

**An adaptive design approach to studio spaces in higher education within the Interior
Design and Architectural disciplines**

by

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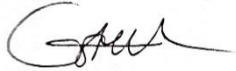
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DECLARATION

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Signed:

A handwritten signature in black ink, appearing to read 'Gail Stock', written over a faint rectangular box.

Date: 05 December 2022

ABSTRACT

This research is focused on dedicated learning spaces within higher education institutions and, more specifically, studio spaces within the disciplines of Interior Design and Architectural education. Conventional design studios in higher education are manifesting a shift due to the steady progress of the internet and information technology. Thus, the educational function of the design studio within the traditional pedagogical structure needs to respond to current social, economic, ecological and technological changes. Consequently, the main research challenge that prompted this study was the search for, and conceptualisation of, a creative and adaptive approach to a more collaborative studio space, so that the integration of the physical studio space and virtual studio might work together to complement each other. The reinvention of the physical studio space could ultimately lead to the design principle of a more structured hot-desking studio, founded on mobile work patterns. Moreover, this research suggests the concept of a nomadic studio as a further development of hot-desking which institutions could adopt. The research follows a qualitative approach which employed Participatory Action Research. In order to analyse the user responses within these spaces, focus group discussions, interviews and participatory observation were carried out at a private higher education institution that has embraced an adaptive and technology-based studio environment. The findings revealed notable needs for adaptation regarding the architecture, interior and furniture elements within the identified spatial typologies of a studio. In particular, tangibility and tacit knowledge were also emphasised by the findings, namely that the immersive nomadic studio which offers students the opportunity to be present in the 'real world' while designing for the 'real world' makes a positive contribution towards empathic design needs.

Keywords: Studio spaces, adaptive (Learning / Teaching) approach, spatial typologies, design education, blended learning environments, hot-desking in educational settings

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- My family and friends for keeping me motivated.
- My fiancé for all the love and belief he has in me.

DEDICATION

This thesis is dedicated to my Ouma Stock, a woman of strength that believed in the importance of education, without her unwavering love I would not be here today.

“Education is the most powerful weapon which you can use to change the world”.
-Nelson Mandela.

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GLOSSARY

Terms/Acronyms

Definition/Explanation

Adaptive/Blended studio

An adaptive or blended studio refers to a space that integrates the potential offerings of online teaching via “digital media, to expand beyond the traditional limits of physical space and time” (Pak & Verbeke, 2015:255). In this research, the reference to an adaptive/blended studio broadly references the work of Pektaş (2015:255): It is “characterised as the use of technology to support face-to-face studio learning activities and environments”, so that the integration of the physical studio space and virtual studio can work together to complement each other.

Blended learning

In the context of this study, blended learning is defined “as the integration of traditional studio face-to-face learning or learning by doing” (Eradze, Rodríguez-Triana & Laanpere, 2019:91) with online learning, thus gaining the individual benefits of both teaching approaches (So & Bonk, 2010). “Blended learning supports and enhances studio activities” (Güler & Afacan, 2013:1100) in an ever-evolving world of technology.

Built Environment

“The built environment touches all aspects of our lives, encompassing the buildings we live in, the distribution systems that provide us with water and electricity, and the roads, bridges, and transportation systems we use to get from place to place. It can generally be described as the man-made or modified structures that provide people with living, working, and recreational spaces. Creating all these spaces and systems requires enormous quantities of materials” (EPA, 2017).

E-learning

Studio-based learning focuses on the characteristics of material space in moulding “disciplinary identities and promoting professional norms” (Sánchez-Prieto et al.,

2016:519). Here, the studio is not merely a space for students to create but also to become designers and artists within the built environment. Sanchez-Prieto et al. (2016:519) define electronic learning (e-learning) as “the use of electronic methods and tools to support, facilitate, and enhance learning” either synchronously or asynchronously.

Hot-desking

This is a term that emerged in the early 1990s to characterise people who did not have a permanent place to sit while they worked. Hot-desking allows workers to share desks and other office resources on a temporary, as-needed basis, making it ideal for situations in which a large number of employees must be absent from the office. Electronic call forwarding and computerised file storage, as well as secure storage lockers, are the backbone of this type of “virtual office” (History of Office Design, 2022).

Integration

Integration is recognised as the process of incorporating learner management systems (LMS) “into the studio-based space through their adaptation” (Garrison & Vaughan, 2008:255) or amalgamation into the studios, supporting both students and lecturing alike.

Learner management system (LMS)

A learning management system, also referred to as an e-learning platform, is defined as “software including various services that assist tutors with managing their courses” (Ouadoud et al., 2018:26). As a computing device, a LMS “groups numerous tools and ensures the educational lines across dedicated platforms to the ODL (open and distance learning), all channels are preserved and expanded for the learner, tutors, coordinator, and administrator within the e-learning platform” (Ouadoud et al., 2018:26).

The LMS provides several functions regarding “content management, particularly by creating, importing, and

exporting learning objects” (Ouadoud et al., 2018:26). The accessible tools in the LMS represent a variety of services that “help manage the teaching process and the interaction between users, such as access control services, synchronous and asynchronous tools of communication, and user administration services” (Ouadoud et al., 2018:26).

Loadshedding

“Loadshedding is a way to distribute demand for electrical power across multiple power sources. Load shedding is used to relieve stress on a primary energy source when demand for electricity is greater than the primary power source can supply” (Courtemanche, 2022).

Studio-based learning

The studio is a space of immersion (Boling et al., 2016), which Pektaş (2015) defines as the continued presence of students within the studio. Immersed students are physically and socially within the studio, which offers them access to design knowledge. Through this, the studio creates numerous opportunities for collaboration “through which students learn the norms of the discipline” (Corazzoa, 2019:1258). Studio-learning relies on the physical and social interaction between people. One of the main reasons why studio-learning is so successful is its social nature (Chen & You, 2010). Learning, according to the theory of situated learning, occurs when people interact with one another and integrate existing knowledge with real, informal, and sometimes unplanned contextual learning (Schadewitz & Zamenopoulos, 2009).

Studio

The term studio has multiple definitions: “a physical space, programme of study, a pedagogical strategy, and culture” (Corazzoa, 2019:1252). The term ‘studio’ within this study refers to the “learning by doing expertise and knowledge necessary to produce innovative, creative, and competent design solutions through reflection-in-action” (Boling et al., 2016:168).

Teaching and learning

Within the context of this study, it pertains to how physical space is set up as a background theme within an educational environment. The motivation for this study was to uncover the design principles that enable an adaptive studio space. Although learning occurs in the studio, “these studies frame learning as a primarily conversational activity. An oral presentation is the primary means by which Interior Design and Architectural students learn how to think and act like a designer” (Thoring et al., 2018:1969).

Virtual studio

“A virtual design studio is an online studio-learning environment where students can collaborate with their peers” (Shilton et al., 2014:4) and lecturers, using software, such as Microsoft Teams and other Interior Design and Architectural related programs.

ABBREVIATIONS

ED02: Environmental Design. Second year class

FTF: Face-to-Face

ID02: Interior Design, Second year class

PAR: Participatory Action Research

PHEI: Private Higher Education Institution

CHAPTER ONE: INTRODUCTION

1.1 Introduction

This research is focused on dedicated learning spaces within higher education and, more specifically, studio spaces within the disciplines of Interior Design and Architectural education. Studio-learning relies on the physical and social interaction between people. One of the main reasons why studio-learning is so successful is its social nature (Chen & You, 2010). Learning, according to the theory of situated learning, occurs when people interact with one another and integrate existing knowledge with real, informal and sometimes unplanned contextual learning (Schadewitz & Zamenopoulos, 2009). According to Schadewitz and Zamenopoulos (2009:1), "the studio model has fostered the type of enculturation into practice that modern schemes of situated learning are just coming to understand", where iterative design necessitates many opportunities for input and reconsideration assisted best by peers and staff members (Morkel, 2011). With the recent adjustment to life brought about by COVID-19, higher education has seen temporary responses to the pandemic, some of which could have permanent influences on altering the studio as we know it (David, 2020). This study focuses on uncovering the Interior Design considerations that enable an adaptive learning environment from a pedagogical perspective. Together, these points provide the background to the study.

1.2 Background to the research problem

Higher education studios, in the conventional form, are manifesting a shift due to the steady progression of the internet and information technology (Chen & You, 2010); students spend more time in computer labs than in studio spaces. This, in turn, is not conducive to interactive and collaborative learning within design thinking and challenges the physical dimension of the face-to-face studio (Morkel, 2011).

The educational function of the design studio within the traditional pedagogical structure should consider responding "to current social, economic, ecological, and technological changes" (Pasin, 2020:1270). This explorative study examines the theoretical and practical considerations of the accumulated knowledge and diverse skills which permeate a studio setting allowing for an in-depth understanding of it uses. Along with collecting qualitative data through Participatory Action Research (PAR), focus groups and interviews were carried out at a private higher education institution (PHEI) that has embraced an adaptive and technology-based studio environment in order to analyse the user responses within these spaces.

This research aimed to identify factors which influence the need to redesign studio spaces in higher education and reveals whether these factors promote or hinder the collaborative

process within studios. The concerning factor of completely integrating online-learning (a virtual studio space) to substitute physical studio-learning results in a lack of familiarity with what many view the studio culture to be. The key challenges that have presented themselves during the COVID-19 pandemic “were student access to data, networks, and devices, as well as the lack of a conducive learning environment for some students at home” (Rahman, 2021), forcing universities to review their current and future methods.

As an Interior Design lecturer at a PHEI in South Africa, through my lectures during COVID-19, I observed that virtual learning had little to no effect on student's ability to grasp theoretical knowledge. However, I felt that the collaborative design-thinking aspect within a virtual setting did hinder their learning and held students back from expressing their ideas visually and vocally. For this reason, I believe this topic should be acknowledged and considered when designing future institutions as it could lead to smaller building typologies for Interior and Architectural educational institutions. I foresee that education, in general, may move to a more online or hybrid organisation, leading to an adoption of online studios and face-to-face studios. This concept could ultimately lead to the design principle of hot-desking studios, founded on mobile work patterns. In such spaces, students would not have permanent personal workstations but use any available desk during class sessions. Limited research has been undertaken to explore systematically the link between the “physical environment, studio culture and its embodied behaviours under hot-desking conditions” (Cai & Khan, 2010). Moreover, the concept of a nomadic studio as an extension of hot-desking is another approach which institutions could adopt. For this reason, the appropriate integration of technology and physical learning environments is essential for achieving the goal of designing for a more adaptive and sustainable environment in which we live, work and play (Eradze, Rodríguez-Triana & Laanpere, 2019).

1.3 Statement of the research problem

It has become more apparent that preparing to teach remotely is being encouraged on national and international levels (Webster, 2020). The main research challenge that prompted this study: Is there a creative and adaptive approach to a more collaborative studio space, so that the integration of the physical studio space and virtual studio can work together to complement each other. This would allow for cross-pollination of knowledge, shared and encouraged in a natural progression of activities, experiences and interactions. The recent impact of COVID-19 forced campuses to migrate to virtual learning exclusively. Institutions turned to the implementation of online-teaching through learning management systems (LMS) that could be retrieved through downloads or online platforms. The idea of this reality also brought with it a level of nervousness around remote teaching for students and lecturers alike. A defined level of inequality has been identified, as learning from home

relies not only on access to technology and the internet but also on physical space and moral support (Webster, 2020).

These various situations could also lead to blended learning approaches to compensate for the lack of resources required for remote learning in low-tech mediums (Toni & Olsen, 2020). The prospect could anticipate the reinvention of the traditional university learning familiarities. Broz (2020:1) notes that "[t]here will always be a need for a physical presence for we are naturally social beings, but the future campus could merge online learning with traditional campus learning". Within the studio space, the learning environment is focused on student collaboration, problem-solving and feedback, both from peers and lecturers, leading to a paradigm shift away from the concept that the lecturer holds all knowledge and thus discourages self-directed learning (Toni & Olsen, 2020). Building a culture of collaboration in a studio is possibly easier when the mode of communication is unhindered (Alawamleh et al., 2020). In my experience as a lecturer, individuals have visual, audio and even tactile communication channels in the studio space, whereas online students default to text-based communication, such as email or chats. Alawamleh et al. (2020) note for lecturers to recreate a studio culture online, they need to focus on two areas: engaging students and getting students to engage with one another.

1.4 Research questions

Rather than a studio being designed as conventional which can lead to stagnation, the main research question aims to evaluate a more evolving approach. Understanding the effects of the increasing demand for online learning due to COVID-19, integration of learning technology and immersive environments within the studio is imperative.

The main research question is: How can face-to-face and online learning be implemented in the Interior and Architectural Design studio to support an adaptive design-thinking environment?

The following sub-questions will be considered to address the main question:

- What are the vital spatial typologies within an Interior and Architectural Design studio, and what are their spatial considerations?
- To what extent can e-learning platforms be used in Interior and Architectural Design, and what design-thinking processes influence the consideration of these platforms in studio environments?
- How are traditional categories of spaces becoming less meaningful and adaptable as activities blend?

1.5 Research aim and objectives

With this study, I aim to explore what future physical studio spaces will require in the educational disciplines of Interior and Architectural Design. As we globally create short-term responses to the COVID-19 pandemic, there are also long-term prospects to remodel the traditional studio space. Broz (2020:1) argues that online learning allows “people to learn at their own pace, but also at their own place”. This, in turn, could impact how studios are designed in the future and questions whether physical studio spaces are something of a dated concept in contrast with a virtual studio space. Granted that the physical studio is regarded as an essential core in design education (Orr & Shreeve, 2017), there is a necessity to further validate its influence on learning in the built environment. With this, we reverse the potential extinction of the physical studio and inform future adaptations in response to changing needs and budgets. Table 1 below indicates the study's proposed objectives and research methods:

Table 1. Objectives and research methods.

Objectives	Research Methods
To investigate what factors can be implemented in reaction to the need for adaptive studio spaces;	<ul style="list-style-type: none"> ● Literature review ● Focus groups ● Interviews ● PAR: participatory observation
To investigate how the approach to an adaptive studio space lies beyond the confines of the traditional studio spaces.	<ul style="list-style-type: none"> ● Literature review ● Focus group ● Interviews ● PAR: participatory observation
To establish which of the identified (technological and spatial) factors are promoting or hindering a collaborative studio environment;	<ul style="list-style-type: none"> ● Focus group ● Interviews ● PAR: participatory observation
To investigate alternative solutions to the hindering factors within the design of adaptive studio spaces.	<ul style="list-style-type: none"> ● Literature review ● PAR: participatory observation

1.5 Research method and design

Research design elements, as depicted in Figure 1, include the study's methodology, its tools, sampling strategy, and its approach to analysing and interpreting data.

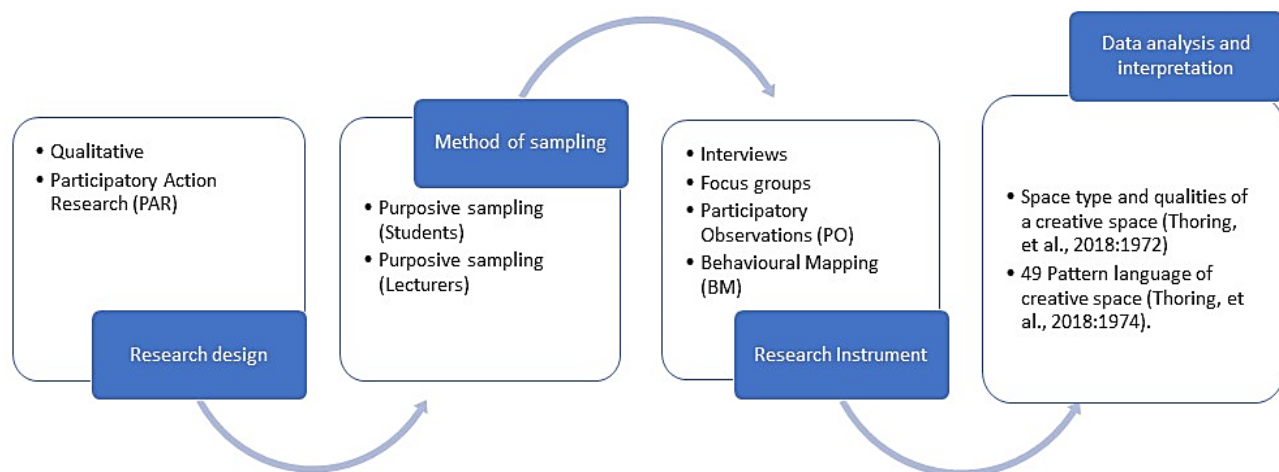


Figure 1. Research design and method (Stock:2022).

1.6 Research design

Blanche, Durrheim and Painter (2006:12) state that the "internal reality of subjective experience" is the interpretative paradigm that must be considered in order to select the most appropriate qualitative research methods, including a consideration of the associated interaction and interpretation (Blanche, et al., 2006). In this research, Participatory Action Research (PAR) was used: a "repeated, methodical process of planning, acting, observing, evaluating, self-evaluation, and critical reflection prior to planning the next cycle", according to Kemmis et al. (2014:6). In action research, the term positionality is used to describe the researcher's insider/outsider status in the community under investigation in action research. Someone who works for or is a part of the participant community is considered an insider, whereas someone from outside the group is considered an outsider. (Coghlan & Mary Brydon-Miller, 2014). As a design lecturer at a PHEI, I felt that PAR could be applied immediately in my field of work (Burrows et al., 2012). With that the positionality I have taken is that of reciprocal collaboration which is of equal insider and outsider (Coghlan & Mary Brydon-Miller, 2014). This stance adheres to the foundations of action research, which define the technique as one in which researchers and participants engage in a process of co-inquiry to solve problems, effect change, or discover new possibilities.

One definition of a PAR process in the field of education is the participatory observation of a classroom, school or method of instruction with the goal of enhancing the efficacy of those settings and methods. For this reason, I observed two of my Built Environment classes, the objective having been to observe activities, participants and physical characteristics relevant to my research while engaging in activities fitting the social situation recorded by comprehensive field notes (Daniel & Harland, 2018). The observational study focused on two categories of location, the first being the PHEI campus. The second, a 'nomadic studio', was a temporarily adopted space which was not located on the PHEI campus and was used

for design learning. As the process of PAR unfolded, it came to be considered the pinnacle of self-reflection in the studio (Burrows et al., 2012).

1.6.1 Method of sampling

A purposive sampling method was selected, the method of selecting a sample from a larger population is referred to as purposeful sampling. Purposive sampling takes into account well-defined characteristics of the population (Bhattacharjee, 2012). Utilizing the characteristics and characteristics of an entire population to target a small subset representative of the entire population (Yin, 2011). With students and lecturers as the key users of blended learning in both online and FTF studios. Three lecturers from the Built Environment Department at the PHEI were chosen. All three lecturers facilitated classes during and after COVID-19, giving them insight into online, face-to-face and hybrid teaching. Several second- and third-year students volunteered to participate in the focus group. All of the students were my former students and had participated in online, face-to-face and hybrid classes during their academic experience. This comparison between teaching and learning in the two sample groups provided insight into the users' individual experiences of space in the different settings. Then, lastly, the observed sample group consisted of two second-year Built Environment classes whom I taught Design.

1.6.2 Research instruments

Interviews, participant observations and document analysis are the three most often employed research methods in PAR studies. Interviews and participatory observations were chosen for this study. Before conducting the semi-structured interviews, initial observations of the two student groups were undertaken. The observations were captured and transcribed using the Behavioural Mapping method, which describes the behaviours that actually occurred rather than those planned (Nickerson, 1993). Before conducting the observation, I received the design plans of the PHEI. Whereas the nomadic studios were hand-drawn on-site before the students' arrival. The interactions, experiences and behaviours of the pupils were recorded on these plans as mapping.

Literature-based design principles were utilised as a guide to inform the interviews. Using semi-structured interviews, a sample of students' and lecturers' experiences was gathered. This involve interviewing several individuals regarding the same phenomenon (Squire, 2008), and the results from each participant group were compared.

1.6.3 Data analysis and interpretation

The findings gathered through participatory observation, interviews and focus groups were summarised according to the themes identified in the literature reviewed. The emerging themes were: typologies of creative space, spatial quality, technology, hot-desking,

nomadic studio and design approaches. The data were further synthesised using Thoring et al.'s developed design principles that offer designers "a systematic design or redesign of a creative workspace based on the typology of creative space" (2018:1972). I was then able to write a critical reflection pertaining to the findings distilled from the data collection.

1.6.4 Limitations

Limitation within the study include the following:

- I was granted only one month of participatory observation with my two Built Environment classes which, I believe, limited my time to explore the concept of a nomadic studio.
- No interviews with or photos of my two Built Environment classes were permitted for the study as per the request of PHEI. This limited the feedback I was able to receive from my students when implementing PAR methods.
- The data collected are based on findings from one of the several campuses of PHEI and are, therefore, not a reflection of all Built Environment institutions where class size and socio-economic contexts may differ.
- The use of technology in FTF studios and online platforms was restricted to that which is used at the PHEI and, therefore, limit the scope of investigation.

1.7 Significance of the research

The study potentially contributes to the body of knowledge on the Interior and Architectural Design aspects of a Built Environment Department, specialising in the design of studio spaces in higher education. The outcome of this study is an improved understanding of design considerations that enable an adaptive studio through examining the contribution of the physical space of the studio in Interior and Architectural Design. This was accomplished by investigating how the physical environment of the studio has been described in literature and by taking into account how the digital realm is layered over physical spaces.

1.8 Ethical considerations

Consent in principle was obtained from the private higher education institution where I am a lecturer. However, a request was made by the institution that it remains anonymous and is, therefore, referred to as a 'PHEI'. Other guidelines included: that individual consent forms were obtained from willing participants before the data collection process and that, in the case where photographs had been taken, no staff or students or graphic design alluding to the PHEI, were shown in the photos, ensuring anonymity, as requested by PHEI.

1.9 Delineation

This study is defined as focusing only on the need for an adaptive studio design space within the context of the PHEI that I work with, which includes all elements of Interior Design, Architectural Technology and the Built Environment. However, this PHEI in the Western Cape does not represent the full scope of higher educational institutions, and thus the outcomes of the research do not contribute to a final interior solution.

1.10 Summary

In summary, the proposal introduced the research study, stating the relevance of identifying the need for an adaptive studio space in higher education, particularly that of the Built Environment of a PHEI. Therefore, this study's main objective was to explore the creative and adaptive approach to a more collaborative studio space, so that the integration of the physical studio space and virtual studio can work together to complement each other. The study will reveal whether these factors are promoting or hindering the students' overall learning experience.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

“Students were not merely solving problems; they were engaged in an iterative process of expressing—and thus shaping—their identities” (Shaffer, 2007:121).

Covid-19 has questioned the need for large gathering facilities, such as educational institutions, and thus also the need for studio spaces. Furthermore, the idea of physical space being scaled down to that of a learner management system is driven by financial implications of sustaining the upkeep of buildings and facilities (Ceylan et al., 2021). This has ultimately left us with the questions: Is there still a need for the physical studio space? What does the future hold for studio spaces? This chapter covers an overview of the literature on the design of educational studio environments. The academic literature consulted are journal articles, online databases and books. The preliminary data were summarised and organised according to the themes that emerged from the literature.

2.2 A historical overview of a studio

Archaeologists propose that, in its earliest form, caves set the scene for a creative studio space, as hunters and gathers would illustrate their hunting skills with paintings on the walls of the caves (St Fleur, 2018). The individual and collective collaboration efforts within these spaces highlight the generational transfer of skills and knowledge over time, showcasing a studio's consistency in mentoring and practical domains. The traditional studio used specific tools and implemented certain methods still present in today's studios. Through this account, five key constructs defining the characteristics of a design studio environment, as observed throughout history, have emerged, as seen in Figure 2 (Meggs & Purvis, 2016).

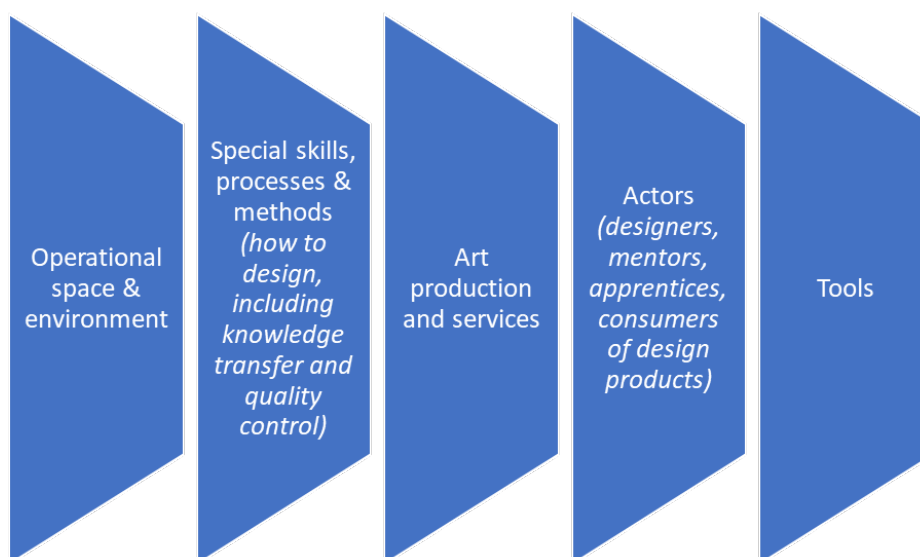


Figure 2. Five key constructs defining design studio characteristics (Meggs & Purvis, 2016).

Throughout history, the studio functioned as a workshop for artisans to serve a master or teacher. The 16th and 17th centuries were home to the guild system in Europe's medieval era, where the studio served as a place of training and philosophical reflection on the arts. Simultaneously, the artists themselves became a visual theme of their environment (Meggs & Purvis, 2016). Further evolution of studios, approaching the concept of art education, unfolded during the Era of Enlightenment in the 18th century. This witnessed the studio's progression into that of privately run academies owned by wealthy aristocrats. Studios were then utilised to commission artists to produce works viewed as significant. This led to the evolution of the studio as an important site of professional training and aesthetic dialogue in the 19th century (Meggs & Purvis, 2016). The 20th century saw the introduction of photography and film into the studio environment. This shift in materials, media and tools motivated an innovative advancement in technologies that accompanied the traditional combination of skill, learning and practice development (Goldsmith & O'Regan, 2005).

The birth of the design studio within an architectural context date as far back as the 18th century, when the National School of Fine Arts was formed in France which offered free training and promoted equality among its students, allowing students from all social backgrounds to enrol (École des Beaux-Arts 2022). In 1919, the German architect Walter Gropius founded the Staatliches Bauhaus, a school devoted to bringing together all artistic disciplines under one roof. The school served as a centre for Europe's finest avant-garde artists (Richman-Abdou, 2021). These two institutions set the foundation for contemporary Schools of Architectural Studies, "but the nature of education keeps evolving affected by emerging theories and methods of teaching, as well as the needs and requirements of society" (Pasin, 2020:1271).

2.3 The context of an Architectural and Interior Design studio

Words, such as 'context', have different meanings in different settings (Koffeman & Snoek, 2019). According to Edwards and Miller (2007), in a classroom setting the term 'context' refers to a "bounded container that enables for a variety of activities to occur". Furthermore, the context is adaptable enough to allow for the tolerance of a variety of activities (Koffeman & Snoek, 2019). The design studio setting establishes a classroom in which students' imaginative capacities are emphasised (Ibrahim & Utaberta, 2012). When compared to the design studio environments of graphic design, fashion and communication, the Architectural Design studio environment is surprisingly similar in terms of physical infrastructure and human engagement (Corazzoa, 2019). The only real distinction is in the precise nature of the work done in the larger framework of an Architectural Design studio. Architectural Design studios are places where students work together to find solutions to issues of space

and structure. In reality, there is little difference between the physical setting of the design studio and an industrial design studio. Thus, the infrastructure of an Architectural Design studio could, in the main, be used by either group of designers. There are a number of situational and contextual aspects, as well as the participation of students and instructors, that make up the design studio context (Emam et al., 2019). In their paper, Orbey and Sarioglu (2020) argue that the activities inherent in the design studio environment foster students' innate capacity for innovative design; without instructors and students working together, the design studio's physical space could never foster a studio environment (Rodriguez et al., 2018). Bashier (2014) paints a picture of the design studio as a place where students and lecturers work together to solve problems and further their education. Grover et al. (2020) argues that the design studio setting actively encourages students to tap into their innate creative potential.

2.4 Challenges of Space and Place

The many possible interpretations of the word 'space' have been thoroughly investigated in the fields of social and educational study. Turnbull (2002:135) views the term 'space' as a "popular trope, bombarded with mental/cognitive space, discursive space, knowledge space, social space, architectural space, object space". He believes that space can be divided into four distinct categories: discursive, cognitive, existential and material spaces.

"The discursive space is a representation of knowledge and can be viewed as the process by which this knowledge is acquired" (Turnbull, 2002:135). More so, Maciag (2018) argues that moral properties take precedence over natural properties and that our mental traits take precedence over our bodily features, such as our nervous system's properties. *Cognitive* space employs the analogy of position in two, three or more dimensions for the purpose of characterising and categorising an individual's thoughts, memories and ideas. Each person's brain is wired differently, and their thoughts are organised in a manner that is unique to them (Newby, 2001). Norberg-Schulz (1971) defines *existential* space on an urban scale as a relatively stable system of perceptual schemata, or a system of three-dimensional interactions between significant things. However, these types overlap with one another and are fundamental to "higher-order spaces such as social space or knowledge space" (Turnbull, 2002:135). Much of the reviewed literature on learning space does not clearly differentiate between 'space' and 'place' but rather uses these terms interchangeably. In certain situations, this is not relevant; nonetheless, 'space' is the preferred term. This concept is well explained by James Tyner by referring to an imaginary classroom:

“Imagine you are sitting in a university classroom. The room has a particular area, or floor space. There are desks and chairs, chalk boards and trash cans, and these have a particular spatial arrangement. When classes are not in session, such as on weekends, or late at night, the room may be considered to be empty – despite the presence of chairs, desks, and so on. However, through the day, when classes are in session, the room becomes a place. But depending on the students, the room is a different place. In the morning for example, the room might be occupied by a mathematics class, while in the afternoon it is occupied by a geography class. The room may stay the same, but the social relations and interactions are very different. This is because the interactions among the students and the professor vary” (Tyner, 2012: 15).

All spaces, therefore, change depending on the identity of the occupants and obtain significance through social relations and interaction and through this process of signification, space becomes place (Tyner, 2012:16).

Despite this, a sizeable portion of literature in “geography, anthropology, architecture and urban studies distinguishes between space and place, and some of these distinctions turn out to be useful in framing different perspectives on learning” (Ellis & Goodyear, 2013). From the start of the 1970s, literature in phenomenological geography shows that there was a preferred use of the word 'place' when people's lived experiences were involved (Relph, 1976). The distinction between space and place is frequently ascribed to Yi-Fu Tuan's phenomenological perspective that the concept of space is more conceptual than implying a physical location. As we learn more about and assign significance to an area, it transforms from an indistinguishable blank slate into a genuine location (Tuan, 1977:6). Ingold (2011:145) is strongly against the concept of space, arguing that “[o]f all the terms we use to describe the world we inhabit, it is the most abstract, the emptiest, the most detached from the realities of life and experience”. In addition, he challenges the notion that location constraints action by arguing that individuals construct, furnish, rearrange and invest meaning in their environments as they go about their daily routines. This can be said to be the same for common spaces in universities, such as libraries, lecture halls and cafés, to name a few. The level of personalisation differs based on the actions of staff and students.

One must then ask: If 'place' is a physical location for individuals, does the same apply for the idea of space. The answer lies in that "educational leaders and managers in higher education seek to shape the environment (physical, virtual, hybrid) to serve the educational goals of the institution" (Boys, 2011:). Given that depictions of locations can be used to

normalise certain types of behaviour while stigmatising others, a focus on space management approaches risks concealing the numerous other factors that contribute to the formation and construction of spaces (Ellis & Goodyear, 2016:157). 'Space' can hence be viewed as a more abstract version of 'place'. Alternatively, these two concepts can be viewed as "existing in different ontological frameworks: the nature of the existence of 'space' for a planner is different from the nature of the existence of a 'place' for a lecturer who teaches in it" (Law & Mol, 2002:157).

Deliberating the connectivity between space and learning is often met with obstacles. Space is often treated as an environment that houses social activities instead of being viewed as integral to occupants' experience of it. Consequently, the perception of material space is adopted as "an invisible backdrop for the complexity and vibrancy of social space" (McGregor, 2004:1) and viewed as a "passive container for social action" (McGregor, 2004:350).

Boys (2011) looked at 28 learning theories and found that many of them failed to take spatial settings into account. He concluded that academics are discouraged from doing research that centres on spatial components of education. Hettithanthri and Hansen reviewed 60 articles written within the last ten years which focused on "the current knowledge on the conventional design studio context" (2022:15). What the authors found was that, for the past decade, researchers have paid close attention to the design process and practices in design studios, but they have paid less attention to the possibilities of context-generated design studios that could be established outside the traditional academic framework. Hettithanthri and Hansen (2022) observed that clearly many academics have focused their attention on the differences between traditional design studios and online, hybrid or other types of online learning environments - specifically on the pedagogical and creative processes that occur there - whereas the traditional design studio activities still tend to follow stereotypical patterns adopted decades ago.

The current research also showed that there are restrictions to establishing artistic designers in a creative design studio context. It revealed that the design studio adheres to traditional design studio procedures that were established several decades ago, and that little has changed to accommodate the modern learning context of students. Future studies could investigate to what degree the use of traditional studio procedures in a design studio setting hinder students' capacity for design-thinking (Ellis & Goodyear, 2016). Moreover, Hettithanthri and Hansen (2022) found that there is less room for experimentation and emotion in the studio's restrictive area and routine involvement. Students have little space for empathy in design studios, although it is a crucial part of the design process. When

designing with the end user in mind, the iterative process of experience-based design is essential. Human-centred design expands on the work of environmental psychology, which aims to understand how people behave in different environments. This is accomplished through empathy, through which direct experience is gained (McDonagh-Philp & Denton, 1999). Even if part of the design studio experience includes going out into the field, students are still expected to work to address real-world problems while in a design studio setting (Ellis & Goodyear, 2016). As a result of this procedure, students' capacity for independent thought and discovery has been constrained. According to Hettithanthri and Hansen (2022), the design studio environment lacks the sensory stimuli necessary for effective design-thinking. There is a shortage of unconventional methods of establishing design studios that bypass the design studio's infrastructure and resources. In addition, a gap in the literature concerning the prospective expansion of the design studio into new settings has been brought to light (Hettithanthri & Hansen, 2022). For these authors, it is not sufficient to restrict the design studio to a purely academic environment. Most of the intangible qualities of a design studio can be developed by students and instructors through their own studio practices, which can take place anywhere. Furthermore, Brandt (2013) has cautioned that ignoring the studio's cultural value may expose insensitivity. A similar caution is issued by Gray and Smith (2016), who state that studio and professional standards that potentially restrict the variety of students in creative areas should not be blindly replicated.

