

Disruption by dissociation: exploring human-centred design through transformative engagement in the spatial design studio

by

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Disruption by dissociation: exploring human-centred design through transformative engagement in the spatial design studio

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Abstract

This study explores the use of hybrid ways of engagement in the spatial design studio, as a disruption to complement the traditional methods of design inquiry. Through normative dissociation, an empathic approach to investigation is adopted in order to take a human-centred perspective, where users are considered as part of the understanding of complex spatial design issues. The use of a plug-in workshop facilitates the qualitative data collection, analysis and synthesis, without coding, as a four-hour workshop inserted into an active studio project. Four programmes in interior architecture at tertiary institutions are purposefully selected in the third year of study. These are considered biopic investigations and form the basis of the research as an indicative study, which is data driven.

A constructivist paradigm allows for interpretation of data findings according to the three research questions in order to make meaning of the evidence collected in situ in the design studio. This approach allows the researcher to triangulate thick descriptions with observations from research assistants and students' own primary work. The plug-in workshop requires students to step outside their comfort zone and adopt the perspective of particular users or communities. This troublesome action asks them to shed their own preconceived ideas and bias in order to make meaning of complex social scenarios, often unfamiliar to them. Threshold concepts emerge as part of a transformative journey.

The study acknowledges that transitions in worldviews are not easy and that more exposure, experience and skills are required, especially at an educational level. However, it is important to reveal and expose designers to situations where fluid and unpredictable living scenarios define how we live and interact in an increasingly complex world. The contribution of the research emerges from the speculative and provocative approach, asking difficult questions pertaining to a transformative spatial design milieu. This equips students with softer skills to be present and to act respectfully with an attitude of mutual learning as citizen designers on behalf of communities and people.

Keywords

Disruptive practice, normative dissociation, empathy, transformative learning, human-centred, design values, ethics, design citizenship

PREFACE

*With the sound of the wind through the trees,
in a shady spot, we discuss once again,
the potential that lies beyond.*

Thank you to my supervisor, Dr Carin Combrinck for your patience and for the question that set it all in motion: “What do you need to do now?” The answer was clear – I had to *make* something... In an instant, the focus shifted from *what*, to *how*! This changed everything.

*More questions,
- provocations
cutting through everything, revealing.
What lies hidden, should not go unnoticed.*

Prof Dr Hennie Reynders, thank you for your willingness to be co-supervisor and for the engaged conversations that ensured the essence of the investigation stays true. Your insight and critical voice are valued beyond words. Thank you for inviting me to facilitate a workshop with your students in Chicago.

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To my colleagues, family and friends, a heartfelt thank you.

For Rudolph, Karin and Petra

*In memory of my beloved father and mother
Andreas van Aswegen (1948-2008) and Petra Hester Alberts (1949-2020)*

DECLARATION

I, the undersigned author, declare that the applicable research ethics approval has been obtained for the research described in this work and that I have observed the ethical standards required in terms of the University of Pretoria's Code of Ethics for Researchers and the Policy Guidelines for Responsible Research.

The thesis is submitted in fulfilment of part of the requirements for the degree Philosophiae Doctor in Interior Architecture at the University of Pretoria. No part thereof has already been, or is currently, being submitted for any other degree or examination at any other university.

Anika van Aswegen

2021

RESEARCH CONTRIBUTIONS RELATED TO THIS STUDY

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this is an interdisciplinary study
it is speculative
it does not attempt to solve any problems
or create any toolkits, guidelines, or models
this study asks questions
it probes and explores
it investigates how we engage with design challenges
it does not give answers
but
it shows what can happen
if we challenge outdated old grooves
through disruptive action
this study cares to make a difference
it hopes to reach beyond the surface
to enable change
it puts people first
by embracing various voices
it asks who, how, why

this is a provocation

Anika van Aswegen 2021

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ABBREVIATIONS

DtT	Designerly thinking
DT	Design thinking
GDC	Greenside Design Center
HCD	Human-centred design
UJ	University of Johannesburg
UP	University of Pretoria
SAIC	School of the Art Institute of Chicago

prologue

Ever since I can remember, I have been looking for the 'why' in design. Trying to find what lies closer, and deeper; and is more meaningful -

desYgn – DESyGN – des[y]gn – des[?]gn

On this day, 10 August 2019, my mind opened to another world – my poetic voice – from dormant, to alive. Hesitant to emerge for this thesis, being silenced by the formal expectations of a document, paralysed by the rules. Challenging and expanding its boundaries, questioning its fields and thresholds and the spaces in-between. How do I belong in these pages? How can I enter this belonging?

It struck me, one day, as I was traveling as a passenger in an old skedonk, down one of Dar es Salaam's long main roads. We passed a series of flats, where a particular condition made itself known to me. It jumped out from across the street – a makeshift balcony. In that fleeting moment, I pulled out my phone to take a photo, through the driver's window – I wanted to remember.*

That image, imprinted in my being, made me realise that the essence of life, of living, revolves around people. The purpose of architecture is to serve its user.

