scenario may appear rather strong, maybe turning a possible future into collective fate. See Susan Sniader Lanser, *Fictions of Authority: Women Writers and Narrative Voice* (Ithaca: Cornell University Press, 1992).
[31] Ursula K.Le Guin, *The Language of the Night* (New York: Scribner, 1989), 212.
[32] This effect is confirmed by the author's satisfactory feeling of having been informed of relevant scenario topics beforehand.
[33] Margaret Atwood, *Negotiating With the Dead: A Writer on Writing* (New York: Anchor Books, 2003), 158.
[34] In other words, within the SBSA authors experience the realization of their own abilities, they transfer their vast competencies into relevant performance.
[35] Jürgen Straub, "Temporale Orientierung und narrative Kompetenz: Zeit- und erzähltheoretische Grundlagen einer Psychologie biographischer und historischer Sinnbildung," in *Geschichtsbewusstsein: Psychologische Grundlagen, Entwicklungskonzepte, empirische Befunde*, ed. Jörn Rüsen (Köln: Böhlau, 2001), 39.
[36] Straub, 39–40, original in German, translated by the authors.
[37] Paul J. Eakin, *How our Lives Become Stories: Making Selves* (Ithaca: Cornell University Press, 1999), 98.
[38] In other words: "[t]he self, and narratives about the self, are culturally and discursively 'situated'; [...] Simply put, 'my story' can never be wholly mine, alone, because I define and articulate my existence with and among others, through the various narrative models – including literary genres, plot structures, metaphoric themes, and so on – my culture provides". Mark P Freeman, "From Substance to Story: Narrative, Identity, and the Reconstruction of the Self," in *Narrative and Identity: Studies in Autobiography, Self and Culture*, ed. Jens Brockmeier et al. (Amsterdam: John Benjamins, 2001), 287. See also Jerome S. Bruner and Carol Fleisher Feldman, "Group Narrative as a Cultural Context of Autobiography," in *Remembering Our Past: Studies in Autobiographical Memory*, ed. David C. Rubin (Cambridge: Cambridge University Press, 1995), 293.
[39] John Shotter, "Social Accountability and the Social Construction of 'You'," in *Texts of Identity*, ed. John Shotter et al. (London: Sage, 1989), 137 and Eakin, *How our Lives*, 62–3.
[40] Eakin 1999, 43–4.
[41] In this context, it needs to be stated that scenarios by definition cannot have the same literary-aesthetic complexity as a novel, for example, but it is nevertheless possible to transfer the model of 'literature as cultural ecology' (Zapf) to narrative scenarios in analogy and devise functional hypotheses.
[42] Hubert Zapf, *Literatur als kulturelle Ökologie: Zur kulturellen Funktion imaginativer Texte an Beispielen des amerikanischen Romans* (Tübingen: Niemeyer, 2002); Hubert Zapf, "New Directions in American Literary Studies: Ecocriticism and the Function of Literature as Cultural Ecology," in *English Studies Today: Recent Developments and New Directions*, ed. Ansgar Nünning et al. (Trier: WVT, 2007).
[43] Original in German, translated by the authors. The original reads as follows: "Es ist die These dieses Buchs, dass Literatur sich in Analogie zu einem ökologischen Prinzip oder einer ökologischen Kraft innerhalb des größeren Systems ihrer Kultur verhält." Zapf, *Literatur als kulturelle Ökologie*, 3.
[44] Zapf, "New Directions", 147–48.
[45] Zapf, *Literatur als kulturelle Ökologie*, 3.
[46] The sentences above are (shortened) paraphrases of the German original, Zapf, *Literatur als kulturelle Ökologie*, 3–4. See also Zapf, "New Directions", 148–49.
[47] This mode "consists in the staging of typical deficits, blind spots, imbalances, deformations, and contradictions […]. On this level, the dynamics of the text follows a cultural-critical impulse which characteristically presents these systems as structures of severe external or internal constraint, as often traumatizing forms of negating individuality, difference and multiplicity […]." Zapf, "New Directions", 155–56.
[48] Zapf, 157.

[49] This mode refers to "the reintegration of the excluded with the cultural reality system, through which literature contributes to the constant renewal of the cultural center from its margins. This reintegration does not mean any superficial harmonization of conflicts, but rather, by the very act of reconnecting the culturally separated, sets off conflictory processes and borderline states of crisis and turbulence." Zapf, 158.

[50] Thomas Gordon, *Leader Effectiveness Training, L.E.T.: Proven Skills for Leading Today's Business into Tomorrow* (New York, NY: Berkley Publishing Group, 2001), 4.

[51] See Amy C. Edmondson, *The Fearless Organization: Creating Psychological Safety in the Workplace for Learning, Innovation, and Growth* (Hoboken, NJ: Wiley, 2019), 6–8.

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FROM LEARNER TO TEACHER: THE ROLE OF INTERDISCIPLINARY COLLABORATIVE EDUCATION IN MITIGATING BIAS IN ARCHITECTURE & DESIGN

Author:
KENDRA KIRCHMER, BYUNGSOO KIM

Affiliation:
KANSAS STATE UNIVERSITY, USA; NORTH CAROLINA STATE UNIVERSITY, USA

INTRODUCTION

Disciplinary bias and gender stereotypes persist in architecture and design, leading to numerous issues and perpetuating a hierarchy within design disciplines. An enduring example, as discussed in Havenhand's 2004 paper "A View from the Margin," is the practice of interior design, which has often been marginalized within the broader field of design, perceived as feminine, superficial, and inferior to architecture—a view reinforced by early modern movements and societal attitudes.[1] This bias extends to other disciplines and their outcomes as well. For example, there is an oversimplification in product design for women, such as simply using pink and making men's products smaller, highlighting a lack of female representation and disadvantages for women.[2] Additionally, masculine-stereotyped areas in maker spaces deter participation due to ergonomic and accessibility issues.[3]

This disciplinary bias often results in valuing certain knowledge over others based on gender connotations, including a preference for 'hard,' objective, quantifiable methodologies and measurable outcomes, as opposed to 'soft' impacts and outcomes that are less quantifiable. Recognizing and integrating diverse types of knowledge is increasingly crucial for design that promotes social justice, inclusion, and the shift towards empathetic, human-centric approaches.

In mitigating disciplinary bias, interdisciplinary collaboration can play a crucial role by fostering a learning environment that welcomes diverse perspectives, encourages peer-to-peer teaching, and promotes holistic understanding. Integrating various disciplines exposes students to broader ideas and methodologies, helping them break down preconceived notions and biases.

Importance of Reflections

However, implementing effective interdisciplinary collaboration is not without its challenges. Differences in terminologies, methodologies, and epistemological foundations across disciplines can lead to misunderstandings and hinder productive collaboration. Integrating reflective practices can be instrumental in addressing these challenges. Reflective practices are an important part of interdisciplinarity[4] and, more broadly, in design practice[5] and educational environments.[6] Further, Lattuca et al. posit that an essential measure of interdisciplinary competence entails reflecting on disciplinary biases and choices in problem-solving, understanding development, and recognizing their impact on directions and solutions,[7] thus underscoring the role of reflections as a vital pedagogical tool for interdisciplinary teaching and learning.

Types of Reflections

There are various types and ways to describe reflections. This study used terminology based on the timing of the reflection relative to the activity. This approach categorized reflections into two types: pre-activity, or *anticipatory reflections*, and post-activity, or *reflections-on-action*. The primary difference lies in their timing and the targeted outcome.

Anticipatory reflection involves pre-emptive engagement with the material or experiences to come.[8] This reflection type is critical for setting the stage for meaningful engagement with learning experiences.[9] Reflecting in advance allows learners to approach situations with heightened awareness and preparedness, enhancing their readiness to learn and adapt. Anticipatory reflection underscores the importance of a proactive approach to learning, suggesting that effective learning involves deliberate preparation for future scenarios and challenges, not just reactive responses.

Conversely, reflection-on-action, as described by Schön,[10] occurs after the event.[11] This reflection type involves looking back, analyzing actions, and considering alternatives.[12] Reflection-on-action is more deliberative and retrospective and allows individuals to learn from experiences, integrate new knowledge, adjust future behavior, and apply lessons learned in similar situations.

Although educators have actively utilized reflection to enhance learning experiences in design education, few documented studies exist on teaching design students to understand and mitigate bias in interdisciplinary collaboration using reflection as a tool in a studio setting.

PURPOSE OF THE STUDY AND RESEARCH QUESTIONS

This paper proposes a transferable, pedagogical model for interdisciplinary, collaborative learning alongside the outcomes of a thematic analysis of synthesized data from different reflection activities as educational interventions.

Beginning in 2022, students were asked to engage in reflections-on-actions at designated moments during the semester, such as the end of a project phase. The practice involved reflecting on their and their teammates' actions after the preceding phase. Additionally, starting in 2023, students were asked to prepare for a week-long interlude consisting of an intensive and challenging interdisciplinary design activity by engaging in anticipatory reflections.[13] The anticipatory reflections prompted students to reflect on their disciplinary understanding, awareness, and appreciation of non-disciplinary perspectives, disciplinary limitations, and measures of interdisciplinary success. In both reflections, the developmental experiences occurred within the larger context of a 16-week design project (figure 1).

This study addresses the central research question: what is the impact of reflective practice on understanding and navigating disciplinary expertise, limitations, and biases? This study also aims to understand the biases commonly arising during interdisciplinary collaborations in educational studio settings and identify effective strategies to mitigate these biases throughout the collaboration process.

METHODOLOGY

The first author, an Interdisciplinary Collaborative Design Studio instructor, facilitated reflexive activities in connection with specific design phases over three years. Students from different architecture disciplines engaged in analytical and generative tasks to explore interdisciplinary problem –definition, –understanding, and –solving (Figure 1).

Two different prompts, anticipatory reflection prompts and reflection-on-action prompts, were provided to students for reflections during and after studio projects over the three years. For anticipatory reflection, students were asked to respond to two main prompts: *Disciplinarity* and *Criteria for Success*. Disciplinarity-related prompts are focused on disciplinary awareness, appreciation of both disciplinary and non-disciplinary expertise, and recognition of disciplinary

limitations. Criteria for Success-related prompts encouraged students to consider disciplinary and interdisciplinary success criteria.

The reflection-on-action prompts comprised two categories: peer evaluations and self-assessments. Peer evaluations aimed to gain insights into behaviors that significantly influenced the group's progress and to identify plans that students could implement to enhance their contributions to better collaboration in the latter half of the semester. Self-assessments were designed to understand students' perceptions regarding their strongest attributes as team members and the group work skills they aimed to improve. The first author of this paper facilitated the reflexive activities in connection with specific design phases (Figure 1).

Thematic analysis was conducted to find insights from students' feedback, answering the research questions.[14] The researchers utilized MaxQDA, a qualitative data analysis software (version 2022), for this analysis.

Participation in the study was restricted to students concurrently enrolled in the instructor's course at the time of survey distribution, excluding students who had previously withdrawn. The Kansas State University Institutional Review Board reviewed the data collection and analysis process with an exemption under protocol number 11853.

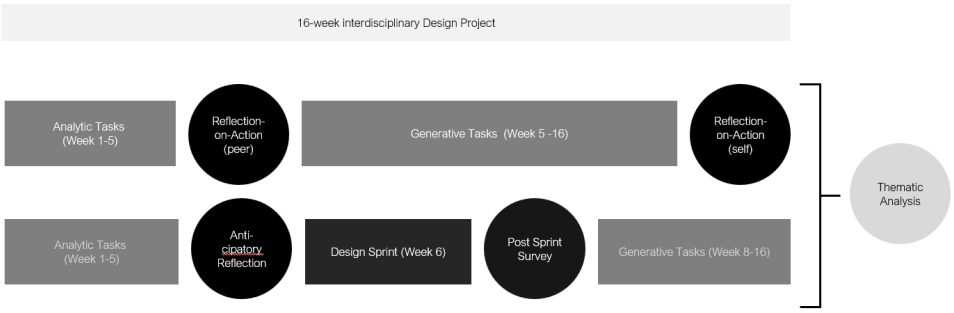

Figure 1. Methodology: Data Collection & Analysis Overview

There were 70 student participants across three distinct design disciplines: ARCH, IA, and LA. The table below shows participant demographics, including the number of participants from each discipline and their respective academic year levels.

Disciplines	**2020 - 2022**	**2023**	**Total**
ARCH (5th yr.)	15	3	18
IA (5th yr.)	20	11	31
LA (4th yr.)	18	3	21
Total	53	17	70

Table 1. Participants Demographics Overview

RESULTS AND FINDINGS

Impact of Reflections

The first research question of this study focuses on the impact of reflective practice on understanding and navigating disciplinary expertise, limitations, and biases. Emergent themes from this investigation into the impact of reflective practice include *enhancing communication and collaboration*, *improving team dynamics*, *broadening perspectives*, *recognizing strengths and weaknesses*, and *fostering learning and adaptation.*

Enhancing Communication and Collaboration

One of the key themes emerging from this investigation is enhancing communication and collaboration. Effective communication is fundamental to the success of interdisciplinary collaborations, influencing group dynamics, facilitating problem-solving, and enhancing individual contributions. The thematic analysis highlighted that participants viewed communication as essential to collaborations, consistently mentioning successful collaboration relies on effective communication. As one participant succinctly noted, "Above all, it comes down to communication." Further, reflective practices helped participants recognize their strengths and weaknesses in communication, thus enhancing overall team performance. For instance, one participant noted the need to, "(improve on) communication because you can never have perfect communication," Thus underscoring the significance of effective communication in fostering successful interdisciplinary collaborations.

Enhancing Team Dynamics

Reflective practice improved team dynamics within interdisciplinary collaborations. Participants indicated that through reflective practices, they became more aware of the necessity to trust their teammates and recognize diverse schedules and methods of task completion. Trust emerged as crucial in fostering a cohesive and efficient team environment, promoting inclusion, and mitigating disciplinary biases. As one participant reflected, "Reflective practice made me realize I need to put more trust in my teammates and that they will get their share of the work done to the best of their ability within their own schedule." Another participant observed, "Reflecting on our project, I realize I need to work on my steadiness during presentations and communicating better with my team. This awareness has helped me improve our team dynamics." These reflections highlight the role of trust and communication in enhancing team dynamics.

Broadening Perspectives

Reflective practice also facilitated broadening perspectives, allowing participants to gain a more comprehensive understanding and approach to design. One participant stated, "Reflective practice has made me more aware of the strengths and weaknesses of my discipline and how to leverage them in an interdisciplinary setting. This awareness has broadened my perspective on design and collaboration." Another noted, "Reflecting on my own practice and the contributions of others has helped me see the bigger picture and understand how different elements come together to create a successful project. This increased broader perspective has been invaluable in improving our team's performance." Reflections helped students become more aware of their discipline's strengths and weaknesses and learn how to leverage them effectively in an interdisciplinary setting.

Recognition of Individual Strengths and Weaknesses

The thematic analysis underscored the role of reflective practice in helping students recognize their strengths and weaknesses within a team setting. One participant noted, "I believe my biggest strength in a group is my work ethic. I completed my tasks to the best of my ability and took on extra work at the end to help others. For future group work, I should strengthen my communication skills." Another mentioned, "My greatest strengths as a team member are: being flexible for any task. The group work skills I plan to work to improve are: being more open-minded." These reflections highlight the importance of self-awareness in fostering effective collaboration by encouraging students to leverage their strengths while actively working on their weaknesses.

Learning and Adaptation

A critical theme emerging from the study was the role of reflective practice in fostering learning and adaptation. Anticipatory reflection helped students consider possibilities before acting, enhancing their readiness to adapt, while reflection-on-action prompted analysis of their actions for continuous improvement. One participant reflected, "I am used to working alone on design projects, so I have been working on running important design decisions past everyone. I also have high standards and am a perfectionist, so I am working to be patient because I have different skills and ways of doing things than other group members." Another shared, "… being open to trying new things and learning new programs and taking on any task that needs to be done even if it is outside my usual work." These reflections underscore the importance of being open to learning and adapting to enhance interdisciplinary collaboration.

Bias and Interdisciplinarity

The thematic analysis results also answer the research question: What specific biases commonly arise during interdisciplinary collaborations in educational studio settings, and what effective strategies can mitigate these biases throughout the collaboration process? Analysis of the reflections revealed various biases present in interdisciplinary collaboration among participants. These biases included *disciplinary*, *scale*, *knowledge and expertise, collaborative*, and *conceptual biases*.

Disciplinary bias was evident as participants preferred their own field's methods, approaches, and priorities; for instance, landscape architects emphasized the importance of outdoor spaces, whereas interior architects focused on experiences within indoor spaces. Scale bias emerged as participants from different disciplines tended to think and operate at preferred scales, influencing their design process; landscape architects often considered large-scale environmental impacts, while interior architects focused on details. Participants demonstrated knowledge and expertise bias by valuing the knowledge and expertise inherent to their discipline more highly than others. Their reflections showed confidence in their field's strengths, such as technical knowledge or conceptual development, while acknowledging gaps in their understanding of other disciplines. Collaborative bias was also noted, with some participants preferring to work within their discipline or hesitating to engage in interdisciplinary collaboration due to unfamiliarity with or undervaluation of other disciplines' contributions. Lastly, conceptual bias highlighted how different disciplines prioritize various design aspects, with some focusing more on functional and technical aspects while others emphasizing conceptual or experiential elements. These biases highlight the challenges in interdisciplinary collaboration, as participants must negotiate differing priorities, knowledge bases, and conceptual frameworks to achieve a cohesive and integrated design outcome.

The second research question also identified effective strategies to mitigate biases throughout the collaboration process. Emergent themes include *recognizing disciplinary limitations and biases*, *inclusive communication*, *peer-to-peer learning*, and co-creating *knowledge.*

Recognizing Disciplinary Limitations and Bias

The analysis revealed that acknowledging inherent biases and limitations within specific disciplines is crucial for effective collaboration. Participants' reflections indicated that recognizing disciplinary biases facilitated the integration of diverse perspectives, leading to more comprehensive and user-centered solutions. One participant noted, "I think something that can be a weakness in my field is being so focused on the interior details that sometimes the indoor-outdoor connection can get a little lost." Another mentioned, "I think landscape architects tend to have large-scale and holistic approaches to design… I think landscape architects lack knowledge of the intricate small-scale details that can contribute to the overall experience that interior architects and architects have."