Despite these cautionary reflections these studies have focused more on the social aspects of studio education than the material space. When asked whether the discipline of architecture may hold any solutions to the problems affecting today's classrooms, Boys argued that it cannot. As physical location is influential but not crucial, we need to ask "new and varied types of questions about learning, space, and design" to understand the inner workings of universities and the ways in which they might be enhanced (Boys, 2011:175). For this reason, it is important for my research to provide an enriched understanding of the physical studio space and highlight its overall contribution to educational understanding in Interior and Architectural Design.

2.5 Built form: physical, virtual, hybrid

This section brings together the array of constructed places created in universities, such as studios, libraries, adaptable learning spaces, break areas, etc., as well as virtual spaces that hold similar attributes to their physical counterparts, such as online seminar and meeting rooms. According to Wimpenny et al. (2012), the latter have enough similarities to real locations and spaces, whether seen from an experiential or management perspective, to qualify as virtual places or spaces.

The term 'constructed places' is also referred to as physical, material, or real places with the intent of distinguishing them from virtual, non-material or digital artefacts or places. In many cases, the 'virtual' is implicitly referenced in discussions of materiality, despite the fact that this is not the primary focus of the literature on materialism (Yoo et al., 2012). These terms help with understanding exactly what can and cannot directly be perceived. An example is the term 'material' which suggests something tangible, implying that touch may have a role in this context. The terms 'virtual' and 'immaterial' suggest that touch is not involved. Sight and sound are the primary senses engaged as, 'in' a virtual environment, users can personalise their own avatars and engage in user-generated content-based interactions with one another (Ellis & Goodyear, 2016). In higher education, 'Second Life' can be used for both distance-learning, in which instruction and study take place away from physical classrooms, and blended learning, in which students spend some of their time in a 'Second Life' setting and real-world setting (Thorne & Macgregor, 2018). It can also be a useful tool in the education of more complex topics in the fields of chemistry, mathematics, architecture, astronomy, and space geometry (Wang & Burton, 2013). Since virtual reality platforms, such as 'Second Life', are not currently used by PHEIs, they will not be the focus of this research. However, it is crucial to have identified their possible future integration as a technological means within specific architecture studios.

Alternatively, the term 'digital' is characterised by a type of device, either phone, laptop, computer or tablet, which holds tangible and intangible traits and its defining digital qualities lie in its inner workings. The experience of the virtual has to be facilitated through some form of digital device that is hybrid, meaning both material and immaterial. For this reason, the virtual or non-material are classified as components that exist solely through the operating of computer software "where one's experience of a place is mediated via a computer interface, and where the geography or configuration of the place is maintained as a representation in software" (Ellis & Goodyear, 2016:158).

Moreover, technological developments are leading to increased interpenetrations of the material and virtual world, which hold distinct opinions on both areas. Laptops and smartphones are used in FTF classes, and lecturers use online coursework portables, which are a centralised online platform managed by an educational institution so that digital versions of the course can be viewed with a log-in password. In contrast to white boards and markers, "touch displays (re)introduce a palpable quality to engage with digital information, much as a tablet's built-in camera and microphone can facilitate the transition from the physical to the virtual" (Ellis & Goodyear, 2016:159). Bower argues that outlining the material and digital changeovers in one's everyday activities brings about an awareness

of how this hybrid or interconnected area of our lives has evolved at an accelerating rate (Bower et al., 2015).

2.6 Technology and its role in the studio space

Computer-assisted learning domains, such as electronic learner, and education technology have developed rapidly since the turn of the century, and even more so during COVID-19, with the growing acceptance of technology as a driving force to efficient learning in higher education (Laurillard, 2016). Consequently, there is a wealth of research on the integration of technology into education; however, there is little research that addresses the adaptive integration of technology into the physical studio space. Most published research engages in a general discussion of technology with the dominant topics in current literature being “technology acceptance, adoption, inclusion, e-learning” (Downes, 2005:1), emerging technological tools, systems, blended learning (Singh, 2021), as well as technology and pedagogy (Rudneva, et al., 2019). There is an apparent absence of evidence highlighting the reliance on educational technology within design-related disciplines.

There is an increased focus on technology-driven innovation in information and communication technology (ICT) within education, as a result of changes in student behaviour and developing issues in the more traditional studio settings (Bennett, 2009; Park, 2011). There is a substantial corpus of writing on the possible applications of ICT across several disciplines. Virtual learning environments (VLEs) – or, as Mahnegar (2012) defined them, namely learning management systems (LMSs) - are online platforms for managing and disseminating educational content. According to Cavus (2013), LMSs are a valuable platform for managing, delivering and measuring learning for all students and faculties in higher education. The primary objective of learning management systems (LMSs) is to centralise and automate administration while providing learning information swiftly at any given moment, independent of geographic location (Cavus, 2013). Furthermore, Web 2.0 “are websites and applications that make use of user-generated content for end-users. Web 2.0 is characterized by greater user interactivity and collaboration, more pervasive network connectivity and enhanced communication channels” (Web 2.0, 2019).

LMSs and Web 2.0 are the two broad categories of online educational technology (including social networking sites). Pinto and Leite (2020) offer a literature evaluation mapping the digital tools intended for usage by higher education students in formal education environments between 2012 and 2017. The findings reveal a pattern of technologies reflecting lecturers' preference for approaches integrating FTF and distance-learning, typically in conjunction with the adoption of flipped classroom methods “structured around

the idea that lecture or direct instruction is not the best use of class time. Instead, students encounter information before class, freeing class time for activities that involve higher order thinking” (Flipped Classrooms, 2022). Mapping the digital devices used by students revealed a trend of three predominant categories among the nine detected: LMS, ICT, and Publish-and-Share technologies, as seen in Figure 3 below.

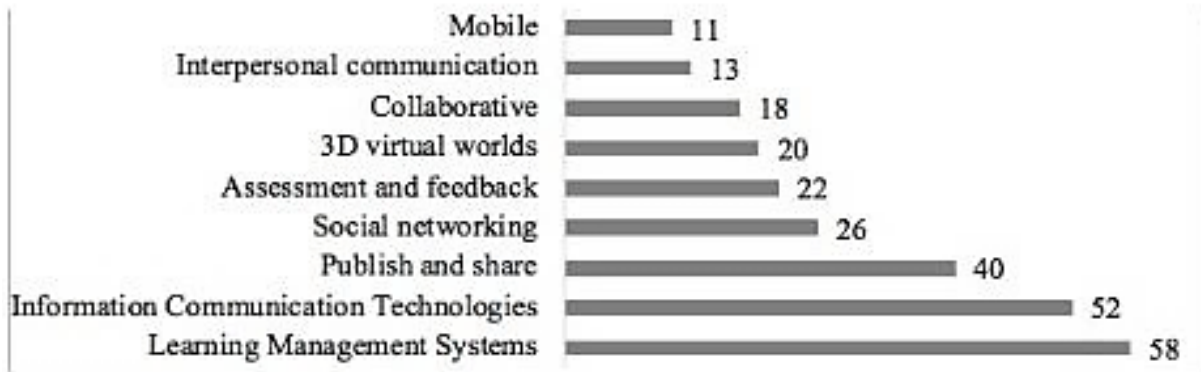


Figure 3. Number of papers published per category of digital technology (Pinto & Leite, 2020:346).

Institutional LMSs primarily provide broader access to information and learning materials, followed by technologies that facilitate the posting and sharing of content relevant to class activities, as well as a vast array of ICTs. The use of technology to enhance students' active involvement and participation in the learning process, both within and outside the classroom, was shown to have a favourable effect on the learning process and results (Pinto & Leite, 2020:346). The data also showed that digital technologies are utilised to support more transmissive methods of instruction, making it easier for students to access, share and publish knowledge on their own but far less often to facilitate collaborative and cooperative learning (Pinto & Leite, 2020).

It is not only that students and lecturers interact differently when technology is integrated into studio settings; it also shifts the emphasis of the studio from the teacher to the student, potentially transforming the latter into a digital artisan or craftsman in a more dynamic and interactive learning environment (Wieser, 2020). The goal of studio-based classrooms is to provide students with the key to lifelong learning abilities and marketable qualities that can only be developed by sustained hands-on practice (Oliver, 2000). Building students' reflective abilities is a key component of the studio-based approach, and the strategic use of e-learning technologies and LMSs is crucial to this process (Shön & Rein, 1994).

There are commonly three distinct varieties of online classes, distinguished by the timing and manner of instructor-student communication (Dung, 2020). Firstly, online asynchronous classes are not real-time; self-directed students' complete coursework and assignments are

on schedule. The teacher-student engagement is via discussion boards, blogs and email. No class time is set. Students with time constraints or very busy schedules benefit from asynchronous learning. Secondly, synchronous online courses involve instructor-student interaction. Students receive lessons and communicate with their instructor and classmates using texts, voice chats and video chats in a virtual classroom. Synchronous learning environments allow students to engage in real-time from home.

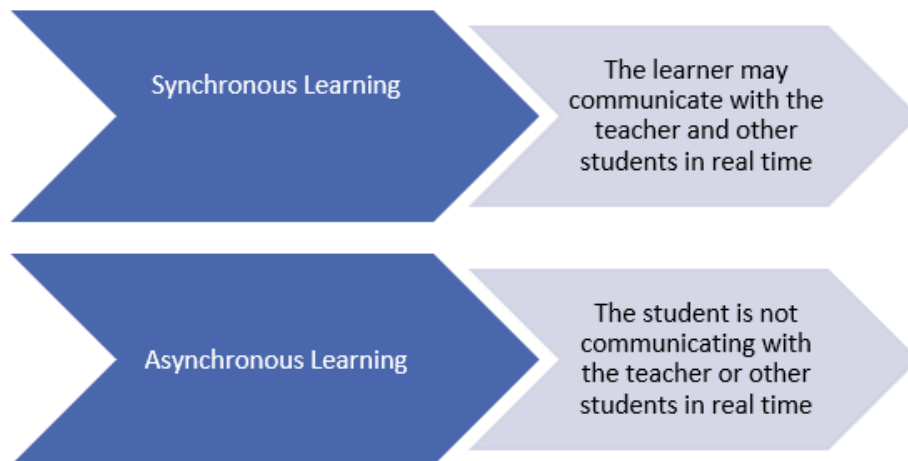


Figure 4. Types of learning systems (Faragallah:2020).

The third and final variation of online learning is hybrid as it is a combination of in-person and online learning which happen simultaneously. Hybrid courses need face-to-face meetings, as well as computer-based communication. Hybrid virtual learning is asynchronous, synchronous and face-to-face (Dung, 2020).

2.7 Typology of creative space

“Spaces used for teaching and learning are never empty. They should not be thought of as a vacuum when chosen by a student or designed by an institution as a place in which to learn” (Ellis & Goodyear, 2016:159).

Physical learning spaces generally have dedicated areas for students to be seated (or standing) and somewhere for the lecturer to be based. An assortment of tools and artefacts are also included in the room design, from data projectors to screens and computers. Furthermore, users of these spaces also bring their tools and artefacts: laptops, earphones, notepads and pens. Ellis and Goodyear advise that, upon considering the role of virtual space in learning, “it is useful to conceive how students use the tools, texts and other digital objects provided for their course to pursue their learning outcomes” (2016:159). An understanding of students' experiences with an artefact or tool helps to clarify how students' study and underlines how the usability of the course software shapes the students' learning in both virtual and physical learning. An example of this would be when students learn new

discipline-specific software online, in which case the session can be recorded, permitting students to reflect on tools they struggled with. In contrast, a physical studio session, in which different students may face different challenges and the lecturer can approach only one student at a time and individually to demonstrate a solution on his/her device, ultimately means that the only opportunity for a student to reflect would be from memory. The availability of wireless internet allows students to utilise their devices in class, leading to a rapid change in the information ecology of the studio, as academic knowledge in the classroom is no longer centralised around the lecturer (Ellis & Goodyear, 2016). When access to the internet, course-specific software or databases is called for during lectures, the necessity for universities to provide appropriate facilities through furnished learning places is essential.

To construct a better understanding of the furnishings of learning spaces, it is important to define the distinction between: objects, artefacts, tools and text as depicted in Table 2. An object can be said to be a general term, as it encompasses artefacts, tools and text. "Objects can be material (tangible) or nonmaterial (virtual) or both (hybrid)" (Ellis & Goodyear, 2016: 160) and refer to commonly reoccurring objects. Artefacts can be both simple or complex objects. Tools are a unique type of object shaped by use and practices. A tool is differentiated from a physical or digital object in that it is used by people to achieve an end goal in a task, and its use alters the property of the task (Kroes, 2010). A text is a particular kind of artefact which includes images, pictures, diagrams, as well as multimedia extensions. Text can also be inscribed in or on a physical or digital item.

Table 2. Distinctions between: objects, artefacts, tools and text.

Type	Description	Examples
Objects	<ul style="list-style-type: none"> • Encompass artefacts, tools and text. • Objects can be material (tangible), or • non-material (virtual), or • both (hybrid) and refer to commonly reoccurring objects. 	<ul style="list-style-type: none"> • Sketch book (tangible). • Digital tools within an architectural program (virtual). • Technical drawing either as a PDF or printed (hybrid).
Artefacts	<ul style="list-style-type: none"> • Can be both simple or complex objects. 	<ul style="list-style-type: none"> • Brick (simple). • A project management diagram (complex).

Tools	<ul style="list-style-type: none"> • A unique type of object shaped by use and practices. • Used by people to achieve an end goal in a task, and its use alters the property of the task (Kroes, 2010). 	<ul style="list-style-type: none"> • Drawing pencils, pens & markers, architect's scale ruler, trace paper, sketchbook or drawing paper. (tangible). • Architectural software programs. (virtual). • Digital sketch pads (virtual).
Text	<ul style="list-style-type: none"> • A particular kind of artefact which includes images, pictures, diagrams, as well as multimedia extensions. • Can also be inscribed in or on a physical or digital items. 	<ul style="list-style-type: none"> • Technical drawings (virtual). • Renders renderings (virtual). • Google earth (virtual). • Hard-copy technical drawings (tangible).

Consideration of student and lecturer needs in a learning place, regardless of whether it is physical or digital, can thus be categorised into the terms: objects, artefacts, tools and texts. The specific needs of the place will thus be dependent on the tasks undertaken. There is a central idea here that "individual technologies" (and other items) offer value only to the degree to which they are combined into successful configurations (Suchman et al., 1999:399). Comprehending the value of a singular artefact is one aspect; "understanding how it plays its part in a temporally and spatially configured heterogeneous assemblage that interlocks with real-time learning and teaching activities is quite another" (Ellis & Goodyear, 2016:160). Learning spaces need to be recognised as places in which objects and activities are built on each other, driven by curricular purposes and values.

Traditional design studios offered a curated classroom space meant to inspire original thought and expression. However, students in the traditional design studio have exhibited lower levels of interest and involvement when working in a studio. This is due to a number of factors (Rodriguez et al., 2018). Creative thinking and design are influenced in different ways by the conventional design studio's methodical, sequential procedure which limits students' exposure to different perspectives and approaches to learning (Rodriguez et al., 2018). Moreover, according to Rodriguez et al. (2018), the traditional design studio context has demonstrated a disconnect from real-world problem situations, which emphasises that resolving real-world challenges while seated in a dedicated working environment may be the primary cause of this disconnection of place. It is crucial to be aware of the factors that set the standard design studio apart from other settings. It can be difficult to facilitate design tools that were originally intended to function within a computer-aided design environment while attempting to create a nomadic design environment outside of a traditional studio

setting. An example of this would be if students were asked to research a given topic within a nomadic setting and there is no wi-fi available.

Several factors, such as ergonomics, comfort, technical infrastructure and individual preference, need to be considered when designing a learning space. Unfortunately, these design choices are frequently made as needed and without much forethought (Thoring et al., 2018). For this reason, the authors developed design principles to offer designers “a systematic design or redesign of a creative workspace based on the typology of creative space,” as seen in Figure 5 (p.21) and Table 3 (p.22) below (Thoring et al., 2018:1972). One definition of "space type" is "a specialised area for a given activity at a specific time" (such as a presentation space, collaborative space, or model-making space). Thoring et al. explain that there are five distinct types of creative spaces: "(1) the personal space, for working or learning alone; (2) the collaboration space, for working or learning together with co-workers, classmates, or teachers; (3) the presentation area, for giving presentations, attending lectures, and presenting or studying creative work examples; (4) the making space, in which people are able to experiment, try things out, build stuff, and make noise; and (5) the intermission space, includes spaces that are not deliberately intended for creative design work but connect the other space types, for example, hallways, cafeterias, or the outdoors, and provide spaces for breaks” (Thoring, 2019: 84).

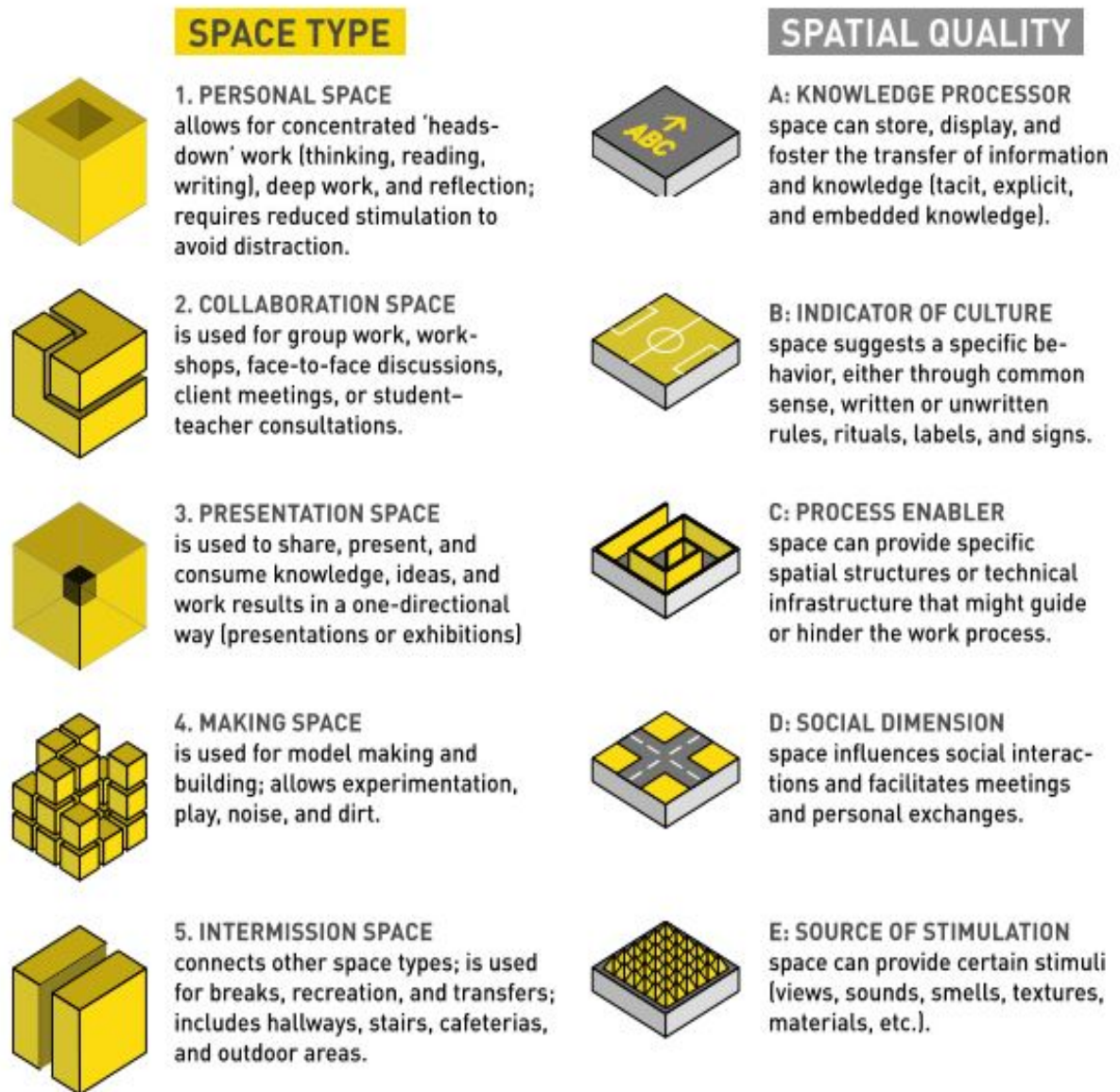


Figure 5. Space types (left) and qualities (right) of a creative space (Thoring et al., 2018:1972).

Each location has a predetermined "affordance" (Norman, 2002) that dictates the primary activities that can take place in it, based on how the area is laid out (e.g., the spatial layout and furniture). Since this set-up is modifiable, the characteristics of a given space may also shift. In spite of this, rearranging furniture or removing walls takes time and energy. The versatility of a location is measured by how quickly and easily it can be transformed from one use to another. Spatial quality is the capacity of a location to facilitate a certain goal, which is unrelated to the sort of space in which it is located. There are five distinct characteristics to a creative space: (a) being a knowledge processor, (b) an indicator of organisational culture, (c) acting as a process enabler by providing an appropriate infrastructure, (d) having a social dimension, and (e) being a source of stimulation. Table 3 below shows that, depending on the process phase, the extent and characteristics of the

quality, or individual preferences, may have either a favourable or negative impact on the work being done (Thoring, 2019:89).

Table 3. Requirements matrix of space types related to spatial qualities (Thoring et al., 2018:1974).

	Knowledge Processor	Indicator of Culture	Process Enabler	Social Dimension	Source of Stimulation
Personal Space <i>should/might:</i>	<ul style="list-style-type: none"> – protect knowledge – provide access to explicit knowledge – provide repository 	<ul style="list-style-type: none"> – indicate privacy – provide separation from others – express individuality 	<ul style="list-style-type: none"> – provide secluded booths – provide appropriate equipment 	<ul style="list-style-type: none"> – reduce social interactions 	<ul style="list-style-type: none"> – be protected from external stimulation – provide individually adjustable stimulation
Collaboration Space <i>should/might:</i>	<ul style="list-style-type: none"> – provide access to knowledge – display explicit knowledge – enable tacit knowledge exchange 	<ul style="list-style-type: none"> – indicate rules for usage and behaviour – be accessible – be playful – facilitate common rituals 	<ul style="list-style-type: none"> – facilitate teamwork – provide collaboration furniture – include flexible and moveable furniture 	<ul style="list-style-type: none"> – invite and enable social interaction – provide meeting areas 	<ul style="list-style-type: none"> – provide visual and acoustic stimulation – allow higher noise level – limit noise level to acceptable degree
Making Space <i>should/might:</i>	<ul style="list-style-type: none"> – provide instructions for usage – display artefact knowledge 	<ul style="list-style-type: none"> – invite experimentation – invite trial-and-error – allow noise and dirt 	<ul style="list-style-type: none"> – provide materials – provide making infrastructure 	<ul style="list-style-type: none"> – facilitate task-related social interactions 	<ul style="list-style-type: none"> – allow higher noise/dirt level – limit noise/dirt to acceptable degree
Presentation Space <i>should/might:</i>	<ul style="list-style-type: none"> – facilitate knowledge transfer – display artefact knowledge 	<ul style="list-style-type: none"> – upvalue/highlight presenter or work – enable/encourage feedback 	<ul style="list-style-type: none"> – provide infrastructure for presenting – provide a platform to display/present work 	<ul style="list-style-type: none"> – invite feedback/discussions 	<ul style="list-style-type: none"> – reduce external distraction – presentation should become main stimulation
Intermission Space <i>should/might:</i>	<ul style="list-style-type: none"> – facilitate knowledge transfer – display knowledge of general interest – provide access to field/user research 	<ul style="list-style-type: none"> – be inviting, cosy, welcoming, or representative – facilitate common rituals 	<ul style="list-style-type: none"> – provide outdoor access – provide recreation area – provide access to suppliers – be in proximity to other spaces 	<ul style="list-style-type: none"> – facilitate coincidental meetings – enable collective breaks 	<ul style="list-style-type: none"> – provide fresh air and/or food – provide reduced stimulation – provide natural stimulation

2.8 The pattern language of creative space

Thoring et al. (2018:1974) established 49 abstracted design principles for the design of creative spaces which offer insights into working procedures for “facilitating design activities and improving design processes through the spatial environment”. These principles are not intended to deliver precise design draughts. However, they serve as a desirable model which needs to be adapted by designers of creative spaces to suit the contextual needs of the environment. The principles for creative spaces provide the designer with the required spatial arrangements applicable to a given environment.

Table 4 on the following page, presents a catalogue of all 49 “abstracted design principles for creative spaces” (Thoring et al., 2018:1974). Each principle is assigned unique names

that suggest its possible context and objective. “[T]he principles are grouped into four categories—like Alexander et al.’s Pattern Language (1977); they are ordered from large scale to small scale in Figure 6: Furniture, Interior, Architecture, and Neighbourhood” (Thoring et al., 2018:1969).



Figure 6. System of creative spaces (Thoring, et al., 2018:1969).

Thus, users can choose principles which fit the resources, accessibility and backdrop. Shifts among categories could be viewed as undefined, as particular principles could apply to multiple categories, e.g., a “high seat could be a piece of furniture or an elevated stage as part of the interior of a space” (Thoring et al., 2018:1969). The principal descriptions elaborate on the working application of the principle while giving defined examples and references to related literature. This method of applying relevant principles creates a substantial foundation for studio-based environments.

Table 4. Overview of 49 design patterns for creative spaces, ordered from small scale to large scale (Thoring, et al., 2018:1974).

No	Title	Description	Space Types	Qualities People
1	Visible Tools	Visible tools provide inspiration and guidance about the process or prototyping possibilities.	Making Process	Process Enabler
2	The Label	Signs or posters indicate a specific philosophy, mindset, or suggest a creative behaviour.	Intermission, (Collaboration) Culture	Culture
3	Visual Inventory	Storage units or rooms that display their content or usage instructions through labels, signs or icons, provide helpful information.	Intermission, any other space type	Knowledge Processor
4	The Bulletin Board	Display of people's expertise or informal exchange of supplies.	Intermission	Knowledge Processor
5	Writeable Surface	Paper sheets available for informal, spontaneous notetaking. Surfaces of furniture (tables, boards) or walls can be used for collaborative notetaking.	Collaboration, (Intermission)	Knowledge Processor, (Process Enabler)
6	The Greenhouse	Plants or green areas provide visual stimulation and better air quality.	Intermission	Stimulation
7	Invitation Chair	Small stools next to a workstation invite others to sit down and give feedback. Workstations for two enable pair programming.	Collaboration	Social Dimension
8	High Seat	Elevated seats allow for better views and eye contact with passers-by, as well as a more active participation in teamwork.	Collaboration	Process Enabler
9	Seat Variations	Different seats enable varying work postures and different activities.	Collaboration	Process Enabler
10	The Out-look	Views to the exterior or observation points within the building provide visual stimulation and eventually instigate social interaction.	Intermission, Collaboration	Stimulation, (Social Dimension)
11	The Beanbag	Unconventional seats allow for temporary withdrawal from work and playful relaxation, and indicate that this is invited by the organization.	Intermission	Culture, (Stimulation)
12	Communal Table	Shared tables in hallways or communal areas instigate collaboration and provide the possibility to work individually but in company.	Intermission	Social Dimension
13	Showcase	Interim work models become an excerpt of the work process and provide practical inspiration. Finished projects incorporate artifact knowledge of successful design, material usage, or construction.	Presentation, Intermission	Stimulation, (Knowledge Processor)
14	The Allrounder	Multifunctional furniture can help to use limited space more efficiently. Two-in-one solutions allow for different usage scenarios at different times.	Collaboration	Process Enabler
15	The Pop-up	Foldable furniture allows temporary usage when needed.	Collaboration	Process Enabler
16	The Movable	Furniture on wheels allows easy moving and rearranging.	Collaboration Culture,	Process Enabler

17	The Garage	Handmade appearance and raw materials create an experimental atmosphere; graffiti murals invite artistic self-expression.	Intermission	Culture
18	The Confessional	Seat arrangements for two allow intimate conversations or consultations.	Collaboration, (Intermission)	Social Dimension
19	The Capsule	Secluded booths facilitate focused work, daydreaming, and personal withdrawal.	Personal, (Intermission)	Stimulation, (Social Dimension)
20	Collectibles	Dedicated space to collect own items/ideas or inspirational material on some sort of "mood board".	Collaboration	Stimulation, Knowledge Processor
21	The Swap Station	Dedicated space to exchange items with own pieces invites interaction and inspires through variation.	Collaboration, Intermission	Stimulation, Culture
22	Cabinet of Curiosities	Collections of materials, techniques, and small toys or gadgets provide inspiration.	Making, (Collaboration)	Stimulation, (Knowledge Processor)
23	Playground	Games, toys, musical instruments, and sports facilities foster experimentation and activity.	Intermission, (Collaboration)	Stimulation
24	The Anchor	Central attractions facilitate chance encounters and meetings across departments, floors, or buildings.	Intermission	Social Dimension
25	The Flex Room	Studios or meeting rooms for varying purposes, available on demand and upon request.	Collaboration	Process Enabler
26	The Lounge	Group arrangements with sofas and lounge chairs invite casual meetings.	Intermission	Social Dimension
27	Odd Shape	Unusual shapes of common elements can trigger curiosity, play, and interaction; hence, these provide inspiration.	Intermission	Stimulation
28	Mystery	Elements with unclear functions or restricted access instigate curiosity and thus trigger creativity. The lack of instructions or visual affordances instigates experimentation and trial-and-error.	Collaboration, (Intermission)	Stimulation
29	Buzz	Ambient background noise like relaxing music or a certain level of background conversations can set someone into a creative and active mood.	Collaboration, (Intermission)	Stimulation
30	The Silencer	Especially in open plan office environments, a raised noise level causes distraction. This problem can be minimized through integrated (e.g., felt) silencers.	Intermission, Collaboration	Stimulation
31	Access Control Time-delayed	Time-delayed usage distribution and security reasons require digital booking systems and access control.	Collaboration, Personal	Process Enabler, Culture
32	The Plug-in	Sockets, digital info boards and technical infrastructure enable working anywhere.	Collaboration, Intermission	Process Enabler
33	Leftover Space	Niches and dead corners invite experimentation. People can use them to install exhibitions or set up their own hangout areas.	Intermission	Stimulation
34	Empty Space	White space and emptiness invite implementation of own ideas; the space acts as a stage for people's work.	any	Stimulation, (Process Enabler)

35	Informal Library	Casual areas with books and magazines provide inspiration and facilitate research.	Intermission, (Collaboration) Knowledge	Knowledge Processor
36	Semi-Privacy	Views across rooms enable eye contact and allow observation of others' activities. Glass walls provide noise protection but keep visual contact.	Collaboration	Stimulation, (Social Dimension)
37	View Variations	Window views are stimulating. This effect can be enhanced through structures and frames that make the view more interesting and varied. Windows in varying sizes and arrangements provide changing views.	any	Stimulation
38	Mixed Lights	A space that is flooded with light is stimulating and facilitates manual work such as sketching or reading. Large windows and additional lamps provide extra brightness.	any	Stimulation, (Process Enabler)
39	Vertical Distance	Large room height allows large-scale prototyping and "opens the mind".	Making, Collaboration, Intermission	Stimulation, (Process Enabler) Collaboration
40	Asymmetric Floor plan	Non-rectangular (polygon, concave, or rounded) floorplans create cosy niches and interesting perspectives across interior and exterior areas.	Collaboration	Stimulation
41	Nested Open Plan	Open-plan offices facilitate visual contact and social interaction, but can result in a "factory" atmosphere. Elevated plateaus and nested areas can mitigate this effect.	Collaboration, (Intermission)	Social Dimension, (Stimulation)
42	The reception	A welcoming reception area can put people in a positive mood and make them receptive for creativity.	Intermission	Social Dimension
43	Visible Structures	Visible construction triggers a "garage" feeling and reveals knowledge of functionality.	Collaboration, Intermission	Stimulation, Knowledge Processor
44	The Plaza	Large staircases or central junction areas are great hangouts or casual work areas. They facilitate chance encounters and serve as observation points.	Intermission	Social Dimension
45	Outer Space	Outdoor access enables casual breaks to get some fresh air and, hence, provide a change of perspective.	Intermission	Stimulation
46	The Pavilion	People love to work outdoors, but there is often a lack of equipment, electricity, or shelter. Outdoor work spaces with appropriate infrastructure mitigate this drawback.	Collaboration, Intermission	Stimulation, Process Enable
47	Genius Loc	Creative neighbourhood, heritage, or history can spark off creativity.	any	Culture
48	The Supply Store	On-site availability of resources facilitates prototyping and provides stimulation.	Intermission	Stimulation, Process Enabler
49	Field Access	Central location or easy access to public transport enables easy (user) research.	Intermission Social	Social Dimension, (Process Enabler)

I cannot analyse all 49 design patterns for creative areas in detail due to page limitations. Therefore, only one pattern is represented in detail in Table 5 below. The table highlights the context, problem, solution, explanation, disadvantage and space type of 'view variations. I have chosen pattern no 37 as an example due to its reoccurring relevance to connection between space, place and people and how it showcases physical and phycological relevance in the design consideration of creative spaces. Designers, lecturers and urban planners can use this table to identify parallels between their own surroundings and those featured in the overview of the design principle, and then modify the suggested solutions accordingly.

Table 5. Design principle No 37: View Variations (architecture) (Thoring et al., 2018:1974).

View Variations (architecture)	
Context	Window views are considered positive for creating an inspiring and stimulating atmosphere.
Problem	However, always looking at the same scene might also result in boredom.
Solution	Windows arranged in various sizes, angles and vertical positions provide a multitude of different views and motifs.
Explanation	Surprising views can create inspiring stimuli. Making new connections can lead to flexibility of ideas.
Disadvantage	Possible distraction
Addresses	Space type: intermission space, collaborative space, personal space. Spatial quality: Stimulation

2.9 The nomadic studio - an expression of immersive design-thinking.

The idea of 'nomadicity' is progressively viewed as an element of work practices and refers to work that can take place in various locations while mediated and supported by technology. Ciolfi notes that

"The advent and spread of mobile and networked technologies such as laptops, PDAs, mobile and smartphones and so forth, is one of the foundations to the proliferation of nomadic practices because it allows for the mobility of the workplace to new locations where necessary resources to conduct the work can be found" (Ciolfi & de Carvalho, 2014:127).

Evidence in literature of the practice of nomadicity shows a much longer history of nomadic work within computer-supported cooperative work (which is the study of how people work together using computing and communication technologies) as they undertake projects across locations, much of which calls for collaboration with others (Perry et al., 2001).

Mobility and nomadicity are often seen as overlapping concepts. However, Ciolfi and de Carvalho (2014) maintain that they should be viewed as two separate concepts:

- “Mobile work” should be interpreted as an occupation or activity in which people move across locations to achieve their work (pilot, captain, diver).
- The concept of nomadicity takes on a layer of complexity as “it involves both the movement of people and things and the work in preparing for such movement and following the movement in creating conditions to engage with work and life activities” (Ciolfi, 2014:121).