**skedonk is a battered, old car, its condition can testify of many years of hard, but dedicated service*

A couple of months later, I wanted to capture this image in words, as a way of reconnecting to the original experience. With my first attempt, I realised that I fell into the trap I was trying to address in this research. My description conveyed a physical account of objects and physical characteristics. It was only after I internalised the experience, by remembering what I 'felt' in that moment, that I discovered its significance. Instead, it was about the people who created this makeshift balcony, with its traces of use and enjoyment, of the small and seemingly insignificant things that mattered.

personal reflection [provocation]

*Elevated sentinel
in full bloom, again.
Passers-by unaware
the silent voice, then
shouts out
a kaleidoscope of
colour; that goes to sleep
- the empty wooden
seat.*

*makeshift balcony 1
Dar es Salaam, Tanzania*

spectator
observer
outsider's view

*I sit here
early morning, late afternoon
looking forward to remind you
to bring some onions,
or to ask: "how was your day?"
I talk to my plants, my
pride and joy
- my balcony, my
extra room.*

*makeshift balcony 2
Dar es Salaam, Tanzania*

participant
user
insider's view



PART A CONTEXTUAL CONDITIONS

Part A contextualises the societal conditions and subsequent design inquiry, in which this study is situated. The research opportunity and purpose of the study emerge from insights gained through a description of the theoretical context and deep reading of grounding theories. This initial study then informed the delimitations and limitations used as a framework in defining and articulating the core research questions. A general description of the methodology includes the plug-in workshop brief as used in the data collection and analysis. Definition of terms and concepts are listed and the outline of the document describes how the research unfolds. *Chapter 1* therefore outlines the provocation to make deeper connections through other ways of design inquiry. It is written in such a way that other researchers can replicate the study in different contexts and situations.

Chapter 1 POSTULATIONS AND QUESTIONS

In an increasingly complex and changing world, where global problems are felt locally, the systems we currently use to plan, design and build our urban neighbourhoods – the vital building blocks of our towns and cities – are doomed to failure (Campbell 2018:9).

Background

The world as we know it is changing rapidly. Design education and design practice are facing a time where disciplinary knowledge is not enough to address the pressing challenges that affect lives and living at large, also at the smallest scale. The global health pandemic of 2020 is one such example of how an unprecedented scenario influences peoples' lives directly, in our homes, our children and families. The long term repercussions of this event is unknown at this stage, but the consequences for design will reveal itself as life returns to normal in the future. This single example illustrates the challenges and the *wicked* nature of complex and overlapping issues that designers will need to understand. Concerns that have become increasingly clear since the mid-twentieth century (Rittel & Webber 1973:160). Complex issues within the spatial design milieu are entangled and cannot be isolated. Social, cultural, economic and psychological matters are interwoven in human living environments and the study therefore includes all of these for consideration as a holistic approach to inform engaged spatial design inquiry.

How do we prepare designers within societal contexts where unpredictable and fluid conditions of living are prevalent? Where situations can change overnight, where our survival is dependent on our adaptation to new ways of living. Do designers have what it takes to adapt in their professions to respond, not only effectively and efficiently, but to show the same resilience in their practice, as people display every day in these extraordinary times? In this light, the ways in which we create meaning and connect to that which we deem important, becomes essential. Now, more than ever, connections

between people, where a deeper understanding and insight into what lies deeper and closer, are in need of attention: people, experiences, whether embodied or virtual, well-being, belonging, community, empathy, and the ways we engage in the word.

Design practice and industry show innovative ways of keeping abreast with complex challenges and engage deeply in situations where problems are not always well articulated (Fern Tiger Associates 2013, Greater Good Studio 2019, Panorama Innovation n.d.). Design education on the other hand, is in need of integrating 'new' ways to supplement the traditional and conventional design inquiry, especially in the spatial design disciplines (interior design, interior architecture and architecture), in order to stay relevant (Design Research Society, PedSig n.d., Globally we design 2020). The Design Research Society's (DRS) Special Interest Group in Design Pedagogy (PedSIG) hosts a biannual conference series, of which 'Insider Knowledge' was the topic for 2019, addressing studio praxis, student development and modes of learning, which includes emerging practises in teaching (Jones 2019). In addition, GloW-DESIGN, "a global thought leadership platform" hosted the 2018 ReDesignED Educators Forum, with the Universal Design Education Charter, as outcome of the meeting. The charter addresses "the key issues of continuous culture change, knowledge and skills (education), sustainability, technology, acknowledgement (certification) and betterment of all life as design's primary concern" (globally we design Press Release 2018). Within spatial design disciplines, the onus lies on academia to adopt different perspectives and approaches in design education, in order to facilitate a gradual shift towards connected and engaged learning, as indicated in the two educational platforms described above.

These are ethical and political questions deserving of closer attention in future design studies. But these studies also need new kinds of researchers, able to understand complex technological issues certainly, but able to situate them in social practices. Articulate researchers that do not see the now clichéd distinction between practice-based work and more scientific and social scientific forms of design study. Researchers able to put the case for the design discipline and designerly ways of thinking as central to modern ways of working (Lloyd 2019:177).

This discourse is grounded in the roots of designerly thinking, based in research design over the past 40 years (Johansson-Sköldberg et al 2013). It considers design as reflective practice, (Schön 1983), the creation of artefacts (Simon 1969) and problem-solving (Buchanan 1992). In addition, designerly thinking focuses on process (Lawson 1980/1990) as a 'way of knowing' (Cross 1982, 2006) and the creation of meaning ('semantic turn') (Krippendorff 2006). Designerly thinking seen through the lens of the key authors focuses on a traditional way of approaching design. In comparison, design thinking's emphasis on people is the key to merging the two discourses, as a holistic picture of design to benefit design pedagogy and practice.