These reflections highlight the need to recognize disciplinary limitations and biases to foster effective interdisciplinary collaboration. This awareness helps integrate diverse perspectives, leading to more comprehensive and user-centered solutions.

Inclusive Communication

Inclusive communication emerged as vital for mitigating biases. Participants highlighted the importance of clear communication free from field-specific jargon to ensure that all team members, regardless of disciplinary background, could contribute effectively and feel valued. Creating an environment where all ideas are welcomed and discussed was seen as essential for preventing the dominance of single perspectives and promoting a balanced approach to problem-solving.

One participant emphasized, "We need to continue to be aware of jargon and work towards a design language that everyone understands." Another noted, "Distilling our ideas down to one concise idea will require a lot of honest communication because everyone needs to be on board to put their best effort in moving forward." These reflections underscore the importance of inclusive communication practices in enhancing interdisciplinary collaboration.

Peer-to-Peer Learning

The analysis underscored the importance of learning from each other to mitigate biases. Participants expressed interest in learning from their peers' strengths and hoped to diversify their skills. One participant noted, "I hope the keen attention to detail and space that interior architects bring will rub off on me and can be a way of thinking I use in the future." Another shared, "I hope I can help diversify their skills broaden their perspective and help them see outdoor challenges differently." These reflections highlight the reciprocal nature of learning, where each discipline influences and enhances the other, leading to successful collaboration outcomes. As Kolb suggests in his Experiential Learning Theory, learning through experience is fundamental to adapting and improving in collaborative settings.[15] The analysis showed that learning from each other helps to mitigate biases, underscoring the importance of interdisciplinary learning opportunities in overcoming disciplinary biases and enhancing teamwork.

Co-Creation of Knowledge

Co-creating knowledge through collaborative efforts was identified as leading to more innovative and effective solutions. Participants expressed excitement about interdisciplinary collaboration, which expanded their knowledge and perspective by considering new and diverse aspects. Participants viewed this co-creation of knowledge as vital for addressing complex design challenges and enriching the collaborative experience.

One participant shared, "I am excited to collaborate on aspects I do not normally consider or touch. I am hoping that others outside of my discipline prompt questions that I am not used to thinking about to expand my knowledge of design." Another noted, "Recognition of the different approaches to conceptual design will be important to creating an effective framework that provides enough guidance and leeway moving forward." These experiences underscore the importance of interdisciplinary collaboration in mitigating disciplinary biases, fostering a more holistic and integrated approach to design. Aparna Datey's article on decolonizing the design curriculum underscores the transformative role of co-creating knowledge, emphasizing that it integrates students' prior knowledge and personal experiences, fostering a collaborative and inclusive learning environment that addresses biases and promotes holistic design solutions.[16]

DISCUSSION AND CONCLUSION

This study sought to examine the impact and integration of reflective practices in an interdisciplinary collaborative design studio and identified key outcomes for mitigating disciplinary biases and fostering effective interdisciplinary collaboration. The findings underscore the value of reflective practices in enhancing students' understanding of disciplinary expertise, limitations, and biases, contributing to more holistic and empathetic design solutions.

Reflective practice plays a crucial role in bias mitigation within interdisciplinary collaborations. Through reflection-on-action, students fostered an understanding of individual and team strengths and weaknesses, promoting areas for improvement and effective project management. Anticipatory reflections prepare students for interdisciplinary challenges by encouraging them to reflect on their disciplinary understanding and expectations.

Bias identification and mitigation emerged as a significant outcome of reflective practices. Students identified biases related to disciplines, tools, workload distribution, cultural dynamics, and feedback. The responses indicated that open communication and equitable task delegation, fostering a culture of mutual respect, and alignment within teams where all strategies are utilized to address these biases. Overall, the results support reflective practice as a tool to enhance the collaborative process by promoting a deeper understanding and mitigation of biases, leading to more effective and inclusive interdisciplinary teamwork.

The study underlines the importance of interdisciplinary collaboration in the co-creation of knowledge and the development of holistic design solutions. Leveraging the strengths of other disciplines and integrating diverse perspectives were seen as essential strategies for mitigating disciplinary biases. This collaborative approach enriched the learning environment and enabled students to envision solutions that transcended their individual disciplinary boundaries.

This study highlights the significant role of reflection in interdisciplinary design education. By enhancing students' awareness of disciplinary expertise, limitations, and biases, reflective practices foster holistic and empathetic design solutions. This study contributes to design education by demonstrating how reflective practices can enhance interdisciplinary collaboration, mitigate disciplinary biases, and promote holistic and empathetic design solutions.

NOTES

[1] Lucinda Kaukas Havenhand, "A View from the Margin: Interior Design," *Design Issues* 20, no. 4 (2004): 32-42.
[2] Harvard Advanced Leadership Initiative, "Shrink It and Pink It: Gender Bias in Product Design," Harvard Advanced Leadership Initiative.
[3] Anastasia M. K. Schauer, Hunter Schaufel, and Katherine Fu, "The Makeup of a Makerspace: The Impact of Stereotyping, Self-Efficacy, and Physical Design on Women's Interactions with an Academic Makerspace," *Engineering Studies* (2023), https://doi.org/10.1080/19378629.2023.2224016.
[4] Regina Bendix, Kilian Bizer, and Dorothy Noyes, *Sustaining Interdisciplinary Collaboration: A Guide for the Academy* (University of Illinois Press, 2017); Lisa R. Lattuca, David B. Knight, and Ingrid M. Bergom, "Developing a Measure of Interdisciplinary Competence for Engineers," in *Proceedings of 2012 ASEE Annual Conference & Exposition*, 25-415 (June 2012).
[5] Donald Schon, *Becoming a Reflective Practitioner: How Professionals Think in Action* (London: Temple Smith, 1983).
[6] Alan Rogers, "Learning and Adult Education," in *Supporting Lifelong Learning*, ed. Roger Harrison, Fiona Reeve, Ann Hanson, and Julia Clarke (London: Routledge, 2001), 18-34.
[7] Lattuca, Knight, and Bergom, "Developing a Measure," 25-415.
[8] J. John Loughran, *Developing Reflective Practice: Learning about Teaching and Learning through Modelling* (London: Routledge, 2002).
[9] Loughran, *Developing Reflective Practice*, 45.
[10] Donald A. Schön, *The Reflective Practitioner: How Professionals Think in Action* (Routledge, 2017), accessed August 5, 2024.
[11] Loughran, *Developing Reflective Practice*, 45.
[12] Rogers, "Learning and Adult Education," 18-34.
[13] Loughran, *Developing Reflective Practice*, 45.
[14] Alan Bryman, *Social Research Methods* (Oxford: OUP Oxford, 2012); Kathy Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis* (London: Sage, 2006); Johnny Saldaña, *The Coding Manual for Qualitative Researchers* (Los Angeles: Sage, 2021).
[15] David A. Kolb, *Experiential Learning: Experience as the Source of Learning and Development* (Englewood Cliffs, NJ: Prentice-Hall, 1984).
[16] Aparna Datey, "Decolonising the Design Curriculum: Making 'Sustainability' Accessible, Understandable and Practicable to Second-Year Undergraduate Architecture Students," *Archnet-IJAR: International Journal of Architectural Research* 17, no. 3 (2023): 496-517.

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METAMORPHOSIS —TRANSFORMATION, MEDIALITY & IMPARTATION

Author:
LUKAS JAKOB LÖCKER

Affiliation:
UNIVERSITY OF ARTS LINZ, AUSTRIA

INTRODUCTION

I am a multimedia composer, documentary filmmaker, researcher, and lecturer, currently teaching at the department of "Media Design Teachers Program" in Linz, Austria. In the academic year of 2020/2021 I was in charge of the annual topic of our department for the first time. During the preparations, I felt the urge to connect my personal artistic research practices with the heterogeneous realities of my students, since all of us were confronted continually with changes on so many different levels. From private life to politics, regarding (mental-)health, work, and leisure, within teaching as well as in arts, at our university and in public schools, ranging from economy to media, as recipients as well as creators, in our daily routines or even in certain states of emergency.

TRANSFORMATION

The summer semester of 2020 showed quite clearly the deficits of distance learning — social contact was missing, only virtual participation in projects was possible, the personal connection of students was almost nonexistent, to name just a few. Therefore, I wanted to enable a creative and reflective approach towards dystopian (and utopian) tendencies and above all, I tried to evoke an emancipatory moment — analyzing, processing, and thus actively shaping these processes of transformation! Our annual topic „metamorphosis" worked as connective tissue of sorts and extended the shared virtual space into a common „ideational space" where all students and lecturers or teachers of the department were invited to participate.[1]

Communication

To enable a steady exchange between all participants, I was searching for a way to connect the means of online meetings, social media feeds, mailing lists and personal messenger. The idea was, to implement a communication element for discussions, updates regarding the topic, an opportunity for open exchange, and thus feedback in general — so we (students and fellow lecturers alike) had a regular online meeting via open platforms of our university once a month since October 2020, for planning further steps together.

With the intention to have metamorphic impro-sessions, I designed these appointments somewhere in between the ideas of "al-halqa"[2] and „akadĕmeia" — an easy access format, that one could join and leave on their own accords, providing personal points of view and getting involved on the spot, or to just listen and observe in the background. A pool of different communications attempts, meant to

make everyone feel comfortable and to enable a diverse "audience" to become protagonists within their own pace!
I moderated and led these improvised "Metamorphing Sessions" through my background as musician and presenter of radio and tv shows. This is how we started to brainstorm, listen to music, watch online content and discuss all angles of these multimedia intersections. Over time that would ultimately lead to concrete ideas towards certain projects, texts, and possible realization of specific impartation formats.
Some of these were picked up, further developed and later realized independently by the lecturers themselves. One of them was Antonia Prochaska's format "Metamorphic Conversations" — a five-part online discussion series incorporated within the courses "Media Education" and "Narrative Theory". Aimed at facilitating an open exchange between students and experts from various areas of active media practice, about metamorphosis in media, art and education. These lectures turned dialogs were the nutrient for artistic works by participating students for the Instagram exhibition "METAMORPH:ME" in March 2021
The latter became the inspiration for the next event in the summer semester — we segued from processing students' personal transformations, into social changes that affect us all. A transition from the point of view by a certain "ME", to a reflective prospect of a general "WE", so to speak — changing perspective, turning a graphic character upside down.

Experimentation

The pop-up lab "METAMORPH:WE — Transformation on Display" was planned for May 2021 as a space for experiments in media and mediation at the "splace am Hauptplatz" gallery on Linz's main square. Through this attempt, we wanted to connect the heterogeneous transformation processes of different projects that were already developing, with interested students from various backgrounds, access to analog and digital media, as well as diverse experimental ideas for courses, workshops, lectures and more. For the first time in the course of the project, this would happen in a real space.[3]

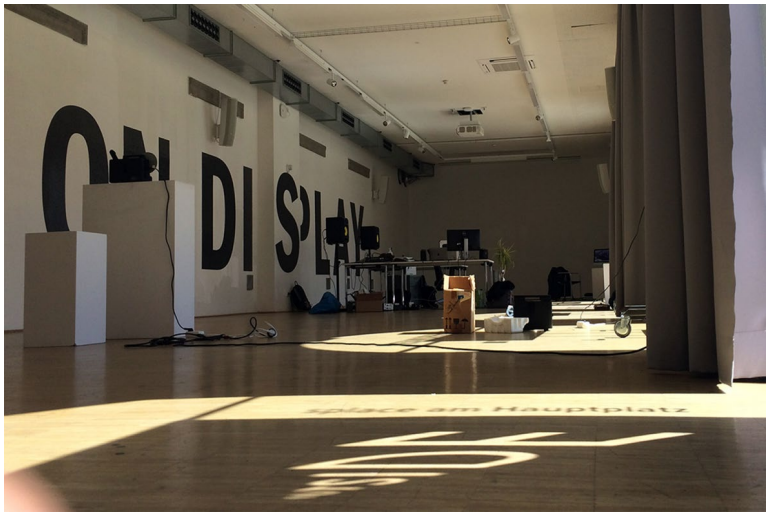

Figure 1. The "splace am Hauptplatz" gallery.

Originally planned to include interested passers-by and visitors, changes and adaptations had to be made due to the latest guidelines regarding Covid. Thus, the intersection between exhibition space and public space, as well as the possibility of participation, had once again to be pushed into virtual space — as within so many areas of art, culture, and education back then. So the thematic bracket of

this weeklong research experiment could be read through its title as a „transformation that affects all of us“ — from very personal developments to the omnipresent changes within our social interaction and therefore the usage of media as such, and its socio-political implications, respectively.[4]
Therefore, we thought to make this flaw a feature, and flipped the need of using a screen into our tagline — literally „on display“[5] were, on the one hand various student works, guest lectures, courses, workshops, and performances, but on the other hand also the teachers, lecturers and artists themselves — and thus, these changed conditions of current mediation practices, respectively. Highlighted by positioning a single office desk in the middle of the almost empty gallery, where one would find a colleague of mine, our guest lecturers or most of the time myself — sitting alone in front of a screen. While students, classmates, the community, or participants (of said talks or courses) were somewhere distant, sitting alone in front of a screen themselves.

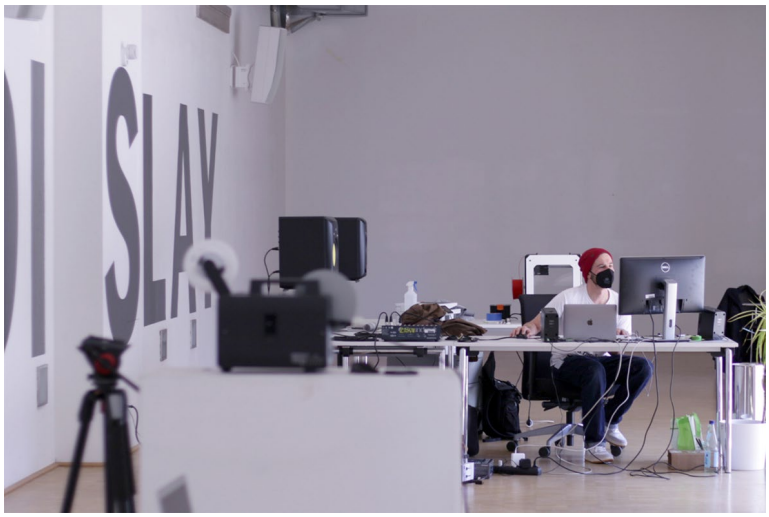

Figure 2. I am sitting in a room — single desk set-up.

Furthermore, all content of the programmed lectures, courses, workshops, and talks as well as the audio-visual works were accessible for recipients through three huge screens within the three big windows towards the main square[6] — featuring a different program each, and a daily live stream including a video-chat. In each case, you could use your personal smart device to scan the QR-code pasted on the glass of the window to get information regarding the respective video or to get in touch with the person on the desk inside, by joining the conversation via the live stream.[7]

Figure 3. Hybrid interaction lectures with QR-code window interface.

MEDIALITY

Increasing intersection of projects created further opportunities and showed several new aspects of mediation — through the annual topic, we were able to connect them continuously. Thereby, courses were enriched by the provided thematic backdrop and theoretical research basis they could build upon. At the same time, synergies between the different individual inputs of each lecturer spawned further meta connections, of which students now could benefit. Furthermore, the chance for intermedia projects and crossmediality within their artistic practice and the respective research increased.

This fact is very important in our case, since we tried to promote within our department the mind-set, that we are dealing with an idea of the “next media education” already. Meaning, that a reflective engagement and bidirectional learning and teaching is crucial for becoming a media teacher, or artist, who is in touch with technological, but also with socio-political progress and changes.

Practice & Research

Artistic research and media practice were each fueled by rhizomatic intersections of courses as stated above, throughout the whole academic year. Starting with the workshop “How to teach a plant the internet” in cooperation with Kiel-based #memeclassworldwide, which was implemented by Bernhard Garnicnig in November 2020 as part of his course “New Media Art”. Followed by Antonia Prochaska's aforementioned format “Metamorphic Conversations”, in which experts from various media fields gave discursive guest lectures, combining her two courses “Media Education” and “Narrative Theory” in an interdisciplinary way from November on, culminating in the online group exhibition “METAMORPH:ME” in March.

Figure 4. Intermedia research practice on film as media.

Through the formats above, as well as during the course of our pop-up lab "METAMORPH:WE — Transformation on Display" in May, a number of practical works were created — primarily multimedia works by students of the courses "Sound", "Artistic Photography", "Media Art Project", "Video" and "Communication Design". Some of them were even collaborations with the lecturers themselves, such as "Generation:Transformation:Film" by Judith Zdesar and her students.

Exhibition & Publication

All these works were collected at the end of the semester, and culminated in August 2021 in a final joint exhibition of all the artistic projects that were developed. It featured interactive installations — for example three different analogue sound installations — as well as an immersive audio-visual intervention. Several video/film works were displayed, and various multimedia installations shown, as well as a writing performance by one student, or also textile/haptic sculptures. For this final exhibition, we even developed a corona-conform solution for all audio-visual projects or sound-works as such, where we handcrafted customized input-sockets and provided additional Bluetooth transmitter, so visitors could bring and use their own headphones.

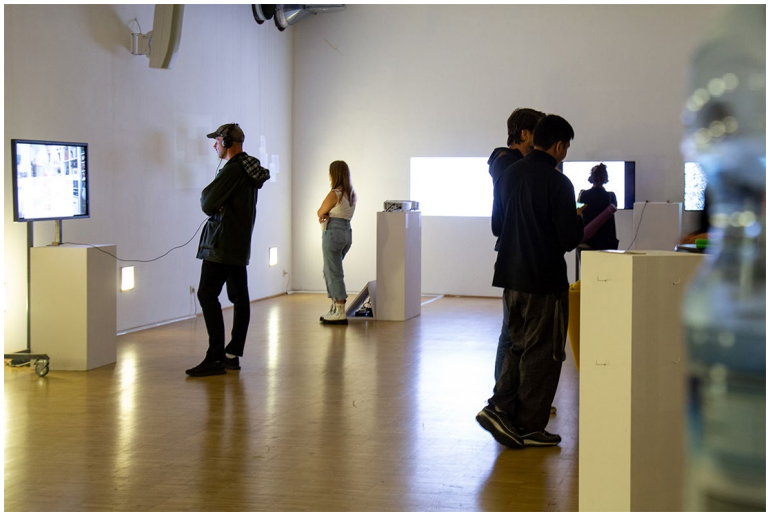

Figure 5. Exhibition set-up at the "splace am Hauptplatz" gallery.