Studies of nomadicity centre their research on the nomadic worker, also referred to as the hot-desker (Brown & O’Hara, 2003; Nelson et al., 2017). Alternatively, the research is seen to be centred around the nomadic work of collaborative groups, meaning groups that have a shared objective, for instance, students completing a common brief (Rossitto, 2014). As much as the study of nomadic work has become a common research topic (Ciolfi & de Carvalho, 2014), little of it seems to have focused on educational scenarios/challenges. Ellis and Goodyear (2016) maintain that studies of students involved in working across numerous sites in long-term collaborative activities are rare. It can be said, however, that studying the research in other fields can lead to a strengthened understanding of nomadic collaboration.

According to the Theory of Creative Affordances (Glăveanu & Petre, 2014), we cannot presume that everyone can sense the potential in their surroundings. There is more at play than a simple response to environmental stimuli in the relationship between the environment and its occupier. Instead, creative results depend on the individual who perceives the potential and are achieved when that individual actively engages with seeing beyond what should be, would be and might be done. Amabile et al.’s influential research in 1996 confirmed that one’s surroundings substantially influence one’s ability to be creative. They summed up the most influential features of the environment as follows: human autonomy, availability of resources, positive reinforcement, external pressures and internal organisational variables.

Through the shift of working environments during COVID-19 we now understand how one’s workplace can be both stifling and liberating in terms of one’s creative output, as well as being a source of stress that can have a negative effect on one’s productivity and morale. “It is demonstrated that the environment is a crucial factor in fostering creativity” (Stone & Sanderson, 2021:87). These researchers maintain that spatial and social components are difficult to separate from one another, despite the fact that isolated architectural traits have

been shown to be essential to production. According to some researchers, for instance, Zane (2015), the complex interaction between the physical structure of a room, its organisation and distribution of space, as well as the humans who occupy it, may play a role in creative production Prabhakaran (2022: par 6) identifies tacit knowledge as follows:

“...knowledge you’ve gained through living experience, both in your personal life and professional development. It is often subjective, informal, and difficult to share or express because it is affected by our personal beliefs and values. Tacit knowledge is abstract and affects how we perceive and move through the world”.

According to Prabhakaran (2022), Michael Polanyi, a chemical engineer-turned-scientist, coined the phrase "tacit knowledge" in his 1958 book *Personal Knowledge: Towards a Post-Critical Philosophy*. He asserts that people are incapable of articulating a certain form of knowledge. In general, tacit knowledge can be expressed in the following ways as seen in Figure 7 below.

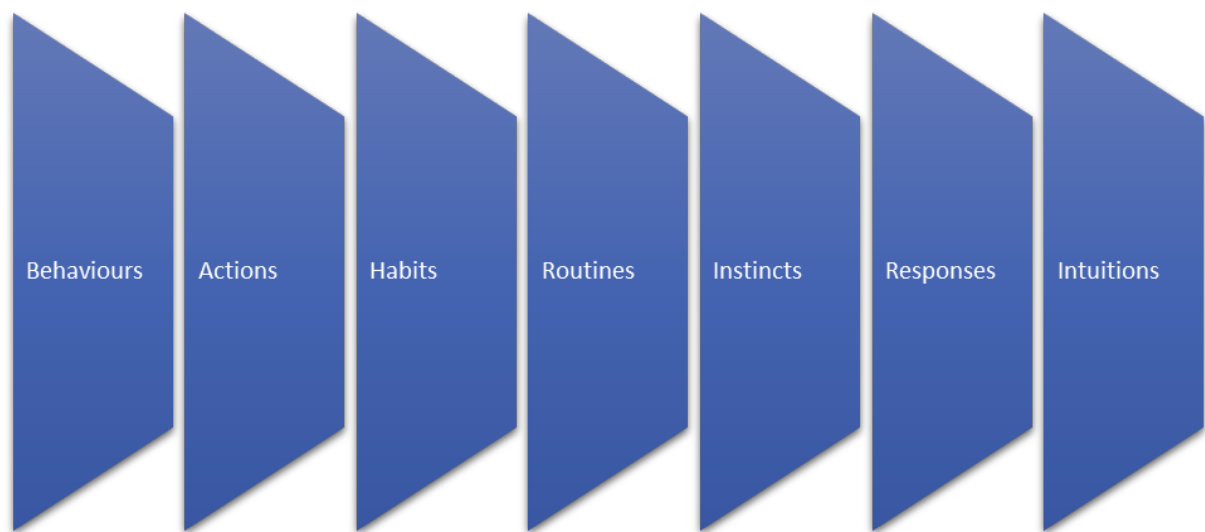


Figure 7. Expressions of tacit knowledge (Prabhakaran:2022).

For a student to acquire tacit knowledge, it is not enough that the lecturer guides the student through a course. Although studying the coursework information and details of a topic is a necessity for acquiring tacit knowledge, learning while being immersed in the setting and accumulating personal experience improve the quality of information. Tacit knowledge is gained through experience, trial and error, experiments, capturing data throughout a research period and documenting findings, then using the data to strategies. Understanding tacit knowledge leads to a realisation of the importance of understanding explicit knowledge which can be easily taught, communicated and explicated with instructions. Explicit

knowledge does not depend on much management, training or prior expertise, making it much simpler than tacit knowledge, as it does not call for in-depth thought. Figure 8 shows the notable differences in key characteristics, coding, ease of transfer and storage of these two main categories of knowledge.

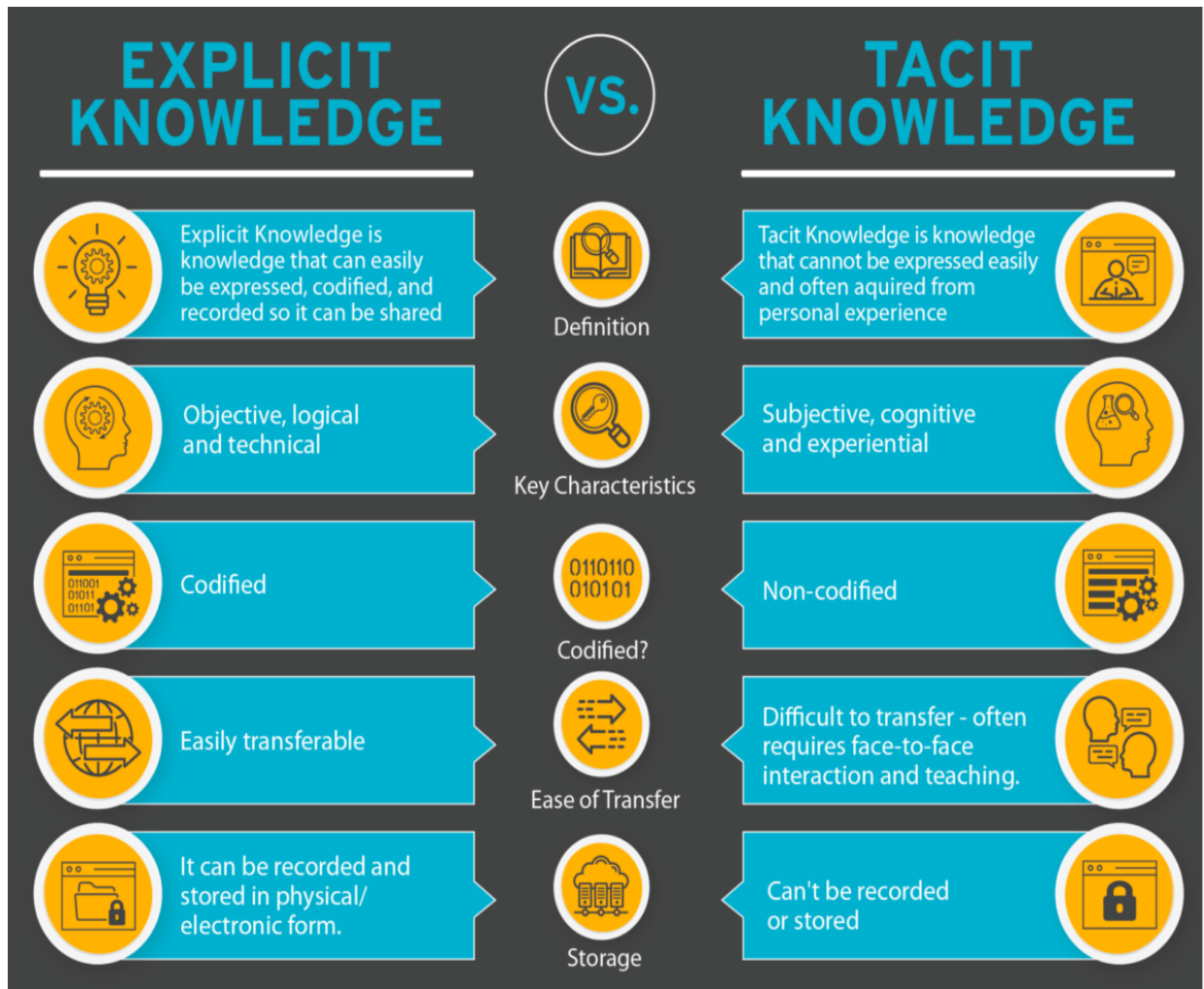


Figure 8. Two primary types of knowledge: explicit and tacit knowledge (Prabhakaran, 2022:1).

Studies of collaborative learning groups that are mobile in nature have received less attention. As Ellis and Goodyear (2016) comment in their review of models of learning space: Observing what students do, how they move through, occupy and rearrange space, how they build conducive learning environments, and how they assemble tools and other artefacts in their work as students is the most effective method for acquiring insight into possible processes. Equally important is speaking with students, instructors and other stakeholders to determine what they are doing and why, how they perceive various settings, and what they feel works best for them in each of the numerous activities that comprise their study. Combining observational and experience data is still uncommon - but crucial (Ellis & Goodyear, 2016).

2.10 Hot-Desking

The hot-desking trend was first introduced in the 1980s and was an approach adopted in office design to save not just space and resources but also to allow staff flexible working hours. Babapour et al. (2018) observed, based on case studies, that participants who adopted the desk-sharing concept found benefits in the ease of access to information and collaborators. However, criticisms were also voiced regarding hot-desking due to the lack of privacy and sense of territory (Babapour et al., 2018). Most studies on hot-desking have been carried out in office settings. Limited research has systematically investigated “the link between the physical environment, studio culture and its embodied behaviours under hot-desking conditions” (Cai & Khan, 2010:40). Therefore, emphasis on observation, documentation and reflection of studios under these spatial constraints is called for with the purpose of examining the behavioural significance linked to the flexibility and conversion of the studio learning environment.

Fredrick W. Taylor (1856 – 1915) laid the groundwork for the contemporary workplace. He suggested methods to increase production by using scientific procedures to measure output, identifying and analysing repetitive steps within tasks (Lewis & Myers, 2011). As a result, Frank and Lillian Gilbreth developed the concept of a production line and realised its usefulness beyond the factory. Workers were lined up in rows in vast rooms to make it easier to keep an eye on them (Stuart, 2014). The typing pool is probably the best illustration of this innovation in office technology which, during the 1940s and 1950s, contributed to a more streamlined, organised workplace. The development of air-conditioning and the advent of the suspended ceiling made it possible to construct highly functional, open-floor plans that were both deep and wide. Wi-Fi, roaming profiles, virtual private networks and portable computers all came into widespread use in the 2000s, greatly improving the efficiency of hot-desking within the office and enabling remote work on a large scale. Several businesses have recently adopted flexible working arrangements, transforming their workplaces into dynamic environments by switching to open-floor plans and implementing hot-desking (Stuart, 2014).

Similarly, over the past decade, studios have transformed due to pressures on space and staff time, as well as a shift in students' work patterns, paired with the ever-evolving change in technology. In response to these changes in technology and pedagogies, some physical studios have moved outside the classroom space to link creative designs with real-life community design problems (Salama, 2016). Alternatively, studios respond with new space management strategies, such as integrating hot-desking plans. A hot-desking studio is centred around mobile work patterns, as students have no fixed space to create a personal workstation, but use any available desk during a certain session (Cooper et al., 2017).

Architectural Design programmes typically assign students to a studio for the duration of the academic year. For example, first-year students would be assigned to have classes in the 'first-year studio' and this would remain their studio until they graduate to second year, after which they would be assigned to the 'second-year studio'.

2.11 Design approaches

The following section expands on design approaches which emerged from the literature review. The User Experience Honeycomb model (of measuring user experience) was created by Morville (2004) and is depicted in Figure 9 below. Despite the fact that the model was created for the information architecture (IA), Lau (2015) argues that Architectural Design is basically user-experience design on a physical and spatial level, where the space is just another medium, and buildings and structures are the interfaces and frameworks that users can interact with. The seven elements of the model are: "useful, desirable, accessible, credible, findable, useable and valuable" Morville (2004: par 5). This relates to the reliability of specific design elements and the quality of the service offered.

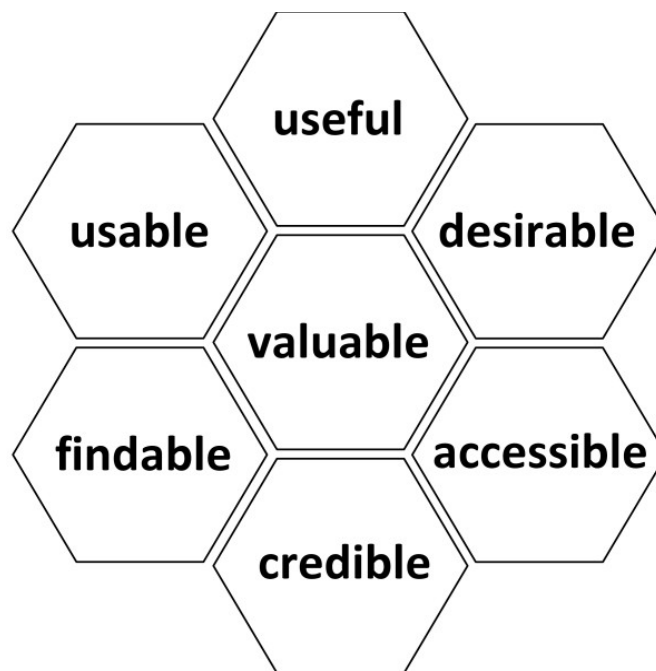


Figure 9. User Experience Honeycomb adapted from Morville (2004).

Morville (2004) applies the lens of information architecture to define "useful" elaborating that it means that designers must have the confidence to ask users directly whether their solutions are beneficial. The functionality of Interior Design may be impacted in a similar fashion (Morville, 2004). The term "usable" refers to something that can be used effectively, in this case, the use of a studio-based setting that enables design-thinking. The term "desirable" refers to the visual aesthetics of a space and how it impacts user-experience. Morville outlines "findable" as a design principle that facilitates user-access to desired

content. Unfortunately, way-finding aids are typically an afterthought or an added layer. Morville describes "accessible" in the context of universal design, which makes the design usable by anyone, regardless of their age, size, or ability. "Credible" refers to "factors that affect whether users trust and believe what we say" (Morville, 2004: par 5).

Environmental psychology, on the other hand, examines the mutually beneficial partnerships between people and their settings (Kopec, 2012). Lighting and noise, buildings, corridors, furniture and symbolic artefacts, defined as the meaning or appearance of a location, are all examples of environmental stimuli that might influence human actions (Kopec, 2012). There is a parallel between environmental psychology and the application of empirical data. Moses (2017) notes that several areas of design, including space-planning, lighting, ergonomics, acoustics, signage and Interior Design, share a common ground with environmental psychology. People are affected by the way buildings and interiors are designed (Gifford, 2012). An example of this is the design of thermal control in a building due to its physical and psychological effects. Personal control is one of the determining elements for user-comfort and environmental comfort (Brown, 2003). According to Kwon et al., greater controllability results in greater thermal comfort (Kwon et al., 2019). Their research also revealed the psychological effect of personal control on user-pleasure by demonstrating differences in perceived satisfaction between "no control" and "do not have" for thermal comfort. Personal control of ventilation was the most influential aspect in determining thermal comfort.

Observational studies allow researchers in environmental psychology to learn about how people perceive their surroundings (Gifford, 2012). Human-centred design elaborates on this idea by defining it as a method by which the needs of the target audience are taken into account during the design process. By putting the user first, human-centred design is defined as "a method that guarantees that the design meets the requirements and capabilities of the individuals for whom they are intended" (Norman, 2013: 9). The key to accomplishing this is developing empathy for the individuals for whom one is designing (del Galdo et al., 2016). Maslow's (1943) 'hierarchy of needs' is frequently cited as a framework for comprehending the importance of user-input in design. In order to illustrate how design has progressed in response to changing human demands, Zhang and Dong (2008) developed a conceptual model. They joined Maslow's (1943) 'hierarchy of requirements' with Küthe's (1995) 'design and society' concept. Maslow's hierarchy of requirements was broken down into its component parts—the "function" level, "the consumer" level and the "human" level. To satisfy the physiological and safety requirements of Maslow's hierarchy, the area must be functionally described as "useful". Human-centred design takes into

account both functional and aesthetic requirements - or "tendencies which future design is likely to care for" (Zhang & Dong, 2008:6).

To comprehend the human-centred design process which ensures that the design meets the demands of the user, del Galdo et al. (2016:18) assert that empathy, which originates in the design practice, "requires intensive research with actual people in their natural contexts". This enables designers to access and comprehend consumer requirements (Kouprie & Visser, 2009). It is commonly recognized by the design research community that there is a 'designerly' way of knowing articulated by Nigel Cross (2006), that is distinct from other types of knowledge. Cross (2006) positions it as a third way of knowing, distinct from a Scientific or Humanities approach. Similarly, Kouprie and Visser illustrate the necessity for empathetic design by describing an experiment in which a number of people from various professions were tasked with designing a product or environment for a particular user-group. Moreover, none of these professions belonged to this particular user-group. This led to the question of how the design team would make relevant design choices, given that their own professional and personal needs varied from those of the individuals for whom they were creating - "others unlike themselves" (Kouprie & Visser 2009:437). This predicament can be described as an 'empathic horizon', which is used to represent the boundaries of a particular designer's capacity for empathy outside of specific group traits (McDonagh-Philp & Denton, 1999). History, youth, sexuality, ethnicity, schooling and experiences are a few examples of these traits.

Empathic tools and strategies are readily available to designers and can be utilised to comprehend and advance empathy across the design process. Kouprie and Visser (2009:439) divide empathic strategies into three categories: "research, communication, and ideation". The investigation component comprises tools that facilitate direct communication between the designer and the user. Thus, designers are able to determine user-requirements and experiences. Communication is described as a method that allows user-studies to be communicated to design teams. In order to observe experiences, user-studies involve spending a period of time observing the environment (del Galdo et al., 2016). Ideation is the method by which a designer's personal experiences materialise in an environment similar to the users.

However, not all authors concur with the design notion of empathy. Mattelmäki et al. (2014) caution that designers may fall prey to the "empathy trap", while Verganti (2009) notes that effective designers not only listen to people, but also trust their own rationale and follow their gut. Mattelmäki et al. (2014:73) warn designers and architects that, "if designers are not vigilant, attempts to be empathic may articulate popular reflections rather than

developing more radical possibilities". The concern associated with empathy may, however, explain why design-aims and user-experience frequently diverge.

In summary, it is obvious that all of the above design approaches share the same factor, namely users and their settings. Experience-based design is an iterative process that analyses user-based experience in order to optimise designs. Environmental psychology seeks to comprehend the interaction between persons and their settings, with human-centred design building on this as a method in which the design is tailored to the user's requirements. This is accomplished through empathy, through which direct experience is gained.

2.12 Conclusion

The literature was presented under the main themes of typology of creative space, pattern language of creative space, design approaches and emergent themes. According to Williams (2008), emergent themes are insights generated from the narratives or written experiences of research participants, collected through engaged reading and a method of abstraction, including the creation of categories from complex material. The typology of creative space provided a framework from which to structure the observation of activities within a given space, whereas Thoring's (2018) pattern language of creative space provides a blueprint of knowledge into how furniture, the interior and architecture could affect the spatial qualities of primary users. Furthermore, the concept of a nomadic studio highlights the ever-growing need to connect with and actively engage in 'the real world', as designers' surroundings substantially influence their ability to be creative (Amabile et al., 1996). With this in mind, human-centred design encourages designers to utilise empathy to comprehend the demands of their intended clients.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

In what follows, I will present my research strategy concerning the research problem and questions: An adaptive design approach to studio spaces in higher education within the Interior Design and Architectural Disciplines. A variety of research approaches are customarily grouped as experiments, surveys, or case studies, involving a particular approach to collecting and analysing data; each method has its pros and cons (Yin, 2018). This study will adopt a qualitative Participatory Action Research (PAR) strategy.

3.2 Data Collection

Data collection is the process of collecting relevant information in a documented systematic approach, either through primary or secondary data, and can be done in the form of images, words or numbers (Yin, 2018). The chosen data collection method depends on the field of study and the methodology employed by the researcher (Wahyuni, 2012). Effective data collection methods employed in PAR are "[f]ocus groups, participatory observation and field notes [as per Appendix D], interviews, diary, personal logs, questionnaires, and surveys" (MacDonald, 2012:41). Implementation of three chosen data collection methods permits effective problem-solving and eliminates the limitations of each method (MacDonald, 2012). The three data collection methods I have chosen to make use of is interviews, focus group, and participatory observation. Additionally Behavioural Mapping was employed as a geographical data capturing method for participatory observation, the consideration behind each of these data collection methods are discussed in detail in this chapter.

3.3 Documentation

This study used documentation to review and analyse journals, articles and academic papers to provide insight into an adaptive pedagogical studio environment as presented in in this chapter. The information found was then linked to the data findings generated from participatory observation, interviews and a focus group. Documents analysed allowed for the following objectives to be achieved:

- Topics surrounding the research question address the need for an adaptive studio-based environment.
- Identify the significance and validity of physical space in the Built Environment studio environment.

The use of documentation is to substantiate evidence from sources and triangulate the data. If document analysis leads to contradicting findings, the "researcher needs to delve deeper

into the topic to identify the problem” (Yin, 2018:157). Yin (2018:157) describes the “strengths and weaknesses of documentation” in Table 6.

Table 6. “Documentation strengths and weaknesses” (Yin, 2018:157).

Strengths	Weaknesses
Stable - can be reviewed repeatedly	Irretrievability - can be difficult to find
Unobtrusive-not created because of a case study	Biased selectively-if collection is incomplete
Exact - contains exact names, references, and details of an event	Reporting bias - reflects (unknown) bias of author
Broad coverage - long period, many events, and many settings	Results may be deliberately withheld

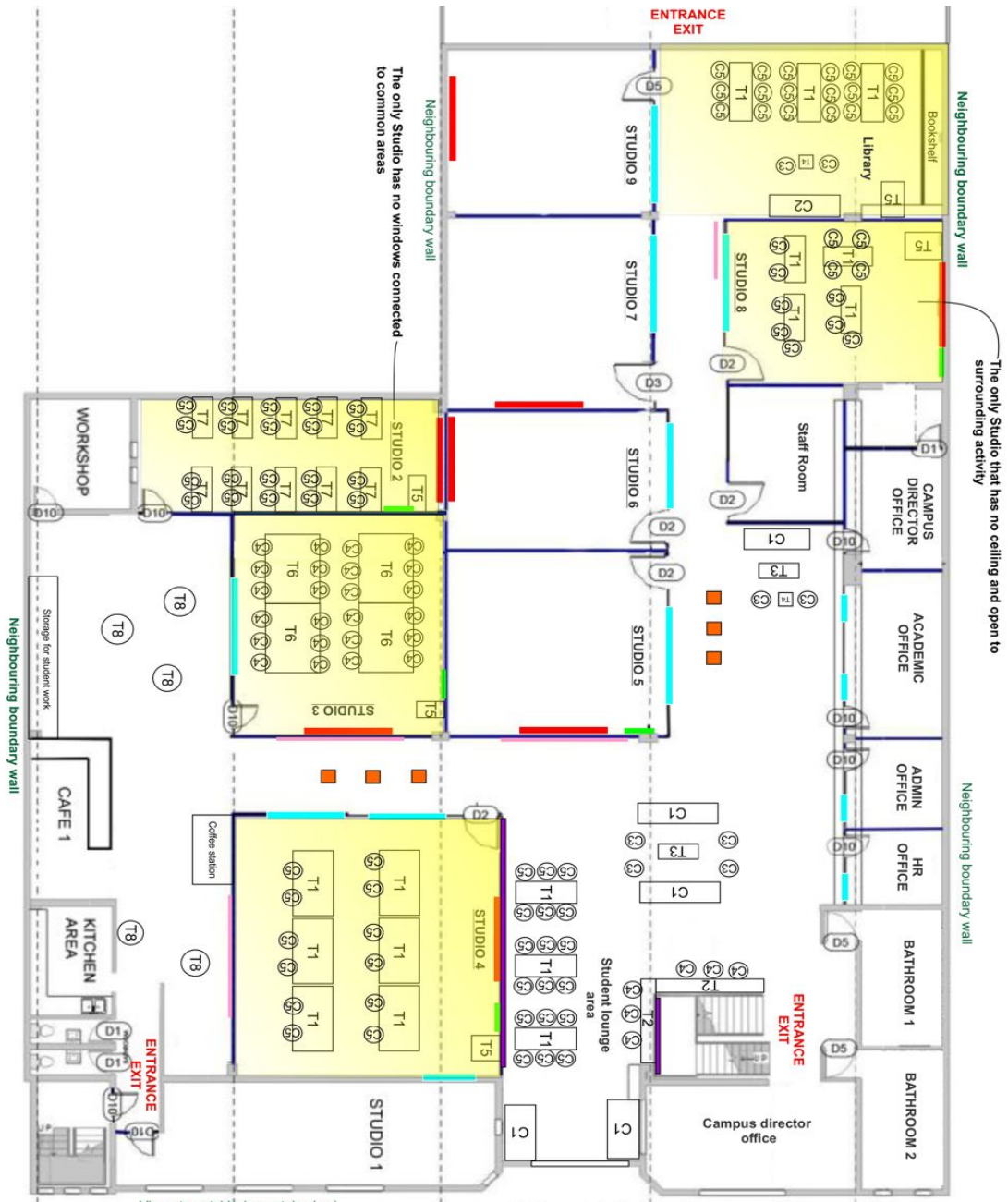
Ethical guidelines, derived from MacDonald (2012), were followed throughout the study process and during the participatory observation phase to maintain academic rigour and minimise prejudice and preconceived views in data inclusion selection and analysis. Section 3.11 contains a detailed analysis of ethical considerations.

3.4 Research setting

The PHEI that served as the case study for this research offers a multidisciplinary programme. Providing courses in ideation, graphic design, audio visual, architectural technology, and Interior Design, among others. In addition, the number of students in a conventional Architectural Design studio program ranges from 3 to 100 students per class. The PHEI being a private institution has, however, narrowed down its maximum intake to 22 students per class. This provides for increased individual time between students and lecturers for feedback, collaboration and coursework.

While engaging in this study, I lectured in two courses offered within the PHEI in the Western Cape, namely Applied Design (which is the main design subject) in Interior Design and Environmental Design. These two classes contributed to the empirical data in this study. The courses fall under the Built Environment Department within the PHEI, which operates several campuses nationally, all of which run within a single institutional structure offering initial and postgraduate degrees. The Built Environment Department comprises the Interior Design, Environmental Design, Interior Decorating & the Architectural Technology Departments. This institution has always shown a driving force for blended learning within the studio environment, as the studios are fully equipped with internet, projectors, speakers, as well as students having their individual laptops.

Two categories of observations in the research were done in two different settings: the first setting was that of the PHEI campus, where I work as a lecturer. A floor plan of the institution can be seen in Figure 10. The second setting was a more nomadic one, in which the choice of location was determined by the students' current design briefs. For example, if the students were currently studying coffee shop design the physical studio session would take place in a coffee shop, allowing the students to be fully immersed in the content they were covering.



KEY LEGEND	
Key	Description
T1	Trestle table: Table top can come off, has two foldable trestle legs per table,
T2	Café style table: Height counter top fixed to wall
T3	Coffee table
T4	Side table: Doubles up as a small seat
T5	Drawing table: Lecturers table houses computer which is linked up the the projector and studio speaker
T6	High table: Large modular tables which are easily taken apart if needed
T7	Table: Has fixed legs and can not be taken apart, desk height
T8	Café Table: Round table, can seat 2-3 people
C1	Sofa: Two seater
C2	Booth seating: Fits up to three people
C3	Occasional seat: Single seater material finish
C4	Bar seating: Plastic height seating
C5	Studio Chair: Plastic seating at desk height
	White board
	Window: connecting to interior circulation
	Projector screen
	Areas used in BM study
	Campus graphic
	Students projects on display

Figure 10. Private Higher Education Institution (de Figueiredo, 2019).

3.5 Sampling

The present study used a convenient sample size drawn from the target population (Denscombe, 2014). I used a stratified random sampling method to ensure that the study's samples were statistically representative of the target population (i.e., studio-based students and lecturers in the Built Environment). Non-probability sampling is one of the most fundamental methods, and explained in detail below (Kothari, 2004).

3.5.1 Non-probability sampling

For this research, a non-probability sampling method was adopted. Non-probability sampling employs a non-random selection “founded on convenience allowing ease to collect initial data which is appropriate for exploratory and qualitative research” (McCombes, 2019:1). Samples that are most useful to an intended research project are selected “to gain detailed knowledge about a specific phenomenon as opposed to statistical inference” (McCombes, 2019:1). Members of the population do not have the same chance of being picked for the sample as they would in a probability or random sample (Bhattacharjee, 2012). Researchers can choose from four distinct non-probability sampling methods, depending on the nature of the study's target population and other contextual factors. These methods of sampling are known as convenience, quota, snowball, and purposive sampling. As can be seen below, the selection of participants for this study was best handled through the use of purposeful sampling.

3.5.1.1 Purposive sampling

A purposive sampling method spoke best to the research question. As a lecturer at an institution of higher learning for a second-year Interior Design class consisting of 5 students and an Architecture second-year class of 15 students, this governed the predetermined sample size.

Purposive sampling refers to the process of selecting a sample from a larger population. The technique of purposive sampling has well-defined characteristics of the population in mind (Bhattacharjee, 2012). The traits and attributes of an entire population are utilised to target a small subset representative of the entire population (Yin, 2011). My research aimed to cast light on the impact of adaptable learning spaces on students and lectures in the Built Environment Faculty. To accomplish this goal, I sought out individuals who could provide pertinent information. Three lecturers within the Built Environment Faculty of the PHEI were emailed to establish their availability for a semi-structured interview, of which all agreed. The selection of these lecturers was based on the subjects they taught during and after COVID19. I felt that it was important to include a broad spectrum of subjects rather than focusing on the needs of just one type of subject, this allowed for a greater understanding

of the Built Environment studio. For the purpose of doing research, purposive sampling selects individuals who best fit the criteria put forward in a study.

An email was sent out to all Campus Academic Managers within the PHEI, advising them of the research topic and the volunteered assistance of 2nd- and 3rd-year Built Environment students. The Campus Academic Managers then sent Microsoft Teams invites to the dedicated student groups, from which seven accepted the invite to participate. The reason for requesting only students in 2nd and 3rd year was their faculty-specific coursework. Students' first-year courses in PHEIs are not industry-specific, but rather a mixture of the Arts. Thus the 2nd- and 3rd- year students served as stand-ins for the community at large (Built Environment) and were chosen based on shared qualities that are important to the goals of the study (Denscombe, 2014). As the sampling method was based on an interpretive stance, the importance was placed not on statistical or numerical criteria but on the usefulness and quality of the participants (Yin, 2011). Table 7 below shows the criteria for the selection of the participation sample.

Table 7. Criteria for the selection of the participation sample.

Main question: How can contact- and distance-learning be implemented in the Interior and Architectural Design studio to support an adaptive design-thinking environment?				
<i>Points of investigation</i>	Data Source	Tools	Unit of Analysis	Unit of observation
<i>Background, Methodology & Theories</i>	Literature	Read, Analyse, Write	Journals, Articles, Books	Published journals, accredited textbooks
<i>What are the vital spatial typologies within an Interior and Architectural Design studio, and what are their spatial considerations?</i>	Lecturers Students	Interviews Focus group Behaviour mapping (participatory observation)	Interior and Architectural Design Department	Built Environment lecturers (3) Built Environment students (7) 2 nd -year Environmental Design class (15) 2 nd -year Interior Design class (5)
<i>To what extent are e-learning platforms used in Interior and Architectural Design, and what design-thinking processes influence the consideration of these platforms in studio environments?</i>	Lecturers Students	Interviews Focus group Behaviour mapping (participatory observation)	Interior and Architectural Design Department	Built Environment lecturers (3) Built Environment students (7) 2 nd -year Environmental Design class (15) 2 nd -year Interior Design class (5)

<i>How are traditional categories of spaces becoming less meaningful and adaptable as activities blend?</i>	Lecturers	Interviews	Interior and Architectural Design Department	Built Environment lecturers (3)
	Students	Focus group Behaviour mapping (participatory observation)		Built Environment students (7) 2 nd -year Environmental Design class (15) 2 nd -year Interior Design class (5)
Total Participants				30

The Hawthorne effect describes the tendency of some participants to work harder and perform better when they are involved in a study. The word is frequently used to emphasise that individuals may alter their behaviour in response to the attention they receive from researchers, rather than as a result of the manipulation of independent variables (Schwartz et al.,2013). In order for researchers to have confidence in the outcomes of their studies, it is necessary to avoid potential difficulties and sources of bias such as the Hawthorne effect. This can be done with the following. Using naturalistic observation techniques might assist, avoid or reduce demand characteristics and other potential causes of experimental bias while conducting research in natural settings. Nevertheless, this is not always achievable (Franz,2018). Another technique is to make responses fully anonymous: Another technique to prevent this type of bias is to make the responses of experiment participants completely anonymous or secret. This may reduce the likelihood that participants may alter their behaviour as a result of participating in an experiment (Murdoch et al.,2014).

3.6 Participatory Action Research (PAR)

Action research is directly linked to an individual's professional practice (Burrows et al., 2012). Within the context of education, one could define the process as analysing a studio, school or teaching style, to analyse and improve the quality of actions or instructions. Participatory Action Research consists of the "repeated, systematic process of planning, acting, observing, evaluating, self-evaluation, and critical reflection prior to planning the next cycle" (Kemmis et al., 2014:6). As the method is continuous, it is viewed as the ultimate form of educational reflection (Burrows et al., 2012). The following points outline the traits of action research (Burrows et al., 2012):

- *Action research is systematic:* PAR allows researchers to observe, solve, or assess paths of action in a systematic and organised practice.
- *Researchers do not start with an answer:* PAR is intended to be honest and unbiased in its approach; researchers collect data to analyse a strategy's outcome rather than a predetermined outcome.