The debate regarding design thinking (DT) and designerly thinking (D&T) (Laursen & Haase 2019) brings another topic into view, by comparing perceived shortcomings of design thinking with approaches of designerly thinking. Their main criticism is that design thinking's use of tools and techniques are not grounded in a design paradigm and that the application is non-situated (Laursen & Haase 2019:814). A rival study, investigating twelve global experts, shows that design thinking's processes are grounded

in an integrative model that is system-orientated, human-centred and creation based (Camacho 2018:631). This study therefore, argues that when the discourse between design thinking and designerly thinking starts to integrate, new opportunities for enriched understanding of engagement in design research will emerge. The two are traditionally seen as separate discourses, but practice shows equal relevance through their integration. In addition design thinking courses are introduced at academic institutions with the aim to “make impact with design” and “to help you use design to make change where you are” (d.school Stanford 2020). This discussion introduces human-centred design, its contributions and shortfalls, but also the focus on situation-centred priorities needed today (Resnick 2016:288) instead of an object-centred approach according to its traditional understanding in project and industrial design (Norman 2013). Therefore, the gap in perception is closing slowly, and this study intends to contribute to this discourse.

The study’s focus on design pedagogy relates to the researcher’s direct involvement in the design studio as coordinator and facilitator. This research context as milieu for exploration provides opportunities to introduce hybrid ways of design engagement to support traditional methods, to increase engagement. Students are impressionable and in the process of personal development on many levels. In the educational milieu, the cognitive domain or traditional approach is over-emphasised (Salama 2015:6). Immersive learning experiences in addition to intellectual activities could enable transformation design. If this happens, design approaches and attitudes can be realigned to reveal a shift in attitude towards an emotionally connected praxis (Heylighen & Dong 2019).

When this study started, the researcher was the coordinator for the third year interior architecture studio and noticed a repeating concern in studio engagement, the reliance on predictable and superficial ideas, presented as solutions. The potential for increased immersive action was endless. The traditional design approaches were no longer rigorous or engaging enough to address projects with multiple complexities inscribed within hybrid conditions. Latour (2008:2) refers to these intricacies as “matters of concern”, compared to “matters of fact”.

Within the relatively new field of interior architecture, these complex spatial design issues play out within increasingly intricate urban conditions. These challenges, whether social, cultural, economic or psychological, impact people at human scale, hence the emphasis on human-centred design. The understanding of ‘people in place’ drives engaged actions within a variety of contexts and user groups. This is embedded within spatial design in a broader sense. Interior architecture can thus not be isolated, but is integrated and forms part of larger interdisciplinary spatial processes. Therefore, the definition of an interior space is expanding with the notion of ‘interiority’ and its ephemeral and fluid conditions (McCarthy 2005:115) of living and being in the world. The way these undefined experiential expressions are understood, the “dialogue between objects and users” (Guinta 2009:58), become areas of potential inhabitation, unbounded by an architectural envelope. In this way, interior architecture provides scope for increased inquiry, as multi-scalar investigations offer opportunities for connected ways of knowing (Belenky et al 1986:113).

Could there be hybrid methods, other ways of design engagement that have not yet been introduced in the spatial design studio? How could we frame design questions to delve deeper and to form understandings from other perspectives? Can we relate more directly? Perhaps open-ended ways could lead to deeper understandings and insight in design praxis. Taking the insider's perspective, instead of the designer's view, could become a way to relate directly to design challenges. In this way, we negotiate design issues and disrupt known design practices to upset conventional and familiar design processes, for the better.

Problem statement

For many years, I felt there was something missing in the depth of design engagement in studio teaching. Skimming over the surface with quick 'recipes' and preferred ways of working, without really connecting to the deeper meanings of things, of situations and living scenarios, or interactions and relationships of people in the built environment.

As individuals and designers, we are all different, but I knew that for a designer to be 'whole', all aspects of human life, the human condition, should be considered and understood in a connected way, if we want to respond truthfully and with authenticity to peoples' needs and requirements – the known and unknown, the tangible and the intangible. This is not a question of personality or preference, or whether it is possible or not, but rather a matter of care and awareness.

This personal view may seem intuitive, open-ended and as of yet insufficient in contextualizing the emerging problem statement. To be more precise will require a *thick* description of how current design education – specifically when dealing with complex spatial problems – seems to be predicated on outdated methods and procedures. One of the most common problems seems to be an obsession with using known building typologies as case studies without acknowledging how such architectural typologies are being used solely as mechanisms for capital accumulation, rather than enabling frameworks for community building. In such cases, we see the question of *what* to build being foregrounded at the cost of questions about *why* and *how* to build.

The thesis propositions and research that will emerge through this work will continually explore and argue for a more reflective and critical approach to the questions of *why* and *how* we engage with spatial design problems in complex cultural and environmental contexts. The education of future architects and designers is the bridge between the discipline of architecture and the profession of architecture – as such requiring us to constantly re-evaluate our methods, our intensions and our mandate as we empower future architects to design on behalf of others. By implication then, introducing questions about the enabling potential of architecture and the need to re-calibrate a human-centred approach in our educational frameworks and methods.

How can this be enabled?

When students have limited access to sites, buildings and contexts, and even less opportunities for interaction with stakeholders and users, connected learning in design projects suffer. This concern becomes even more prevalent in a global society experiencing extraordinary health challenges, which accepts the requirements of social distancing and self-isolation.

How can embodied experiences in the studio scenario be simulated in some way?

As speculative action, take the designer out of a familiar comfort zone and replace that with the unknown, that which the designer cannot control. Introduce intangible conditions into projects in ways to complement the traditional design process and methods. To know wider, to know deeper. We might say that any good studio asks critical questions and challenge students. This study, however, introduces a different lens and ways of engagement than the norm, for this purpose. The emphasis falls on *how* and *who*, instead of *what*, which focuses the exploration as directed by the nature and focus of the particular design studio.

Transformation through provocation?