Following this exhibition we got invited to show some of the works subsequently also at the "Ars Electronica Campus Exhibition —LOOPS OF WISDOM" as part of that year's festival in September. Hence, making the students' contributions accessible to a wider audience and placing them in the pinnacle for early stage media artists.

Figure 6. Audio-visual performance set-up.

Those practical works and all theoretical texts alike were then brought together in the final publication "METAMORPHOSIS — Transformation, Mediality & Impartation". The idea of connection and transformation — therefore, metamorphosis as leitmotif — played a very important role again in the realization of the book. On the one hand for my editorial work, which I wanted to reflect the natural progression of our project, as well as to provide a cohesive and good read! On the other hand, through the realization of its editing and production process — all considerations regarding the design of this book were deliberately made in constant exchange and cooperation with the graphic designer (Hanna Priemetzhofer) in charge. Furthermore, the books were printed on Upper Austrian recycled paper and produced in a small family print shop in Freistadt, Upper Austria — the binding ("Swiss brochure") reflects the general idea of our project once more, and allows the process of "joining" to be seen.

Digitalization & Hybridity

Besides traditional mediality and mediation methods, (art) universities are confronted with an increasing need for innovative online or hybrid formats for teaching — as well as exhibitions, exchange, etc. Since digital communication of the last view years was shaped by the pandemic, it revealed a demand for a transformation that by implication we should now adjust to our needs. In this case, our hybrid setup (in terms of aforementioned applied technologies) enabled us to address the main requirements and blend online and offline activities, as well as virtual, academic, gallery and public space — even enabling inter-action for visitors by using their personal smart devices.[8]

Figure 7. Usage of smart devices in installations.

On top of a sincere attempt to provide this easy-access for attendance and interaction to our attendees, we applied an overall idea of hybridity also aside from (de-)digitalization. Thus bridging dichotomies, or just different forms of categories, like analogue and digital media, or performance and lecture, composition and improvisation, as well as blurring art forms as such, deepen engagement in cross-mediality and above all, interconnecting teaching and learning.[9]

Inclusion & Sustainability

Included in our pop-up lab's program were several lectures on diversity, gender, heteronormativity, and more — e.g. "Let's talk about ..." by master students Lisa Nimmervoll and Shari Keplinger dealing with topics of transgender and normativity, against the backdrop of current graphic design aesthetics; or the talk "Why diversity is no add-on" by Ilona Stütz. In her multimedia project "CVDFMNM — Covid-Feminam" Gerda Martínez López shined a light on female views on the pandemic and their living conditions.

Throughout the academic year, we offered several classes, workshops, and lectures in English by international guests and artists, such as the aforementioned Gerda Martínez López or #memeclassworldwide (Ramona Kortyka, Mateusz Dworczyk and Juan Blanco), Roberta Lazo Valenzuela (CHL) and Julian Stadon (AUS). In our panel discussion, we invited the activists Chrislane Barros Bomfim da Silva and Renette Anayenyi Osako from the local Black Lives Matter movement Linz.

Further, we were reflecting on sound as an inclusive media, featuring student works regarding Helen Keller's biography. Subsequently we also discussed the lack of descriptions in Braille within common exhibition practices, and highlighted the need for a sensitive approach as a (media art) teachers.

Figure 8. Artistic research project on Braille and Helen Keller.

Many offered courses and/or lectures included relevant topics around the importance of sustainability within media arts as well — tackled e.g. through the course "Sustainable Media / Media Ecology" by Nina Grünberger and Wolfgang Ruge that resulted in the paper "Digital Arts | Morphing Planet | Sustainable Media: on the conundrum of digital devices between shine and soil". Two other examples were the talk "Climate Culture — cultural change within climate change" by Norbert Rainer and Rahel Frisch, as well as the lecture performance "TeleAgriCulture" by Julian Stadon.

IMPARTATION

The declared goal was to face the real challenges of current university teaching together (and thus strengthened) in order to develop the missing formats "in situ" cooperatively — in concrete terms, spaces and forms for the realization of practical and theoretical work or projects by all individuals in the department of "Media Design Teacher Training".

The initial idea to connect several layers and key player of our department constituted a methodology that evolved from within the project itself. Enriching both sides — empowering students and their projects as well as elevating our lecturers' perspective on teaching. Both fields showed qualities that constitute a climate for learning, cooperation, exchange, and mutual progression![10]

Methodology

During the preparation of the coming academic year, I reflected on the lessons learned within the first "corona semester" in 2020, which showed a lack of opportunities for our students to be involved and engaged within the department and each other. Thus, missing reflective and creative group projects because of the necessity for distance learning. For that reason, I planned the annual topic of metamorphosis to work as connective tissue for projects, classes, events, and therefore students and lecturers alike. I implemented these connections in our communication tools, lecture formats, exhibition concepts, and artistic strategies as such.[11]

The participation was voluntary and a lot of freedom was deliberately offered in order to evoke possible transformative processes in joint activities, to be able to participate in "metamorphoses" together. Therefore, the execution of stated strategies we managed as a group, with the goal to transform a collaborative and shared effort into a shared experience. For the methods stated above, we used the featured online meeting platform of our university but also experimented with open source

alternatives like Jitsi. Providing lectures and events in a hybrid way and implementing conference settings through the usage of webcams and boundary microphones for the best possible realization.

Figure 9. Hybrid lecture setting during "METAMORPH:WE".

We tried to use the given and provide a low threshold — on the one hand, to emulate the situation within schools, which usually have to deal with a quite low budget, and on the other hand to avoid utilizing "gatekeepers" that are often applied within cultural and social structures, in order to open up towards an inclusive approach. All participants came together regularly to reflected on these strategies and the respective next steps ahead. Also, to decide on how to get involved with external collaborators such as activists, art collectives and galleries, print and bookshops, or media workshops e.g.
This methodology can be generally adapted depending on the teaching situation or environment and necessity. However, a direct transfer of the annual topic "metamorphosis" makes little sense without appropriate adaptation and above-mentioned efforts.

Adaptability

For a vivid exchange among (art) students, their teachers and peers, it is crucial to be able to participate in collaborative/collective projects or events — offline or hybrid. The implementation of an annual topic helped me to realize this collective and collaborative project. Since this idea is no novelty at all, it could be adapted quite easily to other fields within (art) universities and/or other departments as such — the innovative aspect lies in the realization of its methodological approach due to the inherent potential of the picked topic.
The adaptability is therefore on the one hand very broadly possible, but on the other hand also somehow limited, as the specific implementation is very dependent on the underlying starting situation of each institution. The reason why it is nevertheless easily adaptable lies in the methodological concept and didactic-pedagogical implementation.
The general circumstances of society, as well as the current situation of our department and its students and teachers, were honestly reflected upon and evaluated. This enabled us to become aware of the lack that created this need for a collective (theoretical) metalevel in the first place. It was essential to reflect and critically evaluate the current situation of our university, the department, and the situation of our students, respectively.
By adopting the strategy of our project — which only started to unfold throughout the progress of it — one must identify the needs of their own institution first. That means analyzing possible deficits

and reflecting on ideas to overcome them — regarding the organization and methodology as well as the thematic or theoretic background. In summary, it would require the following dynamics or efforts: (1) observation of the institution, (2) reflection on possible needs or deficits, (3) communication and revision with colleagues, (4) research of theoretical and thematic input, (5) milestones for projects, (6) flexibility of planned structures, and (7) collective and collaborative implementation.

Learnings

From my perspective as initiator of the whole project, I have to clearly state that such a free and strong involvement of many people — therefore possibly too many ideas, projects, and strategies to realize — calls for a specific focus on certain tasks, a predefinition of milestones, and a thoughtful selection. Hence, an overview and curation or guiding "project manager" is necessary.

For our students, the shared experience that stemmed from this intense interaction with a vast range of topics, different teachers and varying medialities within a real space, showed an increased identification and connection towards our department and their peers/colleagues, despite the ongoing pandemic. The exchange and communication amongst the various generations of students improved as well and led to a strengthened presence within our university.

Further, we could observe a vast increase of students of our department in their respective student representation and different committees as well — both are vital and important factors for a faculty and the academic life within. The same goes for the University of Arts as a whole — our students and their work are more visible now, as well as the activities of our department.

On a final note, it is important to state, that not only our students and their connection to each other and the department got empowered, but also the relationship amongst lecturers and colleagues got strengthened, and thus the whole department as such. Within the institute for "Art & Education", this strengthening led to a more positive perception of our activities and spawned a vivid exchange with other departments. Therefore, the involvement of their lecturers in our project set an important example for exchange and communication amongst colleagues and peers.

NOTES

[1] Sandro Zanetti, "Situationistische Interventionen mittels Zweckentfremdung," in *Improvisation und Invention – Momente, Modelle, Medien*, ed. Sandro Zanetti (Zürich: Diaphanes, 2014), 235.
[2] Khalid Amine, "TASWIR – zwischen Ost und West," in *TASWIR – Islamische Bildwelten und Moderne*, ed. Almut Sh. Bruckstein Çoruh et al. (Berlin: Nicolaische Verlagsbuchhandlung GmbH, 2009), 23.
[3] Christopher Dell, *Die Stadt als offene Partitur* (Zürich: Lars Müller Publishers, 2016), 74.
[4] Brandon LaBelle, *Acoustic Territories: Sound Culture and Everyday Life* (London: Continuum International, 2010), xvii.
[5] Vilém Flusser, *Towards a Philosophy of Photography* (London: Reaktion Books Ltd, 2000), 8.
[6] Alexander R. Galloway, *The Interface Effect* (Cambridge: Polity, 2012), 30.
[7] François Dagognet, *Faces, Surfaces, Interfaces* (Paris: Vrin, 2003), 49.
[8] Erika Fischer-Lichte, *Ästhetik des Performativen* (Frankfurt am Main: Suhrkamp, 2004), 59.
[9] Galloway, *The Interface Effect,* 32.
[10] Simon Rose, *The Lived Experience of Improvisation: In Music, Learning and Life* (Bristol / Chicago: Intellect Ltd, 2017), 55.
[11] Rose, 57.

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PROTOTYPES FOR BELONGING: CREATIVELY CULTIVATING BELONGING IN PROCESSES OF PUBLIC PLACEMAKING

Author:
GEORGE LOVESMITH

Affiliation:
UNIVERSITY OF THE WEST OF ENGLAND, BRISTOL, UK; UNIVERSITY OF BATH, UK

INTRODUCTION

That there are community contributors who feel they don't belong within processes of place-based change is arguably the biggest barrier to meaningfully democratic development of our shared public realm.

This paper, rooted in my own practice, is situated at an intersection of knowledges, where socially engaged practices of public art and architecture overlap. The specific focus here is the fostering of a feeling of 'belonging' within working processes, for community contributors who get involved in the making of place.

Resonating with the objectives of this practice-based research, the 'Learning. Life. Work' conference call asserted that "Practice is … about development of community members and citizens,"[1] going on to describe the evolution of practices "as a way to share stories and help others evoke theirs in the world."[2] And so, this conference was seen as an ideal forum in which to share experimental practice tools that creatively cultivate belonging in processes of public placemaking.

Figure 1. Volunteers at Maindee Library+, Newport, play a game together as part of the building redesign process (credit: Maindee Unlimited)

Two library case studies form the focus of the paper, in which diverse community groups reimagine the role of these spaces within their cities. Principally, these case studies have been comparatively analysed using Grounded Theory, "arriving at theory suited to its supposed uses."[3] Conditions and working processes are codified and cross-referenced in order to share tools that can be applied in other contexts. Each library project is an imperfect prototype, invariably struggling to live up to the ideals of theory but which is, nonetheless, testament to learning – Each time trying, trying again, refining.

Through these case studies the paper:

- argues for the need to creatively cultivate belonging,
- characterises belonging in placemaking practices,
- identifies barriers – that which prevents a contributor from feeling they belong,

and

- shares working principles and responsive innovations ('prototypes') to overcome these barriers – that seek to engender a sense of contributor belonging in working processes.

THE NEED FOR BELONGING

In structuring his 'Hierarchy of Needs'[4] Maslow cites food, water, warmth, rest and safety as our most basic needs, arguably defining the architects' foundational brief as they design buildings that serve human necessity. Alongside love, Maslow posits belonging as the most significant of our psychological and self-fulfilment needs. In turn we might ask: What if the architect's role were expanded to address fulfilment?

Discourses rightly celebrate community-led and self-organised initiatives, yet there's little exploration of how to enable community members to take part within landscapes of scarcity, limited capacity and the complications of everyday life. How can co-production overcome such thresholds of power imbalance? The catalysing of agency, needs investment, time and creative acts of care. Principles foreground the validation and enabling of community contributors within creative processes of spatial change - asserting the(ir) right to a place at the table – making it a possible and positive experience, by identifying and working around barriers that make inclusion and participation a constant challenge. Kath Shonfield, in her call to develop the public realm, described this shared territory as our "lived experience of democracy,"[5] saying it is "as fundamental to the experience of humanity as the loving touch of the parent."[6] It is perhaps in this vivid metaphor, that the need for belonging within the conceptualisation of the spaces we share, is most powerfully expressed – fundamentally necessary emotional fulfilment. We need to belong.

CHARACTERISING BELONGING

Perhaps at it's most basic level, 'Belonging' has been defined as "the feeling of being comfortable and happy in a particular situation or with a particular group of people, and being treated as a full member of the group."[7] The concern of this study, is the 'feeling' the person has, and whether they feel they could be fully included, in a given situation.

From museum studies Susannah Eckersley says belonging can "be seen as the right to participate"[8] with which there are clear parallels to Lefebvre's 'Right to the City'[9] of 1968. In the blogpost documentation of a Glass-House 'Chat'[10] entitled 'The Right to Shape Places' a notion of "collective belonging" is explored alongside another notion of "equitable infrastructure [that] can help everyone contribute to shaping their cities and communities for the better…"[11]

Geographer, Antonsich,[12] giving a comprehensive account of the interrelationship between place and identity, expands on "belonging as a discursive resource which constructs, claims, justifies, or resists forms of socio-spatial inclusion / exclusion" and this leads on to the introduction of case studies:

Figure 2. Artist Valentina Paz Huxley paints a window mural at Junction 3 Library, Bristol. Chess Club at Maindee Library+, Newport. (credits: Rising Arts & C. O'Beirne)

My Library My Space, Junction 3 Library, Bristol

An invitation to reclaim was the catalyst in the My Library My Space engagement programme. The arts-led approach considered how the city's estate of library buildings might better serve it's young people, speaking to notions of 'constructing' and 'claiming' a socio-spatial belonging. MLMS was commissioned by Bristol City Council throughout 2020 and 2021 (during the depths of covid restrictions). My role was to work in collaboration with and act as a critical friend to two early career producers from Rising Arts (talent development agency).

Maindee Library+, Newport

Maindee Library+, Newport, is a volunteer-run, community initiated, piece of social infrastructure. The library was closed by the local authority in 2015 but was soon reopened by a determined volunteer collective called Maindee Unlimited. Through a co-produced, socially engaged art programme in 2017, Maindee Unlimited appointed Sarah Hollingworth of Architecture 00 and myself to help them reimagine the building.

BARRIERS TO BELONGING[13]

My Library My Space is well placed to help us understand barriers to belonging as the work was conceived in response to earlier research evidence,[14] from which barriers to participation opportunities can be identified:

- "unwelcoming"
- "nothing appeals"
- restricted & irregular hours
- "discomfort"
- "a sense of exclusion"
- lack of publicity
- out-of-touch institutions

& for potential young people who may have:, or be:
- time-poor
- cash-poor
- additional needs
- access needs

Project contributor Aliya expanded during the work:
"Young people felt like libraries were a place where they had no voice and I think we're living in an age where being able to be vocal and verbalise your opinions, especially for young people, is becoming so much more important."[15]

These barriers, which I propose can inform our understanding of barriers to belonging in processes of place-based change, span the physical, lived and perceived, all of which are important as they inhibit belonging in different ways.

From the literature, Eckersley goes on to observe that the "contemporary interest in notions of belonging responds to a perception that societies and their populations are increasingly:
- fragmented,
- disenfranchised

and
- socially isolated"[16]

themselves barriers to belonging, and overlapping with the list above.

Discourses (rightly) celebrate community-led and self-organised initiatives (Maindee Library+ is one), yet there's too little exploration of how to enable community members to take part within landscapes of scarcity, limited capacity and the complications of everyday life. This corresponds to Boyle & Wyler's[17] findings within broader community development. This apparent oversight, between celebrating the community-led and exploring how to enable it, means that innovation and guidance are lacking for contexts where there is:
- no critical mass,
- no momentum,

or
- no capacity within resident communities

for doing the extra things through which community-led initiatives arise.

Arguably, the majority of community members entering a placemaking process, do not initially feel 'comfortable' with the prospect. The situation or the group (or both) is unfamiliar. Confidence must be built, particularly for those not normally invited into the spaces of production as a consequence of (lack of) education, age, race, gender etc. This is also a principle of equity. Full membership is perceived as being unlikely or impossible because of a lack of the credentials that people perceive to be needed, that *are* normally needed, to be included.

PROTOTYPES

From an analysis of my practice experiences, this paper shares evidenced tools for belonging – prototypes to enrich co-production - addressing thresholds of power imbalance. They result from experimentation, with care, towards a greater sense of belonging.

From across these case studies, analysis of the prototype tools suggests thematic groupings, of which this paper focusses on three of those groupings; Communication, Power & Creativity. Reflecting on these in the context of identified barriers enables a corresponding grouping of those barriers – as illustrated in Figure 3. The paper goes on to share prototypical approaches in three sections according to these themes.