- *Action research undertakings vary in length:* “The question determines the length of data collection in an action research study, the nature of the inquiry, the research environment, and the parameters of the data collection” (Burrows et al., 2012:256).
- *Studies must be sufficiently planned before collecting data:* “Having a plan and a schedule for collecting data before starting separates a systematic inquiry from an impressionistic view” (Burrows et al., 2012:256).
- *Observations should be regular:* Many researchers’ observations might comprise quick notes on the date and time recorded; alternatively, they can be longer and more formal.
- *Action research is grounded in theory:* “Relating questions, results, and conclusions to an existing theory provides a context in which to understand your research and a grounding that lends credibility to your results” (Burrows et al., 2012:256).
- *Action research is not an experiential study:* PAR aims to understand what transpires in a given environment. Researchers are not seeking to refute a hypothesis, nor is it an experimental method (Burrows et al., 2012:256).

PAR allows researchers to improve their knowledge of how an individual’s actions or practices can influence and improve a community of practitioners (Kemmis, et al., 2014). Participatory Action Research demonstrates key aspects: “[P]eople’s local responses to changing concerns are prompted by global social movements which are always also educational movements because they always involve the individual and collective self-education of people” (Kemmis, et al., 2014). The critical educational pedagogy of Paula Freire and the Action Research done by Kurt Lewin form the building blocks of PAR (Burrows et al., 2012). PAR is a recursive process that consists of a spiral of flexible steps, listed in Figure 11, and visually represented in the diagram below (McTaggart & Nixon, 2018).

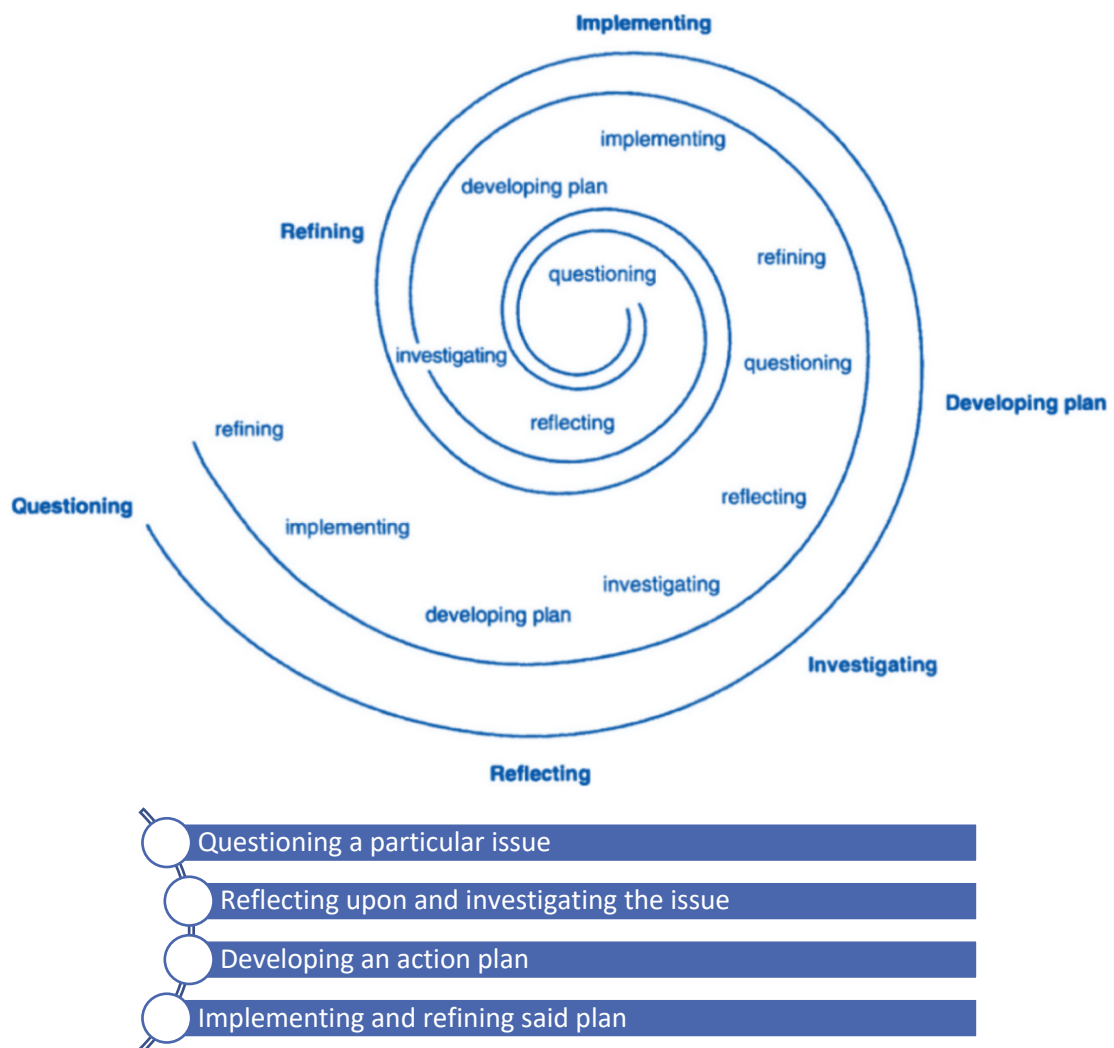


Figure 11. The Recursive process of PAR (Kemmis et al., 2014:6).

I incorporated Behavioural Mapping as a method of capturing participatory observation data, allowing for a systematic format of observations and reflection - additionally, allowing me to assess and solve paths of action, such as arriving at a site visit an hour before the allocated studio time to sketch out the floor plan of the nomadic studio. Furthermore, as I was the observer and participant within the context of the study, careful consideration was needed when taking notes not to detract from the attention and quality of my lecturing. This was managed by having pre-drawn floor plans of the PHEI's studio and ensuring that specific intervals were used for physically writing down notes. The observations led to questions regarding the traditional creative space types seen in Figure 12. Literature discussed in Chapter 2 allowed for further investigation of and reflection on my data. With this, I could put a plan into action and implement it an example being a move from offering the class in a traditional studio space to offering it in an intermission space. From there, the recursive process of PAR started again.

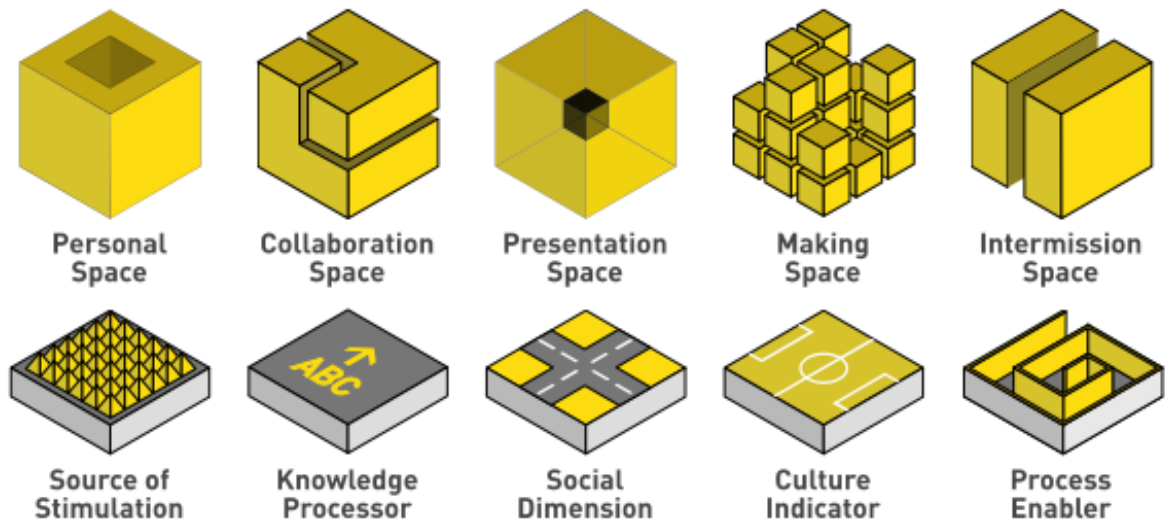


Figure 12. Space type (top) and qualities (bottom) of a creative space (Thoring et al., 2018:1972).

3.7 Participant Observation

Researchers use observation and participatory observation as two crucial data collection methods. When discussing the monitoring and evaluation of a research community, the term ‘observation’ is usually used to denote that a researcher directly observes the community’s activities (Beverly, 2022). Observers are able to witness the research community in action, which is useful for making evaluations. Alternately, in participatory observation, the researcher assumes the role of a participant, participating in communication with the research community and engaging in activities.

As Merriam (2009) points out, there is a spectrum between the roles of observer and observed, and it is along this spectrum that our observation and participant observation studies should be conducted. This continuum is broken down into its component parts as described by the author and seen in Figure 13 below.

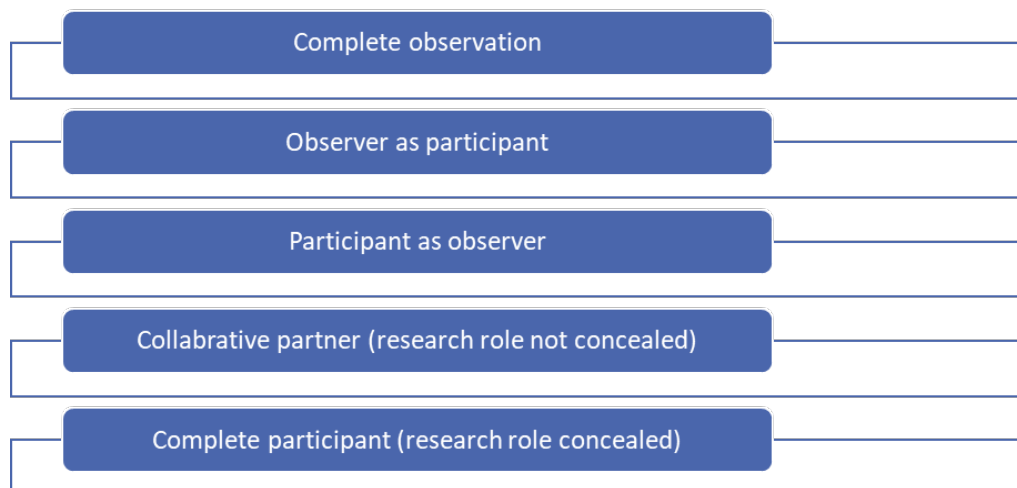


Figure 13. Type of observations (Merriam, 2009).

When doing participant observation, researchers find themselves somewhere along this spectrum “between complete observer and participant” (Beverly, 2022:01). Typically, researchers desire to assume the function of a collaborative participant, in order to obtain an emic view that is important for project planning, monitoring and evaluation (Beverly, 2022). It enables us to observe and comprehend what others are doing, which can then be compared to what they are saying. It enables us to determine whether people's actions deviate from their claims. Similarly, we use participatory observation to add depth to our analyses, as it allows us to witness and understand behavioural or attitudinal change. We observe and comprehend how participants utilise new or unique locations for learning. Comparing what individuals say with what they actually do also adds credibility to a researcher’s evaluation efforts. When planning PAR researchers frequently employ participatory observation to identify needs. Such observation could become a vital component of a needs assessment, particularly when participatory observation is planned. Observation is also used to monitor the deployment process and determine who is engaged and who is not. Observation is frequently used to compare individuals’ actions and to give depth to one’s evaluations.

Participatory observation, according to Bernard (2011), provides us with a unique perspective of the research community, as participation provides an innate knowledge of said community. Schensul and LeCompte (2013) explain that participatory observation leads to an instinctual and analytical understanding of how communities are ordered and prioritised, as well as how people interact with one another. For researchers, this comprises what is culturally suitable, which research programs may succeed, how a research programme is functioning throughout its execution, and exactly what its influence was. The goal of participatory observation is to be viewed as being part of the community - being a genuine participant. Bernard (2011) argues that participatory observation entails becoming close enough to people so that they feel comfortable telling us about their lives and thereby off-setting the observer effect that occurs in observation and participant observation and allowing for emic comprehension.

Participatory observation is utilised by researchers “in the planning, implementation, monitoring, and assessment of initiatives” (Beverly, 2022:01). It can also be employed to assist in the design of future research, such as interview questions. During the planning phase, researchers use participatory observation to determine people's needs and the most effective methods for designing the research. During the monitoring phase of implementation, researchers employ participatory observation to enhance an ongoing activity, such as understanding spatial considerations for design studios. The

researcher can inquire whether the participants in the research are engaged and, if not, why they are not engaged and what can be done to improve the situation (Beverly, 2022).

3.7.1 Behaviour Mapping employed as a participant observation method

Quantitative and qualitative in nature, Behaviour Mapping connects actions to specific locations. A base map of the area and an observation sheet with a prioritised list of behaviours are required for this technique. Researchers assign symbols to the locations where behaviours are observed and write down those symbols on an observation sheet (Cox et al., 2018; Loebach et al., 2020). To study the impact of a mental ward's physical layout on patients' actions, Ittelson, Rivlin and Proshansky (1970) developed the quantitative and qualitative technique of behaviour mapping (Ittelson et al., 1970). Although the initial research detailed the ward and individual rooms (such as bedrooms and common areas) inside the ward, no base map or floor plan of the ward was supplied. Since its inception, Behavioural Mapping has expanded to include a more precise floor plan that indicates where the behaviour in question occurs. Utilising a floor plan in Behavioural Mapping allowed for the prioritisation of behavioural patterns within the context of the actual environment. Later researchers extended the technique to study stroke survivors' rehabilitation, animal behaviour, and children's development (Cox et al., 2018). Behavioural Mapping is used by a range of experts, including urban planners, designers and environmental educators, to document visitor habits, analyse how attendance has changed after a refurbishment, or assess the success of an educational initiative.

Thus, Behavioural Mapping allows for an effective account of geo-located activities; it provides a useful tool to understand behavioural patterns (Cox et al., 2018) regardless of whether the subjects observed are acquainted with the setting or not (Bozkurt, 2016). The contribution of the exact locational of behavioural information permits the true recording of place-dependent behaviours and actions in these locations (Bozkurt, 2016). Generating a GIS (Geographic Information System) of physical actions and social behaviours entails the precise location of observed behaviours and actions and their conception on a base map (Boquett, 2018). The statistical link between people's actions and their surroundings is what strengthens this research method.

Validity and credibility issues are evident in Behaviour Mapping just as they are in any quantitative or qualitative approach. Behavioural Mapping datasets are the product of many hours of laborious data-collecting efforts, requiring researchers to undertake extensive training in the recording of observations (Cox et al., 2018). Due to its focus on quantitative and qualitative data, the study of Behavioural Mapping is well-suited to the investigation of learning environments.

Since behaviour and experience are inextricably linked, the results obtained from Behavioural Mapping. Behavioural Mapping would be useful in participatory observation, making it a good fit for the analysis of an adaptive design approach to studios, and since this is the case, Behavioural Mapping was used as participatory observation. Behaviour Mapping raises consciousness about human actions, such as present site use patterns and intended uses of place, as determined by studio participants and their instructor. Rather than trying to put a number on how much a certain location affects people's actions, Behaviour Mapping looks at how people really perceive that location, both in terms of their activity and behaviours.

My objective was to observe activities, participants and physical characteristics relevant to the research while engaging in activities fitting the social situation recorded by comprehensive field notes (Daniel & Harland, 2018). Behavioural Mapping is a type of systematic observation method that tracks behaviour over space and time and can link certain behaviours with the physical locations where those activities happen. "Behavioural mapping does not record blindly all activities but rather a limited set of behaviours" (MacQuillan et al., 2017). For this study, predefined categories of activities had been selected to be observed. They were coded as S (Sitting), T (Standing) and M (Moving). Their status of interaction, and the use of work surfaces and screens, was also recorded. The identity of the persons involved in the study was coded as I (Instructor), and S (Student). An example of this would be if a student stood while talking to his or her peers; it is represented as a circle with a dot in it and a line connected to it, as seen in Figure 14 below.

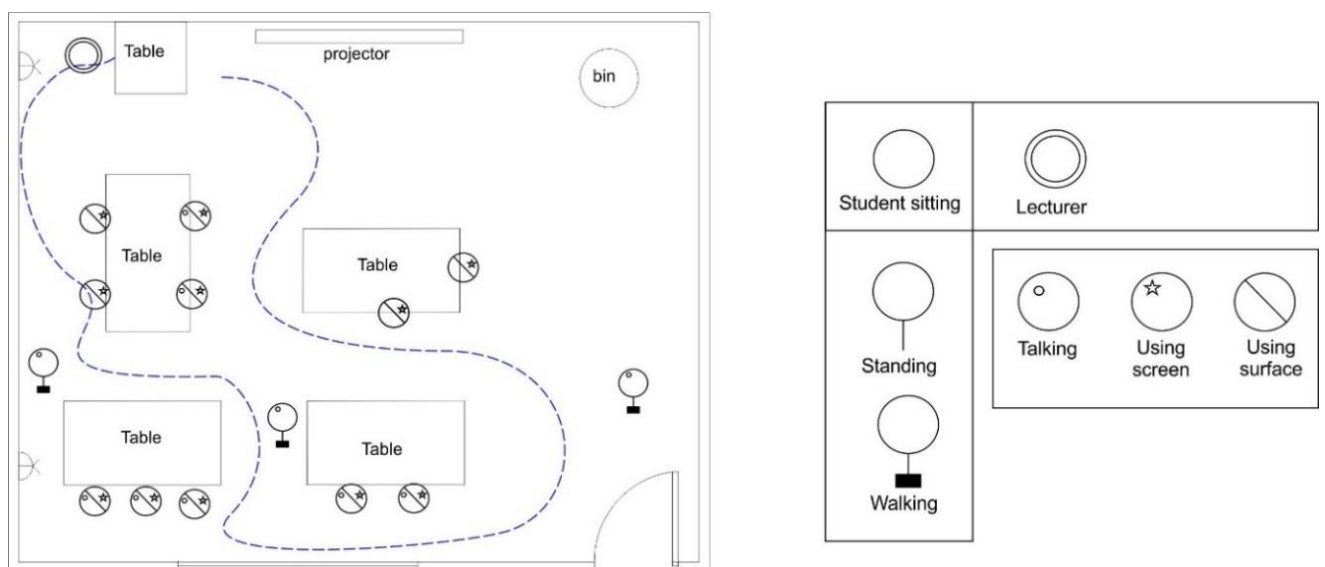


Figure 14. Example of Behavioural Mapping base-map codes filled in (Stock, 2022).

For each behavioural mapping exercise, a printed floor plan of the given studio (Template A, Figure 15) had to be on hand, and a set route of observation was determined from the

lecture's table. Physical locations and activities would be documented for the students in the studio. This would act as a window into how the studio is used.

Week _____	Date _____	Location <u>Studio 8</u>	Number of students _____
Class _____	Session _____	Studio focus <u>Critique / courseware/ studio time to work on brief</u>	

Notes








Figure 15. Example of Behavioural Mapping base-map Template A.

As opposed to Template A, which was used for the PHEI, Template B was used for locations outside of the PHEI. Before a session would begin, the researcher drew a floor plan of the provided setting in the template's blank space. Behaviour mapping requires an accurate base-map - in this case floor plan - so that researchers can precisely record the location of observed behaviour in order to connect place features with the behaviour (Little, 2020).

Week _____ Date _____ Location _____ Number of students _____

Class _____ Session _____ Studio focus Critique / courseware/ studio time to work on brief

Notes

 Student sitting	 Lecturer
 Standing	 Talking
 Walking	 Using screen
	 Using surface


 Path of data captured

Figure 16. Example of blank Behavioural Mapping Template B.

Each cycle of Behavioural Mapping would take approximately 10min. There would be three slots of observation, the start of the class as students enters, the middle of the session and then just before class ends. Students have three sessions per week (Session 1, Session 2 and Session 3), each class session being 1h 45min long. Each session would be recorded on the template. Additionally, the Interior Design or Environmental Design class in question would be documented along with the date, location, number of students present, and the purpose of the session: either a critique session, coursework, studio time to work on a brief, or a mix of these. A month of observation would allow for 360min of observation per group (second-year Interior Design class & 2nd-year Environmental Design class). Behavioural mapping in this setting aims to acquire a general pattern of space used. Mapping on different days also reduced the bias of events on specific days. A notes-section was integrated into the template to capture any unanticipated behaviour and additional reflections.

3.7.2 Analysis of Behavioural Mapping procedures

Mouton (2001:108) states that “the analysis and interpretation of data involve breaking up the data into manageable themes, patterns, trends and relationships,” permitting researchers to generate an understanding of the research and to identify “links between concepts and variables within the study”. In analysing the data, it is necessary to determine the overall number of items recorded, as well as the number of items within each category.

The final step in a continuous process of participatory observation is the analysis and organisation of collected data. For qualitative data, analytic induction would be the preferred method as it is a research logic utilised to direct data gathering, develop analysis, and organise the presentation of research results (Burrows et al., 2012). The technique of Analytic induction is purely qualitative, seeking encounters with new types of data in order to compel changes that will render the analysis legitimate when applied to an expanding number of examples with varying characteristics. Analytic induction is mostly used to build explanations of the interactional processes by which individuals develop what, in their perceptions, appear homogenous kinds of distinctive social behaviour (Burrows et al., 2012).

Research can be read literally, reflexively or interpretively. It is frequently seen that all three methods are utilised when reading the data generated through participatory observation (Willis & Edwards, 2014). Literal readings are often first carried out to access and document a literal version of the data captured (Willis & Edwards, 2014). The data often develop further through interpretive and reflexive readings, which entail “constructing or documenting a version of what you think you can infer from them” (Mason, 2006:149). This then leads to interpreting one’s “observations through theories based on identified patterns or trends found within the data” (Mouton, 2001:149). Alternately, reflexive reading concerns the role of the researcher as part of the analysis regarding the generation and understanding of the data (Mason, 2006). Figure 17 below represents the data analysis procedures for the participatory observation journal. It explains the movement from data reviewing to secondary entries and examines themes that emerged from the given journal text and data reviewed.

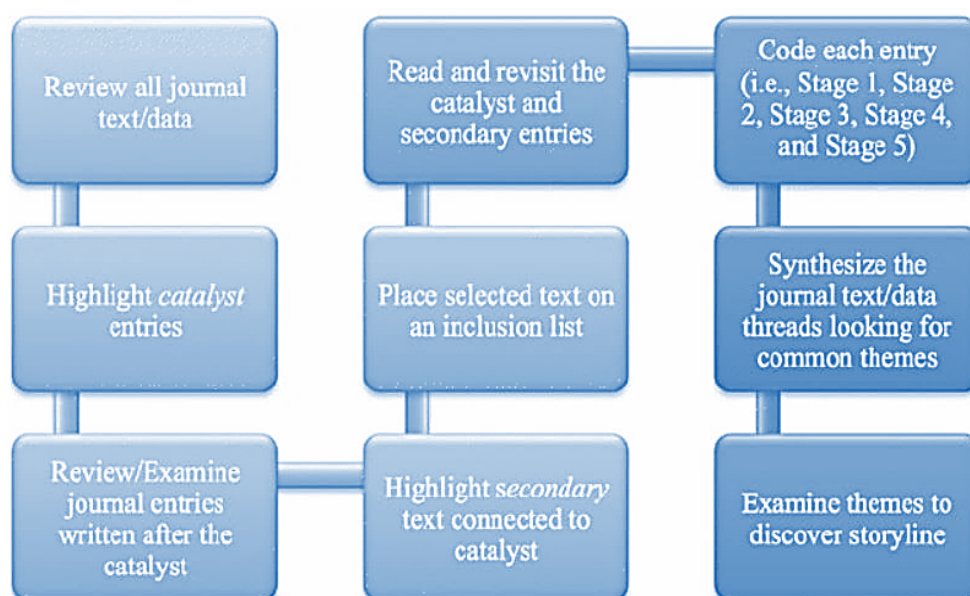


Figure 17. Data analysis procedures for personal participatory observation journal texts (Willis & Edwards, 2014:4).

3.7.3 Coding Behavioural Mapping observations

Activities, the environment, interaction, tools, artefacts and user observations were all captured within a given time frame utilising a predetermined framework. Table 8 provides a sample of the framework. The data from the observational frameworks were organised into emergent themes similar to those found in the literature. Some of the fundamental themes included activity, environment, interaction, noise, window and ventilation, lighting and spatial accessibility, as seen below in Table 8.

Table 8. Coding Behavioural Mapping observations.

Class:ID02+A1:E11	Date: 01/09/2022	Session: 1	Date:05/09/2022	Session:1
Location	<u>Studio 4</u>		<u>Studio8/ Library</u>	
No Students:	3		4	
Studio Focus	<i>Critique & Making space</i>		<i>Critique</i>	
Activity	All three students have their devices plugged into studios plugs. The studio space only have two plug point, so students bring their own leads and adapters from home to allow for more devices to be plugged in. One student wore head phones while working on her brief.		Studio time was used for critiques and for students to work on their briefs that where due for the next session.	
Environment	Studio 4, is a large studio space for a small class. The students are all sitting toward the back of the class as this is where the plug points are located.		Class was meant to be held in studio 8 today, however students requested to move to the library as there is a heater and the space was much warmer.	
Interactions	Students used their laptops to show lecturer their progress work. One student used the counter surface to show sketches in her note book.		Students did not make use of the surfaces at all during this session as their brief was a digital submission. Therefore all work took place on students individual laptops.	
Noise	Students would call lecturer to their work station to ask for assistance with their work. Noise from neighbouring music school can be heard in the studio (drumming).		Noise came from students walking pass, who wanted to access the communal balcony.	
Window & ventilation	Studio has two large, full length windows looking out into the circulation path of the campus. The door leading into the studio is also a glass door. There is an additional window at the lecturers desk, this window is round in shape and looks onto studio 1. None of the windows look outside. none of the windows open to allow fresh air into the space. There is also no mechanical ventilation in the studio.		Large full length window span the length of the library. These windows look out onto the balcony are, where is a common area for break away time.	
Lighting	Florescent lighting is on.		Natural lighting, floods the space and there is no artificial lighting on. Due to the level of natural lighting in the space, students need to be considerate of where they are seated due to the glare on their laptop screens.	
Spatial accessibility	Lecturer moved around to each student for individual critiques		As there is only a plug point at the librarians desk students seating choices were no longer governed by the plug points as previously seen in studio 4 & 8. One of the students physically walked over to the lecturer with her laptop to show further progress of her work.	

By classifying the results into overarching themes, I was able to examine what the vital spatial typologies within an Interior and Architectural Design studio were, as well as their spatial considerations. Similarities and differences between these results and those from the semi-structured interviews were then determined. As behavioural mapping is both qualitative and quantitative in nature the participatory observation provided quantitative findings which were coded. The researcher entered the symbols of the Behavioural Mapping observations into an Excel database and represented the status of utilised surfaces, use of computer/ laptop, and interaction as "true" or "false". For instance, students who interacted were noted as "true," while those who did not were reported as "false". (Table 9 is a small section of the database established).

Table 9. A small set of the database compiled from the behavioural data.

IDENTITY	ACTIVITY	INTERACTION	SURFACE USE	SCREEN USE	DATE	SESSION	LOCATION	STUDIO FOCUS
S	SITTING	TRUE	TRUE	FALSE	01/09/2022	1	STUDIO 4	COLLABORATIVE & MAKING SPACE
S	SITTING	TRUE	FALSE	TRUE				
S	SITTING	TRUE	FALSE	TRUE				
L	WALKING	TRUE	FALSE	TRUE				
Ratio: Sitting	75	100	25	75				
Standing	0							
Walking	25							
S	SITTING	FALSE	FALSE	TRUE		2		
S	SITTING	FALSE	FALSE	TRUE				
S	SITTING	TRUE	FALSE	TRUE				
L	SITTING	TRUE	TRUE	FALSE				
Ratio: Sitting	100	50	25	75				
Standing	0							
Walking	0							

Each class session was categorised according to the studio focus; for instance: Collaborative and Making, Presentation, and Coursework/Personal space. These themes emerged from Thoring's (2019) 'Space Types' as seen in Figure 5 (p.21). Furthermore, the data were divided into two categories, namely 'Interactive' and 'Movement' (as seen in Table 10 below). I was then able to compare the percentages of moving, standing, sitting, interaction, work surface use and screen use across different studio focuses, including different locations within the PHEI and a nomadic studio.

Table 10. Further categories of data: Interaction & Movement.

Ratio of Interaction			Ratios of movement		
Collaborative & Making space			Collaborative & Making space		
Interaction	Surface use	Screen use	Walking	Sitting	Standing
71%	34%	63%	8%	88%	3%

Ratio of Interaction			Ratios of movement		
Presentation			Presentation		
Interaction	Surface use	Screen use	Walking	Sitting	Standing
37%	18%	18%	10%	72%	18%

Ratio of Interaction			Ratios of movement		
Coursework/ Personal space			Coursework/ Personal space		
Interaction	Surface use	Screen use	Walking	Sitting	Standing
80%	0%	20%	0%	80%	20%

This method was then repeated for both the 2nd-year Interior Design class (ID02) and 2nd-year Environmental Design class (ED02). This database enabled me to undertake multiple statistical studies over time.

3.8 Focus groups

Focus groups are deemed a socially orientated route of PAR research and “a form of group interview that benefits from the communication between the researcher and volunteer to generate data” (MacDonald, 2012:41). A focus group commonly consists of seven to twelve participants sharing attributes applicable to the focus of the study (Daniel & Harland, 2018). This intimate number of participants in a focus group allows for comfortable discussion among all members, increasing the potential of essential data being formulated. The researcher allows for “a supportive environment in which discussion and differing points of view are encouraged” (MacDonald, 2012:42). Preferably, in participatory observation, all participant perspectives should be recognised and considered “as all participants have an opportunity to communicate” (MacDonald, 2012:41). The direction of the topic is established by the researcher and participating in collaborative discussions with the volunteers typically provides some structure (MacDonald, 2012). In participatory observation, willing participants play a role throughout the process (McNiff, 2013). The combination of participatory observation and focus group provides access to the group, site selection, and focus sampling (MacDonald, 2012). Table 11 indicates which campus, department and student participants formed part of the focus group.

Table 11. Selection of student participant samples.

Institution*	Campus**	Department***		Participant****	Interview	
		Course	Year		Date	Time
PHEI	WC1	ED	3rd	S1_ED03	08 Sep	18:00- 19:00
	WC1	ED	3rd	S2_ED03		
	WC1	ID	3rd	S3_ID03		
	WC2	ID	2nd	S4_ID02		
	WC1	ID	3rd	S5_ID03		
	WC1	ED	3rd	S6_ED03		
	WC1	ED	3rd	S7_ED03		

* Private higher education Institution in Cape Town (PHEI).

**Location of campus within South Africa.

*** Built Environment Faculty, Environmental Design (ED), Interior Design (ID).

Year indicates year of study in which the volunteer is enrolled.

**** Acronyms of participant names. Full names withheld for ethical reasons (confidentiality).

3.9 Semi-structured interviews

As a method in PAR, interviews allow volunteers a platform to share their views (Daniel & Harland, 2018). Interviewing is a theoretical approach to data collection, “an engaging form of inquiry, and an appropriate method for collecting data regarding human experiences” (Daniel & Harland, 2018:58). Both the researcher and the participants exchange experience and knowledge throughout the verbal process in a reciprocal manner. Table 12 presents the three main types of interviews used in higher education for research purposes: structured interviews, semi-structured interviews, and open interviews. Semi-structured interviews consist of a sequence of open-ended questions based on the researcher’s desired topic areas. The open-ended character of the inquiry identifies the topic under investigation but allows the interviewer and interviewee to delve into certain issues in greater depth (Daniel & Harland, 2018).

Table 12. Three types of interviews commonly used in higher education research (Daniel & Harland, 2018:58).

'Exploring the link between research and teaching in undergraduate courses'		
<i>Structured interview</i>	<i>Semi-structured interview</i>	<i>Open interview</i>
1 What do you see as the main benefits of research-led teaching?	1 How do you see the link between research and teaching?	1 How do you see the link between research and teaching?
2 How do you draw on research when you are designing a course?	[individual level, course level, programme level, department]	
3 Do your students carry out research projects during their degree? If so, please describe when this happens and how it is done.	2 What do you see as the main benefits of research-led teaching?	
4 Do you teach a course in research methods? If so, when and how is this done?	[difference between university teaching and polytechnic, government policy; for students, for teachers, for the university]	
5 How are undergraduate students involved in departmental research activities?	3 How could this link be improved?	
6 How do colleagues in your department link research and teaching?	[current barriers, mass higher education, accountability, education of researchers/teachers to see the link]	
7 Could you describe how institutional policies have helped you link research and teaching?		
8 What helps you link research and teaching?		
9 What hinders you linking research and teaching?		
10 Is there anything else you would like to add?		

To gain a comprehensive understanding of how contact- and distance-learning could be implemented in the Interior and Architectural Design studio to support an adaptive design-thinking environment, semi-structured interviews were conducted with three lecturers from the PHEI in Cape Town. These interviews were held during September 2022. The objective was to compare their spatial experience and tools of lecturing in physical and virtual studios. Coelho (2015) argues that individual studies focused on personal data rather than spatial data may be valuable for comprehending the spatial experience of its occupants, given that each individual has a unique manner of experiencing architecture. This became clear in the interviews with the lecturers, as the spatial configurations of the physical studios were the same, but distinct experiences arose. My finding is borne out by Bate and Robert (2006:309). During the interviews, participants' experiences were accessed through the language they used to describe their experiences, allowing for direct and intimate interaction. Table 13 lists the participants and their respective department. For ethical considerations, pseudonyms are employed to protect the identities of persons who participated in the data collection process.

Table 13. Selection of lecturer participant samples.

Institution*	Department**	Participant***	Interview	
			Date	Time
PHEI	BE	A1	07 Sep	14:00-14:40
		A2	09 Sep	08:30-09:15
		A3	12 Sep	16:00-16:35

* Private Higher Education Institution in Cape Town (PHEI).

**Built Environment Faculty (BE).

***Acronyms of participant names. Full names withheld for ethical reasons (confidentiality).

3.9.1 Basic description of interviewees

Virtual interviews were conducted via Microsoft Teams (MS Teams). During the interviews, I described the protocol to the participants and attempted to foster an environment enabling open dialogue. The lecturers at the PHEI are also a distinctively creative aspect of the institution: typically, Interior Design and Architectural lecturers are full-time faculty members who may or may not continue to work in their specialty after-hours. In contrast, the vast majority of PHEI lecturers are freelance or full-time industry-based designers who lecture at the PHEI on a part-time basis. Thus, the students are exposed to industry via their lecturers which enables them to collect vital information about the requirements and needs of the workplace. This enables the PHEI to integrate such information into the learning experience and prepare students for a successful career in design. The following are the brief career profiles of the interviewees in the Built Environment Department:

A1: The interviewee is female and has lectured for just under five years. She started off on a part-time basis, lecturing diploma students, and is currently lecturing second, third and honours students. Interviewee A1 lectures Software to the second-year students, Design and Theory to the third-year students, and Design, Innovation and Research to students at Honours level. She, thus, facilitates a variety of different subjects.