This study is not aimed at solving problems. It is not focused on fixed characteristics and qualities linked to traditional understandings, but on attributes and values, with emphasis on fluid and transient relationships and scenarios. Moreover, design engagement should then also be flexible and adaptable to allow for critical inquiry and reflection. In this context, the need exists to refocus and to adopt a closer view through design by considering the user directly. This approach could provide deeper insights into the complex societal problems embedded within design projects. The user's perspective is therefore prioritised over that of the designer.

This shift in focus attempts to bring a different awareness to design inquiry and is explored as a plug-in workshop in the design studio. It is process-driven. It aims to uncover various scenarios for response. It hopes to raise awareness of the intangible and that which lies under the surface. The benefits of alternative processes to complement the traditional may be important if we want to relate to challenging design situations in a connected way. Although this study is a speculative inquiry and presented as a provocation, it has serious intentions by opening a wider debate instead of solving problems. Through small but noteworthy insights, important considerations emerge in the context of the spatial design studio to bring an awareness of unfamiliar ways of engaged design practice.

Research questions

The guiding research questions capture the essence of the investigation by combining selected research areas and are related to carefully considered and deliberate activities in the plug-in workshop.

main question

How can a human-centred approach as disruption by dissociation enable transformative engagement in the spatial design studio?

sq1 How does the insertion of a disruptive action by dissociation as designer, influence meaningful connection and design engagement?

sq2 How can the adoption of a human-centred approach expand an empathic understanding when dealing with complex spatial design issues?

sq3 How does the shift to the 'insider's perspective' transform design thinking in students to reveal other design agendas?

Due to the speculative approach, the study deliberately excludes objectives that would test and investigate with a prescribed lens. Instead, it is conducted without preconceived ideas, following the exploratory, yet critical and productive methodology. The exploratory nature enables the researcher to stay true to the methodology. Thick descriptions guide the interpretation and understanding of the qualitative data, to inform the contribution of the research within a larger design discourse.

Theoretical context

The general overview of related literature provides the theoretical background to the study, which is interspersed with accounts from the profession, to illustrate the interrelation between theory and practice. Topics include spatial design pedagogy; disruption; dissociation; human-centred design within design thinking and designerly thinking; empathy; transformative learning and frames of reference; and threshold concepts.

Scrutiny of spatial design pedagogy is not new. Colomina et al (2012) argue that radical pedagogies, or “the way (design) is taught”, can change or “revolutionise” architectural education. They trace this approach from the 1960s and 1970s, where a new *modus operandi* was sought to question, destabilise, undermine or destroy traditions at various scales. These decades saw many revolts against architecture education’s inability to respond to social and political issues, for example against the Beaux-Arts School in 1968, the Yale School of Art and Architecture in 1969 and the 1972 symposium, *The Universitas Project* in New York (Colomina et al 2012). Harris (in Froud & Harris 2015:11) concurs that “established pedagogical aims and practices may be ineffective in promoting learning and social change.”

Day (2015) criticises the radical architecture’s approach by questioning if they are not more reactionary than radical. She speculates that the book has a “quieter current” with a desire to reconnect to people and practice. Perhaps that is why the notion of ‘radical’ is introduced – the fact that it remains a challenge to gain deep insight (Harris in Froud & Harris 2015:12). Awan et al (2011:28) refer to “...aspects of the world that cause architects discomfort, because these often unpredictable and contingent aspects are those over which they have limited power.” In addition, Till (2009:113) prompts that “...the temporal and social aspects of architecture as lived, should be acknowledged as such” in order to represent more than one “temporal condition”. Noteworthy that this challenge has been in existence for the past 60 years – the inability or slow transformation of design pedagogy to engage with wicked problems (Rittel & Webber 1973:160). Latour (2008:9) introduces the philosophy of design

according to Peter Sloterdijk, by referring to the modification of artificial life, or the complex envelopes we inhabit.

Sloterdijk does not treat humans matter of factually, but treats humans and non humans as “matters of grave and careful concerns” ... But by treating their life supports as matters of concern, we pile concerns over concerns, we fold, we envelop, we embed humans into more and more elements that have been carefully explicated, protected, conserved and maintained ... (Latour 2008:10).

It can therefore be argued that traditional design methods in spatial design have become inadequate to address complex design problems, are too rigid, object-, outcome- and solution driven, and lose focus of the fine-grained requirements people place within the context of multifaceted problems. Latour (2008:4) argues for the design of ‘things’ instead of ‘objects’, where ‘things’ refer to “complex assemblies of contradictory issues”. For this reason, “[t]he standard tools of aesthetics and making are insufficient to negotiate these networks on their own...” (Awan et al 2011:28). There is a need for design inquiry to introduce a human-centred approach to find an equilibrium in design pedagogy. Caan (2011:53) argues that we cannot continue to design for a “universal human being” and in addition “...for too long we have avoided delving seriously into the emotive, sensory, and phenomenological impacts of design.”

Therefore, we need to adapt to embrace connected and immersive approaches from seemingly unrelated disciplines to fill this gap in design research. In an applied research context (Tharp & Tharp 2018:126), where the emotional, experiential or ‘affective’ side is often neglected (Caan 2011:53), the inclusion of concepts from health sciences, especially psychology and psychiatry (Ross & Watling 2017), becomes important. Especially when considering normative dissociation to ‘imagine’ or ‘simulate’ users’ needs and requirements (Panero et al 2019), and empathy, to connect to the unspoken or intangible conditions of being (Kouprie & Visser 2009). According to Latour (2008:2) there is a need for “attachment, precaution, entanglement, dependence and care”.