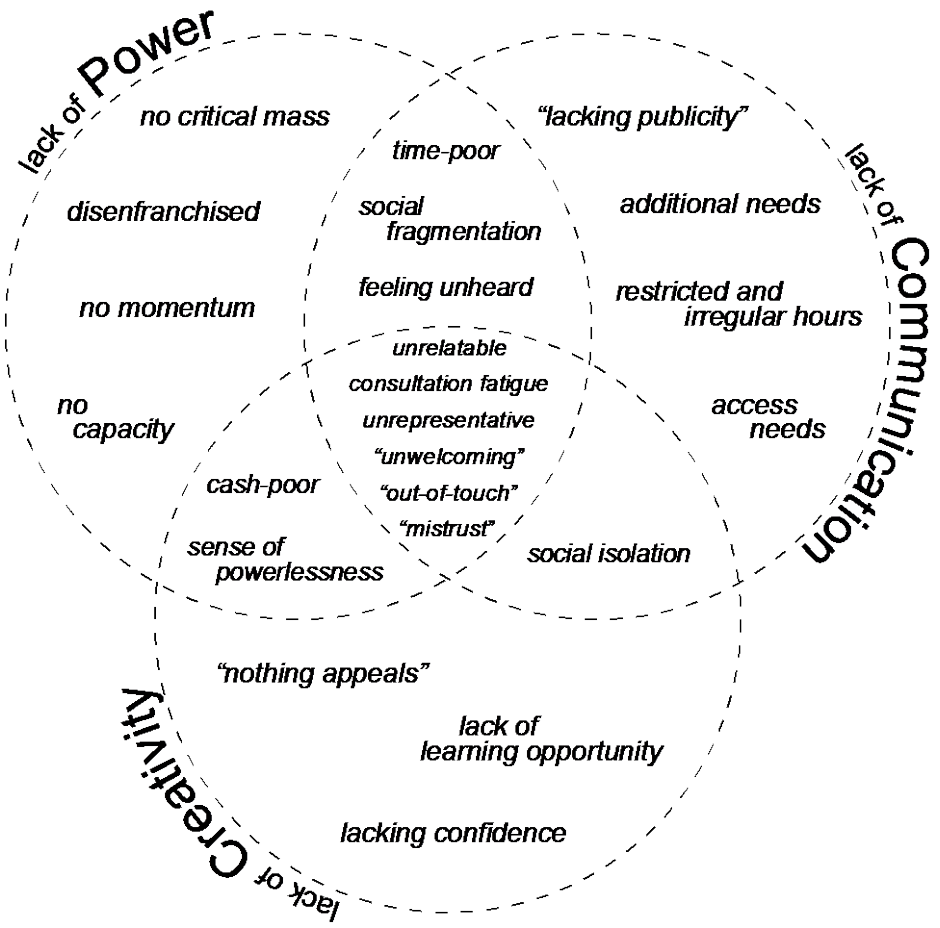

Figure 3. Venn diagram grouping of Barriers to Belonging.

COMMUNICATE WITH PEOPLE – WHERE THEY'RE AT

Social Media

In both library projects, executed pre- and mid- pandemic, social media was deployed to enable virtual engagement as well as physical. This meant we could communicate with people in their homes and pockets, at a time to suit them, to build both awareness of our working processes and a sense, for recipients, that the library institutions care whether the contributor is kept informed.

Platform selection (fig. 4) according to target contributor characteristics is important. "Giving a young person agency over marketing, for instance, will help reach younger audiences."[18] Once online contact is established it can enable people to respond and enter into dialogue in both similar and different ways to in-person engagement opportunities. As is widely acknowledged more broadly, but not always deployed in place-making practices, social media can enable a virtual community-building, complementing face-to-face community-building and indeed, the building of physical community spaces.

Figure 4. Commissioned Bristol Artist Abbi Bayliss' illustration linking users to My Library My Space content through social media platform Grapevine

Contributor-Generated Documentation & Sharing

Often existing within or alongside social-media content, photo collections, pod casts and film clips[19] can usefully capture the spirit and activity of a process in familiar, immediately accessible and easily digestible ways (fig. 5). This promotes belonging in many of the ways outlined above.

When the story is told through multiple contributor voices this has the potential to strengthen the belonging of the contributor as they see themselves represented within the legacy record of the process and get the sense that their contribution is valued. Furthermore, it is an opportunity for the contributor to express themselves giving their own unique perspectives and insights. The power of representation in any documentation can have a multiplier effect as potential contributors identify with the voices they hear.

Figure 5. Instagram post: 'We're making a film' (credit: Maindee Unlimited)

Meet Access Needs

Communication is also a question of accessibility. My Library My Space sessions were never scheduled according to library opening hours but instead extended opening enabled events to take place in evenings to suit the young people the library was trying to reach. Similarly, the team prioritised funding for sign language interpreters and captioning software in order to remove barriers to the sense of contributor belonging.

Figure 6. Instagram post: 'New yellow doors' (credit: Maindee Unlimited)

Forge Opportunities to Contribute at Different Scales

An additional aspect of social media engagement is the varying degree to which a participant can contribute, from the light-touch 'like' emoji (fig. 6) to active on-line workshop participation.[20] Creative in-person opportunities within My Library My Space also ranged from that of the producers and artist-in-residence (18 months) through the cohort commissions (9 months) to contributors co-authoring the community poem (momentary drop-in). Each of these approaches is about recognising there is no one-size-fits-all mode of engagement and that contributors are more likely to feel they belong when they can do so in the way that works for them.

POWER - IN THE HANDS OF COMMUNITY CONTRIBUTORS

Volunteer Decision Makers

Maindee library is volunteer-led, putting agency, power and responsibility in the hands of a representative community, enabled to take action.

'Place Recognition'

The term 'place recognition' emerged as a conceptualisation of place-based change from dialogue within and around the processes in Maindee - representing a shift from practices of "generic", "tool-kit, quick fix" placemaking,[21] working with the character of what was already there. This was generative placemaking: valuing existing & potential contributors, enabling the emergence of contributors taking a lead – and initiating change at a speed & to a degree that contributors are comfortable with.

Open Invitations

"The library supports [contributors] with different ideas that they might have now and into the future."[22] In this quote my collaborator, Sarah Hollingworth recounts the spirit of enabling at Maindee Library+, Newport. Prior to our appointment, Maindee Unlimited had forged a community in which contributors feel at ease putting forward ideas, knowing that with consensus to trial something, there's support to realise both good and risky initiatives.

A characteristic of both library projects, the 'open invitation' was shared with potential contributors in different ways at numerous points, to create agency and recognise prior knowledge - An effective tool countering feelings of powerlessness and being unheard. The initiative was recognised in Arts Council Wales' independent review as "Placemaking as social inclusion"… with "real authenticity, control and involvement of communities"[23] and in the project manager's review as "practising acceptance and an ability to trust".[24]

Ownership & Representation

At Junction 3 Library such a devolution of power to the young people the library sought to better serve was intrinsic. As the project evaluation report reflected, "services who are keen to engage with young people more should do so by hiring them and giving them some decision-making power… If a service's structures do not allow this, challenging these structures is the first step".[25] This was validated externally by the Friends of Bishopston Library saying that "the approaches taken by My Library My Space were particularly helpful in shifting the focus more towards the involvement of young people in the planning process."[26]

Furthermore, the leadership of the early-career producers was specifically designed to ensure a youth "ownership of the processes, methods and visions."[27]

Intimacy – Work Deeper with Fewer People

"The intimacy of this particular programme means that the conversations we have can be deeper and therefore more meaningful, which means we can get more from it."[28]

Contributing artist Sophia's words are testament to the value of sustained relationships through the cohort engagement model (expanded on later). Funding body rubrics often demand volumetric growth in attendance, consultation or participation driving arts and development bodies to engage with audiences and communities in very shallow ways, and consequently a legacy impact for participants is minimised.

But the power of investing in such 'intimacy' is yet more profound than this, as explored in Carrillo Rowe's (be)'longing' for a "Feminist Politics of Relation" in which she outlines an importance to "build intimate knowledge of that which lies between self and other,"[29] as part of our pursuit for belonging.

COMMISSION CREATVITY

Artists and Arts Organisations as Relationship Builders

Artists working creatively, & smaller organisations "can create trust and connection… in a way that institutions can struggle to."[30]

In Maindee this took the form of both architecture student live projects and micro-commissions for artists and designer-makers, through which workshops were vehicles for new and existing contributor participation. At Junction 3 Library this involved a network of varied commissions (fig. 7).

These foster belonging by giving contributors novel opportunities to be creative and develop skills in civic settings. The support structure means that contributors are 'held'[31] in the process, while enjoyment and social connection are both contributory factors to the sense of belonging.

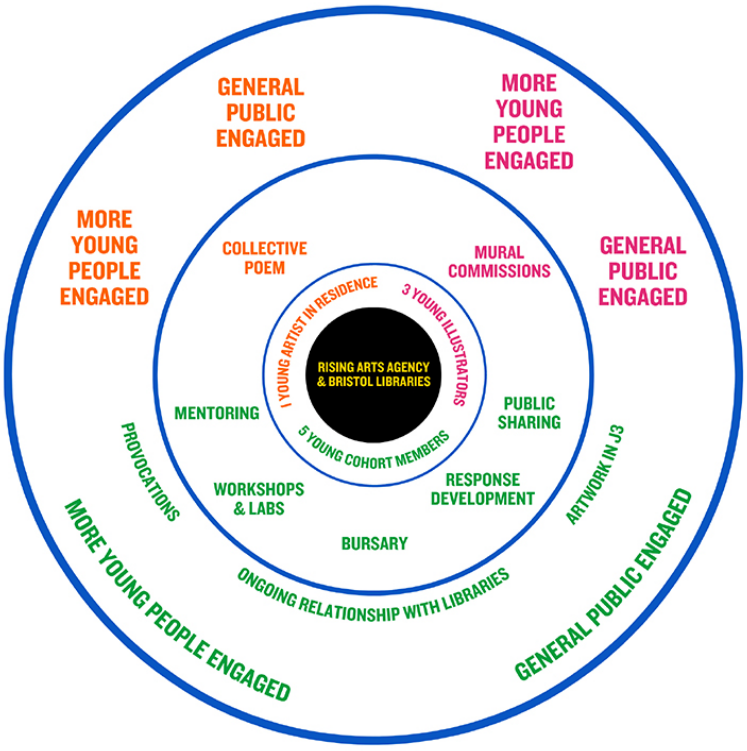

Figure 7. Network of creative commissions in the My Library My Space programme (credit: Rising Arts)

Micro-Commissions

To support and develop local young people at Junction 3 Library, three artists got their first paid commission to execute temporary murals aiding development of their portfolio and network.

"A paid commission made me realise that other people valued the energy I've channeled into my work. It felt like a recognition and has brought me an injection of confidence"[32]

These artists benefitted from a platform and an audience, and on a very practical level, payment which, aside from being the right thing to do, helps overcome this barrier to involvement for those who may feel cash-poor. As a simple yet tangible transformation of place, these commissions built belonging in place-making by affirming these young artists' agency to make change.

Figure 8. My Library My Space artist cohort (credit: Rising Arts)

Cohort Model[33]

Further to the principle of commissioning is a practice of community building and collective investigation that we named the Cohort Model. At its root was a desire to commission a group of young people (fig. 8) to test new ways of using and inhabiting libraries and as with the standalone commissions the artists earned a platform and audience for their work.

"Another form of value would be being able to come together and share our responses for a common cause and hopefully for it to make transformational changes for the future."[34]

Regular time together enabled the artists to explore issues of library usership with library teams and users, developing skills and agenda together rather than working in isolation.

"As well as the workshops the 5 young people received a £700 bursary for their time to participate and 1:1 mentoring with an industry professional relevant to their avenue of research and development".

Mentoring

The idea of a 'process' reciprocating to a community member with mentorship in return for their input, was explored at both Maindee Library, through the recruitment of a volunteer sustainability champion, and within the Junction 3 Library cohort model. Expanding the evidence for belonging fostered in this setting, the cohort enthused about their expanded professional network, saying they were able to "meet a lot of really interesting people from different fields" that they wouldn't have been able to engage with without the project and "they've been really helpful for my creative practice beyond this project."[35]

Play

In the early phases of our work with Maindee Unlimited it became apparent that ambitions for what could be achieved with the budget far outstretched money available. This isn't unusual, even within professional design teams, yet we wanted a shared understanding of this limitation and for each

member of the volunteer community to understand the different priorities those around them held for how the money should be spent. To counter perceived barriers of institutional detachment we creatively worked with the power of play, devising a game 'You be the Architect'[36] in which teams of players were compelled to decide how they would allocate the budget and which elements of the brief they would forego (fig. 9).

Figure 9. Volunteers at Maindee Library+, Newport, play a game together as part of the building redesign process (credit: Maindee Unlimited)

The format of a game created a safe space for risk-free collaboration, promoting empathy through role play as each participant took on a budgetary responsibility they don't usually have. Play is remarkable for promoting belonging – Enjoyment relaxes us and can form positive memories, whilst the interaction involved creates new opportunities for social connection.

Fundamentally, indulgence in creative modes of being, shifts mindsets, welcoming personalised, unprecedented input. As peace activist Elise Boulding said, "We can't work for what we can't imagine. So we have to be able to imagine, play, daydream." [37]

Figure 10. Community Poem 'Altogether' at Junction 3 Library, Bristol (spatial intervention: Malizah & George Lovesmith. Image credit: Jade Ayino)

Collective Creative Spatial Intervention

'Altogether' is a community poem curated by My Library My Space artist-in-residence, Malizah, intertwining contributions from dozens of Bristol residents. Not only a performance piece, Malizah and I collaborated to transpose the words onto the library walls (fig. 10). Through this, members of the Bristol community have effectively reclaimed the library space as theirs through their words. In contrast to the earlier celebrated push for depth and intimacy, this is an example of a mass creative involvement made easy and which has a value not only because of its simplicity but because it was

devised to form a tangible transformation of place. It was essential to the spirit of the endeavour that authorship for the work was shared, with each contributor credited in the way they wanted to be. The light touch impact in the library demonstrates the potential of agency and the reward was quickly apparent (unlike many of the outputs of placemaking). As the poem itself recounts:
"Altogether we are playing with the set ways of life
To see what else can be"[38]

NOTES

[1] "Practice | Engagement" Architecture Media Politics Society, accessed May 31, 2024, https://amps-research.com/san-francisco-practice-engagement/. Original quote abridged slightly without changing meaning. Original reads: "practice is also about development of makers, community members, professionals, and citizens."
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[8] Susannah Eckersley and Helen Mears, *Toolkit on Belonging for Museum Professionals*. (Newcastle, 2022) 14.
https://eprints.ncl.ac.uk/file_store/production/285034/091A10DB-7EB0-44AE-98ED-275471280EAC.pdf
[9] Henri Lefebvre, *The Right to the City*. (Paris, 1968) https://theanarchistlibrary.org/library/henri-lefebvre-right-to-the-city#toc13
[10] Glass-House is "**a national [UK] charity dedicated to connecting people with the design of their places, and connecting design with people", who describe their online 'Chats' as** "safe spaces to ask questions, explore ideas, approaches and methods, share learning and make connections… designed to help build confidence and capacity in the sectors to engage communities in design and placemaking." **https://theglasshouse.org.uk/about-us/**
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[11] Jake Stephenson-Bartley "The Right to Shape Places" Glass-House, accessed August 13 2024,
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[12] Marco Antonsich, "Searching for Belonging – An Analytical Framework" *Geography Compass.* 4/6 (2010) 644.
[13] Note that the research explores analysis of affecting aspects for both the contributor (such as degree of autonomy, how contribution initiated or duration of involvement) and affecting aspects for the project (such as site characteristics, physical objectives of the design brief, social objectives of the brief etc). These could not be covered within the limitations of this paper.
[14] Elinor Lower for Rising Arts Agency, *Re/Imagine: Exploring the Future of Libraries* (Bristol, 2019) 4. https://www.rising.org.uk/re/portfolio-rethinking-the-future-of-libraries
[15] Aliya Douglas, speaking in Rising et al. *Libraries Reclaimed: A radical experiment empowering service users as creative agents*. (Bristol, 2021) https://www.rising.org.uk/re/portfolio-rethinking-the-future-of-libraries
[16] Eckersley, *Toolkit on Belonging,* 14. Bullet-pointing added.
[17] David Boyle and Steve Wylder, "Us and them': A mindset that has failed our communities" Local Trust, accessed September 7 2023, https://longreads.localtrust.org.uk/2021/12/10/us-and-them-a-mindset-that-has-failed-our-communities/
[18] Rising Arts Agency, *My Library My Space: Evaluation Report* (Bristol, 2021) 14. https://www.rising.org.uk/re/portfolio-rethinking-the-future-of-libraries
[19] Scan these QR codes to access video content for the Maindee Library+ and My Library My Space initiatives:

[20] See. https://www.youtube.com/watch?v=f5bf6ajQEyY
[21] Essex, *Thinking Beyond,* 12.
[22] Sarah Hollingworth in George Lovesmith & M Miah, *Beyond Lending* (2018) https://vimeo.com/285528440
[23] Ruth Essex and Chris Coppock, *Thinking Beyond the Snowline* (Cardiff, Arts Council Wales, 2019) 12. https://arts.wales/sites/default/files/2020-02/Thinking%20Beyond%20the%20Snowline.pdf
[24] Aled Singleton, "The Push and Pull of Place" Maindee Unlimited, accessed January 12, 2024, https://www.maindee.org/the-push-and-pull-of-place
[25] Rising, *My Library My Space,* 14.
[26] Rising, *My Library My Space,* 16.
[27] Rising et al. *Libraries Reclaimed*
[28] Sophia Harari, speaking in Rising et al. *Libraries Reclaimed*
[29] Aimee Carrillo Rowe, "Be-longing: toward a feminist politics of relation" *NWSA Journal* 17 (2), (2005) 38.
[30] Rising, *My Library My Space,* 14.
[31] "I felt safe, relaxed and connected." Valentina Paz Huxley, "…gave me encouragement in my moments of self-doubt; I really felt supported." Isabella Brunt, both speaking in Rising, *My Library My Space,* 9.
[32] Brunt, speaking in Rising, *My Library My Space,* 9.
[33] Whilst within this paper I have written about the cohort model within the Commissioning Creativity section it is equally about Power in the Hands of Community Contributors. The cohort model could work to bring contributors together around change irrespective of the creative dimensions because it was developed specifically to counter a sense of spaces, processes and institutions being unwelcoming, unappealing or out-of-touch.
[34] Douglas, speaking in Rising et al. *Libraries Reclaimed*
[35] Leeza Awojobi, speaking in Rising et al. *Libraries Reclaimed*
[36] Devised in collaboration with, and delivered by Rosie Poebright of Splash and Ripple
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BEING LIFE-WIDE: CASE STUDIES OF EMPATHY-BASED PEDAGOGY, ENHANCING LEARNING JOURNEY'S IN THE WORKPLACE

Authors:
DAVINA WHITNALL,[1] RACHEL FERGUSON,[2] LOUISA JONES,[3] AND LUCY SAUNDERS.[4]

Affiliations:
[1] UNIVERSITY OF SALFORD UNIVERSITY, UK. [2] THE MIDDLETOWN CENTRE FOR AUTISM, UK. [3] THE ROYAL MARSDEN HOSPITAL, UK. [4] KING'S COLLEGE HOSPITAL NHS FOUNDATION TRUST, UK

INTRODUCTION

This paper presents case studies of different learning environments with a focus on "life-wide" empathy-based pedagogy, enhancing learning journeys in the workplace. The examples embody the lived experience of four professional practitioners and explores the challenges, syntheses and fascinating approaches that push boundaries of both the educational and professional contexts. Moving away from the concept of learning for learning's sake, the case accounts embrace learning through life and work to facilitate learning that matters. The contextual setting of the learning is important and underpins personalised approaches that are befitting to the professional environment. The personalisation is also a lens by which we view the extent of approach and how this connects to the learner and their holistic needs. Empathy as learner, teacher and professional are critical drivers and help shape the evidence-based practice of the learning experience. Set in the environments of Academia and Healthcare, we explore approaches such as Universal Design for Learning (UDL) based on the CAST model[1] and both learner and teacher experiences of Empathy-based Pedagogy (EBP).[2] In the context of work-based learning, the journeys of empathy-based proactive practitioners are unpacked providing a snapshot of learning experiences, explorative learning. Navigating the blurred lines of "Learning. Life. Work." form key concepts in the reflections of the practice-based approaches. The presenters and case studies demonstrate examples of these 'messy' spaces and moving across boundaries, embracing challenges and developing approaches to structure the learning to enhance development that's "life-wide" as well as skills for life in the workplace.