A2: The interviewee is a professional architect who has worked in the industry for several years at a well-established architectural firm. Interviewee A2 has lectured part-time for close to five years. He currently lectures Architectural Technology, which is a mixture of design and technical drawing applications.

A3: The interviewee is an alumnus of the PHEI. He studied Architectural Draftsmanship, followed by the High Certificate for Architectural Technology course and finally completing his studies with a Degree in Interior Design at the end of 2015. Since then, Interviewee A3

has worked for a well-established firm where he is still currently employed. Simultaneously, he started working as a part-time lecturer at the PHEI and has close to 7 years' experience in lecturing. Initially, he lectured the Higher Certificate course, which is mostly architectural draftsmanship. Approximately four years ago, he started lecturing Technical Drawing Application to the second-year ID and ED students. This is also the interviewee's current subject.

3.9.2 Interview protocol and process

Ethical clearance was first obtained from the PHEI - with the note that all communication with volunteers was to come from the Campus Academic Managers. Once I had consulted with the Campus Academic Managers on my campus regarding the ethical committee's requirement, permission was granted to email my selected volunteers. Purposeful sampling was used to pick the interviewees for the semi-structured interviews. Participants who agreed to be interviewed were requested to sign consent forms in accordance with the study's ethical guidelines before their interviews could be scheduled. Volunteers then received a follow-up email confirming the date and time for their interview. I checked that all their MS Teams recording technology functioned properly on the day of the interview to ensure a smooth process. The interviewees were asked predetermined questions relating back to the research topic. The recorded interviews were then stored safely for transcription purposes.

3.9.3 Coding interviews and focus group

In-Vivo Coding was utilised to analyse the interview data, in which a word or brief phrase from the participant's native language serves as a code (Saldaña, 2021). Therefore, In-Vivo Coding was employed in this study to ensure that the participants' experiences and perspectives were given due consideration (Saldaña, 2021). Table 14 below displays the raw data from the transcribed interviews, with each interview response displayed in a separate row. The InVivo Coding method was used to code the raw data, which helped to extract the data's significance (Charmaz, 2006).

Table 14. Example of coded interview.

Raw data: Volunteer A1	Preliminary coding	Themes coming through
<p>Question 1: How did you find the initially transition to online studio lecturing during COVID-19?</p> <p>So, it was quite an adjustment I would say. I think everyone at that stage was struggling to adjust and it was so rapid. We moved very quickly onto online learning, which in a way was really good because we didn't miss any time, but it was quite an adjustment. You become so accustomed to working in the ways that you typically work in. So, you'll set up your studio time, you'll set up your talking time, you'll set up your lectures and with the move to online you lose a lot of that individuality; where you can't see the responses of your students and you can understand who is with you and who's not focusing. So, it was quite an adjustment.</p> <p>I was fortunate enough to have a setup that allowed me to link my iPad with my computer, so drawing wasn't an issue because, obviously when you're teaching design, you want to be able to draw, you want to be able to illustrate and show your students what you're talking about. I was very fortunate in the fact that I had that option.</p> <p>But what I also found was that my students relied more on the recordings of what was going on rather than being present in class. With software that I was teaching at that point, it was an easy transition because the students now had everything on the screen in front of them. It wasn't this backwards-forwards looking at what was going on. So, it was a lot easier to go from teaching software in person to teaching software online.</p> <p>Whereas with design there were a lot of problems and a lot of misunderstandings regarding what you were talking to your students about. As creatives and as designers we rely on the pen to talk about what we're doing, so you lose that through your online teaching.</p> <p>Yeah, I think the biggest challenge with that was the fact that communication had to alter completely. Instead of</p>	<ul style="list-style-type: none"> • quite an adjustment • it was so rapid • You become so accustomed to working in the ways that you typically work • move to online you lose a lot of that individuality • can't see the responses of your students • understand who is with you and who's not focusing • I was fortunate... drawing wasn't an issue • when you're teaching design, you want to be able to draw • to illustrate and show your students what you're talking about • students relied more on the recordings... rather than being present in class. • Software... an easy transition, students now had everything on the screen in front of them" • design there were a lot of problems • misunderstandings • As creatives and as designers we rely on the pen to talk • you lose that through your online teaching. 	<ul style="list-style-type: none"> • Communication was altered • Loose touch with students • Students' way of learning shifted • Ability to draw was diminished • Lecturer drained by shift in teaching style
<p>Yeah, I think the biggest challenge with that was the fact that communication had to alter completely. Instead of</p>	<ul style="list-style-type: none"> • communication had to alter completely 	

Key concepts emerged from the data similar to those in the literature, and the central ideas included the following as seen in Table 15 below:

Table 15. Themes which emerged from coding the interviews.

Themes in the literature	Themes which emerged from the interviews
Typologies of creative space	<ul style="list-style-type: none"> • Spatial typologies • Adequate facilities • Communication • Transfer of knowledge • Collaboration
Spatial quality (Design patterns of creative space)	<ul style="list-style-type: none"> • Tangibility • Natural lighting • Thermal comfort • Furniture • Views to connect • Human connection • Community

	<ul style="list-style-type: none"> ● Acoustics ● Communication ● Transfer of knowledge
Technology	<ul style="list-style-type: none"> ● Online-learning ● Software ● Disconnect in online-learning ● Communication ● Transfer of knowledge
Nomadic studio and immersive learning	<ul style="list-style-type: none"> ● Human connection ● Atmosphere ● Adequate facilities ● Collaboration
Hot-desking	<ul style="list-style-type: none"> ● Spatial typologies ● Adequate facilities ● Communication ● Transfer of knowledge ● Collaboration
Design approaches	<ul style="list-style-type: none"> ● Human connection ● Adequate facilities ● Functionality of space ● Community ● Collaboration

The preliminary codes allowing for a clear understanding of the differences and similarities in experiences between students and lecturers. This was completed for each of the aforementioned themes. The entirety of the findings was compiled into a table, allowing for a comparative assessment between the lecturers and students, based on the participatory observation and interviews. By mapping the findings, the spatial typologies and the necessary considerations of these spaces became evident. The relations and significance of the behavioural mapping codes and themes emerging in the In-Vivo coding are discussed in-depth in the findings chapter

3.10 Reliability and validity

When a measuring device consistently returns the same readings after having been used to take multiple measurements, we say that it is reliable (Bernard & Bernard, 2013). When research tools, data and results have been shown to be accurate and trustworthy it is accepted that validity has been established (Bernard & Bernard, 2013). Using several data collection methods and comparing the results obtained from different approaches improves reliability and validity (Guest et al., 2012). This was accomplished through focus groups with students, studio observations of Built Environment students through participatory

observation and Behavioural Mapping, as well as interviews with lecturers. During my class sessions with the students, two different student sample groups were observed. Being the researcher, I was not permitted to interview my own students. It was third- and second-year Built Environment students, who were former students of mine, whom I interviewed. Which allowed for a safe and comfortable place to exchange thought experiences. The results of the observations and interviews provided a clear understanding of the online and FTF studio experiences, which aligned with Ulrich et al.'s findings (2006). During interviews and focus groups, participants frequently reveal information beyond what is assumed from observational studies (Simons, 2009). The interviews were recorded and transcribed, which further strengthens the authenticity of the data by producing a verbatim narrative (Guest et al., 2012). The themes that emerged from the data were comparable to those in the literature, and the validity of the themes was reinforced by the use of direct quotations throughout the data analysis and discussion.

3.11 Ethical considerations

Braun and Clarke (2013) state that being an ethical researcher does not merely mean adhering to the minimum prerequisites set out in the code of ethics. It also entails developing a more extensive ethical orientation that informs the entire research process.

Before the research could proceed, a proposal was submitted to the university's Faculty Investigation Ethics Committee (FREC), outlining the research's purpose, objectives and data collection strategy. The FREC approved the research proposal, which meant that I was then able to apply for ethical clearance with the PHEI's Research Board (Appendix A). The name of the institution was to remain confidential and it has, therefore, been referred to as the PHEI. Once consent had been given and the research letter had been obtained (Appendix B), individual consent forms needed to be distributed to participating individuals. Students and staff were informed about the aims and objectives of the research and asked to participate voluntarily. Volunteers who agreed were sent individual consent forms, provided by the university and signed by each of the participants before the data collection process (Appendix C). The individual consent forms indicated that the students and staff did not give permission for their names or photographs to be used in any documents.

For ethical considerations, pseudonyms are employed to protect the identities of the persons who participated in the data collection process. Anonymity and confidentiality are crucial features of ethical research conduct in the social sciences (Bhattacharjee, 2012). To maintain anonymity, the lecturers in the interviews have been designated cues (A1, A2, and A3), and the students in the focus group are denoted by ID 03, ED 03 or ID 02 (based on their degree and year of study). Rather than referring to individuals, quotations referring to

specific passages or transcripts are presented. The interviewees were told that the information they supplied, as well as their personal information, would be kept strictly confidential and that the research would be used solely for academic purposes. Moreover, students in the Behavioural Mapping data were represented by symbols and only key behavioural aspects were captured. No photographs of students in the studio were permitted, nor was verbal discussion of the research topic authorised as part of the confidentiality agreement with the PHEI. Ethical principles, adapted from MacDonald (2012), that I adhered to when conducting participatory observation were also adhered to during the research process. These are mentioned below:

- The initial step warranted that all willing actors and authorities had been “consulted and that guiding principles of the work were accepted before any initiation of research took place” (MacDonald, 2012:45).
- Non-willing parties were respected, and it was permissible for willing parties to influence the research.
- Advancement in the research displayed transparency and was “open to suggestions from others throughout the research process” (MacDonald, 2012:45).
- Consent was granted prior to formulating observations or “examining documents produced for other purposes, due to shared ownership of the research” (MacDonald, 2012:45).
- Descriptions of the work of others and their viewpoints will be negotiated “with willing participants in participatory observation before publishing any of the work” (MacDonald, 2012:45).
- I took it upon myself to sustain confidentiality during the research process, choices of the research direction, and possible collective outcomes when using a participatory observation method.
- I was clear about the intent of the research from the start, “including all personal biases and interests while ensuring that there is equal access to information generated by the process for all participants” (MacDonald, 2012:45).

3.12 Limitations

Securing ethical approval took five months due to the diverse considerations and viewpoints of the PHEI's twelve ethical board members. This, therefore, reduced the timeframe for data collection. In addition, only one month of Behavioural Mapping was approved. Not being permitted to interview and photograph students or give surveys to Behavioural Mapping participants was a further restriction due to requirements of the PHEI's ethical board. Furthermore, Simons (2009) advises that when interviewing a busy person with limited time, “it's recommended that one employ focused questions” to connect with them. Despite these

potential drawbacks the collected data showed what worked and what did not in a very transparent and direct way.

3.13 Conclusion

In this chapter, the research design and method were discussed. The interviews were guided by the provisional coding, and the observations were recorded using a Behavioural Mapping framework. InVivo Coding method was used, which allowed the meaning of the data to be condensed, after which the data were further grouped according to emergent themes.

CHAPTER FOUR: PRESENTATION OF FINDINGS.

4.1 Introduction

The previous chapter described the research design and procedures utilised to collect and analyse data for this study. The findings gained through a mix of research approaches are in keeping with the objective of the study:

To explore how contact and distance learning can be implemented in the Interior and Architectural Design studio to support an adaptive design-thinking environment.

In response to the objective, the following subsequent secondary questions were posed:

1. What are the vital spatial typologies within an Interior and Architectural Design studio, and what are their spatial considerations?
2. To what extent are e-learning platforms used in Interior and Architectural Design, and what design-thinking processes influence the consideration of these platforms in studio environments?
3. How are traditional categories of spaces becoming less meaningful and adaptable as activities blend?

Table 16 below is divided into the primary themes that emerged from the specific data findings and the secondary questions to which the data provided responses.

Table 16. Summary of main themes through data analysis.

Secondary questions	Method of findings	Themes emerging from data
<ul style="list-style-type: none"> ● What are the vital spatial typologies within an Interior and Architectural Design studio, and what are their spatial considerations? ● To what extent are e-learning platforms used in Interior and Architectural Design, and what design-thinking processes influence the consideration of these platforms in studio environments? ● How are traditional categories of spaces becoming less meaningful and adaptable as activities blend? 	<ul style="list-style-type: none"> ● Semi structured interview with the lecturers ● Focus groups with students ● Participatory observation (Behavioural Mapping) 	<ul style="list-style-type: none"> ● Typology of creative space: online versus FTF ● Environmental qualities in the FTF studio ● Immersive nomadic studio ● Hot-desking studio

4.2 The educational context

When COVID-19 hit South Africa, PHEIs instructed lecturers and staff that all face-to-face classes would be moved solely online, assisted by using Microsoft Teams. Whether online or FTF instruction, coursework at PHEIs is accessed via an online LMS, where students and instructors log in to access their coursework slides. This meant that the transition from FTF to online classes did not restrict students' access to course materials. With this in mind, students, due to varied Wi-Fi band widths, were instructed not to turn on their cameras on during class sessions; only lecturers would turn on theirs on to facilitate the class. The nation-wide lockdown occurred at a time when skills-based and peer-to-peer learning was critical in the ID02 and ED02 modules for these courses.

Unlike most institutions offering Interior Design and Architecture qualifications that provide computer labs with course specific software for students on campus (Morkel, 2011), the PHEI requires that each student buy a laptop in their first year to use for the remainder of their academic career. With this, all the necessary software, such as Revit and CAD, are loaded onto the students' devices, making access seamless.

Starting mid-April 2020, classes maintained a solely online presence, and from 2021 onwards the PHEI implemented a mix of hybrid, online and face-to-face classes. The intention behind this decision was to ease the move from solely online back to solely face-to-face learning. Ellis and Goodyear argue that, upon considering the role of virtual space in learning, "it is useful to conceive how students use the tools, texts and other digital objects provided for their course to pursue their learning outcomes" (2016:159). Therefore, subjects, such as Design and Technical Drawings, were seen as the first subjects that "had" to be moved back to face-to-face sessions due to the tactile nature of the coursework, whereas currently some theory-based subjects are still presented solely online until the end of the academic year.

The participatory observation conducted offered a window into how Built Environment students were currently navigating the Design studio after their online experience. The interviews became a space for reflection and sharing of positive and negative experiences in both online and face-to-face learning. The findings aligned with Thoring's (2019) five unique types of creative spaces: making, collaborative, presentation, and intermission and personal spaces. These space types helped define the uses, spatial needs and transformation of these spaces due to the introduction of online learning which will be discussed in this chapter.

4.2.1 Coursework presentation space and student presentation space: online versus face-to-face (FTF).

Thoring used the term 'presentation space' to indicate an area for attending lectures, presenting or studying examples of creative work (2019). However, I have identified two distinct types of presentations through my experience in the design studio online and in-person. The first is the course presentation, in which time is allocated to lecturers to introduce students to new theoretical and practical content. Students are all typically seated behind a desk with their laptops or notepads open in front of them. Simultaneously, the lecturer stands in front of the class, presenting the digitally projected course content, as seen in Figure 18 (Studio 4).

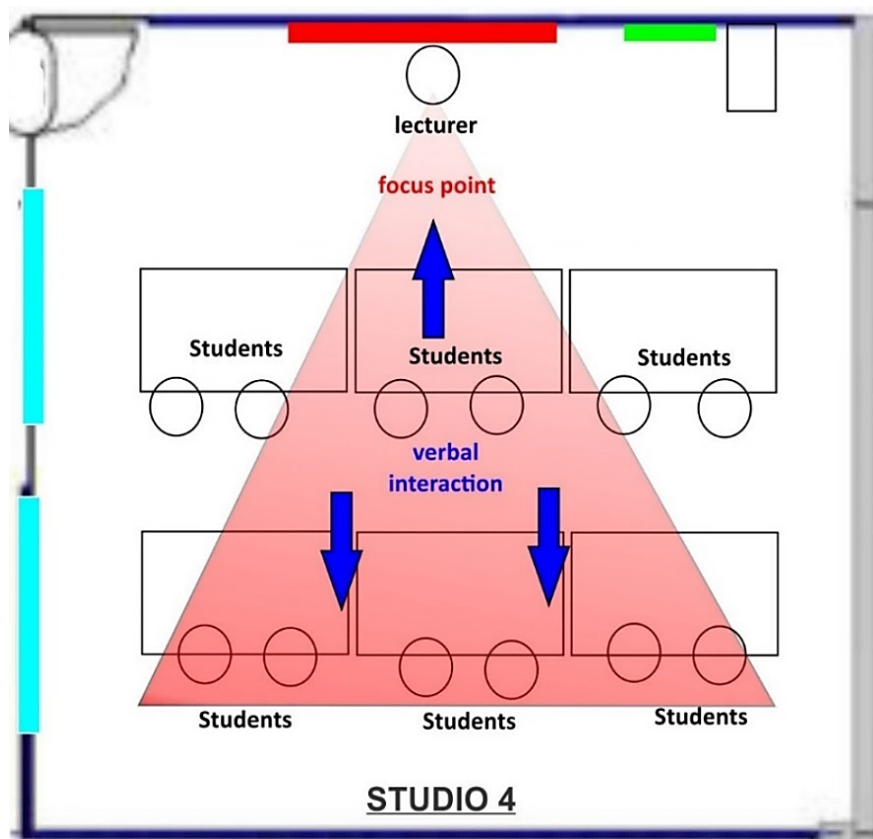


Figure 18. Spatial layout for course presentations in Studio 4.

Reflecting on the participatory observation, the primary distinction noted was that, while presenting course content, I always ask or am asked questions by students, which makes the presentation interactive and leads to unintended conversations or topics that may not even be directly related to the lecture material at hand. As depicted by the arrows in Figure 18, these presentations involve a significant amount of give and take, as a means of engagement between students and the lecture content. In addition, the tools and artefacts present in that space during coursework presentations are specific to the task at hand. For instance, students may have their laptops open in front of them because they may not be

able to see the projected images clearly; thus, they will view the lecture material on their laptop screens. Others may be taking notes.

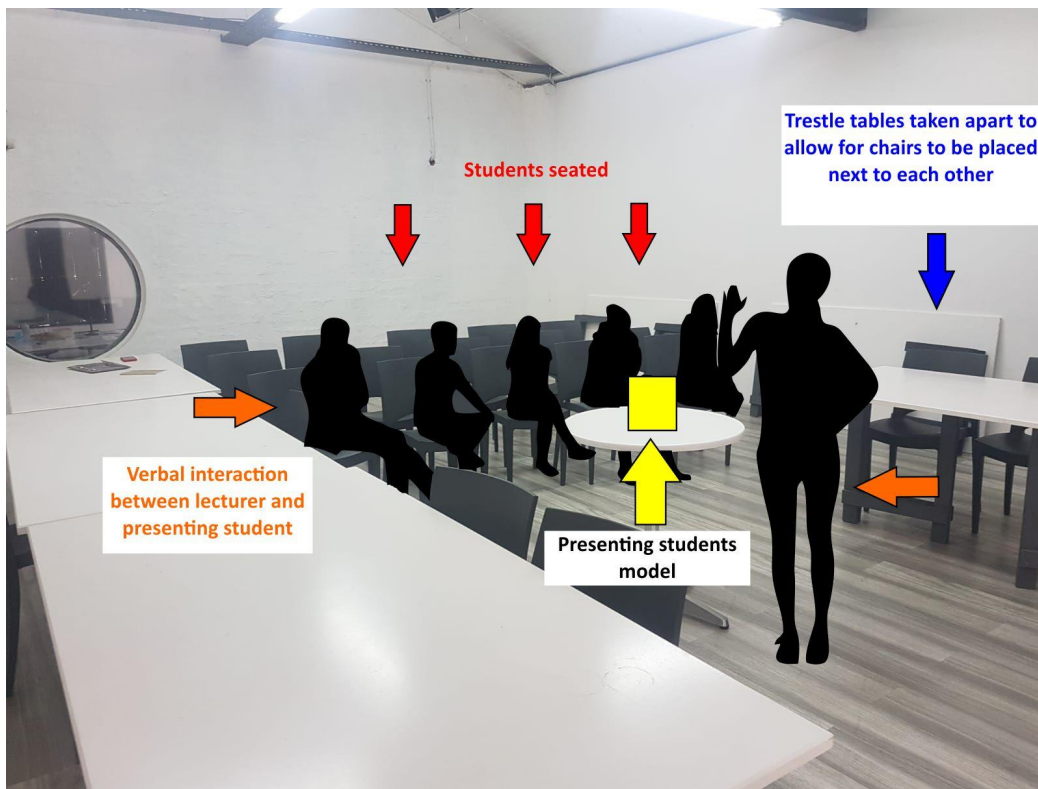


Figure 19. Student presentation space in Studio 4.

The second type of presentation is when a student presents his or her work, as seen in Figure 19. Laptops are packed away as everyone is meant to focus on the person presenting. The only real interaction is between the student presenting and the lecturer who may offer comments or feedback. The spatial configuration of this area will also have changed, tables can be removed, as no laptops are needed, and the chairs are arranged to face the direction of the presentation.

However, the online and the physical studio dynamic for coursework presentations and student presentations are characterised by comparable strengths and weaknesses, as expressed by both lecturers and students. During the semi-structured interviews with lecturers, a typical pattern emerged regarding the topic of how coursework was communicated in the online studio. Lecturers described the move from contact to online classes as a rapid adjustment and a reshaping of the once familiar learning spaces. This, in turn, also altered how lecturers taught within these environments:

*“You become so accustomed to working in the ways that you typically work”
(A1:2022).*

Communication had to change completely from tangible tools and artefacts, such as pen and paper, to solely verbal and text-based communication:

“[O]nline there were a lot of issues with trying to show students and trying to engage with students in a face-on personal interaction over a computer” (A3:2022).

Due to the change in not just communication channels but also the style of communication, lecturers experienced a feeling of anxiousness and stress that was brought about by the disconnect in communication between themselves and their students.

“Communication had to alter completely; instead of pointing at something so simple, you have to describe everything... it was completely draining and exhausting to transition into that” (A1:2022).

Additionally, all online studio sessions were to be recorded synchronously because of the unequal availability or accessibility to WI-FI - combined with load shedding at the time. This posed both positive and negative outcomes for specific course content, as some students would start to rely solely on the recording of the class, moving the studio from a synchronous to an asynchronous learning environment.

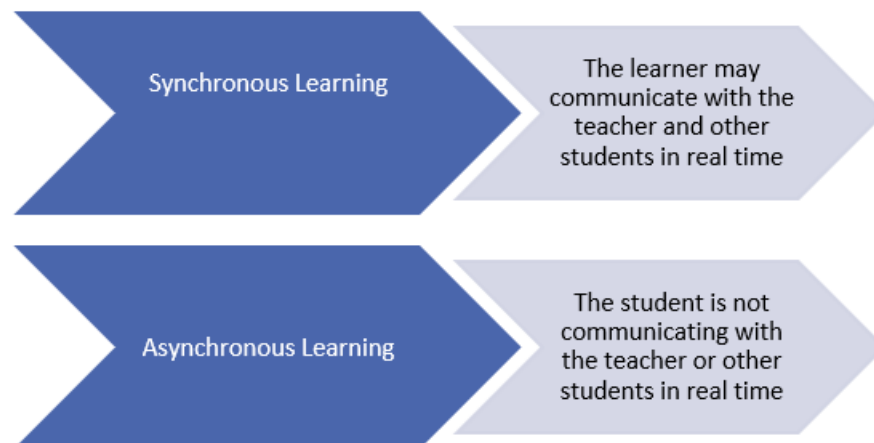


Figure 20. Types of learning systems (Faragallah:2020).

The positive aspect of this was that students could revisit recordings of coursework that they may not have understood or of lectures that they had been unable to attend. On the other hand, due to technical issues, students did not always fully receive the benefits of the recording as student S2_ED03 expressed:

“A lot of times there would be a bad connection and the lectures zone out, break up, and you miss information, and even if you go back in the recording, it has completely gone” (2022).

Furthermore, an adopted reliance on these recorded sessions appeared to discourage student interaction and concentration levels, with many students in the focus group touching on this matter:

“Sometimes with the very information-dense work, I would zone out because they (the lecturer) can't see me. If I am sitting there not paying attention, nobody is going to know. Whereas if I was in a class, I would be forced to pay attention. I think that was one thing that I struggled with” (S5_ID03:2022).

The physical space of the face-to-face studio thus appears to enable a more seamless and unhindered means of communication. Lecturers are also visually able to connect with their students and engage more harmoniously, as lecturer A1 elaborates below:

“There is something about the way in which you communicate as a designer with visual people. We'd like to have quirky conversations; we want to understand the personalities we're dealing with because we are working in a more intimate one-to-one kind of scenario. Without having that space when you're online you actually lose touch with your students and with their problems or if someone is struggling with something” (2022).

The above comment implies that the concept of an environment that derives its communication cues from tangible and visual artefacts connects lecturers and their students not only physically, but also psychologically. In this respect online lectures disconnect lecturers from their students.

4.2.2 Place and pace of coursework presentation space: online versus face-to-face.

The emphasis on recorded sessions also led to a change in learning at students' own pace and in their own place as the comfort of their bed or dining-table became the studio for the day. However, this idea of place and pace presented a layer of both positive and negative themes throughout the interviews. The first theme refers to a rise in students' attendance throughout online classes, as expressed by lecturer A3:

“They could sign on, and we had a great attendance because they never had to move further than their bedroom” (2022).

This convenience seemed to have been positively adopted by students and lecturers. However, when the shift back to FTF was integrated, there appeared to have been a significant decline in attendance for all subjects, as lecturer A2 explains:

“Students know the convenience of online learning. So, it, in my opinion, has deterred them from attending a lot of in-person classes for various reasons. You know, you can sit in the comfort of your own home in your pyjamas, looking at a screen, and you don't have to get up and sit in traffic to go to a campus. So, I think it's purely out of convenience and it has affected the attendance now that we're back in studio” (2022).

However, not all students felt that the return to FTF classes was an inconvenience but rather a paradigm shift in which courses, they felt articulated better online, due to their past learning experience. That said, when students and lecturers were asked which courses, they believed, were best taught online versus in person, both groups reached the same conclusion: For subjects with a greater emphasis on theory, such as Business, History and Design Theory, online learning was identified as a favourable alternative. Student S1_ED03 explains:

“I think there's certain things where if it's, like, very text heavy, that stuff does benefit from being online” (2022).

This is further validated by lecturer A3:

“The theoretically based stuff was perfect to do online ... I found very easy, as it's just the slide show presentation and videos that doesn't really need to be done in person” (2022).

A significant factor contributing to this attitude could be that, in the case of the course components mentioned by both the student and the lecturer above, there is no significant difference in the mode of communication between online and FTF presentations, as, in the latter scenario, the lecturer communicates with the help of a projector and relevant slides, and the students engage in the session in both a visual and auditory manner.

This raised the question of whether or not students felt most comfortable learning in their own home environment. All the students in the focus group stated that they had a desk in their room. Several remarked that their area was cramped and that they had felt uninspired:

“Sitting at the same desk everyday becomes very repetitive. It is just not a nice routine to be in. You’re not feeling inspired sitting in the same space every day” (A1_ED03).

Students who described the experience as 'repetitive', felt prompted to seek out new and inspiring spaces in and around their homes, and for those unable to do so, coffee shops became the studio space of choice:

“I tried to keep moving around my house as best I could to get to different areas. So, I would sometimes be downstairs or sometimes be in my room or in the office...But at the end it became so repetitive. I got stuck in this cycle” (S1_ED03).



Figure 21. Word cloud of students’ answers to the question: Did you have a comfortable place to work in during online classes?

As a result, even these newly-acquired workspaces became a distraction or hindrance to students' study experiences, with others citing the noise from surrounding family members as a contributing factor. Consequently, the lack of inspiration in one’s personal place appeared to outweigh the convenience of having everything online. This can be attributed to the fact that our homes were never intended to be vessels of inspiration within the framework of an educational studio, demonstrating the absence of environmental psychology which is defined as partnerships between people and their environments that

are mutually beneficial (Kopec, 2012). This concept also draws on human-centred design, a method which takes into account the target audience's needs during the design process. By putting the user first, human-centred design is defined as "a method that guarantees that the design meets the requirements and capabilities of the individuals for whom they are intended" (Norman, 2013). We know our homes were not designed to be the sole container of 'work, eat, sleep, repeat'. Table 17 below shows a summary of the strengths and weaknesses of coursework presentations in both online and FTF studio environments as discussed.

Table 17. Strengths and weaknesses of coursework presentations: online versus FTF studio environment.

	Online studio	FTF studio
Strengths	<ul style="list-style-type: none"> ● Software facilitates lecturing online. ● Improved verbal communication skills. ● Students' manner of learning shifted. ● Theory-based subject easily taught online. ● Convenience of own space/own place. ● Travel time and money saved. ● Software or hardware basis easily transitioned from FTF. 	<ul style="list-style-type: none"> ● Ease of information distribution. ● Visual aspect of teaching physically presentation. ● Informal connections between students and staff. ● Easier to monitor engagement ● Knowledge transfer.
Weaknesses	<ul style="list-style-type: none"> ● Lecturer loses touch with students. ● Ability to draw was diminished. ● Lecturer drained by shift in teaching style. ● Online lecturing increased level of anxiety and stress to be perfect. ● One-on-one critiques encroach on lecturer's personal time. 	<ul style="list-style-type: none"> ● Absence of recording for later/further reflection. ● Lack of attendance.

4.2.3 Place and pace for student presentations: online verse face-to-face.

During COVID-19, students at the PEHI were instructed that all submissions of briefs were to be digital. This meant that students were tasked with pre-recording their verbal presentations alongside their digital slides. Initially, the idea seemed excellent: I, as a lecturer, was now able to watch the students' recordings at my own pace and in my own place, and then provide written feedback on their mark sheets. That said, students were now able to perfect their presentation with the benefit of recording their work at their own place and own pace.

Subsequently, what actually happened during these recorded presentations was that students started just reading the content off their slides, leading to an absence of presentation skills and experience - which the FTF studio fosters. The second issue arose in the disconnect of feedback between student and lecturer, as discussed previously in Table 17: the feedback was no longer in real-time as we experienced it in the FTF studios. Student S5_ID03 described her experience of returning to FTF presentations in her final year of studies:

“It was kind of crazy coming back because, I don't know about everybody else, I did my first in-person presentation in my third year of my studies which is kind of mind-blowing. I think that the pressure from the projects in first year, being online, left me feeling disconnected. It almost felt like it wasn't happening because I wasn't there and I wasn't experiencing it. Being thrown into the third year of studies, I still mentally felt like I was in first year. Because it didn't feel like I had actually done it, I wasn't actually there. That was like a real shock, actually realising, ‘oh wow, I'm actually studying. I'm in a degree program. I just haven't been physically doing it this whole time” (S5_ID03).

This leads me to the conclusion that there was a complete disconnect between students, their work and the experience of presenting, brought about by the requirement of a digital submission, which could be said to result in a lack of tacit, explicit and embedded knowledge provided by a FTF studio. Referring back to Chapter 3, Thoring (2019) touches on five spatial qualities which presentation spaces should or could evoke as seen in Table 18. Therefore, it is clear that factors, such as knowledge processor, indicator of culture, process enabler, social dimension and source of simulation, are lacking in a pre-recorded presentation.

Table 18. Presentation space related to spatial qualities (Thoring et al., 2018:1974).

Presentation space should/might	Knowledge Processor	Indicator of Culture	Process Enabler	Social Dimension	Source of Simulation
	-Facilitate knowledge transfer -display artefact knowledge	-Upvalue/ highlight presenter or work -Enable/ encourage feedback	-Provide infrastructure for presenting -Provide a platform to display/ present work	-Invite feedback/ discussion	-Reduce external distraction -presentation should become main stimulation

Lecturer A2 affirms these losses of spatial qualities when speaking, not only to the difficulties of assessing a digital presentation, but also to the hindrances of the digital submission:

“Almost all the coursework, when we went virtual, became a digital submission and it made a lot of assessment quite tricky. Like when they did their models, they had to photograph their models and then submit photos of their models. However, the idea of building a model is to gain 3-dimensional experience of it. How do you accurately assess a student if you're looking at stills of only areas which they have chosen to show you? A model is also something that's quite robust, how do you grade them on how robust it is? But apart from that line weights, digitally it looks completely different to when you print it out. So, when your class is fully digital, it makes it really tricky to see if when you print the drawing and take it aside will it be legible” (A2:2022).

In my experience in industry, when presenting a project, it is almost always in front of the client or a representative. It is not customary practice to make a recording and send that to a client. Maybe I might have a Skype call, if it's an international client. Nonetheless, real-time presentations and creating tactile artefacts, such as sample boards or models, are without a doubt very valuable skills in industry, and are sculpted and perfected in the design studio. For this reason, I understand the anxiety that students, such as S4_ID02, experience:

“Also, I found that having online presentations made me more nervous for in-person presentations” (2022).

... and more so the lack of confidence that student S5 spoke of:

“It was quite a big knock in terms of building up that confidence that you get in first year with doing presentations and getting to know the other people on campus. That made it really difficult to be thrown back into things halfway through a second year, having to do in-person presentations and stuff, having never done that or never even shown your face to your peers. That was definitely terrifying for me” (S5_ID03:2022).

Table 19 below shows a summary of the strengths and weaknesses of student presentations both online and in the FTF studio environment as discussed in the text.

Table 19. Strengths and weaknesses of student presentations: online versus FTF studio environment.

	Online studio	FTF studio
Strengths	<ul style="list-style-type: none"> ● Recording allowed students to perfect their presentation. ● Lecturers could watch recordings at their own place and pace. 	<ul style="list-style-type: none"> ● Interaction between student and lecturer is more seamless. ● Feedback in real-time. ● Easier for students to understand problem areas.
Weaknesses	<ul style="list-style-type: none"> ● Recording leads to a lack of development of industry skill, namely presenting live in front of an audience. ● Feedback: Loss of real-time critique, as feedback was given in text-based format on their mark sheets. ● Disconnect between students and their work. ● Inequality of access to technology, physical space and internet amongst students. ● Assessment of physical projects in a digital format becomes complicated. 	<ul style="list-style-type: none"> ● Confusion and adjustment from online back to FTF classes. ● Relearning how to present in front of a class. ● From their peers, students experience a high level of expectation to perform, leading to anxiety.

4.2.4 Collaborative, Making and Intermission spaces: online versus face-to-face.

Thoring differentiates between three different physical spaces. Spaces designed for group work or instruction are called “collaboration spaces”. Creating room for people to experiment, construct objects and emit noise is called “making space”. “Intermission space” refers to the areas between different types of spaces, such as hallways, cafeterias, student lounges and the outdoors (Thoring, 2019:84). The participatory observation and interviews revealed a significant degree of overlap between these three spaces, hence why I have grouped them under one heading. From this context, two significant challenges emerge. Firstly, due to design's abstract and sometimes subjective nature, it is difficult to equip design educators with universal pedagogical frameworks as it is neither art nor science but rather a creative endeavour. However, teaching approaches in the arts, such as in oil painting or pottery teaching, do not fully apply to Architectural Design, as the spaces we create are expected to satisfy human needs. Secondly, lecturers struggle to articulate their expertise online. Lecturer A2 expressed what being back in the studio felt like versus being online:

“I felt a lot more comfortable and freer because you can walk around, you can engage, you can sketch, you can draw” (2022).