Empathy, also used in design thinking and business innovation (Brown 2009), expands the understanding of the use of empathy, its benefits and shortfalls, although aware of rival criticisms (Bloom 2016). Design thinking, a human-centred way to creative problem solving, introduces empathy as the starting point to the process (Brown 2009). This is widely used in practice such as IDEO’s Human-centred Design Toolkit and the Field Guide to Human Centred Design (IDEO: Design Kit 2019) and the British Design Council’s double diamond framework for innovation (Design Council 2019). This approach has transitioned into educational institutions now offering courses in design thinking, for anyone outside the design disciplines, such as the Stanford d-school (Kelley in Camacho 2016, Platner et al 2016) and the Interaction Design Foundation (n.d.). Academic research criticises design thinking for not being rigorous enough in its process, and that its methodological approaches fail to meet empirical requirements (Laursen & Haase 2019: 813). This can be contended with the many practices today that employ human-centred approaches by integrating critical reflection and other approaches (Fern Tiger and Associates 2013, Gensler (n.d.)). These may be seen as disruptions in the traditional sense; however, they prove to be immersive and able to connect designers and researchers directly with people and complex challenges in design projects.

The inclusion of disruption or disruptive practice, as first used by Christensen (1997) as disruptive innovation, is to upset the conventional practice and to develop an alternative to the status quo. Acaroglu (2017) developed the disruptive design method, focusing on a specific process to enable positive change for the environment and for people. This study does not use disruption for disruption's sake, but rather as a critical and productive disruption, which creates an enabling environment where new questions can emerge.

By combining these seemingly unrelated concepts in an interdisciplinary study, the research borrows and integrates concepts from other disciplines, but the investigation is grounded in design research. It addresses the development of students and their affective attributes through a disruptive practice where the standard studio status quo is upset. Although any good design studio has always asked critical questions, this study expands the design inquiry by including critical and new questions not previously considered.

The notion of asking questions in design projects is not new. However, asking the right questions, or asking questions that will provide better responses, therein lies the challenge. As designers, we are accustomed to knowing upfront, on behalf of the client or user, what the best solution can be. The reality is that today, this is no longer enough. People live in situations and conditions where the 'obvious' solution is probably not the most appropriate, and other ways of engagement are needed in order to determine the best course of action. There are many examples to demonstrate this reality.

One such example is a project by the Greater Good Studio for the Academy for Global Citizenship, reimagining the school food experience for children. Addressing waiting time with limited options as a rushed event, were replaced with a shift in service style, empowering them with options at the table, resulting in less food wastage and a positive lunch break experience. Transformation through design was seen in mind shifts and behaviours of the children. The design team also employed other ways of engaging with the challenge, including seeing the problem from a child's perspective (Greater Good Studio – Academy for Global Citizenship 2020). In addition, Panorama Innovation's homepage shares their passion for what they do, "see deeply, see differently, see beyond", all concerning people to "understand users and customers", to "create something new", to "invigorate products and offerings" and to "build innovative capabilities" through "creativity, empathy and flexibility" (Panorama Innovation (n.d.)).

The concept of time presents a challenge, as the development of understanding to gain new insight cannot be hurried. The questions we ask in design projects will lead to understanding. But, how do we frame the questions and what happens if they are the wrong questions? How do we deal with consequences, who is affected? There are many other methods similar to this investigation, so why is this one important? Are we not already working in alternative new ways to transform our thinking?

Transformative learning, according to Mezirow (1991, 1997:5-6) deals with perspective transformation of an individual, where 'habits of mind' and 'points of view' are challenged. The hierarchical view of development, as seen in many developmental theories, is questioned. Ethical and cognitive development of students, according to Perry (1970), is presented as a scheme of transformation, and

echoed by King and Kitchener (1994) that builds consecutively and cumulatively. In comparison, Belenky et al (1986) argue that procedural knowing includes separate knowing and connected knowing, and although the authors explicitly state that it is not a model, it is often interpreted as such in practice. The lesser-known affective domain in the Bloom's taxonomies (Krathwohl et al 1964) emphasises values, attitudes and making deliberate choices towards a particular cause, as part of a holistic development.

This study argues for an open and fluid interpretation of these theories, as the speculative approach will reveal as the exploration unfolds. Threshold concepts, as critical points in development, indicate where noteworthy shifts are observed in the transformation of an individual's perspective to life. These transformations can be irreversible (Meyer & Land 2003, 2005) and have long-term implications for design students, and their trajectory towards preparation for a profession.

Research opportunity (relevance and importance)

Graduates will be future design practitioners. It is therefore important to equip them with ways of engaging and connecting with a deepened understanding and connected knowledge related to complex design issues. While there are many research projects in practice and education relating to challenging societal issues, little research brings a psychological perspective to balance the design intent in spatial design. While it is important to ensure adequate and relevant spatial solutions, it is now even more important to prioritise the needs of people in a time and society of adversity and uncertainty.

The research builds on previous work in the design sciences, but integrates that with pertinent concepts and approaches from the health sciences, business innovation, student development and transformative pedagogy. By incorporating aspects of psychiatry, educational psychology and human behaviour, a better understanding can be formulated regarding modes of engagement and the impetus for transformative actions. This research is interdisciplinary and includes various voices into one study, it crosses boundaries between seemingly disparate disciplines and topics, but the whole illustrates the benefit when considered together. In this way, micro considerations in small-scale scenarios, regardless of spatial environment, can be addressed through a refocused lens.

The study embraces the larger curricular framework into which the core studio and plug-in workshop are located. The interrelatedness of the various supporting modules enable translation and interpretation in design projects. The research is hands-on and conducted within four higher education design studios where primary data is collected to report on first hand experiences.