This paper is an expansion of the conference presentation[3] with further reflections unpacking our process and case study development, highlighting the ways of working together as learners and a practitioner community to explore empathy in learning, working and life. Recognising that the learning journey is not simple or isolated but complex and engrained, we embrace the "messy space" not as a barrier to learning and teaching but as an integral part of it. We present our reflections of the Lived Experience as characterised by Frechette as "being-in-the-world" and "meaningful totalities out of scattered events"[4] as students, teachers and practitioners.

IMMERSIVE CASE STUDIES OF CONTEXT AND CONNECTION

The case different learning environments explored in Academia and Healthcare are King's College Hospital NHS Foundation Trust, The Royal Marsden Hospital, The Middletown Centre for Autism and The University of Salford. These environments are both places for learning and working, places of life, research, and teaching. The separation between life and work are increasingly blurred and impacts not just how learning happens, but also how learners engage. The Lived Experience is central to each of the case studies and brings the examples together across different working and learning environments, with focus on:

1. The impact of empathy and compassionate pedagogies in workplace.
2. The collective experience of practitioners as learners and the journey to shape and influence our learning and teaching practice.

EMPATHY IN THE CONTEXT OF WORK-BASED LEARNING

Starting with the impact of empathy and compassionate pedagogies in workplace, we identified that this was a common driver across our collective environments. In exploring the effect of empathy more widely, a critical review of the literature reveals that empathy is central in disciplines such as drama and the arts and a strong predictor of desirable academic outcomes according to the research[5] It's seen as an enabler, serving as the pathway to perceive and accurately express emotion to better understand context to facilitate thought, self-correction, and growth. Zhou advocates empathy in teaching by drawing from the disciplines of psychology and social neuroscience, suggesting that empathetic tutors prepare students for the "world outside." Furthermore, Empathic Teaching helps learners to forge an emerging sense of future professional identity, an important attribute in the workplace and critical in healthcare and educational environments. Through this research it's possible to see how empathy-based teaching supports the learning journey across a range of disciplines and settings but how does this specifically facilitate learning between the teacher and student?

The social-emotional competence of teachers is a crucial factor influencing the quality of student outcomes and experiences, according to Aldrup et al., and highlight the correlation between a teacher's empathy and the effectiveness of their teaching methods[6] In their systematic review of the association between teacher empathy and teacher-student interactions and student outcomes; the research suggests that empathy appears to be a particularly promising determinant for explaining high-quality teacher-student interactions, especially emotional support for students and, in turn, positive student development. Additional workplace benefits also suggest that empathic behaviour can support higher productivity, a stronger workplace culture, and better organisational health in the workplace as reported in the Mackinsey Podcast "It's cool to be kind: The value of empathy at work."[7] Whereby, employees who believe their organisations are empathic tend to report less burnout and stress-related illnesses, emphasising the wellbeing benefits of taking an empathetic approach.

With these positives in mind, can empathy and compassion be developed or cultivated? Recent research in the field of neuroscience shows that compassion is a state that can be intentionally cultivated through practice. "Compassion training,"[8] facilitates opportunity to increase awareness of Lived Experiences and to focus on the experiences teachers are facing in their own context and can help to develop compassion. By reflecting on specific incidents that trigger automatic stress reactions, strategies can be developed according to Jennings and Min. This model is positioned as sustainable, helping professionals who work with people exposed to trauma as well as supporting own wellbeing as a critical component of professional learning. Furthermore, recognising the changing demands teachers face of trauma and emotional burden and intentionally expanding the time teachers can do this work is also apparent.

Appreciating the place of empathy as part of the learning process, as a group of practitioners, we came together as a community through a shared learning experience ourselves which offered us a unique insight into our practice as teachers by also being learners. As part of this process, each practitioner shared their aims as a teacher and lived experience as a learner. This helped each of us to develop an approach that was contextually relevant and drew on the two common approaches of UDL and EBP. We used Observation of Teaching (OoT) as a method of reflection and evaluation through sharing and supporting each other by regularly connecting as a group and then as a Community of Practice (CoP).

*Figure 1. Connections of the framework used to develop and explore the lived experience case studies. *Indicates the poignant intersections with our lived experiences.*

Each of the case studies contains four common elements: UDL, Practitioners as learners, The Workplace and Empathy. These are the common features and connections expressed through all four case studies.

CASE STUDY 1: EVIDENCE-BASED APPROACH - SENSORY DIFFERENCES IN THE CLASSROOM ENVIRONMENT

Lead: Rachel Ferguson, Researcher at The Middletown Centre for Autism

In the first case study, we explore an evidence-based approach focusing on sensory differences in the classroom environment. Rachel, the lead of this study, employed an approach that was deeply rooted in evidence and resonated through the learning materials, in both the presentation format and the use of evidence to shape and influence thinking. Rachel led by example, modelling the expectations she had set. She drew from a rich tapestry of resources, including practice, publications, and practical knowledge, which were all underpinned by her lived experiences. In her delivery of teaching under the banner of "Learning. Life. Work." Rachel showcased her ability to model and illustrate the desired practice. She did this by weaving together relevant imagery to further the learning process; the choice of colours, background, and uncluttered slides were all carefully curated to support students with neurodiverse needs. Rachel's approach was not just based on her experiences but was also deeply rooted in evidence, including her research on Autism and managing anxiety.[9] This case study serves as a testament to the power of an evidence-based approach in creating an inclusive and effective learning environment.

Figure 2. Case Study 1: Learning from practice

CASE STUDY 2: EXPLORING THE LANGUAGES OF LEARNING – INTRODUCTION TO CRANIAL NERVES

Lead: Louisa Jones, Lecturer Practitioner at Royal Marsden Hospital

In the second case study, we delve into the exploration of the languages of learning, with a specific focus on the introduction to Cranial nerves. The lead of this study, Louisa, demonstrated her ability to deliver complex concepts through three distinct language formats - visual, written, and audible. Louisa's approach catered to different learning styles and preferences. She used visual language, which included the use of diagrams and other visual aids, written language that provided detailed explanations, and audible language that added increased understanding through an auditory dimension to the learning experience. In her "Learning. Life. Work." teaching delivery, Louisa made effective use of technology and media. This included the use of YouTube videos that served multiple purposes - they explained and explored the concepts, provided background information, and highlighted the importance of the learning material. One of the standout aspects of Louisa's approach was her use of clear diagrams and mnemonics to remember the 12 cranial nerves. These resources were carefully curated and developed to maximise learning in the time available. Despite the complexity of the subject matter, Louisa's approach ensured that the learning curve didn't feel too steep from a student's perspective. This case study underscores the effectiveness of using multiple language formats in teaching complex concepts.

Figure 3. Case Study 2: Unpacking complexity through use of language

CASE STUDY 3: SCAFFOLDING THE LEARNING AS A PROCESS – NEWBORN SCREENING EXAMINATION OF THE EYES (NIPE)

Lead: Lucy Saunders, Midwifery Practice Facilitator, King's College Hospital NHS Foundation Trust

In the third case study, we examine the process of scaffolding the learning journey, with a focus on the Newborn screening examination of the eyes (NIPE). Lucy, the lead of this study, employed a unique approach to scaffolding, which she referred to as the four "C's": Connections, Constructive alignment, Continuity, and Challenging assumptions for clarity. Lucy's teaching delivery, under the banner of "Learning. Life. Work." was a meticulously planned process. The learning journey began even before the scheduled lesson, with pre-work assigned to the students. Lucy made sure to establish how this pre-work connected with the learning session right at the start, ensuring a seamless transition for the students. She used constructive alignment in the development of the resources, creating a coherent learning journey from the pre-work phase, through the in-session phase, and finally to the end. This approach ensured continuity with other sessions and built upon the students' prior knowledge. Lucy also made it a point to challenge assumptions for clarity. She did this by asking questions throughout the session to check the students' knowledge. This use of examples and the question-and-answer technique kept the students engaged and ensured a thorough understanding of the concepts. One of the key aspects of Lucy's approach was her ability to unpack the "what, why, and how" of the subject matter. She revisited these aspects throughout the narrative and in concluding towards the end, ensured that the students had a comprehensive understanding of the topic. This case study highlights the effectiveness of scaffolding the learning process in teaching complex concepts.

Figure 4. Case Study 3: Scaffolding the journey

CASE STUDY 4: CREATING SAFE SPACES FOR LEARNING – THE BENEFITS OF MENTORING

Lead: Davina Whitnall, Equality and Diversity Lead for the Learning Teaching Enhancement Centre at The University of Salford.

In the fourth and final case study, Davina reflects on the creation of 'safe spaces' for learning, with a particular focus on the benefits of mentoring. This case study explores the creation of a safe space for learning during a session on mentoring and the development of these safe spaces rooted in trust and authenticity. In Davina's "Learning. Life. Work." teaching delivery, the priority is the facilitation of safe spaces to empower learners. There are clear rules of engagement, emphasising that the learning environment was a safe space where confidentiality was maintained, all voices were heard, and all views were respected. It enabled opportunities for learners to provide feedback or contribute anonymously, for instance, through a Padlet rather than a Teams or Zoom chat. This ensured that all learners, regardless of their comfort level with public speaking or sharing, had an opportunity to contribute to the learning process. Authenticity was another key aspect of approach, leaning into vulnerability and sharing lived experiences. This case study underscores the importance of creating "safe spaces" for learning and the benefits of fostering such environments.

Figure 5. Case Study 4: Creating a 'safe space'

Reflections on the 'life-wide' approach – case studies, empathy and UDL

In learning and teaching, empathy plays a pivotal role but how does it manifest in professional environments? The application UDL and the incorporation of both learner and teacher's lived experiences through EBP may facilitate this. We embarked on a journey where four distinct examples of practice were shared across four different environments and through a group model of peer observation, allowed us to delve into the practical aspects of empathy in teaching. Integral to this process was the sharing of individual aims and experiences, each practitioner brought their unique objectives as a teacher, coupled with their personal experiences as a learner. This sharing not only fostered a sense of support but also served as a rich source of insights and perspective. Drawing from these shared experiences and the collective learning of the group, we were able to develop an approach that was contextually relevant. This approach was firmly rooted in two common methodologies - UDL and EBP; by intertwining these methodologies with our shared experiences, we were able to create a teaching and learning environment that was not only effective but also empathetic. Reflecting on the key takeaways from the case studies, it's evident that each one adopted a different approach to support "Learning. Life. Work." in the professional learning environment:

1. The first case study highlighted the importance of modelling exemplar practice. It demonstrated the power of leading by example and using evidence-based approaches to shape and influence learning.
2. The second case study underscored the utility of language in its various forms - visual, written, and audible. This multi-faceted approach made learning memorable and facilitated the understanding of complex concepts.
3. The third case study explored the effectiveness of scaffolding the learning. It presented learning as a process with clear connections and constructive alignment, thereby creating a coherent and effective learning journey.
4. The fourth case study emphasized the significance of creating a safe space for learning. Such an environment encouraging sharing and supporting, fostering a sense of trust and mutual respect among learners.

These case studies collectively provide valuable insights into the diverse strategies that can be employed to enhance learning in a professional environment. They also represent much more in the value that they've brought to us as a group, for example unifying our knowledge, the use of peer observation and development of confidence in our practices. Some of our personal reflections include:

Micro-teach: A personal reflection – case study 3:

"Our group model of peer observation allowed us to explore and reflect on empathy in teaching. This was particularly insightful due to our diverse lived experiences within education, the learning environments we operate within and the learners we support. My microteach on 'Newborn screening-Examination of the eye (NIPE)' showcased the effectiveness of 'scaffolding the learning' in promoting constructive alignment to create a coherent and effective learning journey."

Impact and action beyond the activity: A personal reflection – case study 4:

"Inspired by the contextual approach of reflection in the workplace and further exploring similar approaches such as John Driscoll's reflective approach for health care professionals.[10] I felt compelled to adapt this approach and to create a personal and contextualised model 'ROSIE' (Recall, Observation, Situation, Impact, and Evidence) that I regularly use to support own reflection and focus following on from this experience."

CONCLUSION

We have explored "Learning. Life. Work." through a variety of lenses, applying it across diverse workplaces and learning environments. These environments are not just places of work, but also places of life, where the learning journey is complex and deeply ingrained, rather than simple or isolated. Through these case studies, we have shared our reflections on using an EBP approach rooted in our lived experiences as students, teachers and practitioners. We have also highlighted the importance of sharing practices within a supportive community that we've developed as learners. This community has not only enriched our learning experiences but has also significantly enhanced our practice as teachers, and underscores the interconnectedness of learning, life, and work, and the profound impact they have on each other.

In conclusion, the exploration of "Learning. Life. Work." in the professional learning environment has provided valuable insights into effective learning strategies, contributing to enhanced and contextual understanding of EBP. Across all four case studies key learning has emerged, the importance of modelling exemplar practice, the utility of language in its various forms, the effectiveness of scaffolding the learning and the significance of creating a safe space for learning. Each case study collectively illustrates that effective learning in a professional environment is a multifaceted process with empathy at its core and unifying activities through a universal design approach makes learning better for everyone. It requires a combination of strong role models, diverse communication strategies, structured guidance, and a supportive learning environment. The elements, when integrated effectively, can facilitate a rich and rewarding learning experience that prepares individuals for life and work and connects the journeys of learners, teachers and practitioners in the workplace environment. This exploration and reflection serves as a foundation for possible future research and practice through the lens of "Learning. Life. Work."

NOTES

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OFF-GRID SOLAR-POWERED ELECTRIC VEHICLE (EV) CHARGING STATION – A DESIGN-BUILD PROJECT

Authors:
SHANNON CASEBEER, DEREK CLEMENTS

Affiliation:
KANSAS STATE UNIVERSITY, USA

INTRODUCTION AND OVERVIEW

As fossil fuel resources continue to deplete, the United States has begun the shift to alternative powered automobiles with electric vehicles (EVs) estimated to constitute 40% of vehicle sales by 2030.[1] Kansas State University (K-State) is working to find ways to make its campus more sustainable including establishing infrastructure to serve EVs with the majority of faculty and students favoring installation of more EV charging stations on campus.[2]

Students in the GE Johnson Department of Architectural Engineering and Construction Science pursue their undergraduate degrees to work professionally as architectural engineers or construction managers. As an undergraduate research project, selected students representing these two disciplines worked together in a design-build format to conceptualize, design and construct a solar-powered, EV-charging station on the K-State campus. Student researchers were guided by engineering and construction management faculty who supervised their efforts.

Development of Modular, Affordable, Off-Grid, Solar Charging Station

As a first step in the design process, a programming session was conducted with faculty and students to set key goals for the project. The vision was to create an off-grid, sustainable charging station suitable for places like universities, offices, or shopping areas where EVs park for extended periods. As such, this station was designed for slow charging to provide top-off in lieu of full recharges of depleted EVs.

Another project requirement included developing a modular design, allowing for flexibility in accommodating varying numbers of EVs, different parking configurations and the ability to connect to the power grid at the end user's discretion. Students explored various parking lot scenarios such as curb islands, end-of-row zones, and perimeters, creating drawings of these scenarios to understand the challenges in each application.

While designed to function independently from the power grid, provisions were made for potential grid connectivity. Even if connected to the grid, the utilization of solar power mitigates the strain on the utility grid during peak hours.[3] While the on-campus prototype charging station was conceived to be free to use for K-State students and faculty, the researchers' design also considered revenue generation capability for other owners.

The students conducted preliminary market research to determine the uniqueness of their off-grid EV charging system. Their findings suggested that, although solar canopies and EV stations are common,

a unified system providing off-grid charging is not. They identified three such existing systems that emphasized portability and easy installation, albeit with significant upfront costs. Therefore, the design team concentrated on devising an affordable, versatile alternative.