Therefore, most of their information remains tacit knowledge. Due to this, the complex 'conversation' expressed vocally or nonverbally between lecturer and student in the design studio, becomes somewhat muddled.

Through my participatory observation supported by the recursive process of PAR, it became evident that 'collaborative spaces' and 'making spaces' shared similar communication tools and artefacts. In Figure 22, one sees that both spaces share tactile, verbal and digital forms of communication. The overlapping connection is that, through the process of 'making' and exploring in design, a pause in the process of 'making' is brought about by collaborative feedback between lecturer and student or students and their peers. Without instructors and students working together, the design studio's physical space cannot foster a studio environment (Rodriguez et al., 2018).

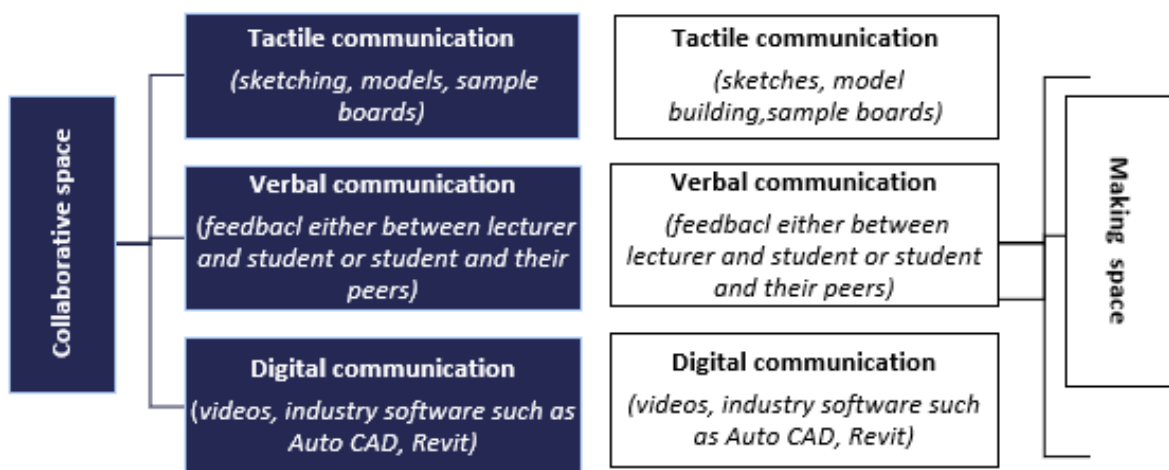


Figure 22. Similarities between collaborative and making space.

Nonetheless, the stages of design, such as concept development, ideation phases and nature of the brief, determine the spatial dimensions of these two typologies. Lecturer A2 elaborates on this point:

“It's definitely got to do with the coursework and the content because obviously mine being quite practical you do need big surfaces to work on, and you do need lots of space” (2022).

However, lecturer A3 observed that when the brief's due-date looms:

“Then, we moved to Studio 8 where it is smaller and warmer. More intimate from that point of view. I do not need to walk around and explain the scale

and be drawing on the board and giving them enough space for all their books. Then we move into a smaller space” (2022).

With this in mind, the words ‘free’ and ‘freedom’ came up several times when I asked both lecturers and students which spaces enhanced or promoted creativity. This could be interpreted in two ways: the first being the physical scale and proximity that space provides for an individual. Thoring refers to “vertical distance as a large room height which allows large-scale prototyping and opens the mind” (2019) as one of her 49 patterns of creative space. The second is the flexibility of space on which lecturer A1 elaborates regarding her experience of critique sessions in the student’s lounge (Figures 23 and 24):

“Two students can sit together on a couch and talk about their work together. We consider it a desk. There is a lot more flexibility then, and it's almost like you allow them to identify how they want to sit with their personality or their mood of the day, and that in itself allows for more creative expression. You can't work with the same process every single day. It is not just maths and science and statistics. We have to have fluidity in the way we think, so why not in the way we sit in the studio?” (2022).



Figure 23. Student lounge types of furniture (View 1).



Figure 24. Student lounge types of furniture (View 2).

The concept of a creative environment supporting flexibility and fluidity in the design process is inevitable. However, through the lens of participatory observation, my students and I were moving beyond the four walls of the traditional studio into intermission spaces, such as the student lounges mentioned by lecturer A1 above. This was prompted by considering the creative enablement that space allows students physically and psychologically. As discussed in Chapter 3, Hettithanthri and Hansen (2022) validate this point by observing that design studios adhere to traditional design studio procedures established several decades ago. Little has changed to accommodate the modern learning context of students. There is less room for experimentation and emotion in the studio's restricted area and routine involvement. Students have little place for empathy in design studios, although it is a crucial part of the design process (Hettithanthri & Hansen, 2022). Gray and Smith (referred to by Corazzo, 2019) state that studio and professional standards that potentially restrict the variety of students in creative areas should not be blindly replicated. Figure 25 below shows the percentage of movement for the ED02 class within the different spatial types throughout the month of Behavioural Mapping. With a large percentage of the time spent sitting while working it is unavoidable that spaces, such as the student lounge, become appealing due to the freedom of choice in furniture as lecturer A1 has remarked earlier.

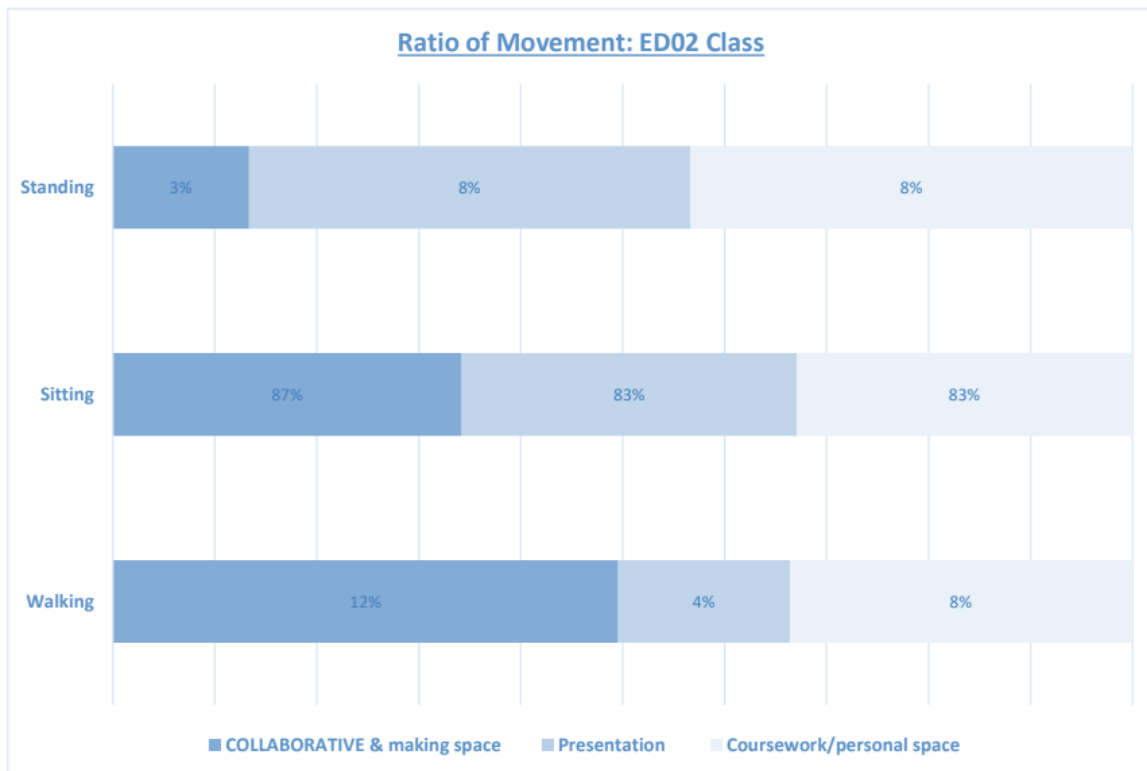


Figure 25. Ratio of movement amongst ED02 students.

However, in the online studio, a defined level of inequality started to appear as learning from home relied not only on access to technology and the internet but on physical space and moral support, as has also been observed by Webster (2020). Lecturer A2 confirmed this when stating:

“A lot of the students were hampered through the virtual sessions because they couldn't accurately photograph their work or they didn't have the resources or are not comfortable doing it virtually because they're not tech savvy, for example. But anyone can pick up a pen and draw on a piece of paper and share their ideas that way” (2022).

It is, thus, evident that technology provides beneficial qualities to a theoretical course-based subject but also hinders more tactile-based course content. There exists a new sense of exploration in what students and lecturers want from their 'creative spaces'. I suggest that the sense of freedom of choice can be brought about by furniture or open spaces that allow for a more organic and empathetic way of reflecting when designing. My reflection during the course of this research led me to conclude that part of this newfound exploration of space is a consequence of the restricted confines in which we found ourselves during COVID-19, and the need to address our physical and psychological needs which space provides for us.

Table 20 below summarises the strengths and weaknesses of making, collaborative and intermission spaces in online and FTF studio environments, as discussed in the text.

Table 20. Strengths and weaknesses of making, collaborative and intermission spaces: online versus FTF studio environment.

	Online studio	FTF studio
Strengths	<ul style="list-style-type: none"> ● Recording of session allowed students to reflect on content. ● Work at own pace and place ● Increase in student attendance 	<ul style="list-style-type: none"> ● Human-centred connection ● Individuality ● Ease of collaboration among students and their peers ● One-on-one only within the given studio time ● Increase in sharing of work ● Transparency of all design stages of student’s design process ● Faster turnaround time for critiques ● Unplanned collaboration between peers
Weaknesses	<ul style="list-style-type: none"> ● Impersonal environment ● Loss of engagement between lecturers and students ● One-on-one critiques encroach on lecturer’s personal time ● Communication channels altered from tactile to text-based ● Practical coursework experienced challenges within the digital format. ● Repetitiveness led to uninspiring spaces within students’ homes. ● Furniture / bed / desk impacted productivity ● Distracting environment within the confines of student’s homes ● Reliance on recordings led to lower concentration levels. ● Technical issues, such as WI-FI and load shedding, meant a loss of connection to join classes. 	<ul style="list-style-type: none"> ● Confusion and adjustment from online back to FTF ● Adjustment to time management ● Relearn how to communicate design ideas

4.3 Environmental qualities in the FTF studio

Thoring refers to environmental qualities as source stimuli as “space can provide certain stimuli from views, sound, smell, textures or material” (Thoring et al., 2018:1972). Environmental psychology examines the mutually beneficial partnerships between people and their settings (Kopec, 2012). Elements, such as lighting and noise, buildings, corridors, furniture, and symbolic artefacts, are defined as the meaning or appearance of a location, and are all examples of environmental stimuli that might influence human actions (Kopec, 2012). More so, in order to observe experiences, user studies involve spending a period of time observing the environment (del Galdo et al., 2016). With this in mind, the following

categories were observed during my lectures: lighting, views, acoustics, thermal control, furniture, recourse, colour, spatial layout. Each of these environmental qualities is discussed in detail below.

4.3.1 Lighting control

Lighting, from natural to artificial light, is an important consideration in Interior Design. The use of lighting can “stimulate and facilitates manual work such as sketching or reading while large windows and additional lamps provide extra brightness and stimulation seen as a process enabler” (Thoring et al., 2018:1974).

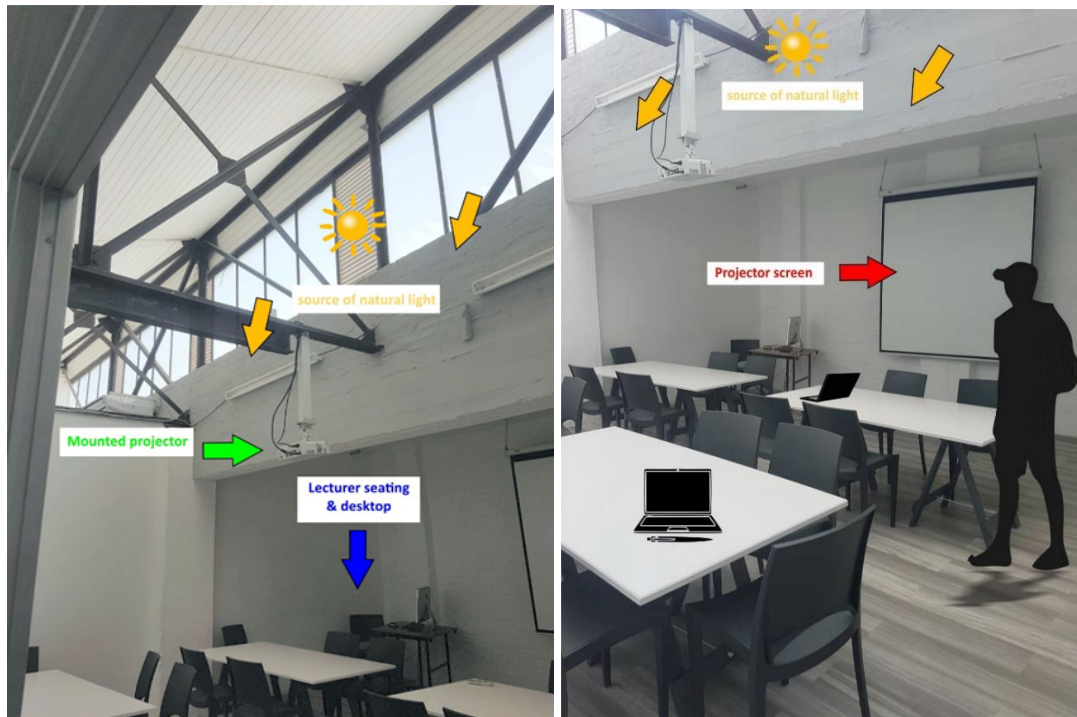


Figure 26. Studio 8 - Exposed to natural light.

Throughout my participatory observation it became evident that lighting control was a common issue in the studios when using the projector in presentation spaces. I observed that “[i]n studio 8 there is no full ceiling and the natural light from above is streaming in, thus distorting the clarity of the projection” (Stock: notes, 2022). However, on a day that was overcast the fluorescent lighting of the main building lit up the studio; the yellow arrows in Figure 26 show the natural light flooding into the space, while the green arrow shows the position of the projector screen. Studio 4 (Figure 27 below) was seen as a preferred studio by students and lecturers due to lighting control during presentations, as lecturer A1 commented.

“There’s good light quality in that room, the equipment works well, and it’s dark enough so when you turn off the lights the projector works well enough” (2022).

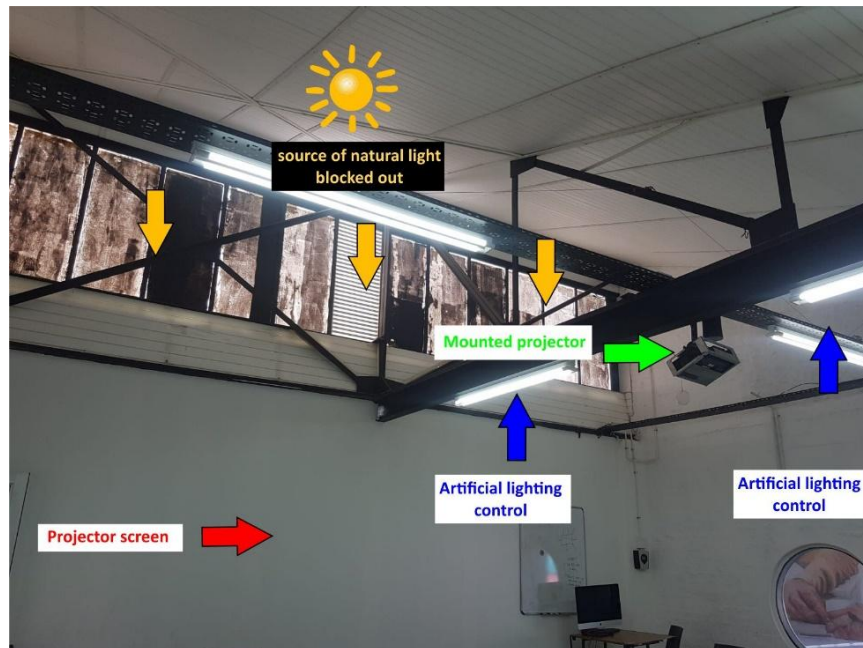


Figure 27. Studio 4 - preferred lighting.

Studio 5 was another favoured studio among the lecturers and students:

“In terms of artificial lights and when you switch the lights off, it is quite dark, so the content reads well in the projector” (A2:2022).

As seen in Figure 28, this is due to the windows having been treated with a black block-out paint which obstructs the natural light from streaming into the studio space.



Figure 28. Studio 5 - preferred lighting.

A further observation was that different spatial types called for different lighting needs. Despite the fact that Studio 8 had an abundance of natural light which was not conducive for presentations, it was, however, ideal for making and collaboration space as lecturer A1 pointed out.

“I would prefer to work in the library because it's a lot lighter. There's better movement in that space.... I think that the library is probably my favourite place to have class when we're just critiquing and I can go around to individual students. There's something really relaxed about the students in that space and I feel that when they relax, they allow their brains time to tick over and develop ideas” (2022).

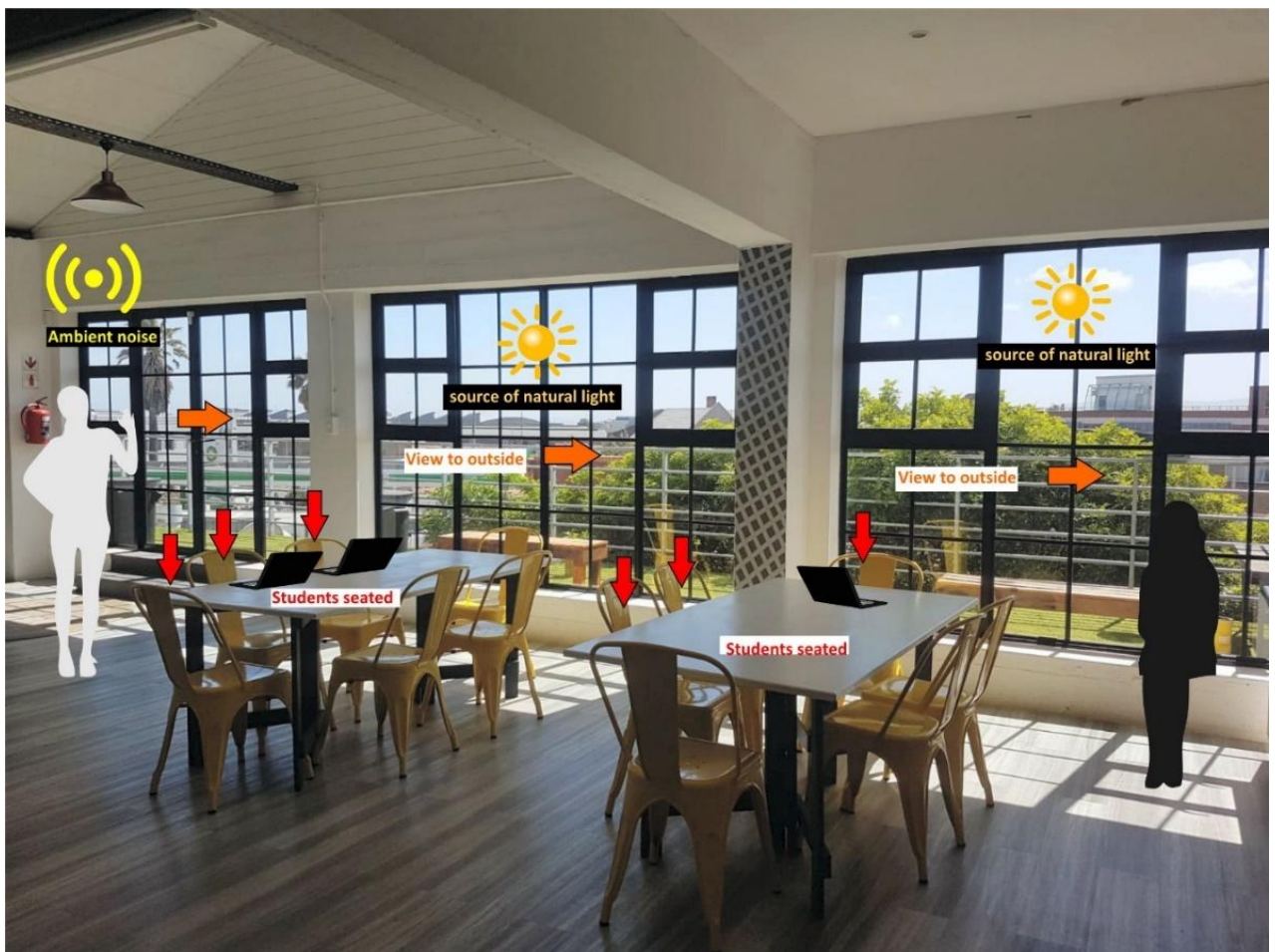


Figure 29. Library intermission space.

I have experienced a similar sense of comfort or a ‘relaxed feeling’ in the library during collaborative sessions. However, what I did observe was:

“a lot of natural lighting floods the space and there is no artificial lighting on. Due to the level of natural lighting, students need to be considerate of

where they are seated due to the glare on their laptop screens” (Stock, notes:2022).

In a presentation space it is important to control the level of light in the space as I observed in Studio 3.

“Florescent lighting is off to allow for clearer quality of the projector. There was some natural lighting coming in from the window” (Stock, notes:2022).

I came to the conclusion that an important factor in the lighting control issues on the campus is the lack of flexible window treatment, which could be adapted to the different space types within a given studio. At the time of the research, the level of lighting was determining the quality of productivity, rather than being an enabler of productivity.

4.3.2 Views to connection

Studio 2 has no windows or views connecting it to the exterior or intermission spaces. There are two windows at the back of the studio that look into the workshop area; however, these have been blocked out with paint.

In Chapter 3, reference is made to Thoring et al.’s description of views into intermission or collaborative spaces: “the Out-look; views to the exterior or observation points within the building provide visual stimulation and eventually instigate social interaction” (2018:1974). Throughout discussions in the focus group Studio 2 was identified as the least favoured studio and a large contribution to that was the lack of views. Student S1_ED03 summed up the overall feel of this studio:

“A studio that I hate, okay dislike, is Studio 2. There are no windows, the lack of natural light makes you feel like you're in a little dungeon. It's horrible. It's very cold there and I don't like how narrow this space is. It does not make you feel free and like you want to be creative” (2022).

Two months after my participatory observation exercise, and to my surprise, Studio 2 was turned into a storage room. I deduce from this that the authorities came to know about the general dislike for this studio among the majority its users which may illustrate what space means to people. Just because a place was created with a specific intent (collaborative, making space) does not mean it automatically becomes a process enabler. This, in turn, touches on Morville’s seven elements of user experience “useful, desirable, accessible, credible, findable, useable and valuable” (2004). Studio 2 no longer felt desirable for students; there was limited accessibility to wall sockets affecting the usability of the space, which made it less credible. The lack of connecting views onto intermission spaces made it

less findable, and so users felt that the space was useless and not valued. It should also be noted that the linear form of this studio is a further negative aspect that Thoring et al. touch on: “non-rectangular floorplans create cosy niches and interesting perspectives across interior and exterior areas” (2018:1974).

In contrast, Studio 4 offers a number of views into intermission spaces.

“Two large, full-length windows looking out into the circulation path of the campus. The door leading into the studio is also a glass, there is an additional window at the lecturer’s desk, this window is round in shape and looks onto studio 1, however, none of the windows look outside of the building (Stock, notes:2022).

Variations in window views are appealing as seen in Figure 30. This impact can be amplified by the use of buildings and frames that provide a more captivating and diversified perspective. Windows of varied sizes and configurations offer varying perspectives (Thoring et al., 2018:1974).

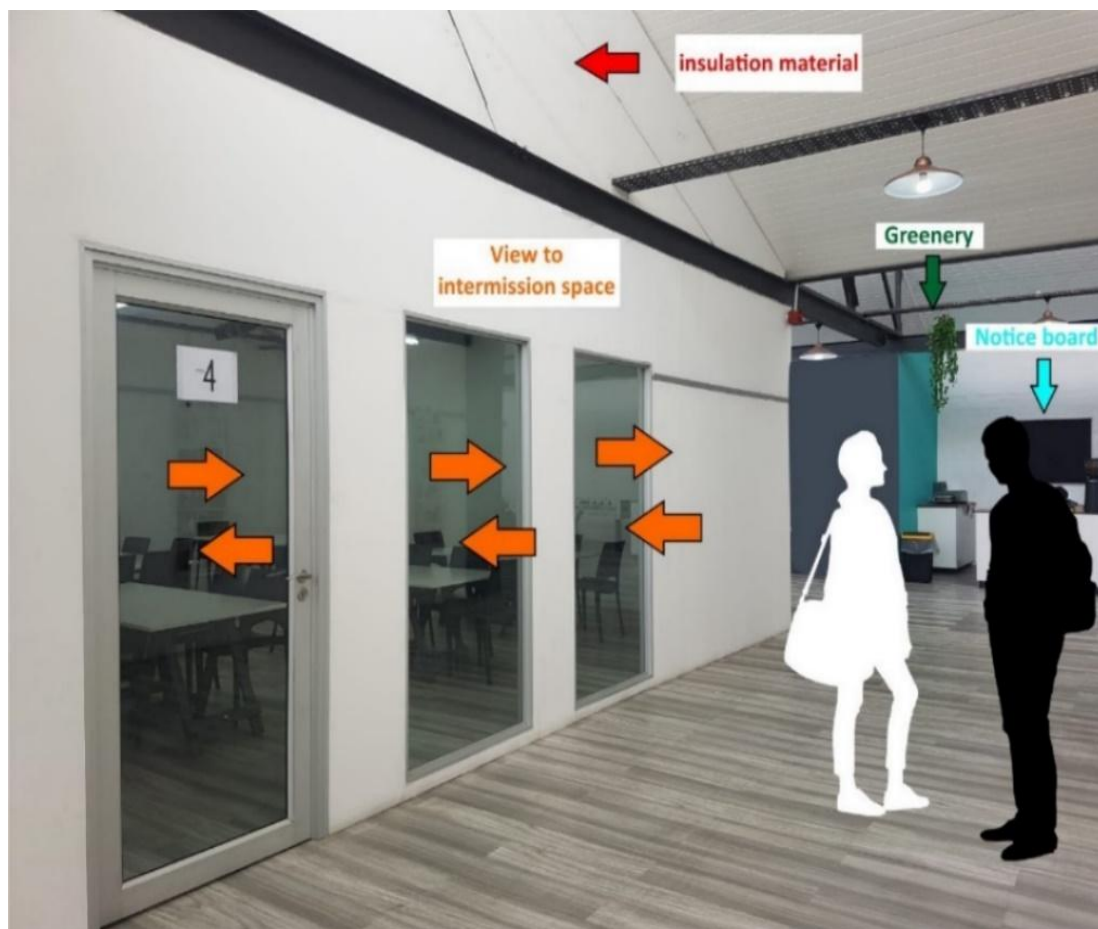


Figure 30. Studio 4 - Views to connection.

In Studio 8, one large window offers a view into the connecting passage, as well as into the adjacent Studio 7, which also has a window. This creates a sense of connection to students in Studio 7 as seen in Figure 31. These types of views can be interpreted as “Semi-Privacy: Views across rooms enable eye contact and allow observation of others’ activities. Glass walls provide noise protection but keep visual contact” (Thoring et al., 2018:1974). Through my participatory observation it was evident that these windows became a means of connection to our surroundings and a sense of physical awareness of what was outside the studio.

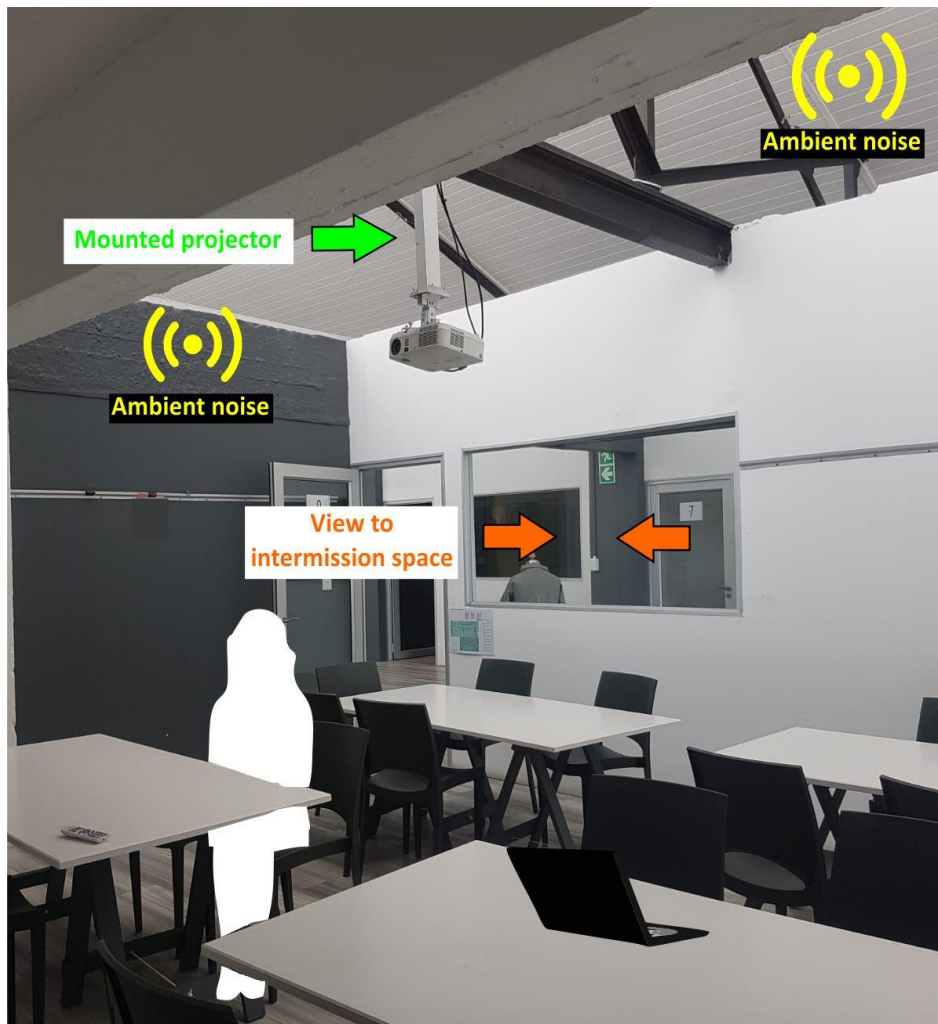


Figure 31. Studio 8 - Views to connection passages.

Studio 5, on the other hand, was the most favoured studio as student A3_ID03 describes:

“Studio Five is the best one. You can see what’s going on around you. You feel like - OK, there are people, there’s something going on” (2022).

Student S2_ED03 further validated the importance of connection with the outside world which students want to feel.

“Studio Five is the best, it's like a nice space. The lighting and the windows and you feel connected to everything” (2022).

This yearning for connection may well be linked to the fact that students are tasked to design for real-world problems within a detached and confined ‘box’ called ‘the traditional design studio’. Or are these intermission spaces becoming a curated classroom space for inspiring original thought and expression?

4.3.3 Thermal and acoustic control

“I can't work when I'm cold...your brain needs to be warm and in a happy place” (S3_ID03 :2022).

Thermal control manages the interior temperature of a building. It helps maintain consistent heating and cooling throughout the year as the seasons change. Additionally, it contributes to the comfort of the occupants of the venue and to the quality of their experience (Kwon et al., 2019). In the same vein, acoustics play a vital role in an educational context. Learning is inextricably tied to communication, and acoustics is the study of auditory communication. However, learning requires concentration, and external noise that is overpowering in volume is a significant source of distraction (Thoring et al., 2018).

As mentioned in Chapter 3, due to its physical and psychological effects, personal control in an interior space is one of the determining elements for user-comfort and environmental comfort (Gifford, 2012). An example of students’ user-comfort was observed during a course presentation in Studio 4, when students requested to relocate our class to an intermission space, such as the library. In my notes I recorded the following observation:

“Class was meant to be held in Studio 4 today; however, students requested to move to the library as there is a heater and the space was much warmer” (Stock, notes:2022).

On another occasion, I noted this:

“Studio 8 has no ceiling; a lot of natural ventilation comes in from the top. This, however, is not conducive for today's setting as it made the studio very cold” (Stock, notes:2022).

This became a common theme throughout the semester, as my class was assigned to Studio 2, and many students complained about the ineffective thermal control and lack of windows overlooking the connecting rooms.

As a result, I would walk through the campus and investigate which studios were available during our timeslot; Studio 8 was often available and thus became our newly adopted space. Nevertheless, midway through the sessions, several students would request to move to the library because it was warmer there, eventually leaving me with some students working in Studio 8 and the rest in the library. On further reflection, this same pattern developed in the scorching summer months, when the lack of ventilation in the studios produced uncomfortably hot conditions as student S5_ID03 explains:

“There's so little natural lighting and ventilation. I think there are maybe two or three windows in our whole campus that actually open. We only just recently this year got an air con and there's actually only two throughout the whole campus which are never on” (2022).

I could confirm this. When observing connecting views into Studio 4 I noted

“none of the windows open to allow fresh air into the space. There is also no mechanical ventilation in the studio” (Stock, notes:2022).

A major reason why students are drawn to the library during the summer months is its access to the balcony area which allows for fresh air as seen in Figure 32. Thoring notes that “outdoor access enables casual breaks to get some fresh air and, hence, provide a change of perspective as are seen as Intermission spaces that provide stimulation” (2018:1974). However, based on my observations, these spaces are intended to be intermission spaces and not collaborative or making spaces which is what they are now being utilised for.