Purpose of the study

The purpose of the study is to probe the 'connected' mode in design practices and inquiry in the spatial design studio. It acknowledges that design projects (in education and practice) have time constraints due to the scope and high degree of complexity and multiplicity. Pressed schedules drive quick responses, which leave limited opportunities for the multitude of questions for investigation. Sometimes there is no time for new questions to guide a project in a responsive way due to a new or deeper understanding. Time is needed to internalise issues and to think deeply, and the educational calendar does not allow for this privilege. This research therefore introduces a speculative 'shortcut', and 'hacks' the conventional project trajectory, by inserting a four-hour speculative plug-in workshop into an active studio design project. The workshop emphasises contingent conditions that are unpredictable and dependent on the occupation of users. It is not meant to become a framework, not even an open-ended framework, but an approach, or a way of engaging, an attitude, towards design practice. It is flexible, focused on relationships, robust and can change and adapt over time or as needed. It promotes a mind-set geared to formulate deeper understandings and new insights into complex issues. As disruption, it requires deliberate shifts between different modes of operation, and various perspectives. It asks of students or participants to work swiftly, without fear of the process, to engage deeply in order to find a way 'into' a question or concern. By making quick decisions, the disruption becomes a productive way of subverting familiar tools and methods and offers possibilities to formulate new questions leading to connected knowing and being in order to take action. In this way, the traditional methods of design inquiry could be extended and supplemented to consider the human condition as a whole.

Delimitations and limitations

Delimitations

The research is delimited in the following ways:

- 1** Participation of third year, exit level students in an undergraduate degree course (with assumed experience, skills and knowledge), primarily in interior design, interior architecture and architecture, also referred to in this study as spatial design.
- 2** The researcher provides 'second life' materials to all student groups, ensuring an equal baseline library of materials during the workshop activities.
- 3** The study does not include testing for personality types to inform the research, as participation is spontaneous and captures in-situ responses during the workshops.
- 4** No demographic or personal information is captured as part of the ethical considerations, as all students enrolled in an exit level programme are representative of the discipline and particular course.
- 5** The study supports decolonialised design education and it is implied and embedded through this investigation without considering its political background. This is a holistic and inclusive inquiry.

6 Visual representation of issues of spatial complexity forms part of this discussion, however demonstrating the visual nature of research graphics and students work (as examples) are for further research.

Limitations

Possible unpredictable scenarios limit the study:

1 Participation and responses by students during the workshops cannot be guaranteed, as participation is voluntary and participants can withdraw at any stage. There is no certainty about the degree and nature of participation.

2 The types of active studio project of the four investigations are unknown at the start and might influence the study in some way. In the end, two were spatial in nature, and two object-based in their project outcomes.

Methodology

...people actively and agentially seek out, select and construct their own views, worlds and learning, and these processes are rooted in socio-cultural contexts and interactions. In other words, cognition is generative and active rather than receptive and passive respectively (Cohen et al 2018:23).

The research methodology is situated within a constructivist interpretivist paradigm. From a constructivist perspective, people make meaning of their lives in various relational situations. Researchers investigate these from various viewpoints in order to gain understanding and insight of social processes and interactions (Cohen et al 2018:23). The adoption of multiple lenses relates to the philosophical beliefs about reality (ontology), which is based on an emic perspective in this study (Yin 2016:335, 338). An emic view directly relates to the experiences and responses of the group participating in the research. It highlights the insider's voice throughout the data analysis and presentation of findings (Creswell & Poth 2018:91-92). Constructivist research complements the interpretivist approach, as it aims to understand experiences of the world through the eyes of participants. Cohen et al (2018:20) furthermore explains,

From an interpretive perspective, the hope of a universal theory which characterises the normative outlook gives way to multifaceted images of human behaviour as varied as the situations and contexts supporting them.

The qualitative research ontology is centred on people being instrumental to meaning-making, within specific situations that are context-bound, and in which multiple interpretations can emerge. This view is relevant to people and socio-cultural aspects in a decolonial discourse (Mathebula 2019). In addition, it allows for multiple and complementary intelligences to emerge (Fisher et al 2017). It is up to the researcher to describe and understand these experiences based on relationships and social reality and interactions. Subjective accounts describe the qualitative epistemology of the study (Cohen et al 2018:288-289). The methodology uses 'thick description' (Geertz 1973) and qualitative data analysis

without coding. Instead, Yin's (2016) five steps are used in conjunction with 'keywords in context' (KWIC) (Bernard & Ryan 2010:192) and an adaptation of recursive abstraction (Polkinghorne & Arnold 2014) to distil the essence of the data. This study, however, does not aim to propose a universal theory, but to speculate on the value of the findings and interpretations in the context of spatial design.

In conjunction to the qualitative methodology described above, the plug-in workshop follows a disruptive practice (Acaroglu 2017, Christensen 1997). However, it is not seen as a method, but an approach instead. Method by implication refers to tools and techniques – a prescription. As approach, the focus falls on a 'way of engaging', or 'action(s)' to allow for spontaneous responses. Although the workshop brief can be interpreted as a method, especially when considering the original briefing document stating the aims: *As 'plug-in', the workshop intends to serve as a tool to investigate and interrogate*. This initial reaction demonstrates the continuous challenge for designers, including the researcher, to transform thinking and approach towards a mind-set of open-endedness, of ambiguity and hand over control to the process. Upon later critical reflection, comes the realisation that any reference to tool or method, becomes another trap of predictability and bias of product and outcome over process and engagement.