Design-Build Project Delivery and Collaboration Across Disciplines

The concept of design-build project delivery merges design and construction services under one responsible entity, offering these combined services to an owner via a sole contract with terms specific to the approach of design-build. This method stands in contrast to the traditional design-bid-build approach, where owners contract design and construction services separately. According to the Design-Build Institute of America, "design-build is more than a sole-source contract… It is intended to be a highly collaborative, fully integrated undertaking that is built on trust, mutual respect, teamwork, innovation and creative problem solving. Design-build works best when everybody makes the mental shift to think and act as a single entity focused on achieving shared project goals."[4]

It was with this mindset that the students were guided in their work. As the students in our department are emerging professionals representing the two disciplines of architectural engineering (ARE) and construction science and management (CNSM), this research project strove to emulate a design-build project to the extent practical by having these students collaborate during the process to help them understand what work and challenges each side faced while striving towards a common goal.

INITIAL DESIGN

The initial site considered for the charging station was an open parking lot on the campus periphery. A geotechnical report providing insight into sub-surface soil conditions was used to evaluate foundation types that would satisfy the uplift and overturning stresses stemming from the wind loads across the surface area of the solar panel array. Constructability concerns and OSHA excavation safety restrictions were also considered by the team. An augered, cylindrical, cast-in-place concrete pier design was selected with the intent of being installed using readily available rental equipment.

Primary Column and PV Array Canopy Structure

The original design featured a metal canopy cantilevering out over two parking stalls to support solar panels, while also offering shade for parked cars. Square HSS and round pipe were considered for the primary vertical column and both aluminum and steel members were analyzed for the horizontal array support. Again, constructability and safety during installation were discussed at length by the team including an analysis of the labor and equipment necessary to erect the structure. Steel was ultimately selected for use in the horizontal cantilevered frames and square HSS for the primary column. However, the weight of the frames paired with the solar panels resulted in substantial stress at the connection points, leading to high fabrication costs and eventually necessitating a redesign of the station's structure.

Electrical Systems Design

There are three primary types of electric vehicle (EV) chargers: Level 1, Level 2, and DC Fast Charging. Table 1 summarizes the power requirements and approximate range added to EVs charging at each respective level.[5]

Charger Type	Voltage	Power Output	Range per Hour
Level 1	120V, Single-Phase AC	1.2kW-1.4kW	3-4 miles
Level 2	208-240V, Single-Phase AC	2.5kW-6.6kW	10-20 miles
DC Fast Charging	400V-1000V DC	50kW or more	150 miles or more

Table 1. EV Charging Types

The original design focused on Level 1 chargers due to their lower power needs, allowing for a smaller solar array. However, Level 1 chargers require users to provide their own charging cable to plug into standard NEMA 5-15 or 5-20 outlets, limiting the accessibility of the system. On the opposite end of the spectrum, the high-power requirements of DC Fast Charging provide quick charging, however the solar array would need to be more than forty times bigger compared to a Level 1 charger to deliver adequate power. Therefore, a Level 2 charger at the lower end of its power output was chosen to ensure the PV array could supply the necessary power.

The typical commute for American workers is 13.6 miles, and approximately 95% of single-trip journeys are within a 30-mile range.[6] Considering these statistics, the team set a goal for the solar array to generate enough energy to cover a 30-mile driving distance daily. Additionally, they designed the battery storage capacity to sustain this 30-mile range, ensuring vehicles can be charged even in cloudy conditions.

The team evaluated multiple options in battery technology to identify the best solution, focusing mainly on lead-acid and lithium-ion batteries. Lithium-ion was deemed the optimal solution due to its high-energy density, deep discharge capability, and longevity.[7] However, early in the design phase, these batteries commanded a premium price. With a focus on reducing overall costs, lead-acid batteries became the basis of design. Ultimately, this changed in the final design as lithium-ion batteries became more affordable.

PRECONSTRUCTION SERVICES

Design-build project delivery typically includes providing preconstruction services during the design phase to support and enhance team efforts and optimize efficiency. A core preconstruction service includes preliminary cost estimating to inform the team whether design efforts are staying on budget.[8] As the ARE students worked through schematic design solutions that considered various foundation and upper structure options, the CNSM students performed iterative cost estimates for both the charging station as well as a wooden mock-up. Other preconstruction services performed included constructability reviews for equipment and labor needs and procurement lead time evaluation. Subcontractor involvement was also discussed to understand what scopes would require trade partner assistance, and safety was considered for when workers would perform the installation. All student participants benefited from these preconstruction efforts as the process helped both groups understand what each discipline viewed as important in the success of the project.

MOCK-UP CONSTRUCTION & DESIGN EVALUATION

After establishing the initial design, the team built a mockup to evaluate its constructability and functionality, with the goals of gauging the size, comprehending construction methods and evaluating the performance of electrical components. The mockup was constructed using wood to approximate the design of the intended metal structure. Initially designed to span two parking spaces as shown in Figure 1, the mockup was instead constructed for a single space to reduce expenses. During construction of the mockup, the team discovered a miscalculation in the spacing distance required

between panels to avoid shading; initially configured with six rows of panels, the design decreased to four, resulting in a one-third reduction in power capacity.

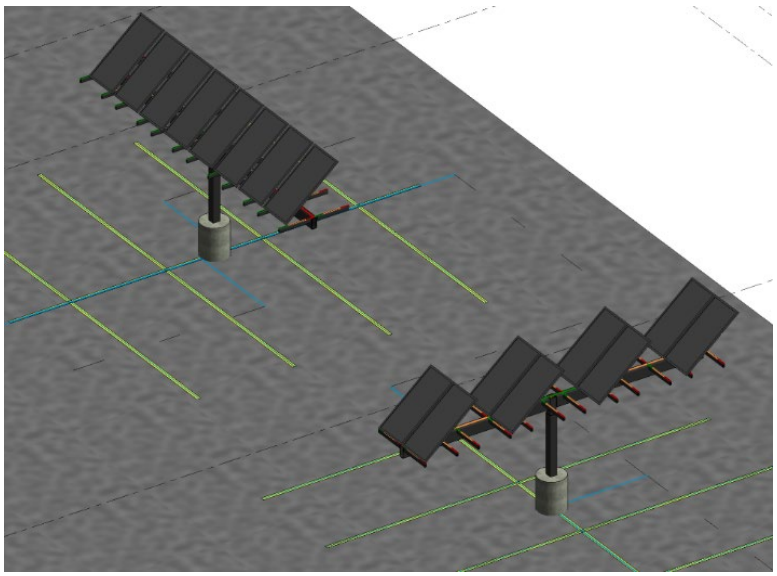

Figure 43. Initial Design Rendering

The charge controller and inverter featured Bluetooth connectivity, allowing for monitoring solar panel production, power output, and battery charge status. Students tested the system weekly, monitoring real-time data and observing variations in power generation due to environmental changes like cloud cover, dirty panels, or reorientation of the array when the mockup was moved. This offered an immersive learning experience beyond a classroom setting.

EVALUATIONS OF INITIAL DESIGN AND THE NEED FOR REDESIGN

While creating the mockup, the construction students tracked cost estimates for the final design and identified that the structure was the primary expense. Its fabrication complexity and labor-intensive installation had pushed the design over budget. Moreover, the augered pier was beyond what standard rental drilling equipment could perform. These factors and the reduction to two rows of panels, convinced the team that they needed to reimagine their design.

As the students began to rework the station's structural design, meetings were initiated with the campus authorities having jurisdiction (AHJs) including the College of Engineering, University Facilities and Parking Services. These entities were supportive of the project, but Parking dictated that the project be relocated to a new site near the campus art museum for improved visibility to prospective users and campus visitors.

Structural and Electrical Systems Redesign

In analyzing the overturning loads of the original design, the required depth of the augered concrete pier exceeded what could be drilled with commonly available equipment and the expense of mobilizing a larger drill rig drove the students to pursue another foundation solution. As they examined a monolithic concrete footing, OSHA regulations for excavation depth were an important consideration for worker safety during forming and reinforcing of the concrete.[9] To eliminate the need for shoring or benching, a maximum in-ground depth of 4’ was established and the footprint of the foundation was adjusted until the size was adequate for soil bearing and resistance of overturning.

Now that the students understood the over-expense of their cantilevered canopy design, they opted for an off-the-shelf solution for supporting the solar panels. Their research identified several companies making array frame kits. A system manufactured by Montana Solar (MT-Solar) was selected due to its proprietary climbing collar component that allowed assembly of the array frame and solar panels at ground level followed by lifting to the final height using a chain hoist. The climbing collar dictated a change in the primary column from a square HSS to a round HSS member. The students' new design included a steel base plate on the column and attachment to the foundation via embedded anchor bolts.

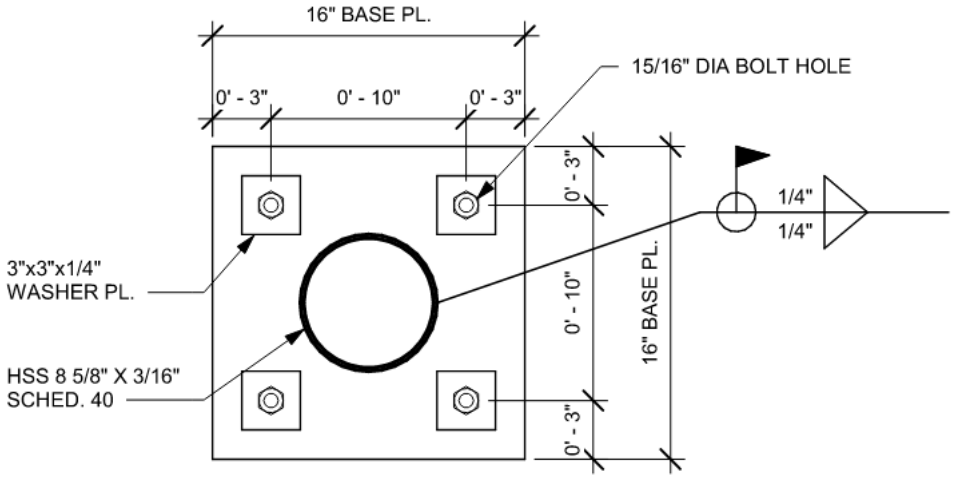

Figure 44. Baseplate Connection Detail

Another feature of the MT Solar kit was the capability of easy pitch adjustment of the array. The optimal tilt angle for solar panels changes with the seasons, with a steeper angle in winter, and a lesser angle in summer being preferable[10]. These changes, and the associated material and labor savings, brought the project's cost back in line with the original budget target.

The redesigned layout allowed for the use of ten solar panels instead of the original eight. Advances in solar technology increased the power output per panel from 370 watts in the prototype to 440 watts in the final version, which combined with the increase in the number of panels, constituted an increased power production of more than 30% compared to the original design.

Moreover, with the reduction in battery costs, what began as a lead-acid battery design transitioned to lithium-ion. The increase in power density bumped the battery capacity from 8kWh to 10.6kWh, thus enabling up to 42 miles of electric vehicle range. Additionally, this change simplified construction as the original battery system kit would have been assembled in a custom weatherproof enclosure. The new, all-in-one battery system was rated for outdoor use.

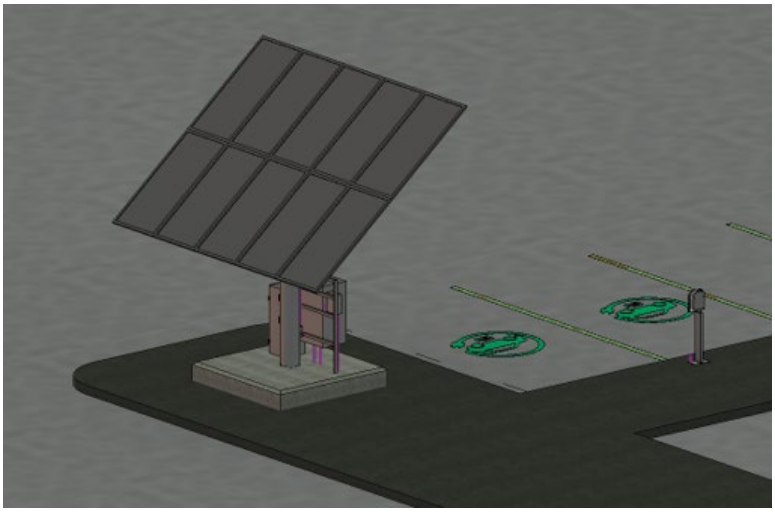

Figure 45. Rendering of Final Design

FUNDING PURSUITS

After completing the design, the team sought funding, submitting their project to the National Council of Examiners for Engineering and Surveying, earning selection as one of eight winners of their 2023 Engineering Education Awards,[11] which provided funding for 25% of the project. The team also reached out to the College of Engineering's Associate Dean for Research to help identify funding opportunities. The College was enthusiastic about the project, viewing it as in-line with their commitment to sustainability while also showcasing student work, and generously offered to fund the remaining costs.

As part of their agreement to provide funding, the College required the station to be located in the engineering parking lot, where it could be viewed by all engineering students. The team worked with Parking Services and the Division of Facilities to identify a location that would not be impacted by shade from nearby trees, would not interfere with snow removal, and would be protected from damage as much as possible.

CONSTRUCTION PHASE COMMENCES

With the station's location finalized and funding secured, the project was ready to move forward with construction of a prototype. Facilities wanted assurance that the redesign of the station's structure was adequate for the various loads and local weather conditions. They engaged a licensed engineering firm to review the students' design and calculations. The firm recommended increasing the size of the primary column from 8" to 10" in diameter, however the upsize was not compatible with the selected array frame kit's climbing collar. A compromise was reached by embedding a longer 8" column deep into the foundation instead of using a base plate and anchor bolts.

At the project's onset, it was intended that the students perform both design and construction of the station. Although it would have been possible to perform the procurement and installation solely through student efforts, Facilities had concerns about safety, liability and schedule. As such, they mandated that a local, licensed and insured prime contractor be secured under contract for their services which included purchasing and oversight by a project manager and onsite supervisor.

An electrical subcontractor was also hired to oversee the installation of all electrical components. The plan was for students to work side by side with the subcontractor to install the electrical components. However, due to procurement delays, other than installation of the solar panels, much of the electrical

work was completed after students left campus for the summer, so students missed the opportunity to be involved in the power conversion installation aspects.

Foundation Placement and Panel Assembly

From the student's simplified design and constructability considerations, a small excavator was able dig the foundation's footprint. Formwork and installation of reinforcing steel followed. The fully embedded column was braced into plumb position and electrical conduits were strategically placed within the formwork, allowing the station's concrete footing to be poured.

Once the foundation and primary column were installed, the team began assembly of the upper array frame and installation of the solar panels. The MT-Solar kit's design allowed safe and efficient assembly of the panel array by the students and contractor's crew working jointly while standing at ground level. Once completed, the array was hoisted into position at the top of the primary column and the climbing collar was secured to prevent any vertical or rotational movement. The array's pitch was adjusted using an inclinometer to 39 degrees which the student's design had determined as optimal for the station's geographic location.

PROJECT CHALLENGES AND SOLUTIONS

As any practicing design or construction professional soon learns, projects don't always proceed exactly as planned. As construction of the prototype got underway, the students were able to experience how issues arise and how a collaborative team can work together to find solutions that keep the project moving forward.

Solar Panel Revision

The selected solar panels went out of stock shortly before the contractor could order them. To maintain the schedule, a new panel was selected. However, the length of the new panel increased by 10". Larger panels meant that previously ordered support rails were now too short. This wasn't realized until the crew began mounting panels to the support rails. Fortunately, a call to MT-Solar quickly resolved the issue with an extender kit, which arrived in days and allowed students to complete the array installation on the frame.

Vehicle and Pedestrian Safety Concerns Raised

After changing locations three times, the station's final location adjacent to the Engineering complex was dictated by the College as a condition of funding. Upon installation, it was noted that the station's array protruded over the curb island, raising concerns about potential collisions with tall vehicles and obstructing pedestrian sightlines. To address this, the orientation of the array was rotated 90 degrees to fit within the curb boundaries, shifting orientation from south to east. This change protected against impacts but reduced the station's seasonal adjustment capabilities.

Impact of vehicles into the primary column was also a concern as the fully embedded HSS pipe was not designed to break away if struck by a vehicle. Solutions that were considered included the addition of protective bollards and low masonry walls around the station's footprint. After review by an external civil engineer, the break-away concern was deemed unnecessary in the low-speed environment of the engineering complex parking lot.[12]

CONCLUSIONS/NEXT STEPS

Construction concluded and the power station became active in July of 2024. With the project operational, the team's next steps are monitoring usage, power generation and user experience, again utilizing undergraduate students.

The team discussed their missteps and improved knowledge to apply lessons learned to future efforts. The largest error was a failure to properly model the station in its final location. Since the Engineering College had provided a majority of funding, they dictated the station be placed on the tour path for prospective students. This resulted in the visibility and impact concerns that necessitated rotation of the station's array, reducing pitch-adjustment capability and diminishing performance through winter seasons. Regardless, the University is pleased with the outcome and views the project as a success. Facilities has been contacted about installation of a similar system for elsewhere on campus.

NOTES

[1] Ice, “Charging into the Future.”
[2] Robinson et al., “Business Models for Solar Powered Charging Stations to Develop Infrastructure for Electric Vehicles.”
[3] Yousif et al., “Design of PV-" Single Phase Grid " Electric Vehicle Charging System.”
[4] “What Is Design-Build? - DBIA.”
[5] Nicholas, “Estimating Electric Vehicle Charginginfrastructure Costs across majorU.S. Metropolitan Areas.”
[6] “95% Of All Trips Could Be Made In Electric Cars, Says Study.”
[7] Makola, Le Roux, and Jordaan, “Comparative Analysis of Lithium-Ion and Lead–Acid as Electrical Energy Storage Systems in a Grid-Tied Microgrid Application.”
[8] “Understanding the Benefits of Design-Build Contracts.”
[9] “Trenching and Excavation Safety.”
[10] Benghanem, “Optimization of Tilt Angle for Solar Panel.”
[11] Goodenow, “Marquette University Wins 2023 NCEES Engineering Education Award.Pdf.”
[12] “Roadside Design Guide 4th Edition.”