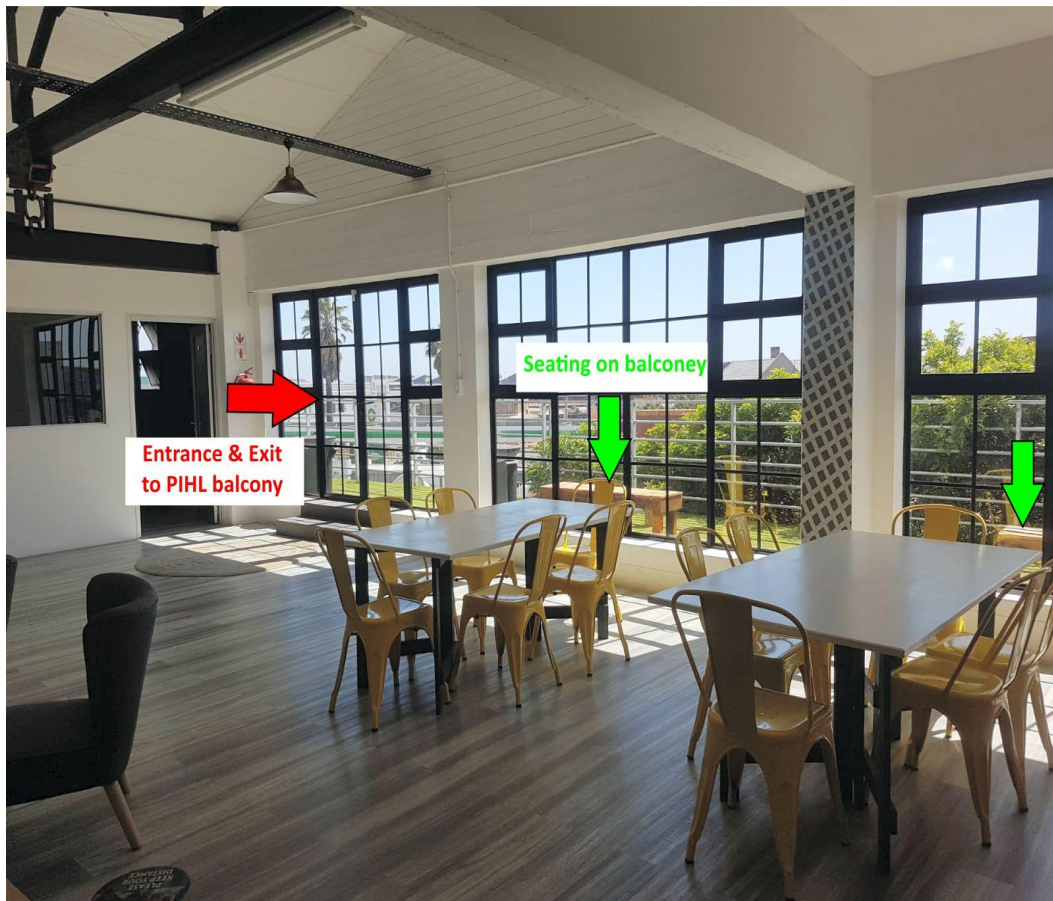


Figure 32. Library access to communal balcony (intermission space).

Additionally, student S6_ED03 touched on how thermal control within a space at the PHEI affects the use of these spaces:

“It doesn't feel as inviting because it's not warm enough. Because I remember the beginning of the semester. My peer and I used to stay after class, just to get some work done.... But then it was warmer, you know? So, campus, it's a great place to work, at least for me. It felt amazing back then, but I can't work when I'm cold... Your brain needs to be warm and in a happy place” (2022).

Through my participatory observation, I have noted that a significant factor influencing the fluctuation in temperature between either very hot or very cold is the building envelope and the lack of sufficient insulation throughout the whole building. The only areas where insulation has been installed are those between studios to act as soundproofing, as seen in Figure 33 (the red arrows). However, this intention has been defeated, as the sound still travels through the walls - more so in the hot summer months when lecturers tend to keep

their studio doors open to avoid overheating. This allows noise in the circulation path to disturb course work and student presentation space.

Additional noise interference, caused by the building (Figure 33, the blue arrows) was noted in my participatory observation:

“Studio 4: Noise is coming from the wind seeping in through the exterior building material” (Stock, notes:2022).

This is due to physical gaps in the building envelope, which have not been sealed correctly. As a result, the wind moves these materials violently at times, negatively impacting the studio’s noise level.



Figure 33. Sound proofing material.

This observation was made in the focus group as well, when student S5_ID03 noted the distracting sound from the building material in the studios:

“So, I think for me, I tend to get quite over-stimulated with the sounds: the sound of that polystyrene thing [(insulation between the studios)] that is

getting sucked by the wind, and other classes' noises all while you're trying to listen to whoever is talking [during presentation space]" (2022).

Student S5_ID03 touched on an essential point: that of being overstimulated and its effect on people's ability to focus on the task at hand. Thoring et al. further validate this when speaking of "the Silencer: Especially in open plan office environments, a raised noise level causes distraction. This problem can be minimized through integrated silencers in areas such as Intermission and Collaboration spaces" (2018:1974). The leading cause of fluctuating temperature is a direct cause of inefficient insulation, gaps in the building envelope and no mechanical ventilation within any of the studios. For this reason, I believe a significant factor pushing students and lecturers out of the traditional studio and into more intermission space is the lack of thermal comfort.

The inability to hear lecturers and students during presentations due to the lack of soundproofing and because of loud noise produced by the construction materials of the building all contribute to an uncondusive learning environment. However, due to the tools needed in presentation spaces (projector and computer) it means primary users are forced to remain in the studio until the content has been covered.

4.3.4 Spatial layout (furniture, writing surface, colour, plugs)

Depending primarily on the supplied infrastructure, space as a process enabler can reinforce or even compel specific procedural behaviours. In a studio, for example, large or inflexible furnishings prevent collaborative work. Thoring (2019:93) argues that in this respect, "the process enabler is an extension of the concept of affordance"; rather than only recommending a certain usage or action, the space requires it. The versatility of a space or piece of equipment is crucial to supporting a range of artistic endeavours. The adaptability of a space is measured by its capacity to convert from one configuration to another with little effort.

This led to the next observation, namely that furniture in a particular space became a challenge for students to navigate as I noted in my written observation:

"Studio 4: the trestle tables work well when the configuration of furniture needs to be adapted, however students are constantly moving the trestle legs and find it difficult to stabilise the furniture piece, along with finding a comfortable place for their legs to be positioned" (Stock, notes:2022).

This very observation was affirmed when student S5_ID03 spoke to the topic of furniture in the studios stating

“Even the desks sometimes don't feel functional. They're always skew or those weird leg things are always folded and sometimes it's not actually holding up the desk at all. I don't always feel comfortable in the chairs” (2022).

As mentioned, a positive aspect of the furniture was its adaptability - “The Pop-up: Foldable furniture allowing temporary usage when needed” (Thoring et al., 2018:1974). However, the trestle tables are not temporary and often the layout of the tables is left unchanged throughout the term. Much of this could be due to the dimensions and weight of the tabletops, as two or more people are needed when dismantling the furniture for rearrangement (Figure 34). A potential solution to this problem would be furniture with wheels which facilitates easy relocation and rearrangement (Thoring et al., 2018:1974). Furthermore, during my participatory observation I noted that the stability of the tabletops made sketching on these surfaces a balancing act at times.



Figure 34. Trestle tables - The pop-up furniture.

These hindering elements impacted the adaptability and useability of the studio space. During my interview with lecturer A2, I asked whether there was anything from a spatial standpoint that he would consider when designing a studio:

I think the nature of the space you teach in has very much got to do with the content of the coursework and how it's structured. So, if there's a lot of discussion time or ideation time where students are asked to break away and come back, then the studio environment is not necessarily conducive to that. You would want smaller break-away rooms or an informal setting where people are comfortable and just feel at ease sharing ideas and thoughts. Whereas the studio environment is very structured because it's inherent in most of us from our primary school and high school training. It's very much a conventional classroom and you only face one direction (2022).

This very idea of coursework determining the structure of the studio led me to observe a pattern of preference emerging in the interviews regarding students' and lecturers' favoured furniture and how this affected student productivity. As Thoring et al. (2018:1974) noted: "different seats enable varying work postures and different activities"

"So, for me, actually, my favourite space to have class is in that sitting area [student lounge], where there's those tables and the couches and stuff. I actually really enjoy having class there because it's quite informal and it's surprisingly the least noisy spot. I think that would be my favourite space to have class even though it's not a real class" (S5_ID03:2022).

The student lounge, furnished with sofas and lounge chairs, encourages informal gatherings. Lecturer A1 noted the following:

"I think sitting in the same studio every day with the same students is monotonous and they get frustrated and bored when we do the same thing. It's a very repetitive kind of process" (A1:2022).



Figure 35. Studio 3 - high tables.

Students also spoke of the fact that Studio 3 was favoured due to its high tables as seen in Figure 35 above.

“It feels more open to me. I can see my whole class. I can talk to more people” (S6_ED03:2022).

Thoring et al. note that “elevated seats allow for better views and eye contact with passers-by, as well as a more active participation in teamwork (Collaboration, Process Enabler)” (2018:1974). However, during further discussion in the focus group it became evident that the high seating in Studio 3 was a hinderance as it was uncomfortable when used for long periods of time. Lecturer A3 elaborated on this when discussing which studio, he favoured.

“So, I think that's Studio 3, with the high tables... it has the bar stools. I used to love that one. I liked that one because it was tucked away, so there wasn't a lot of noise and circulation coming through. But then the students didn't like it because it was so high and they're, sitting on those bar stools” (2022).

Studio 9 and Studio 5 were also preferred spaces; however, not for the comfort of the furniture but rather the spatial arrangement of the tables.

“Studio 9. It’s a good studio as the seating arrangement are not too far from each other, not too low or high and good distance from the lecturer” (S7_ED03).

Common remarks regarding Studio 5 referred to the scale of the space and how this affected the movement within the spatial layout.

“It’s a big space, you don’t feel claustrophobic in there” (S1_ED03).



Figure 36. Studio 9 - Distance of seating between students.

Throughout my observations I noted that a large percentage of the wall in the studio’s was painted white. At first glance it appeared quite cold and uninspiring. However, “[w]hite space and emptiness invite implementation of own ideas; the space acts as a stage for people’s work. Empty frames invite projection of own ideas. Emptiness prevents fixation” (Thoring et al., 2018:1974). The only problem with this is that the majority of submissions at the PHEI are now done digitally. Printing and displaying students’ work in the studio is not frequently practised anymore, leaving the studio feeling clinical in nature.

In the layout of the studios wall sockets became a hindrance to the spatial arrangement as identified in my observations:

“Studio 4 is a large studio space for a small class. The students are all sitting toward the back of the class as this is where the plug points are located” (Stock, notes:2022).

On another occasion:

“Studio 4 -The studio space only has two plug point, so students bring their own leads and adapters from home to allow for more devices to be plugged in” (Stock, notes:2022).

In due course I observed that the position of the wall sockets was governing where students sat, as many of them would need access to power outlets for their laptops.

“Studio Two is horrible and it is so dark in there. I hate this studio. It's so bad. I think there's like one plug” (S5_ID03:2022).

Thoring et al. note that “sockets, digital info boards and technical infrastructure enable working anywhere” (2018:1974). I noted, however, that the absence of wall sockets hindered free movement within a space. This insight led to my further observations of where students chose to be seated and I took note of the position of wall sockets in the vicinity.

“Studio 8 - The accessibility of the plug points in this space are not easy to navigate. If more than one person is in need of the power outlet the seating at the back of the class doesn't allow for circulation around the table, which makes it difficult for the lecturer to access individual student for critiques if the class is full” (Stock, notes:2022).

With the wall socket located in the back corner of the class students would move their desks and chairs to that corner. This, in turn, affected the circulation path around these hotspots making it almost impossible to access individual students for one-on-one critique sessions. This arrangement also precluded the experience of “the Confessional Seat arrangement[s] for two, allow[ing] intimate conversations or consultation” in a collaborative setting (Thoring et al., 2018:1974). Figure 37 below shows my findings regarding the ratio of interaction with laptops and surfaces, as well as human interaction, within the various space types. With a

large percentage of interaction involving students and their laptops, it is crucial to have sufficient access to wall sockets in the studio.

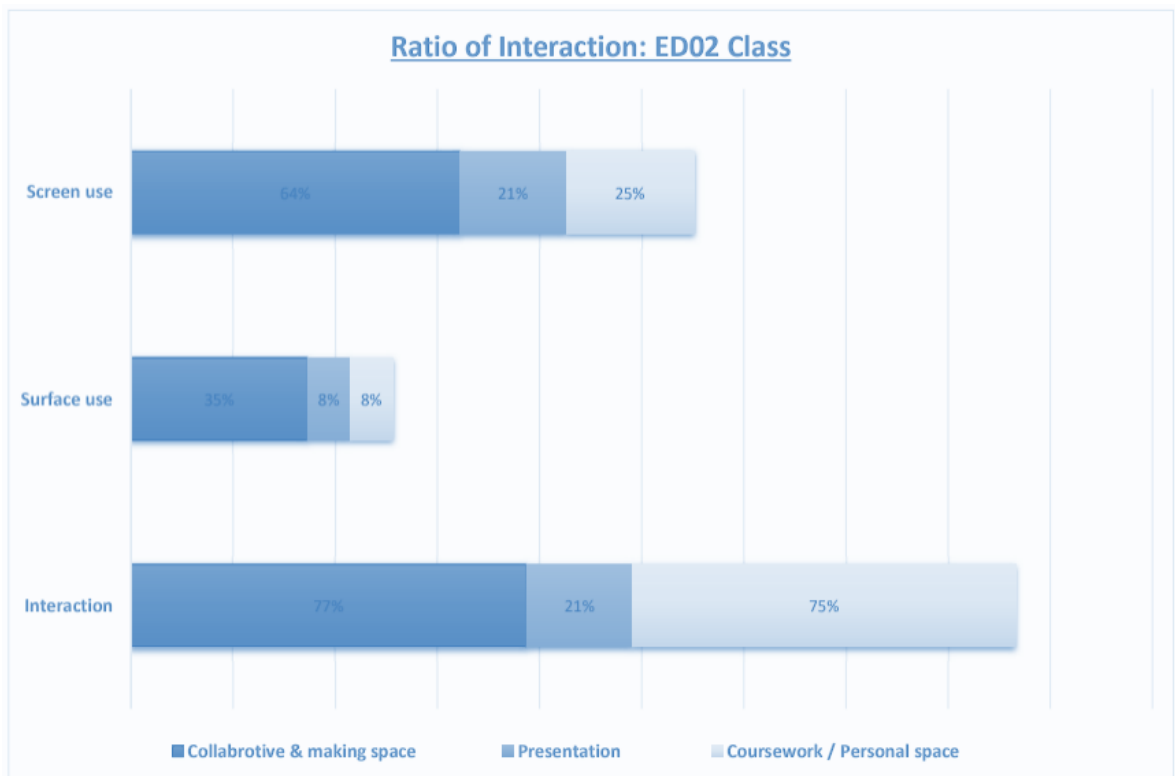


Figure 37. Ratio of interaction with laptops and surfaces, as well as human interaction.

Student S2_ED03 spoke of her experience regarding this issue:

“There’s not enough plug points. The desks, they wobble all the time, and I guess sometimes they are moved further away from the plug points and then there’s a whole line of people waiting to charge their laptops. So, in terms of design, I don’t really think that the spaces are designed well for a studio” (2022).

4.4 A collaborative nomadic studio: an expression of immersive design-thinking in a face-to-face studio

As a result of the change in the workplace brought about by COVID-19 and the insight gained from the interviews, it became evident that one’s workplace may be both restricting and liberating in terms of one’s creative output, as well as a source of stress that can have detrimental consequences with regard to one’s productivity and morale.

“When you are at home and you’re sitting and trying to figure something out, it can feel crippling at times because you’re sitting between four walls trying to figure out solutions alone” (S6_ED03:2022).

According to Zane (2015), the intricate interaction between a room's physical structure, the organisation and distribution of its space, and the persons who occupy it may play a part in this. Thus, an immersive nomadic learning environment could contribute to students' design thinking skills as sharing tacit knowledge is beneficial: it fills in knowledge gaps and allows one to gain insight from the experiences of others. Listening to and learning from others is an excellent way to enhance one's design-thinking skills. Incorporating the concept of tacit knowledge sharing in conventional design studios gives students a richer understanding of the processes at play, which is especially helpful when considering human-centred design (Prabhakaran, 2022).

With this in mind I arranged a collaborative session, also referred to as "critiques sessions", at a coffee shop for my ID02 and ED02 class. This nomadic studio tied in with the students' current brief which tasked them to design a nomadic co-working space that incorporated a coffee shop. I informed students of the 'site visit' nature, date and time. On the day, I arrived an hour before the scheduled class time to sketch the floor plan of the coffee shop and secure enough seating for my 12 students.

4.4.1 ED02 - Nomadic studio

The large central table (Figure 38) in the coffee shop became the studio for the day. Students fully immersed themselves in the experience as they ordered food and coffee while working on their laptops and sketch pads. There was a sense of connectedness about working in this space, a connection to the 'real world' and an immersive connection among the students and their coffee shop brief. This could be seen as I walked around to each student for a one-on-one critique and found students pointing things out in the surrounding setting as they explained their ideas and thoughts. Students observed how people moved through the space; these observational considerations could be seen coming through in their final projects as tacit and implicit knowledge gained from the experience. McGregor validates this point by stating that space is often treated as an environment that houses social activities instead of being viewed as integral to occupants' experience of it. Consequently, the perception of material space is adopted as "an invisible backdrop for the complexity and vibrancy of social space" (McGregor, 2004:1) and viewed as a "passive container for social action" (McGregor, 2004:350). Moreso, Rodriguez et al. (2018) speak to how the traditional design studio context has documented the detachment from real-world problem situations, emphasising that solving challenges posed in the real world while seated in a dedicated working environment may be the primary cause of this disconnection of place.

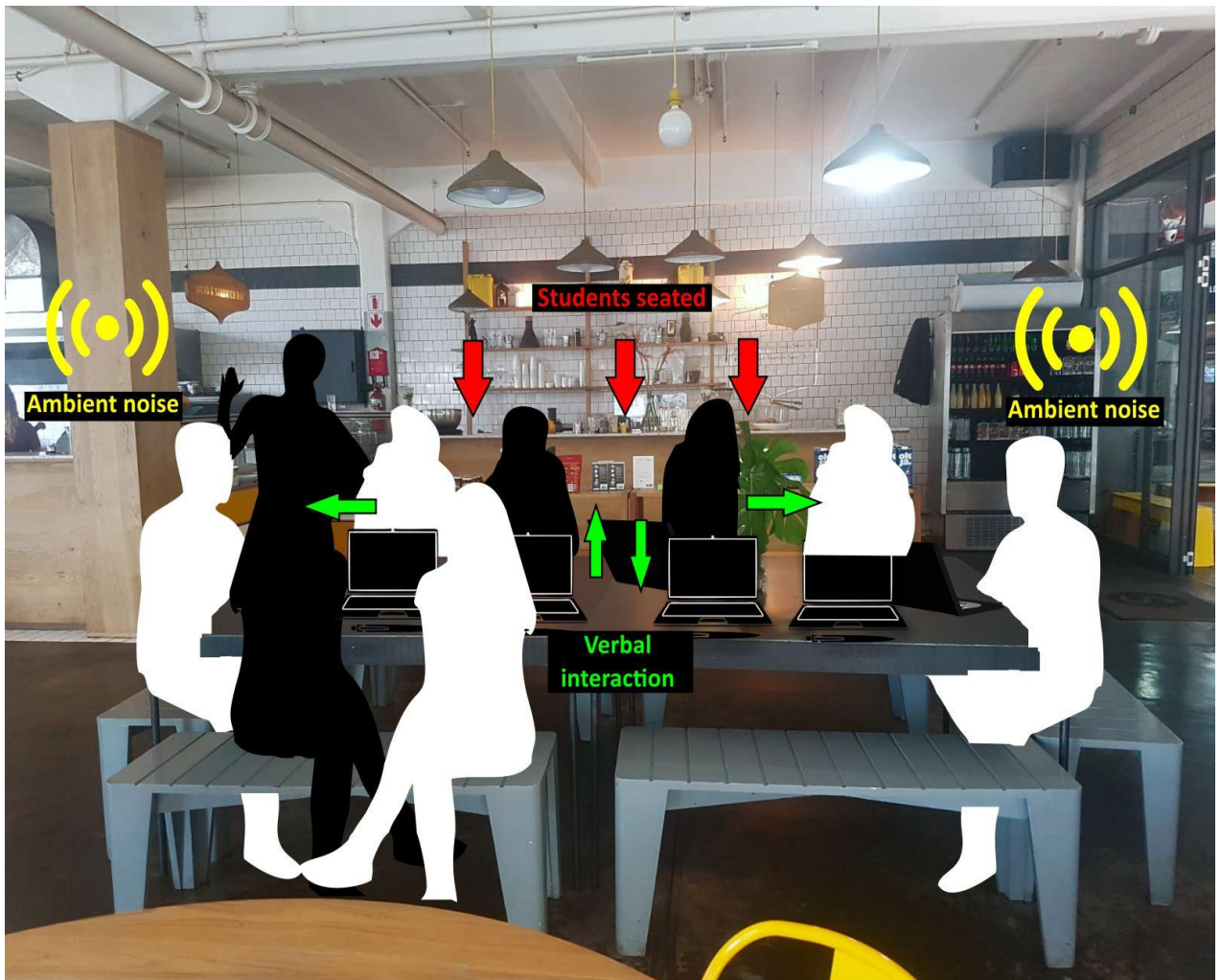


Figure 38. Shared table within coffee shop class ED02.

The students all spoke amongst each other as they worked, which could be attributed to the scale and form of the table, allowing for ease of collaboration as indicated by the green arrows in Figure 38. Thoring refers to this type of seating as a “communal or shared table that instigates collaboration and provides the possibility to work individually but in company” (Thoring et al., 2018:1974).

Moreover, the collaborative atmosphere could also be attributed to the energetic background noise of customers in the space. Thoring describes this as a “buzz- ambient background conversations can set someone into a creative and active mood” (2018:1974). I observed that the coffee shop environment was much livelier than that of the traditional studio, with the backdrop of staff and customers weaving around the creative hub that the shared table came to symbolise for the day.



Figure 39. Seating arrangement in coffee shop class ED02.

Movement within the space was comfortable, as some students left their devices unattended to sit next to other students and discuss their briefs. Others walked to the front counter and engaged with staff while placing their food and drinks orders. These actions could be seen as a form of “learning by doing to gain expertise and knowledge necessary to produce innovative, creative, and competent design solutions through reflection-in-action” (Boling et al., 2016:168). Two students who arrived late chose to sit at the adjacent table, as seen in Figure 39. This did not appear to detract from their experience as they sat close enough to their peers to feel visually connected to the rest of the class and their surroundings. Large windows in the coffee shop connected students to the street view. Thoring et al. (2018:1974), regard view as advantageous for fostering an inspiring creative environment.

There is a shortage of unconventional methods of establishing design studios that bypass the design studio infrastructure and resources. In addition, a gap in the literature concerning the future expansion of the design studio into new settings has been brought to light (Hettithanthri & Hansen, 2022). It is not sufficient to restrict the design studio to a purely academic environment. I believe my participatory observation revealed that a nomadic studio space that ties in with the curriculum brings a sense of enlightenment to the students, helps them think of spaces more critically, and shows them that every environment is an opportunity for reflection and improvement. This was further validated by students’ positive

comments about the 'site visit' and their request to have more classes outside the traditional four walls. Rodriguez et al. (2018) also observed that students in traditional design studios had reported reduced levels of interest and engagement when working in the studio, as creative thinking and design are influenced in different ways by the traditional design studio's methodical, sequential procedure, which limits students' exposure to different perspectives and approaches to learning. As a lecturer, I am aware that a nomadic studio may not always be a viable option for certain projects where the actual site cannot support the replicated studio environment, such as a centre for early childhood development. However, exposing students to locations where a nomadic studio is practical, fosters a point of reference for students when considering the end user.

4.4.2 ID02 Nomadic studio

My second nomadic studio session was with my five ID02 students. Despite this class being far smaller than the ED02 class, this did not appear to affect the quality of the immersive experience. Two tables were pushed together to accommodate me and the students, thus forming a communal table. Due to the proximity and form of the table as seen in Figure 40, it was not necessary for me to walk around to assist students; they would merely turn their laptops and sketch pad in my direction if and when feedback was needed. Similarly, as observed in the previous site visit, students organically immersed themselves in the experience as they ordered food and engaged with the waiter. I observed students commenting on aspects of the coffee shop's layout which they discovered to be insightful when reflecting on their own design work. I also found myself picking up an object on the table to emphasise scale and proportion during critiques with students. I interpreted this as Thoring reference to "social dimension" in which space influences collaboration and personal exchange of knowledge (2018:1972).

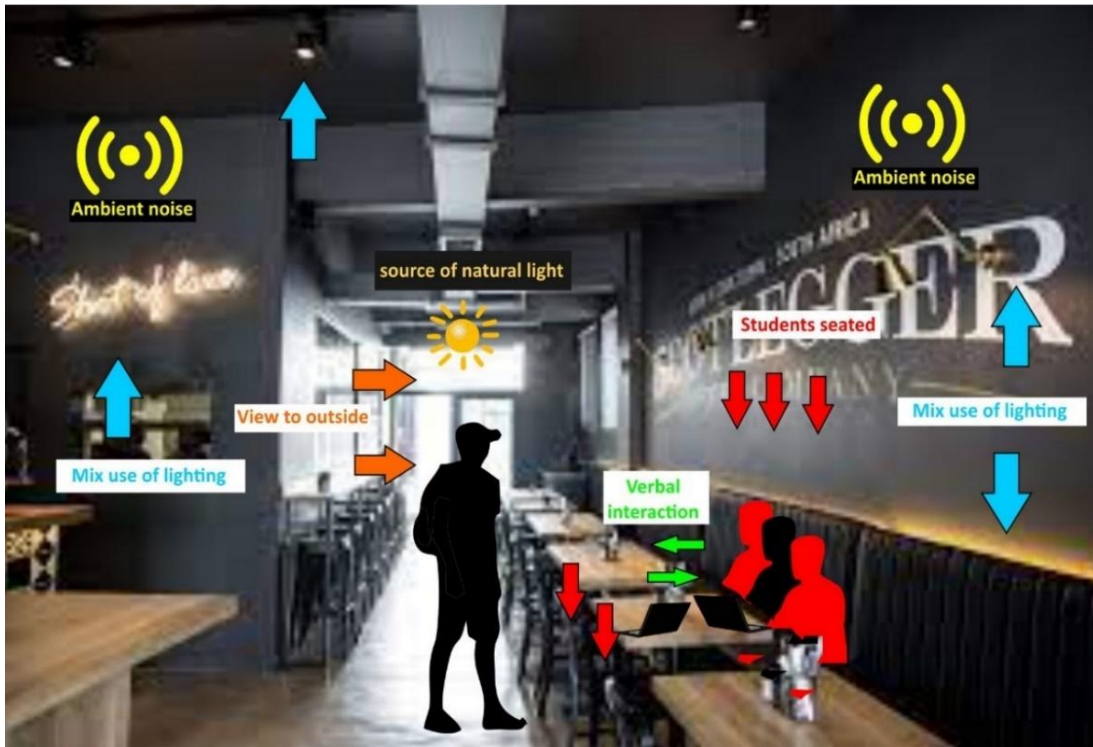


Figure 40. Seating arrangement in coffee shop class ID02.

The coffee shop provided a stimulating environment with natural and artificial lighting. Thoring refers to mixed lighting as a stimulus source in a space that facilitates manual work, such as sketching or reading (2018:1974). The use of large windows for natural lighting also provides additional stimulus in the space, as seen in Figure 41 below.

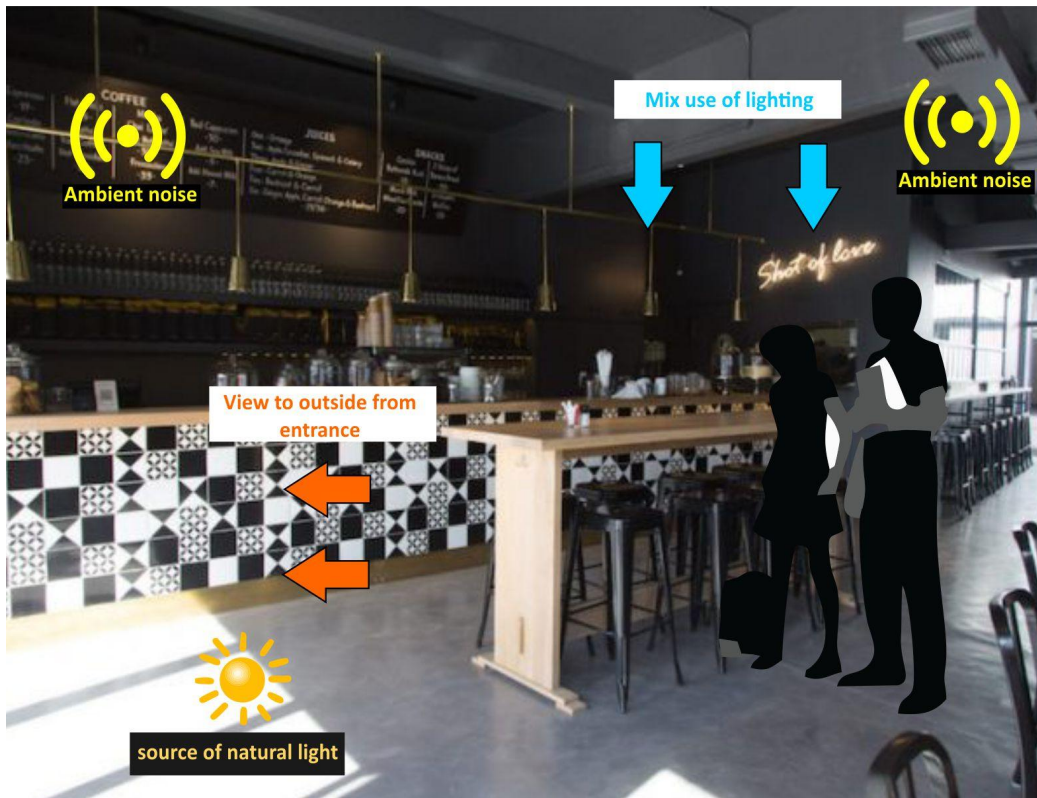


Figure 41. Interior views in coffee shop class ID02.

Even though a portion of the design studio experience involves site visits, students are still expected to solve real-world challenges while in the design studio. In my view, students' capacity for independent thought and discovery has been restricted due to this method. Hettithanthri and Hansen validate this point by showing that the design studio environment lacks the sensory stimuli necessary for effective design-thinking (2022). Where does this leave the design studio within the framework of an institution's material space? I believe that the concept of hot-desking studios could reduce this lack of stimuli in the design studio.

4.4.3 Hot-desking studios - a form of nomadic studio within the FTF Studio

Some physical studios respond to the difficulties posed by pedagogical shifts by moving studios outdoors and integrating creative solutions to actual community design issues (Salama, 2016). On the other hand, studios also respond by implementing new space management approaches, such as hot-desking schemes. A hot-desking studio is based on mobile work habits, in which students have no assigned workspace and use any accessible desk during a lecture (Cooper et al., 2017).

As mentioned in Chapter 3, Architectural Design programmes typically assign students to a studio for the duration of the academic year; for example, first-year students would be assigned to have class in the 'first-year studio', and this would remain their studio until they graduate to the second year, when they would then have classes in the 'second-year studio'. Given that the PHEI is a multi-disciplinary institution, the concept of a set studio space for each programme would not suffice due to space limitations. In light of this, classes are assigned permanent studios per term (or quarter), rather than for the duration of a full academic year. The Campus Academic Management (CAM) allocates the studio selection. The allocated studio space is thus determined by the class size and the desktop which the lecturer may need. Built Environment lectures typically need Window-supported devices due to the software we use, whereas the remaining departments need Mac devices.

However, the designated studios were not always conducive to class activities, as seen in my participatory observation of Studio 2:

“The studio's computer in this space ended up being too slow, that the first person to present was not able to move the slides along. For this reason, we could not continue using this space I then had to find the next available space that was free and move the session to studio 3 (next door)” (Stock, notes: 2022).

4.5 Conclusion

As humans, we all have diverse personalities and preferences; some people are more prone to overstimulation by their environments, while others are unaffected. Expecting students to fit into the 'box' of a traditional studio goes against the fundamental aspect of designing for and with the user in mind. This concept of adaptation is multi-layered and can be linked to Thoring's principles which are grouped into four categories: Neighbourhood, Architecture, Interior and Furniture (2018).

The findings revealed notable needs for adaptation within the architecture, interior and furniture elements. Due to ethical considerations and the PHEI's request, I could not explore the neighbourhood element without giving away the location of the site, thus infringing on the anonymity of the institution. Starting with the architecture of the building, it was clear that the level of uncontrolled stimuli in spaces due to lack of thermal, lighting and acoustic control was a direct result of the building's design and lack of critical design considerations. This oversight in the design and use of the PHEI's building materials started spilling over from the studios into the intermission spaces; however, these latter spaces were only conducive to collaboration and making space. When presentation space was called for, adopting a hot-desking system would be required when uncondusive environmental features prevailed.

Despite the challenges which lecturers and students experienced (due to being forced to abandon the traditional studio space) something uniquely enlightening has accorded. A newfound freedom of the design studio has emerged and become a favoured space in which to collaborate, make and even find personal space. The combination of furniture and environmental qualities enabled this development. An example is the student lounge which offers the freedom of choice of furniture that adapts to students' physical and psychological needs. Lastly, the interior of a studio played an important role when speaking to the topic of connection: internal windows from studios became the new views into the world of circulation paths within the PHEI, ultimately affecting students' and lecturers' impression of space - as Studio 2 proved all too well. I also found that theoretical subjects adapted well to online lecturing, whereas the practical subjects called for the familiarity of tangible space within the creative design studio. Notably, tangibility and tacit knowledge were also emphasised by the findings, namely that the immersive nomadic studio and being present in the 'real world' while designing for the 'real world' make a positive contribution to empathic design needs.

I have adapted Thoring's (2019) creative space types as can be seen in Figure 43 below. As presented in the findings, regardless of the space type, environmental qualities make a critical contribution to spatial qualities and can ultimately affect the usability of a space. It

was also noted in the findings that there are, in fact, two variations of presentation space within the PHEI, namely the coursework presentation space and the student presentation space, with the notable difference being the level of interaction. Furthermore, making space and collaborative space were found to share similar communication tools and artefacts, alluding to similar spatial needs. Moreover, the unforeseen hot-desking also revealed that intermission spaces became process enablers of collaboration and making space. In comparison, the collaborative nomadic studio assisted as a knowledge processor in the form of immersion and fostered a high level of tacit knowledge.