In addition, the study acknowledges the limits of constructivism, due to the skills, knowledge and experience required to construct meaning from complex situations. Within a design context, students (academia) and professionals (industry) might not have the required exposure in order to construct different worldviews.

This workshop brief (Appendix B), with the inclusion of selected activities, illustrates one example of a disruptive action intending to assist students to focus their ways of working during the participation. However, different activities to the ones used here, could have been included. The intention is to provide opportunities for engagement, where their philosophical position and worldviews are questioned and interrogated as "a specific scenario plane where philosophy plays out" (Altshuler 2019). The workshop requires students to focus on the intangible and unspoken in a critical, yet creative way. Furthermore, it asks them to imagine themselves as the users, and not as designers / architects. This hybrid approach brings together empirical scientific research (analytic responsibility within qualitative research) with philosophical speculation (Reynders 2019).

In a critique of 'method' and 'approach' to design, the literature review section (*Chapters 2-4*) considers a theoretical understanding into which industry practice is integrated. This is contextualised in the data analysis and findings chapter (*Chapter 6*) where the speculative workshop becomes a 'testing ground' for 'other ways' of design engagement and offers opportunities to reflect on industry approaches. Moreover, data from the workshops could provide evidence to validate actions in practice, in order to provide evidence of valid results and positive impact.

The argument whether a 'tool' is needed to demonstrate an approach surfaces again. It can be argued that a speculative exploration can be adequate to demonstrate other ways of knowing, especially where people, their direct experiences and participation are involved to create meaning. The unfolding of the investigation demonstrates the degree and nature of the influence of the workshop in an educational context. If different modes of engagement as research-through-design (Tharp & Tharp 2018:126)

enable transformation in participants' awareness of the spectrum of social conditions and scenarios, the dependency on human occupation and meaning-making could be prioritised over formal architectural expressions. Perhaps the workshop findings reveal other types of studio engagement, embedded in contingency and social inclusion, to complement the current traditional studio model.

The four workshops are introduced at four higher educational institutions, with different studio projects and varying contexts, programmes, typologies and users. It allows for a series of results to be analysed according to the detailed methodology description in *Chapter 5*. The research questions are considered in the analyses, focusing on the topics emerging as part of an inductive study, where observation is used to identify topics and patterns from the data (Bernard & Ryan 2010:266), in order to contextualise the speculative inquiry. As provocation, the research interrogates the intensity of engagement in the studio and the potential transformation (as observed by students themselves, the researcher and research assistants) of the shift in attitude and approach. A detailed description of the various modes of engagements follows below, discussing the purpose of each of the activities in the plug-in workshop, as a disruptive inquiry.

intermission

The conviction to intervene in the students' design engagement in the studio was so strong, that I intuitively drafted a workshop brief to address my concerns regarding their project depth and understanding. This spontaneous action was not informed by any prior knowledge or experience of methods other than the traditional design mind mapping, conceptualisation and sketching, and model or maquette building, with presentation poster as sequence. I knew I wanted students to reach deeper into themselves, and to engage more directly with the studio design project. I had the same experience the year before, but this time, I realised it was time to act. I was hoping for responses saturated with meaning, with complex understandings of design challenges and user requirements and needs. Perhaps by taking another approach to design inquiry as an insertion into the existing design project, something unexpected could be revealed.

After my reflection on the poetic narrative description of the balcony scenario, I wanted to explore making as part of the creative inquiry process, in anticipation for the plug-in workshop. This must be spontaneous, yet critical, I thought. Therefore, even though making happened in that way, my mind was already set on creating something that could be exhibited as an object, a composition of aesthetic value and expression. This proves to be a hindrance in the journey making a connection - having preconceived ideas. I realised that it is a challenge to submit to the process, without a result in mind. How do we enter such an understanding? How do we make meaning in this way? How do we connect deeper? Making as a process of discovery, of design challenges, but also of self. I did not exactly know how this would unfold, but my instinct to trust the process knew best.

trapped in the making
predictable response
the process feels
intuitive
but –
do not be fooled
the inquiry
compromised
from the start

I take a step back
realization
the trap is real

How to step
out
of this mind set?



A disruptive methodology – an example

As disruptive insertion, the workshop interferes with the status quo of conventional design activities in the spatial design studio. This is introduced at a pre-determined point during the studio project, ideally in the first quarter (Figure 1-1). This intervention aims to introduce other ways of engaging in design projects – finding ‘an opening’ into, an ‘entry point’ to ask design questions differently. Abrahamson (2019) explains in his own experience: “...helping designers and their clients see challenges in a new way. In his process he brings insights to life through art and play. ‘Making something tangible is a way to unlock people’s minds’ “. The studio project is interjected with a deliberate focus on the user perspective and experience. Continuing this mind set into the larger studio design project, assimilating the newfound insight, is foreseen as the biggest challenge.