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Makola, Cry S., Peet F. Le Roux, and Jaco A. Jordaan. “Comparative Analysis of Lithium-Ion and Lead–Acid as Electrical Energy Storage Systems in a Grid-Tied Microgrid Application.” *Applied Sciences* 13, no. 5 (February 28, 2023): 3137. https://doi.org/10.3390/app13053137.

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A PROCESS-ORIENTED DESIGN FRAMEWORK FOR CREATING EMBODIED LEARNING EXPERIENCES

Author:
MIN LIU

Affiliation:
THE OHIO STATE UNIVERSITY, USA

INTRODUCTION

Today in the world of exhibition design, designers are challenged to leverage technologies to enhance educational experiences by incorporating embodied learning possibilities. This research introduces a conceptual, process-oriented framework to guide designers and educators in creating effective learning experiences to deliver on learning objectives. This framework is inspired by existing embodied learning models and structured within the Double Diamond design process.[1] It was further tested and refined through two design applications using a research-through-design approach.[2] The full research project, along with the downloadable framework, is documented on the website.[3]

EMBODIED LEARNING AND DESIGN CHALLENGES

Embodied learning is an emerging pedagogical approach that emphasizes non-mental factors involved in learning, such as the body, feelings, emotions, and physical actions. Rooted in the concept of embodied cognition, it posits that our bodies significantly influence our minds. Cognition is grounded in our interactions with the environment and culture, tied to our sensory and motor systems. Unlike the passive learning mode of traditional classrooms, where students sit and listen, embodied learning encourages active sense-making through physical engagement. It recognizes the relationship between body and mind and leverages the innate, autonomous competence of learners. By making learning a part of the way people understand and interact with the world, this approach enhances learners' motivation, engagement, understanding, and memory.[4]

Informal learning sites, such as museums and aquariums, offer fertile ground for embodied learning experiences. These environments allow visitors to move freely, interact with educational exhibits, and learn through various sensory and motor interactions. By integrating digital technologies, such as sound terminals, projections, and extended reality, these settings can provide richer multisensory and immersive experiences and encourage varies modes of embodied interactions, significantly enhancing participants' learning and engagement. However, while many educational games and simulations within these environments have considered bodily and sensory forms of engagement, there is often a distance between the outcomes of embodied sensemaking and the educational objectives.[5] It's challenging for designers to create technology-enhanced learning experiences that effectively align with learning objectives through an embodied approach.

One of the key obstacles for designers is converting the theoretical concepts of embodied cognition into effective, practical design strategies that can be implemented in educational settings and tailored

to specific educational topics and content.[6] Additionally, the success of these educational practices requires designers to collaborate with educators, technologists, and curators to align the design vision with educational goals, venue capabilities, and technical possibilities.

To address these challenges, this research explores the development of a design framework and tools to facilitate the creation of embodied learning solutions. Through secondary research, we found that most existing frameworks related to embodied learning focused on taxonomies. This reveals an opportunity to create a process-oriented design framework that could offer more practical and actionable guidance for design practitioners.

DEVELOPMENT OF A NEW PROCESS-ORIENTED FRAMEWORK

Methodologies

The development of this framework is grounded in two key methodologies: translational research and research-through-design. Translational research explores embodied learning theories and principles to inform the design of educational technologies, bridging the gap between theory and practice.[7] In parallel, research-through-design identifies design challenges and outlines the problem-solving process through iterative prototyping, focusing on practical, hands-on exploration to generate new insights.

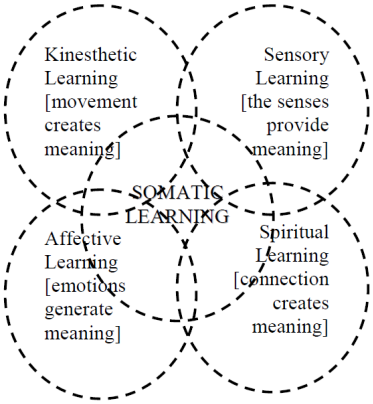
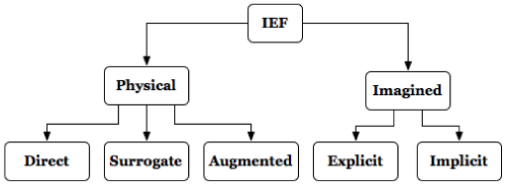
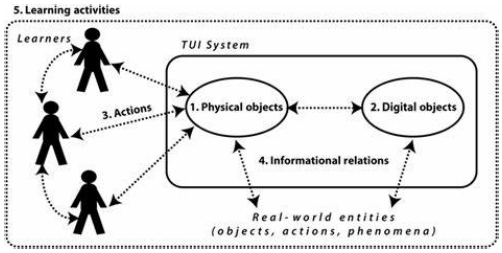
Development Process

As illustrated in Figure 1, this Design for Embodied Learning Experiences (D4E) framework draws inspiration from design considerations found in six existing frameworks related to embodied learning, design, and education. It's structured with in the Double diamond design process by the UK Design Council, which organizes design thinking into four stages: Discover, Define, Develop, and Deliver. To further test and refine this conceptual framework, we applied it in two design projects, "Sun & Earth" and "Dinosaur Explore". These applications demonstrated the framework's potential to help designers integrate embodied learning principles into their design processes.

Figure 1. Framework Development Process

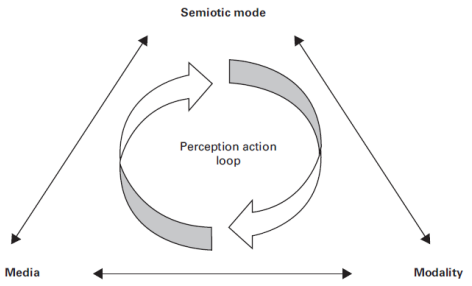
Overview of Influential Frameworks

The following table provides an overview of the six existing frameworks that informed our development of the D4E framework.

Paper Title, Author (s) and Year	Framework Name and Image	Short Description
The Body in Adult Education: Introducing a Somatic Learning Model[8] By Horst, T. (2008)	**Somatic Learning Model**  	The Somatic Learning Model identified four types of somatic learning: kinesthetic, sensory, affective, and spiritual.
Embodied Cognition and Learning Environment Design[9] By Black, J.B., Segal, A., Vitale, J. and Fadjo, C. (2012)	**Instructional Embodiment Framework**  	The Instructional Embodiment Framework describes a progression from physical enactment (Direct, Surrogate, or Augmented) to imagined embodiment, culminating in tasks that facilitate the transfer of learned content. In other words, to ensure effective cognitive processing, learners first engage in an embodied experience, followed by learning to imagine that embodied experience. This sequential approach leverages physical actions and sensory inputs to solidify learning, which is then internalized through mental visualization.
Getting Down to Details: Using Theories of Cognition and Learning to Inform Tangible User Interface Design[10] By Antle, A. N., & Wise, A. F. (2013)	**Tangible Learning Design Framework**  	The Tangible Learning Design Framework offers a structured approach to designing Tangible User Interface (TUI) learning environments by focusing on five key elements: physical objects, digital objects, actions on objects, informational relations, and learning activities. This framework illustrates the interrelationships between these design elements, demonstrating how the design of a learning environment can influence learners' perception and actions.

<table>
<tr>
<td>Learning with the Body: A Design Framework for Embodied Learning Games and Simulations[11]

By Melcer, E. F., & Isbister, K. (2021)</td>
<td>Design Framework for Embodied Learning Games and Simulations
<table>
<tr><th>Group</th><th>Dimension</th><th colspan="5">Values</th></tr>
<tr><td rowspan="5">Physical Interaction</td><td>Physicality</td><td>Direct Embodied</td><td>Enacted</td><td>Manipulated</td><td>Surrogate</td><td>Augmented</td></tr>
<tr><td>Transforms</td><td colspan="2">PPt</td><td colspan="2">PDt</td><td>DPt</td></tr>
<tr><td>Mapping</td><td colspan="2">Discrete</td><td colspan="2">Co-located</td><td>Embedded</td></tr>
<tr><td>Correspondence</td><td colspan="2">Symbolic</td><td colspan="2">Indexical</td><td>Literal</td></tr>
<tr><td rowspan="2">Social Interaction</td><td>Mode of Play</td><td colspan="2">Individual</td><td colspan="2">Collaborative</td><td>Competitive</td></tr>
<tr><td>Coordination</td><td colspan="2">Other Player(s)</td><td colspan="2">NPC(s)</td><td>None</td></tr>
<tr><td>World</td><td>Environment</td><td colspan="2">Physical</td><td colspan="2">Mixed</td><td>Virtual</td></tr>
</table></td>
<td>This taxonomical framework described seven dimensions to categorize embodied educational games and simulations, along with corresponding design choices for each dimension.</td>
</tr>
<tr>
<td>The Need for SpEED: Reimagining Accessibility through Special Education Embodied Design. [12]

By Tancredi, S., Chen, R., Krause, C., & Siu, Y. (2022)</td>
<td>Special Education Embodied Design (SpEED)
 
</td>
<td>SpEED reimagines accessibility in educational environments by applying the principles of embodied cognition. This approach focuses on adapting instructional methods to accommodate the diverse sensorimotor abilities of learners, particularly those with special needs. SpEED is built around three key parameters: media, modalities, and semiotic modes. This model illustrates the reciprocal relations among these parameters and how learners' perceptions and actions are realized through this loop.</td>
</tr>
<tr>
<td>Understanding by Design (2nd ed.) [13]

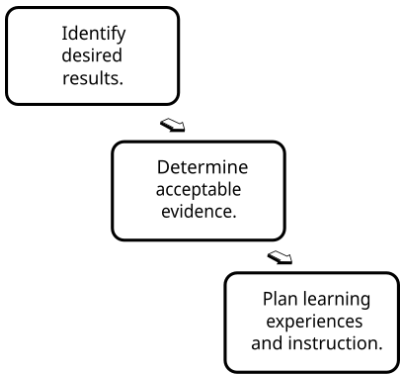
By Wiggins, G., & McTighe, J. (2005).</td>
<td>Backward Design Model
 
</td>
<td>The Backward Design Model describes a method of planning educational curriculum that begins with identifying desired learning outcomes. Educators will then work backward to create lessons and assessment to achieve the learning objectives.
This model is not specifically related to embodied learning; rather, it pertains to learning in general. However, this method is used as a foundation for our design by defining the learning objectives first and then designing the learning experience to meet these objectives effectively.</td>
</tr>
</table>

Table 1. Influential Frameworks

THE D4E FRAMEWORK

Structured within the Double Diamond design process, the D4E Framework comprises four stages: Discover, Define, Develop, and Deliver. Each stage is associated with specific design tools, as illustrated in Figure 2. Designers can use the template tools either in their digital format on FigJam or as printed physical versions.[14] The current conceptual D4E Framework focuses mainly on the Define

and Develop stages, helping designers scope the problem space and then generate and refine embodied learning solutions.

While designers are the primary users of the D4E Framework, collaboration with other stakeholders is crucial for optimal results. Table 2 identifies four key stakeholders - educator, curator, technologist, and end user - and indicates when designers should engage these stakeholders during the design process.

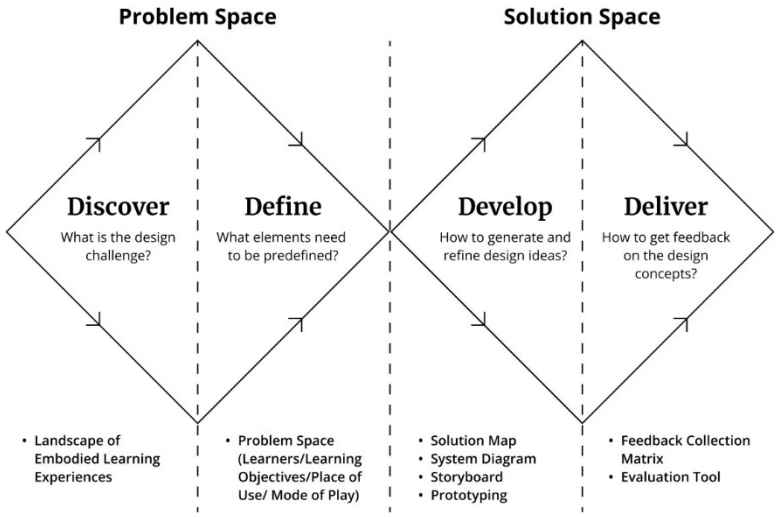


Figure 2. Four Stages of Double Diamond and Corresponding Design Tools

	Define	Develop				Deliver	
	Problem Space	Solution Map	System Diagram	Storyboard	Prototyping	Feedback Collection	Evaluation
Designer							
Educator							
Curator							
Technologist							
End User							

Table 2. Involving Different stakeholders in Design Process

Discover Stage

The primary design challenge is to create learning experiences that achieve both high levels of embodiment and strong learning outcomes (Figure 3).

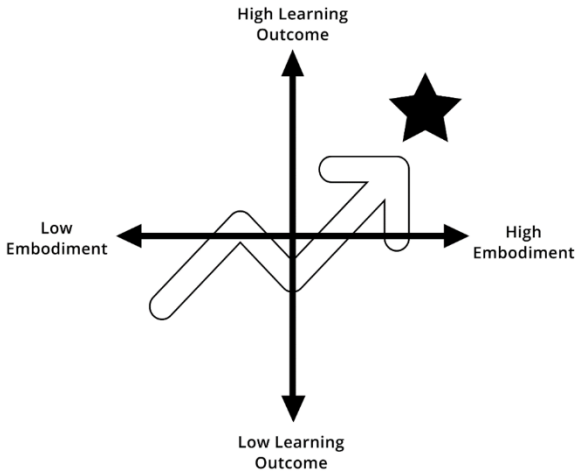


Figure 3. Landscape of Embodied Learning Experiences

Define Stage

Tool 1 – Problem Space

In the Define stage, designers use Tool 1 – Problem Space to scope the problem by defining four essential elements for the learning experience:

- **Learners:** Who are the learners? Consider age, gender, education level, learning ability, interests, needs, and expectations.
- **Place of Use**: Where does the learning activity take place? Options include home, public museums, classrooms, or other project venues.
- **Learning Objectives:** What should learners know or be able to do as the result of the learning experiences? Refer to Bloom's Taxonomy for guidance.[15]
- **Mode of Play:** What mode(s) of play are involved in the learning experience? Individual, collaborative, and/or competitive?[16]

These elements, which vary based on the specific project, will influence subsequent design decisions. Figure 4 presents the template for defining the problem space.

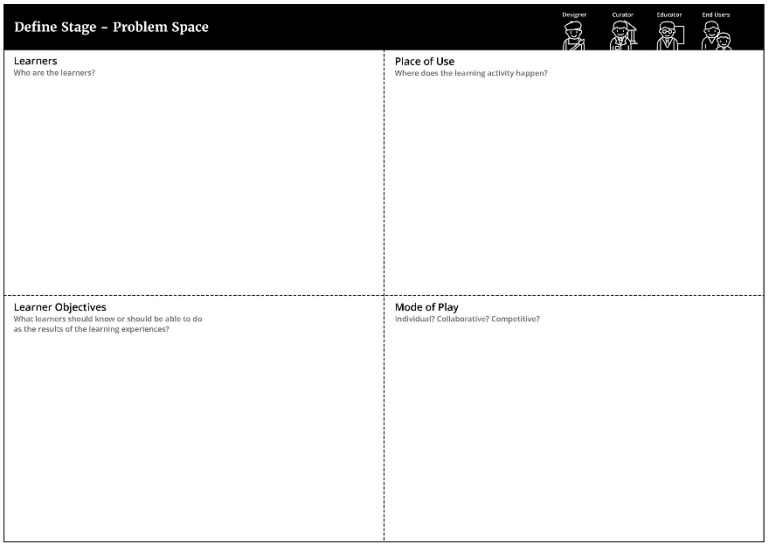


Figure 4. Problem Space

Discover Stage

Four tools are introduced in the Develop stage to help designers generate and develop design ideas.

Tool 2 – Solution Map

Using the Solution Map, designers will start to map out important design considerations for embodied solutions based on the predefined problem space:

- **Learning Concept:** What are the knowledge concepts or skills to grasp?
- **Learning Tasks:** What are the set of embodied learning tasks for reaching the defined learning goals? Consider tasks from two perspectives: physical embodiment or imagined embodiment, and types of embodiments (Surrogate, Direct, or Augmented).[17]
- **Modality:** What sensorimotor systems can be recruited to learn this knowledge? Consider different kinds of modalities such as vision, audition, touch, taste, smell, proprioception, and vestibular senses.[18]
- **Media:** What media system supports learners' perception and action in the experience? Think about media design from three aspects: input or output, digital or physical, learning concept or prompt.
- **Perception & Action:** What are the meaningful sensemaking and interaction processes to reach the learning objective?

A reference paper with terminology definitions and important diagrams (the loop of embodied meaning making, and the Bloom's Taxonomy) is also provided to help designers better use this tool. Figure 5 shows the template for the Solution Map and the reference page.