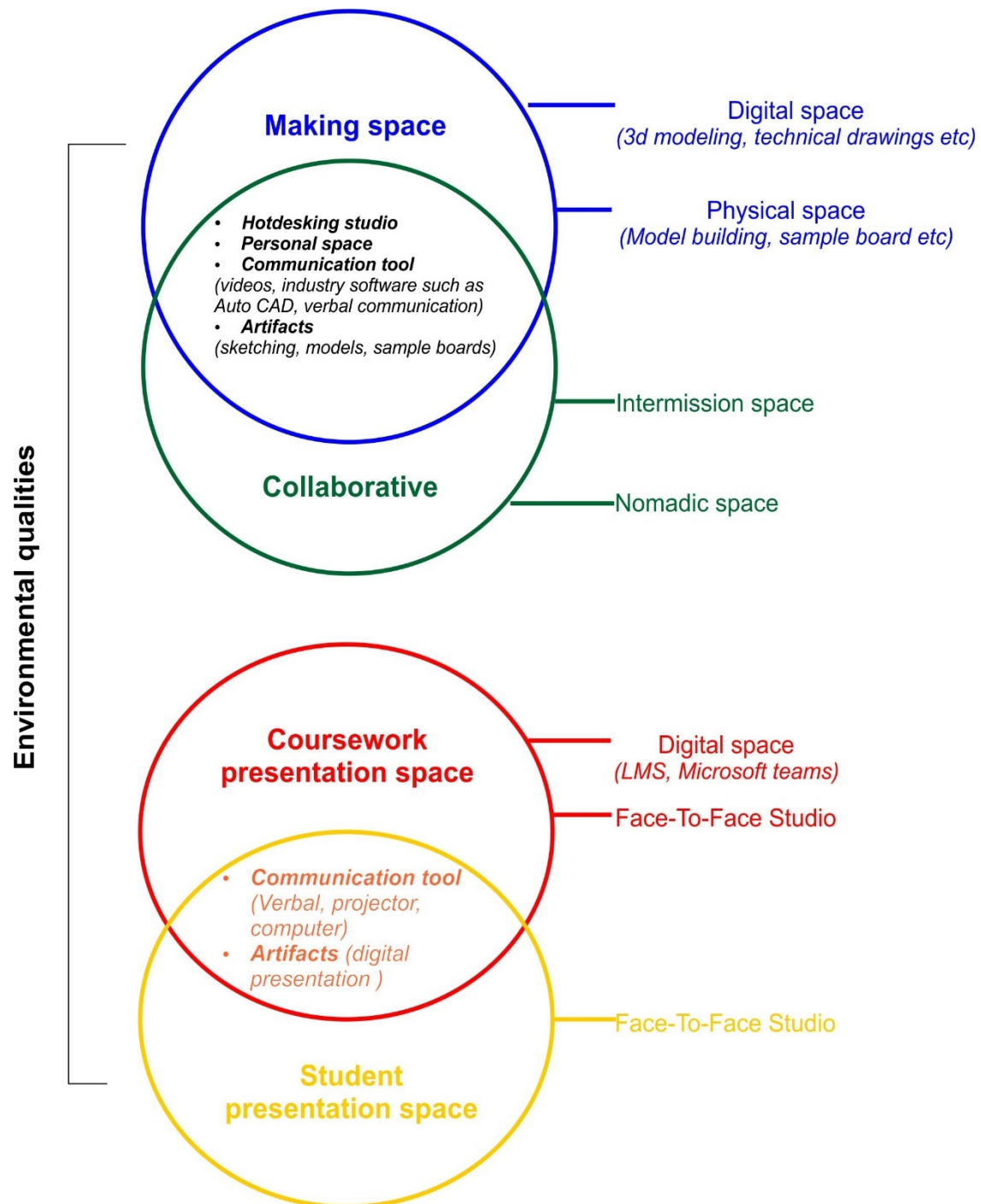


Figure 43. Adapted framework of creative space types within PHEI.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

In response to the aim of the study as to how contact- and distance-learning could be implemented in the Interior and Architectural Design studio to support an adaptive design-thinking environment, the findings in Chapter 4 were thematised using Thoring et al.'s design principles (2018). In designing educational spaces for the Built Environment “they should not be thought of as a vacuum when chosen by a student or designed by an institution as a place in which to learn” (Ellis & Goodyear, 2016:159). By considering the students’ and lecturers’ needs, key process enablers can be implemented in these learning spaces to facilitate “design activities and improv[ing] design processes through the spatial environment” (Thoring et al., 2018:1969).

Chapter 5 will include a conclusion of the discussion of the findings and triangulation with the literature that was reviewed. The chapter is presented under the main themes: Environmental qualities in the FTF studio; Typology of creative space (online versus FTF), and Typology of creative space in FTF studio. The subthemes are further categorised according to relevance and in a manner that permits them to address the secondary research questions:

- What are the vital spatial typologies within an Interior and Architectural Design studio, and what are their spatial considerations?
- To what extent are e-learning platforms used in Interior and Architectural Design, and what design thinking processes influence the consideration of these platforms in studio environments?
- How are traditional categories of spaces becoming less meaningful and adaptable as activities blend?

The findings that correlate with the secondary research questions will provide responses to the primary research questions.

5.2 Summary of findings

Three emerging themes, each with several subthemes, are employed to structure the discussion of the findings. The data often develop further through interpretive and reflexive readings, which entail “constructing or documenting a version of what you think you can infer from them” (Mason, 2006:149). As shown in Table 21, the subthemes are examined in order of their predominance in the findings.

Table 21. Structure of the findings.

Theme	Subtheme
Environmental qualities in the FTF studio	<ul style="list-style-type: none"> • Lighting control • Views to connection • Thermal control and acoustics • Spatial layout (furniture, plugs, writing surface, colour)
Typology of creative space: online versus face-to-face (FTF).	<ul style="list-style-type: none"> • Coursework presentation and student presentation space • Collaborative, Making, Intermission and personal spaces
Typology of creative space in FTF studio	<ul style="list-style-type: none"> • Hot-desking • Nomadic space

5.3 Environmental qualities in the FTF studio

Environmental psychology examines the mutually beneficial partnerships between people and their settings (Thoring et al., 2018:1972). Elements, such as lighting and noise, buildings, corridors, furniture and symbolic artefacts, are all examples of environmental stimuli that might influence human actions (Kopec, 2012).

5.3.1 Lighting control

The literature indicates that natural and artificial lighting is a necessary stimulus and process enabler in a creative design space (Thoring et al., 2018). With the use of PAR methods, it became clear that natural lighting control within the studio space in the PHEI was a primary issue when using the projector screen. Lecturers favoured studios where the room could be darkened enough to show digital coursework and student presentations. On the other hand, well-lit natural or artificial space was seen as a process enabler of making and collaborative space as it fostered reading, writing and sketching.

5.3.2 Views to connection

From the interviews and participatory observation, it became evident that views to the outside were perceived as a change of perspective, enabling the creative design process in making space; more so, views to intermission spaces within the studio were interpreted as physical and psychological connections within the building envelope. Thoring et al. refer to views in intermission or collaborative spaces as “the Out-look; views to the exterior or observation points within the building provide visual stimulation and eventually instigate social interaction” (2018:1974). The importance of views was further emphasised when students expressed their dislike of Studio 2, referring to it as ‘a cave’ due to the lack of

views. This, in turn, touched on Morville's seven elements of user experience "useful, desirable, accessible, credible, findable, usable and valuable" (2004).

5.3.3 Thermal and acoustics control

The participatory observation and interviews revealed that the lack of thermal control in the studios was directly linked to the design of the building's architecture and the lack of sufficient mechanical ventilation systems. A direct cause of this led students and staff to seek out alternative spaces within the campus to accommodate collaborative and making sessions.

It was also noted that noise levels from neighbouring studios, intermission spaces and the building material itself hindered the audio delivery of lecturers and students during presentations. Thoring et al. further validate this by speaking of "the Silencer: Especially in open plan office environments, a raised noise level causes distraction. This problem can be minimized through integrated silencers in areas such as Intermission and Collaboration spaces" (2018:1974). However, due to the use of the projector during presentation sessions, students and staff did not have the freedom to use intermission spaces as they had when utilising collaborative and making space, as projectors were not available in these spaces.

5.3.4 Spatial layout (furniture, plugs, writing surface, colour)

Focus groups revealed a mix of feedback regarding types of furniture within the studio. Both the literature review and the participant observations revealed that flexibility and comfort were the most important considerations for the selection of furniture. Trestle tables were experienced as unstable and uncomfortable due to the placement of the legs; the unsteady tabletops affected the useability of the table as a writing/ sketching surface. Thoring et al. (2018) advise that several factors, such as ergonomics, comfort, technical infrastructure and individual preference, go into designing a learning space. Unfortunately, these design choices are frequently made as needed and without much forethought. Through participatory observation, it became clear that the scale and weight of the pop-up furniture in the studios affected the adaptability of the space as disassembling the furniture needed more than one person. High seating was viewed as positive as it allowed for views across the room. However, the level of comfort of this seating was not conducive for long periods of time when making use of the space for collaboration, making and personal work. Thoring et al. note that "elevated seats allow for better views and eye contact with passers-by, as well as a more active participation in teamwork (Collaboration, Process Enabler)" (2018:1974).

During interviews, the students pointed out that the student lounge and the library (intermission spaces) were favoured for the array of furniture choices and the freedom that this offered them.

Furthermore, the participant observations revealed that students did not find the traditional studio space white walls very stimulating. However, this contrasts with the literature that speaks of the idea that “white space and emptiness invite implementation of own ideas” (Thoring et al., 2018:1974).

The participant observation also revealed that the number and position of the wall sockets in the studio layout governed students’ choice of seating and the furniture layout within the space. Students gravitated towards the nearest power outlet to keep their devices charged during collaborative and making sessions.

5.4 Typology of creative space: online versus face-to-face (FTF)

There are five types of creative spaces: personal, collaboration, presentation, making and intermission spaces. Intermission spaces include those not deliberately intended for creative design work but connecting the other space types, for example, hallways, student lounges or the outdoors (Thoring, 2019). The discussion below reflects on the findings relating to how these spaces function online versus in the FTF studio.

5.4.1 Coursework presentation and student presentation space

The dominant topics in the current literature on studio design are “technology acceptance, adoption, inclusion, e-learning” (Downes, 2005:1), emerging technological tools, systems, blended learning (Singh, 2021), and technology and pedagogy (Rudneva et al., 2019). There is an apparent absence of literature highlighting the reliance on educational technology in design-related disciplines. Participatory observation brought to the fore that, in the PHEI, two types of presentation spaces existed: The first was student presentation space, where students presented their brief. The focus group revealed that students needed more presentation experience due to having pre-recorded their work as a digital submission during COVID-19. This led to a disconnect between students' work and real-time feedback between students and lecturers. Students also expressed a lack of confidence when the move to the FTF presentation was re-instated. For this reason, I conclude that student presentations should remain in the FTF studio and not be integrated into an online studio platform, if this should be a consideration for further planning in higher education.

The second presentation space identified was the coursework presentation space, when lecturers presented theory and practical content to students. Interviews with the lecturers

and the focus groups with students revealed a preference for theoretical content to be presented online due to the recorded nature of the delivery and students' ability to reflect on the recorded session. Wieser (2020) notes that it is not only that students and lecturers interact differently when technology is integrated into the studio settings; it also shifts the emphasis of the studio from the lecturer to the student, potentially transforming the latter into a digital artisan or craftsman in a more dynamic and interactive learning environment. More negatively, though, the data also revealed that some students would start to rely solely on the recording of the class, moving the studio from a synchronous learning to an asynchronous learning environment. Having practical coursework sessions online, however, was experienced as a hindrance for both students and lecturers. The practical nature of the course's tacit knowledge was complex for lecturers to communicate. More so, technical issues with WIFI, availability of electricity and inequality of resources among students led to a disconnect between students and lecturers.

For this reason, I noted that despite the ease with which the explicit knowledge of the theoretical course material could be communicated, the online platform did not lend itself to sharing tacit knowledge embedded within the more practical subjects and thereby brought about a disconnect between the students and lecturers.

5.4.2 Collaborative, making, intermission and personal space

Participatory observation and interviews indicated significant overlap between collaborative and making spaces, using physical, verbal and digital communication.

Two issues emerged from these environments due to design's abstract and subjective nature:

- Firstly, as a large part of the knowledge transferred in collaborative and making spaces is tacit knowledge, lecturers find it difficult to transmit such course material online using only visual and auditory communication tools due to the nature of the subject matter.
- Secondly, concept development, ideation phases, and the nature of the briefs appear to determine the spatial dimensions of these two typologies.

When lecturers and students were asked about creative environments, the phrase "free" or "freedom" came up multiple times. A flexible, fluid design approach is inevitable in a creative environment. Based on the data obtained from the participatory observation, the studio sessions often spontaneously move outside the traditional studio into intermission spaces. This was inspired by the physical and psychological affordance of creative space for pupils.

In Chapter 3, I have referred to Hettithanthri and Hansen (2022) who note that design studios follow standard practices set decades ago. Little has changed in students' current learning environment: The studio's repetitive layout and lack of freedom limits innovation and emotion. The authors argue that this is the reason why, despite its importance, students rarely use empathy in design studios as the traditional design studio settings have documented dissociation from real-world problem solving. Corazzo (2019) advised that studios and professional standards that limit creative students should not be repeated. With a significant amount of time spent sitting while working, it is understandable that student lounges become desirable owing to the freedom of furniture choice.

The goal of studio-based classrooms is to provide students with the key to lifelong learning abilities and marketable qualities that can only be developed by sustained hands-on practice (Oliver, 2000). Developing students' reflective abilities is a key component of the studio-based approach, and the strategic use of e-learning technologies and LMSs is crucial to this process (Schön & Rein, 1994). As mentioned before, the findings made it evident that technology supports theoretical coursework but hampers practical course components and the transmission of tacit knowledge. Students and lecturers desire to explore more 'creative spaces'. My research data confirm that furniture or open spaces that allow for freedom of choice increase sympathetic reflection. In my reflections, I identified that part of this increased spatial exploration is due to several factors:

- The environmental qualities of the PHEI campus caused primary users to explore more physically conducive environments on the campus.
- Students' and staff's exploration of space within the confines of their own place and pace during COVID-19 brought about a new sense of exploration (dining-table, couch, bed, coffee shop). Upon returning to the physical studio, they would still like to have this flexibility.
- Students and staff considered it necessary to meet their physical and psychological demands when addressing collaborative and making space.

5.5 Typology of creative space in FTF studio

The following sections will address alternative space types within the FTF studio and the impact they have on the creative design process of students.

5.5.1 Hot-desking

The literature revealed that some studios respond to pressures on space, staff time, as well as a shift in students' work patterns, paired with the ever-evolving change in technology, by developing hot-desking techniques. Students in a hot-desking studio have no assigned workspace and use any available desk during lectures (Cooper et al., 2017).

Architectural Design programmes typically assign students to a studio for the academic year. As the PHEI is multi-disciplinary, a dedicated studio space for each programme would not suffice due to space limits. Course specific subjects are allocated studios each term, not for an entire academic year. Class size and the software needed for the subject on the studio's devices dictate studio space.

The allocated studios were not always conducive to class activities. During my participatory observation and interviews, I discovered several environmental issues in the FTF studios to the adoption of the hot-desking system amongst lecturers at the PHEI. However, hot-desking studios were not always possible and finding accessible studios could be difficult owing to size or availability. Thus, intermission spaces, such as the library or student lounge, became collaborative places due to their freedom in furniture choices and desirable thermal and light quality. This also raises the topic of the psychological prerequisites for students to establish a feeling of place. Or is this inherent in the manner in which sites are captured and inhabited across time, or can these mobile contexts substitute this innate urge to belong? When students in the focus group used phrases such as "my favourite spot," they indicated that intermission places such as the student lounge and library contributed to a sense of belonging (A1,2022).

5.5.2 Nomadic Studio

There is a shortage of unconventional methods of establishing design studios that bypass the design studio's infrastructure and resources. In addition, a gap in the literature concerning the prospective expansion of the design studio into new settings has been brought to light (Hettithanthri & Hansen, 2022).

As a result of insights gained from the interview, it became clear that a workplace may be both restrictive and liberating for creative output, as well as a source of stress that can harm productivity and morale. According to Zane (2015), the interplay between a room's physical structure and organisation and its occupants may play a role. An immersive nomadic learning environment could help students since sharing tacit knowledge addresses knowledge gaps and gives insight into others' experiences. Listening and learning from others improves design-thinking skills. Incorporating tacit knowledge in design studios helps students grasp the processes at play, which is helpful for human-centred design (Prabhakaran, 2022). I planned collaborative "critique sessions" at a coffee shop for my ID02 and ED02 classes. This nomadic studio fitted the students' brief at the time as they had been assigned to construct a nomadic co-working space within a coffee shop.

The coffee shop's central table became the day's studio. Working in this location gave students a sense of belonging to the 'real world'. As I moved to each student for a one-on-one assessment, I noticed students pointing out the environment as they discussed their designs. Students watched how people walked through the area; this observational knowledge became evident in their final work. Stone and Sanderson state that "the environment is a fundamental support for creativity" (2021:87). More so, Rodriguez et al. discuss how traditional design studio settings have documented dissociation from real-world problem solving, highlighting that solving real-world challenges while seated in the traditional working environment may be the primary source of this disconnection from location (2018).

Unconventional techniques to sidestep design studio infrastructure and resources are scarce. Design studios should not be limited to academic settings, as participatory observation revealed that a curriculum-related itinerant studio space enlightens students. It aids students to think critically about settings, and teaches them that every location is an opportunity for reflection and progress. Students' enthusiastic comments on the "site visit" and requests for future classes outside the standard four walls validated this. Rodriguez et al. (2018) note that students in traditional design studios reported decreasing interest and engagement when working in a studio, as the systematic, sequential procedure limits their exposure to other views and learning approaches. It should also be noted that in the context of this study, PHEI has far fewer students per class than most interior design and architecture studios, which have between 70 and 100 students per class. Due to space limitations, the setting of certain situations as a nomadic studio for the day may not be possible.

5.6 Reflection on my participation

A methodological reflection regarding knowledge transfer and theoretical implications completes this chapter.

5.6.1 Methodological reflection

The research for this study was conducted using PAR which was informed by Thoring's (2019) developed design principles in the literature, namely: space types, spatial quality and her 49 design patterns of creative space. In addition, semi-structured interviews were held with lecturers, while focus groups were conducted with students currently enrolled at the PHEI. The participatory observation was carried out with two of my second-year Built Environment classes at the PHEI. By starting the observations before the interviews, a detailed understanding of the students' environment was obtained regarding the design layout and how students and lecturers utilised the space. The observational findings were

compared with the individual interviews and focus group volunteers, allowing for a more informed and in-depth analysis.

A potential limitation of using a focus group that did not comprise my two Built Environment classes is that it limited the in-depth data obtained within a nomadic studio. In turn, this restricted the ability to collect data which could substantiate observations and identify exactly what students' personal views were on a nomadic studio. This was mitigated by using past students whom I had taught, as they were comfortable enough to open up about their experiences.

In addition, not being permitted to take photos or recordings of data collected or transcriptions of my Build Environment classes during the participatory observation may have affected the quantity and quality of data I could collect at a given time. This ensured that I took down as much in the line of observation data as possible and led to easy reflexive writing in the coding of findings.

Regarding validity, comparable findings emerged from the interviews with lecturers and focus group discussion, with the students supporting what the lecturers had noted during interviews. Using both observations and interviews strengthened the validity, as some findings from the observations regarding environmental qualities also appeared during the interviews. The themes that emerged from the data were mostly consistent with the literature, and the inclusion of quotations throughout the data analysis and discussion contributed to the validity.

5.6.2 Reflection regarding knowledge transfer

Despite including two nomadic class sessions and observing the transferral of tacit knowledge in these environments, it was clear that conducting more participatory observation over an extended period of time would have yielded a more in-depth understanding of which nomadic environment would foster or hinder the creative process and transfer of tacit and explicit knowledge. As a preliminary exploratory activity, I believe that the experience was profoundly beneficial and highly successful; therefore, I would like to acquire additional knowledge on the subject and apply it in my lecturing. I am also planning to incorporate nomadic studio experiences for my students on a more regular basis.

Furthermore, the forced adoption of a hot-desking studio within the PHEI revealed a resilience regarding adaptation amongst students and lecturers and how, despite the negative impact of the studio environmental equalities, the hot-desking system also brought

about a sense of freedom of choice and of self-expression due to the adaptability of space and place. This aligns with Norman's (2013) definition of human-centred design: an approach that aligns designs with users' needs and competencies.

The implementation of participatory observation as a method of PAR provided a combination of self-reflection and secondary viewpoints. All of this helped sculpt a better understanding not just of creative space types but of the role I play as a lecturer and my responsibility to help develop how my students think about design. It is not enough to vocalise design; we experience the world through several senses, and to choose to ignore them because it does not fit into the traditional norms of the design studio, only instils a silent message to keep designing inside the box.

5.6.3 Reflection about theoretical implications

From the findings presented in Chapter 4 and the subsequent discussion, the research contributes to the corpus of knowledge in several ways. Foremost are the three main themes:

- Environmental qualities in the FTF studio
- Typology of creative space: online versus face-to-face (FTF).
- Typology of creative space in FTF studio

These themes were adjusted, and an adapted conceptual framework for creative space types was developed (refer to Figure 43). This framework addresses the first secondary question: *What are the vital spatial typologies within an Interior and Architectural Design studio, and what are their spatial considerations?* The framework indicates the various space types along with overlapping spatial similarities within a given space. The framework highlights which spatial types can work digitally and FTF. This responds to the next secondary question: *To what extent are e-learning platforms used in Interior and Architectural Design, and what design-thinking processes influence the consideration of these platforms in studio environments?* Lastly, introducing a nomadic studio, hot-desking and intermission spaces as learning places address the final secondary question: *How are traditional categories of spaces becoming less meaningful and adaptable as activities blend?*

Moreover, participatory observation of the environmental qualities of the PHEI, using Thoring's 49 design patterns for creative spaces (2018), brought to light that systems of creative space (furniture, interior and architecture) all play a role in knowledge processor, process enabler, social dimensions and source of stimulation for primary users.

5.7 Conclusion

This chapter examined how adapting new design teaching practices, facilitated by online instruction during the Covid-19 pandemic, impacted students' learning experiences in the Built Environment course, as well as the shift back to the FTF studio. It reflected how Built Environment students perceive materiality and dynamic engagement in the online studio. Lecturers viewed the increased formality, structure and simplification of the student-lecturer interaction as detached when using online platforms for design-thinking tasks. However, the isolation from the instructor and other students encouraged them to conduct more independent work and research, which taught them to be more self-reliant. Nevertheless, most students reported that their mental health and, subsequently, their work were negatively impacted by their lack of engagement with their peers and lecturers. The students stated that their isolation restricted their experiences with physical settings, objects and materials and impacted their capacity to generate innovative solutions. Students claimed that interaction with materials, finishes and objects in the FTF studio enhanced their grasp of materiality; however, uncondusive environmental qualities of the studio hindered their creativity.

The findings of this study can contribute to developing online Interior Design and Architectural teaching and learning methodologies for higher education institutions. In addition, the results suggest that design education methodologies can be innovatively adapted, even with limited technology, to transfer knowledge and skills in an online design studio.

CHAPTER SIX: RECOMMEDATION AND CONCLUSION

6.1 Introduction

This chapter concludes the study by presenting recommendations regarding an adaptive design approach to studio spaces in the Interior and Architectural Design disciplines in higher education. The chapter concludes by describing the research contribution to knowledge and its limitations, as well as making recommendations for future research topics on adapted studio designs in higher education.

6.2 Practical implementation

The following section concludes the overall findings which emerged from the research. Three main themes became apparent throughout this study:

- Environmental qualities in the FTF studio
- Typology of creative space: online versus face-to-face (FTF).
- Typology of creative space in FTF studio

In coinciding with the above themes, the subthemes of Interior Design and design elements, the project investigated how contact- and distance-learning could be integrated into the Interior and Architectural Design studio to promote an atmosphere conducive to adaptive design-thinking. The framework produced in this research could guide Interior and Architectural Design institutions in the development of adaptive, creative spaces for students and faculty. Several of the environmental elements, which were design-related and impacted students' creative processes, were discovered in the research. A studio's architecture and interior features may have a negative impact on students and faculty which, in turn, physically and psychologically hinder the use of space and the learning about space.

Focusing on evidence-based, human-centred, spatial, usable and experience-based design, the framework may further educate Interior and Architectural Design practices by addressing how the design approach incorporates the user of the space. The framework can be utilised as a criterion for focusing on particular design components that affect students and staff in creative design spaces. Although this study may be case-specific, the framework can be used to choose which design considerations to prioritise when it comes to students and staff in the Built Environment, notably Interior and Architectural Design.

6.3 Recommendations

The literature review indicates the wealth of knowledge available internationally with regard to studio design in higher education. South African designers often seek international

knowledge and expertise, as a limited amount of information is available locally. Local research would provide insight into studio designs which aim specifically at the South African context in terms of environmental qualities and space types.

International research also analyses elements, such as technological development in higher education. This significantly impacts how institutions carry out learning processes - which affects design solutions. Local research would allow for understanding these constant changes within the South African context. It would assist designers in understanding how higher education institutions could meet these trends and developments. Based on the findings of this study, additional research is required in the areas of policies, practices and future development.

6.4 Further development

The adapted framework for creative space types can be used for replication studies to evaluate the same design aspects in multiple cases where distinct or similar conditions may exist.

In addition, the proposals for future development include the creation of similar frameworks that may be applied to various user-needs in the Built Environment discipline of higher education. The final recommendation would be to establish a context-specific 'toolbox' that facilitates dialogue and participation among developers, architects, interior designers, staff and students.

6.5 Further research

Further research in this field includes, firstly, the replication of this study for the various other campuses within the PHEI. Secondly, additional research is required in the following areas:

- Research into a nomadic studio that ties in with specific course content to understand the long-term effect on students' learning experience;
- Studies focused on a hot-desking studio within higher education and its effects on the spatial consideration of a campus's interior layout;
- Research into the uses of adaptable furniture (modular furniture) inside the traditional studio design and whether or not this may be considered a process enabler for collaborative environments;
- Future studies could investigate how the use of traditional studio procedures in a design studio setting hinder students' capacity for design-thinking.

6.6 Limitations

Limitations to the study include ethical considerations pertaining to the PHEI along with additional limitations outside of the scope of ethical clearance. The terms and conditions that I had to agree to in order to obtain ethical clearance to conduct research within the context of the PHEI, brought about several limitations:

- I was granted only one month of participatory observation with my two Built Environment classes which, I believe, limited my time to explore the concept of a nomadic studio.
- No interviews or photos of my two classes were permitted for the study as per the request of the PHEI. This limited the feedback I was able to receive from my students when implementing PAR methods.
- As I was not allowed to have focus group discussions with the group of students in my own class, another potential limitation of using a focus group was that it limited the in-depth data obtained in a nomadic studio.
- In addition, not being permitted to take photos or recordings of data collected or a transcription of my classes during the participatory observation may have affected the quantity and quality of data I could have collected at a given time. This ensured that I took down as much observational data as possible which led to easy reflexive writing in the coding of findings.

Other considerations that I feel might have limited my study are:

- The data collected are based on findings from one of several campuses of the PHEI in South Africa and are, therefore, not a reflection of all Built Environment institutions where class size and socio-economic contexts may differ.
- The use of technology in FTF studios and online platforms was restricted to that which is used at this particular PHEI and, therefore, limit the scope of investigation.
- Due to the fact that the institution at which I did my research uses shared studios (hot-desking), the findings may not apply to institutions with fixed studio spaces.

6.7 Conclusion

The main objective of this study was to explore what future physical studio spaces will require in the educational disciplines of Interior and Architectural Design. As we globally create short-term responses to the COVID-19 pandemic, there are also long-term prospects to remodel the traditional studio space. The study revealed the critical, creative space types within PHEIs and which factors promote or hinder the students' overall learning experience in both online and FTF studios. This research confirms the findings in literature regarding

the direct and indirect impact of Interior Design on user experience in creative design studios. Several design criteria were discovered through the process of a literature review. Using a combination of more traditional and design research approaches, such as the observations gained through first-hand experience, will shape my future profession as a lecturer and designer.

In this research, I came to understand and appreciate the importance of space as a process enabler within the design studio and how sensory stimulus is a key driving force to environmental comfort. The Interior Designer's role as researcher and facilitator is vital as we position ourselves within the spaces we design, and this could open up vital views into user experience leading to more empathic design choices.

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APPENDICES

APPENDIX A: CONSENT IN PRINCIPLE



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Secretary: Mziyanda Ndede

29 March 2022

Gail Stock
c/o Department of Design
CPUT

Reference no: 210032464/2022/9

Project title: An adaptive design approach to studio spaces in higher education within the Interior Design and Architectural disciplines

Approval period: 29 March 2021 – 31 December 2023

This is to certify that the Faculty of Informatics and Design Research Ethics Committee of the Cape Peninsula University of Technology conditionally approves the methodology and ethics of Gail Stock (210032464) for Master of Interior Design contingent on obtaining consent in principle from [REDACTED] campus director before FREC ethical clearance can be given.

Any amendments, extension or other modifications to the protocol must be submitted to the Research Ethics Committee for approval.

The Committee must be informed of any serious adverse event and/or termination of the study .



Dr Blessing Makwambeni
Acting Chair: Research Ethics Committee
Faculty of Informatics and Design
Cape Peninsula University of Technology

APPENDIX B: CONSENT FOR PHEI



29 August 2022

Mrs. Gail Stock, Lecturer,



Dear Gail,

Thank you for your application for permission to conduct research at [redacted] received on the 06th May 2022, for the intended journal article with the title: *An adaptive design approach to studio spaces in higher education within the Interior Design and Architectural disciplines.*

Your application was considered by the Research Committee on the 29th of August 2022 and approved. The Ethical clearance number is **IEG290822GS** Please share a digital copy of your final research dissertation with us once completed.

The Committee wishes you success with your research project.



Postgraduate Academic Manager



Page 1 of 1

APPENDIX C: INDIVIDUAL CONCENT



FID/REC/ICv0.1

FACULTY OF INFORMATICS AND DESIGN

Individual Consent for Research Participation

Title of the study: An adaptive design approach to studio spaces in higher education within the Interior Design and Architectural disciplines

Name of researcher: Gail Stock

Contact details: email: gailstock505@gmail.com phone:

Name of supervisor: Prof Izak van Zyl & Mrs. Maretha Dreyer

Contact details: email: VanZyllz@cput.ac.za phone:

Purpose of the Study: *Through this study, the researcher aims to explore what future studio spaces will require in the educational disciplines of Interior and Architectural Design. The research focuses on understanding students' academic experience during COVID19 and how a virtual studio influenced engagement with students' studies versus when they migrated back and forth between partial contact class and virtual, and now in 2022 engaging in full contact classes again.*

Focus group Participation: *As a 2nd or 3rd year student within the built environment: Volunteer participation will consist essentially of taking part in a **focus group** session on Microsoft Teams that will be aimed at understanding a student's academic experience of the studio online versus in person. The focus group should take approximately 45 minutes and will be recorded for the sake of transcription and analysis.*

Confidentiality: I, the volunteer, has received assurance from the researcher Gail Stock, that the information I will share will remain strictly confidential unless noted below. I understand that the contents will be used only for MTech thesis and that my confidentiality will be protected by use of pseudonyms.

Anonymity: will be protected in the following manner (unless noted below): No names or photos will be documented in this research. Recorded identity of people will be coded as R (Researcher), and S (Student) and only used for transcribing the information from Microsoft Teams.

Conservation of data: The data collected will be kept in a secure manner on the researcher's laptop (which is password controlled). Once the research is completed, the data will be deleted off the researcher's laptop and backed up in the CPUT data repositories and accessed by the researcher only.

Voluntary Participation: I am under no obligation to participate and if I choose to participate, I can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences. If I choose to withdraw, all data gathered until the time of withdrawal will be destroyed and the volunteer will be removed from the research.

Additional consent: I make the following stipulations (please tick as appropriate):

	In thesis	In research publications	Both	Neither
My image may be used:				x
My name may be used:				x
My exact words may be used:				x
Any other (stipulate):			x	

Acceptance: I, (print name) _____

agree to participate in the above research study conducted by Gail Stock of the Faculty of Informatics and Design at the Cape Peninsula University of Technology, which research is under the supervision of Prof Izak van Zyl & Mrs. Maretha Dreyer.

If I have any questions about the study, I may contact the researcher or the supervisor. If I have any questions regarding the ethical conduct of this study, I may contact the secretary of the Faculty Research Ethics Committee at 021 469 1012, or email naidoove@cput.ac.za.

Participant's signature: _____

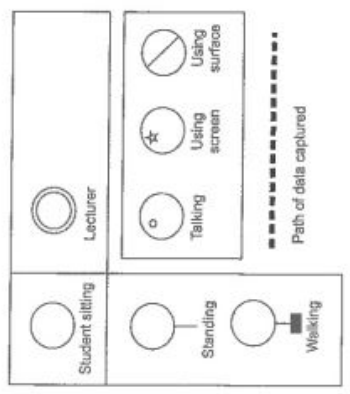
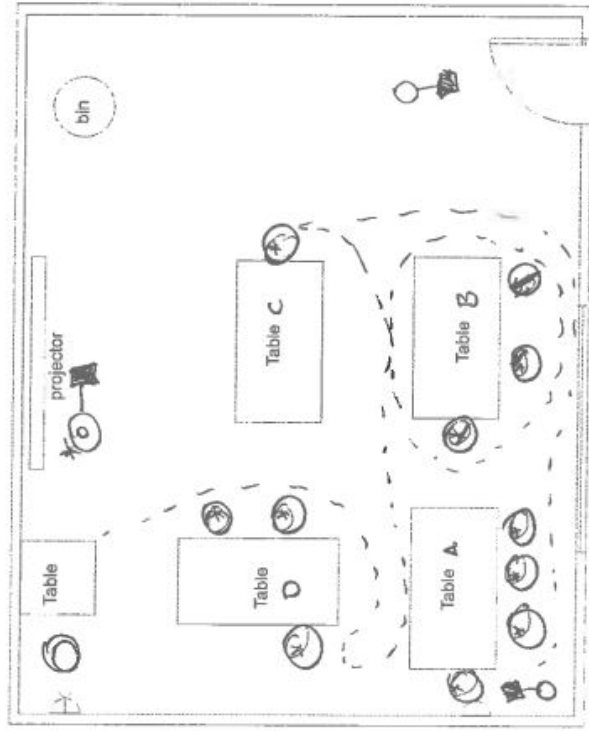
Date: 08 September 2022

Researcher's signature: _____

Date: 08 September 2022

APPENDIX D: BEHAVIOURAL MAPPING EXAMPLE

Week 24 Date 05 Sep Location Studio 8 Number of students 11
 Class ED 02 Session 1 Studio focus Critique (courseware) studio time to work on brief



Notes

- Studio time was used for courseware (15min)
- the remainder of the time was used for crit & studio time to work on brief
- students sitting @ table A & table D preferred to sit their due to close prox to plug points
- students sitting at table b used their table surfaces to show sketches they had made of their work, & lecturer was able to sketch ideas that student should/could consider in their design.
- a student seated at table b had an issues with basin scales in bathroom design & lecturer was able to show student a size consideration in the campus bathroom.
- the projector was running a document in the background as the lecture circulated to each student for a critique.
- student spoke amongst themselves as they worked asking each other questions as they worked.

APPENDIX D: JOURNAL MAPS