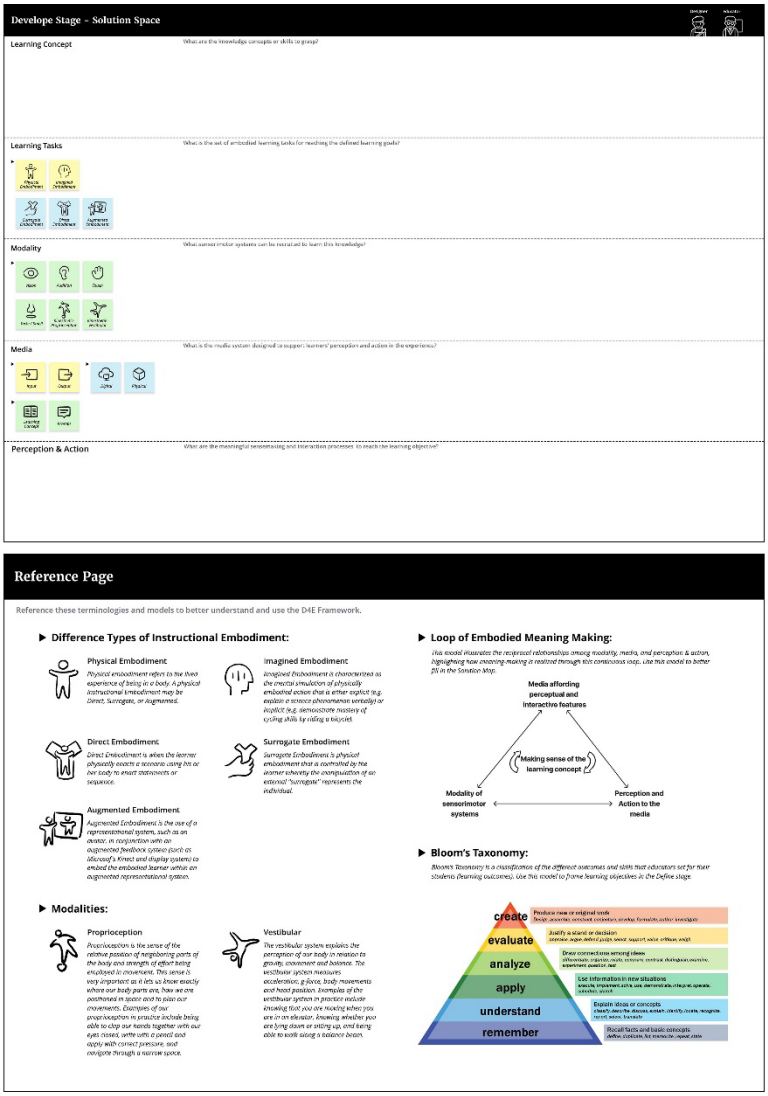


Figure 5. Reference Page & Solution Map

Tool 3 – System Diagram

After mapping out ideas through the Solution Map, designers will visualize the media system using the System Diagram template (Figure 6). The system diagram should include:

- Main components for each medium.
- Scale and spatial layout of the media system.
- Communication flows around humans and media.
- Key user scenarios.
- Potential technology to support the system.
- Technology issues to solve.

Traditional sketching methods can be time-consuming and may not fully capture complex systems, so the D4E Framework offers an alternative: using 2D/3D materials like paper shapes, wood blocks, Legos, or sandbox setups to quickly and effectively visualize system ideas.

Tool 4 – Storyboard

To detail the flow of the learning experience, designers create a storyboard from the user's perspective, based on the flow mapped in the Solution Map. The Storyboard (Figure 6) helps examine each step of the experience, identifying areas needing further development. Alternatively, design teams can act out scenarios using manipulatives to explore the user experience in depth.

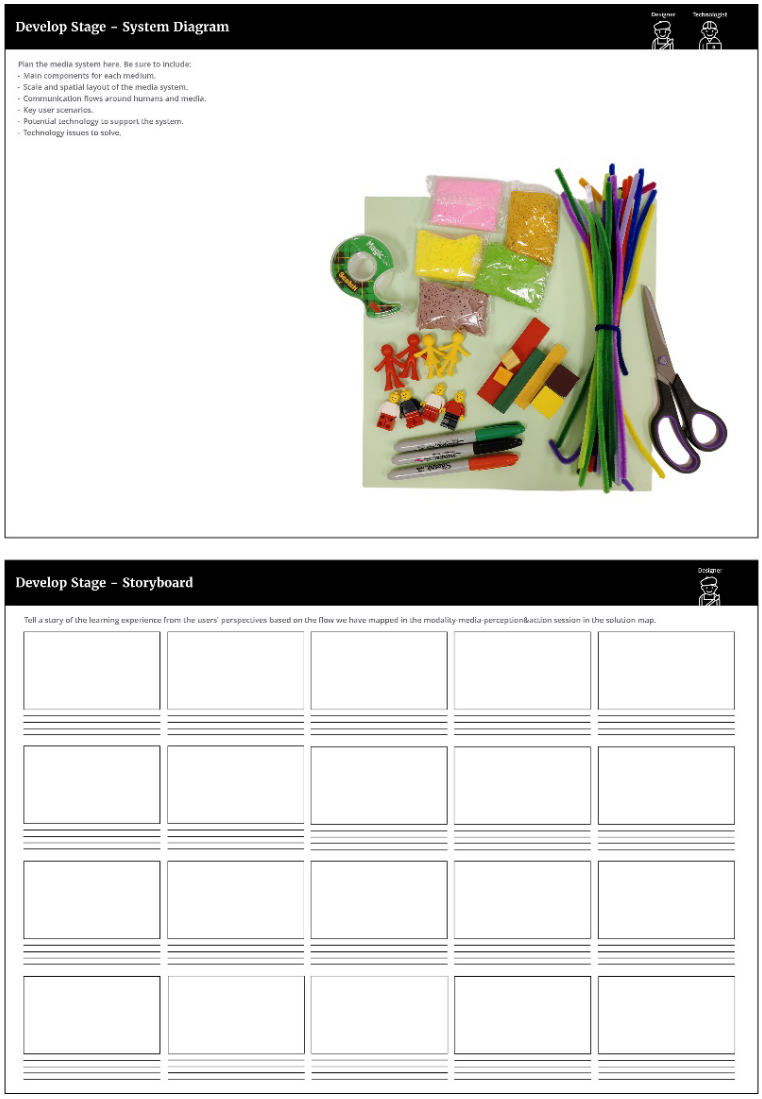


Figure 6. System Diagram & Storyboard

Tool 5 – Prototyping

The final step of the Develop stage involves creating look-and-feel prototypes to simulate how the final media system will work. Figure 7 shows different levels of prototyping, including methods for both digital and physical materials ranging from low to high fidelity. Designers will integrate insights gained from previous activities into their prototyping efforts, using various iterative approaches to refine and enhance the design.

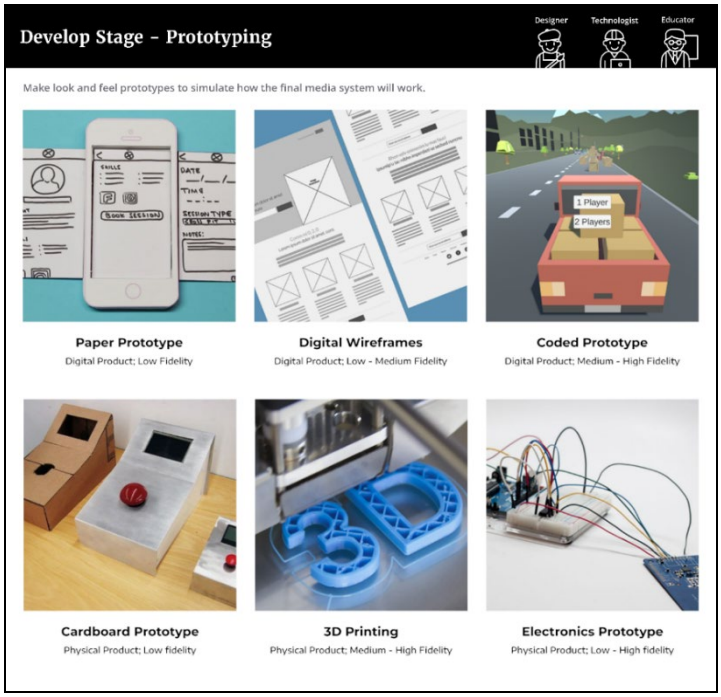


Figure 7. Prototyping

Deliver Stage

The Deliver stage focuses on gathering feedback from various stakeholders to test and refine the final design concepts. Two key tools are introduced in this stage:

Tool 6 – Feedback Collection Matrix

This matrix (Table 3) outlines how designers can present deliverables to different audiences and collect specific feedback.

Deliverable	Audience	Process	Feedback
System Diagram	Educator, Technologist, Curator	Discussion with Stakeholders: Design team presents the system diagram to other stakeholders, providing them with basic ideas for the media system design. The whole team will then have a discussion around the design concept.	Concept feasibility, Technical solutions
Story Video	Educator, Technologist, Curator	Discussion with Stakeholders: Design team presents the story video to the other stakeholders to give them a more complete picture of the learning experience to be designed from the user's perspective, followed by further discussion.	Concept feasibility
	End User	Interview with end users: Design team shows the story video to end users and asks questions in terms of their attitude, opinions, and suggestions about the design concept.	
Interactable Prototype	End User	Think aloud: Design team presents interactable prototypes to end users and asks them to use the product while describing their experience out loud. Observation: Design team shadows the users and takes notes and/or record of the user experience.	Concept feasibility, Product usability

Table 3. Feedback Collection Matrix

Tool 7 – Evaluation Tool[19]

The Evaluation Tool (Figure 8) has two components: learning outcome score and embodiment score. Designers assess each criterion on a scale of 1 to 5 based on prototype testing, culminating in final scores that reflect both learning effectiveness and the level of embodiment.

Learning Outcome Score (1-5 for each item):

- Are clear learning goals stated? (1: No idea; 3: Vaguely know; 5: Very clear.)
- Does the learning content match the knowledge concepts? (1: Not matching; 3: Partially matching; 5: Very matching.)
- Does the media system support meaningful interactions (actions) to make sense of the learning content? (1: No interaction or the interactions are not related to the learning content at all; 3. Interactions are somewhat meaningful and related to the learning content; 5. Interactions are very meaningful and related to the learning content.)
- Is there evidence of a perception - action - reflection loop with the design for both physical and imagined embodiments? (1: Only perception; 3: Perception and action; 5: Perception, action and reflection.)
- Are necessary instructions and prompts provided to guide participants through the learning activities? (1: No instructions or prompts provided; 3: Instructions and prompts are present but not well-designed; 5: Instructions and prompts are well-designed and provide smooth guidance.)

Embodiment Score (1-5 for each item):

- Is it a multisensory learning experience that enables full perception of sight, sound, and touch? (1: Involves only one sense; 3. Involves two senses; 5. Involves all three senses.)
- Does the learning activity encourage body movements? (1: No body movement; 3: Limited body movement; 5: Full body movement.)
- Is it a collaborative learning experience that encourages social interactions? (1: No collaboration; 3: Limited collaboration; 5. Full collaboration.)
- Is it a fun learning experience that fosters emotional engagement? (1: Not enjoyable; 3. Limited fun; 5. Highly enjoyable.)

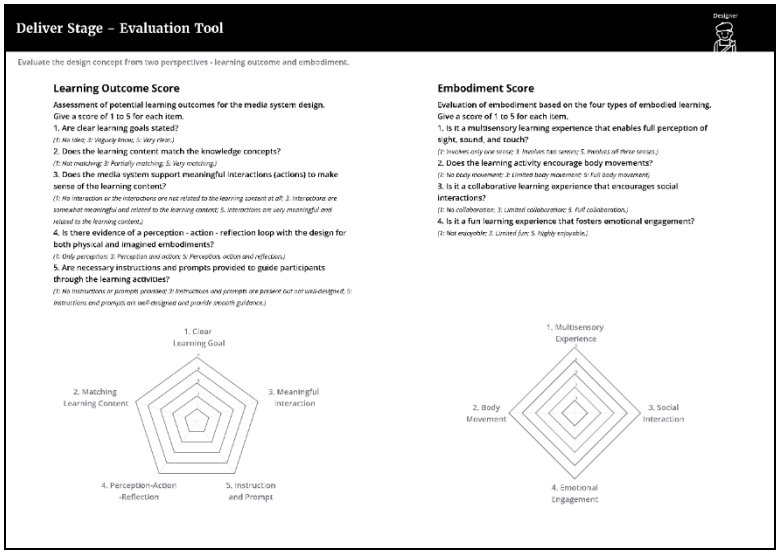


Figure 8. Evaluation Tool

DESIGN APPLICATIONS

The D4E Framework was applied to two design projects, “Sun & Earth” and “Dinosaur Explore”, to evaluate its effectiveness and refine the associated design tools.

“Sun & Earth”

This project involved the development of a home-based educational toy set, utilizing digital framework templates in Figjam (Figure 9). Guided by the Ohio Science Standards, this project targeted two key concepts: Earth's Rotation and Revolution for fifth graders and the Causes of Seasons for seventh graders, thus defining our target age groups.[20] The home environment was selected to explore the design within a familiar, small-scale context. Recognizing the importance of social interaction in embodied learning, play modes were incorporated to support both individual and collaborative engagement.

A high-fidelity prototype served as the final deliverable, featuring two main components: a physical toy set (including embedded Sun and Earth models and a capacitive touch map) and accompanying software with interactive animations and instructions. This prototype was showcased at the Hopkins Hall Gallery of The Ohio State University in April 2024. Participants engaged in three learning activities designed to teach Earth’s rotation and revolution through interactive play:

- Activity 1: Rotate a key on the globe to make the Earth spin on its axis, controlling the day-night cycle on the screen.

• Activity 2: Move the Earth model along its orbit on the map to observe changes in the month and seasonal views on the screen.
• Activity 3: Rotate an arm in front of the screen to control the Earth's orbital trajectory around the Sun and adjust the timeline to reach a specified year.
Due to time constraints and technical challenges, the learning activity related to the Causes of Seasons was deferred to future development. Similarly, the intended social interaction elements were not fully realized and will be addressed in future iterations.

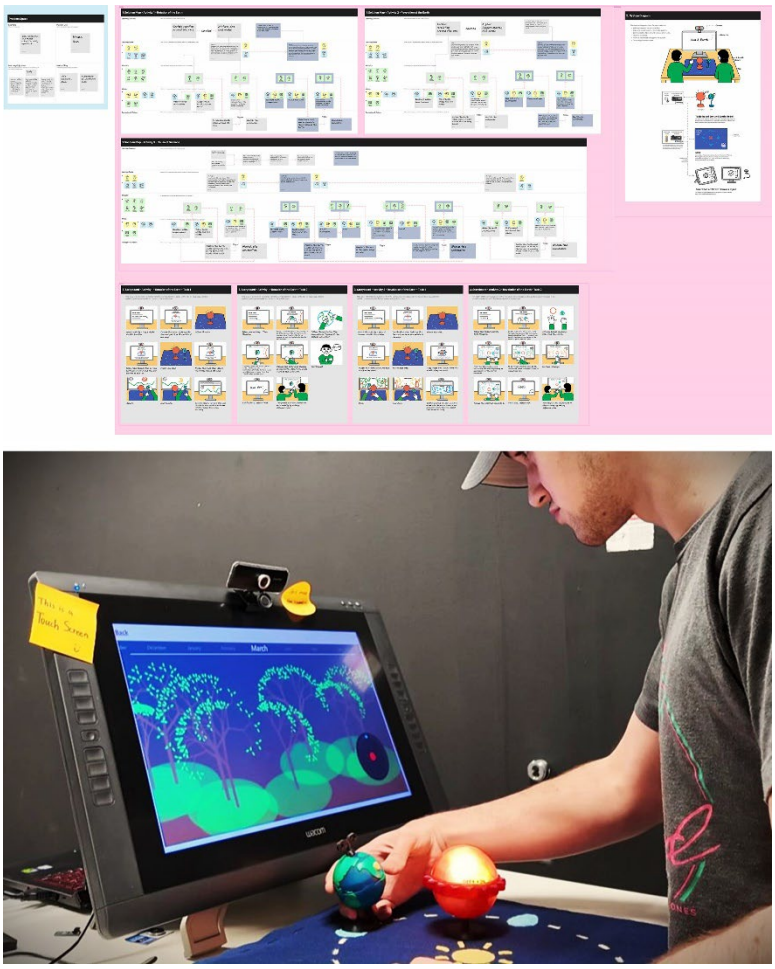


Figure 9. "Sun & Earth" Project

"Dinosaur Explore"

"Dinosaur Explore" (Figure 10) explores embodied learning design in public museum setting, targeting children and families. The project developed an exhibit concept featuring a gamified learning experience where participants form teams to explore the dinosaur world through collaborative and competitive tasks. Utilizing the physical version of the D4E Framework, this project demonstrates the framework's potential for large-scale projects and teamwork.
Currently in the concept generation stage, the learning objective for "Dinosaur Explore" draws inspiration from an activity in the educator guidebook of COSI Science Center, focusing on dinosaur trackways.[21] A low-fidelity prototype was quickly developed using 2D and 3D materials to visualize the design concept. A low-fidelity prototype was created using 2D and 3D materials to visualize the design concept, showcasing deliverables at different design stages compared to the "Sun & Earth"

project. The proposed media system comprises physical dinosaur models, digital projections, and a phone application. Two primary activities were designed to address the learning objectives:

- "Whose Footprint": Learners gather data on digital trackways using the app and compare them to physical dinosaur models to identify the species.
- "Speed of Dinosaur": Learners follow digital trackways to experience a dinosaur's speed, then measure and calculate the speed using the app.

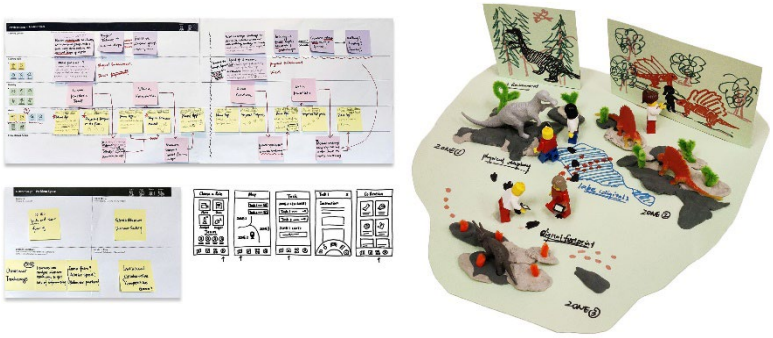


Figure 10. "Dinosaur Explore" Project

CONCLUSION

In summary, this research introduces the D4E Framework, a process-oriented tool designed to guide the creation of embodied learning experiences. Through the "Sun & Earth" and "Dinosaur Explore" projects, the framework demonstrated its potential to help designers develop meaningful, interactive learning environments. By sharing this framework, we aim to contribute to education from a designer's perspective. Future work will involve testing the framework with designers to evaluate its practical utility and effectiveness, and further developing the tools in the Discover and Deliver stages.

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