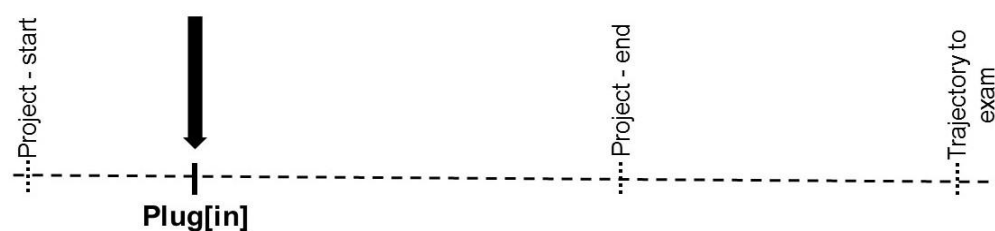


Figure 1-1: Project context of workshop as disruption

The study explores the value and impact of this disruption as speculative investigation. The data analysis and findings in *Chapter 6* reveal the impact as an example of this extended practice. It is assumed that the insertion at the start of a project could have more influence as it addresses the project framing and scope of intervention. However, it could also form part of a continuum of interventions where the insertion is introduced at different stages of the design process to address specific intentions, through different activities. Very often, projects do not offer direct access to students to experience the contexts and situations in which projects are situated. These can be very different to the students’ own frame of reference and they can find it difficult to relate to the context, even more so, the users. When they are left to their own devices to connect to the project, it is mostly cognitively, with practical approaches and architectural object-based solutions.

This workshop introduces normative dissociation (Butler 2006) to gain insight into the user’s situation on an affective level and empathy (Cuff et al 2014; Kouprie & Visser 2009) to reveal the user’s full context, including the emotional or affective, as part of a human-centred design approach. This study, however, focuses on understanding and insight, not on solutions. It promotes an indirect engaged learning to showcase the possibility of ‘connected knowing’ (Belenky et al 1986) or learning, outside participatory action research.

Plug-in workshop brief – plug[interiority]

The 'plug-in' brief was a spontaneous development and materialised after many discussions. Up to that point, I was unsure how to address the issues and concerns regarding design engagement that have been bothering me. I contemplated a series of activities that could activate students' thinking with free and unfiltered exploration. My own third year studio informed the perspective and intent of the brief. Students should find their own ways of immersing themselves in complex matters related to design projects. How was this going to happen? Perhaps if I introduced a 'catalyst' on their behalf. This was written as an intuitive expression from a place of caring, of how students will engage in future, as practitioners. I completed the draft whilst finalising the ethics application for this study. Once the ethics approvals were in place, I leapt into the data collection – without hesitation, but with a big sense of anticipation of what was to come from this...

How would students respond to unfamiliar activities within their known ways of working? The 'plug-in' workshop serves as disruption (Acaroglu 2017, Christensen 1997) of traditional design activities in the spatial design studio. It does not replace the conventional design inquiry, but extends it by introducing a conscious human-centred approach from the outset. It includes activities of critical and creative inquiry, as an example of how another perspective to that of the user, could realign students' design thinking. It investigates a possible shift in focus from physical objects as outcome, to dynamic and social conditions of living. This is where the situational perspective of human-centred design is revealed (Janzer & Weinstein in Resnick 2016:288). This journey of discovery prioritises process over product and aligns with the constructivist research philosophy, where students are able to make meaning for themselves and with others, in the context of the spatial design studio (van Aswegen 2021).

Background

In this study, the third year spatial design studio is used as an explorative test site. Alternatively, it could also be used as an inter-disciplinary investigation, including other creative studios and design disciplines, such as graphic and information design, fashion design and programmes with a human-centred approach. The investigation also holds potential for exploration in practice and real-life projects. The researcher, as lecturer in higher education, chose to include students as research informants and participants. In this way, research activities are combined in studio projects as part of applied research, or research-through-design (Tharp & Tharp 2018:126) in order to provide deeper insights into the pressing matters concerning the current design project. This research focuses on the process of inquiry as a way of engagement. It does not attempt to develop a tool in the process. These activities are an example of another way of engaging the user's perspective in the design studio, and is not an exhaustive solution to the possible scope of such a workshop.

The plug-in workshop's aims, objectives and learning outcomes are an intuitive response of the researcher and address a personal uneasiness with shortcomings identified in the studio. These indicate the intention behind the disruption as a creative and critical intervention (Appendix B). It attempts to address the superficial engagement with projects and design challenges and the predictable formal responses of static solutions and products. The researcher feels an immersive practice is missing in the studio, one that can bring about deeper insights, expand understanding beyond the obvious concerns and solutions. At the time of writing the initial brief, the impact of the word 'tool' was not considered in the context of the study. Subsequently, personal reflection brought the realisation that the research is not tool, model or theory driven, but speculative in nature instead. However, the brief was used in its original form throughout, ensuring consistency and reliability in the data collection in all biopic investigations. Therefore, although the brief states its aims to "serve as a tool", the disruption intends to explore other ways, of which these are only examples, to engage in a speculative process, instead of proposing solutions or finding answers.

The main purpose of the workshop is to create an awareness in students to consider design challenges with deliberate intent, insight and understanding, by asking 'new' or 'other' questions that would normally not be asked or considered in conventional architectural and design practices (Lloyd 2019, Tharp & Tharp 2018:44, van Aswegen 2021). With the user as focus, attention shifts to other matters of concern (Latour 2008:2) for the designer – the primary focus starts with the user in a particular setting, as a human-centred approach. In this way, the disruption intends to acquire deeper understandings and create connections and associations with people as users, their needs and requirements. In addition, the impact of a contextual understanding and pressing issues, immediate and hidden, extend beyond the obvious 'quick fix' responses. In this way, the intervention as provocation hopes to reveal a deeper connection between designer, the user and the context. The consequence of immersive engagement and affective understandings, including empathy, are considered where other perspectives to that of the designer are highlighted.

As part of the data collection, the workshop activities are recorded as evidence of primary data creation. The critical narratives, both textual and visual (drawings and photographs of critical artefacts and live interactions) are collected. These are securely stored according to ethical clearance requirements. In addition, the data collection process includes the researcher's field notes documenting the workshop, with participant observation, reflexive notes and photographic documentation.

The researcher, together with research assistance – the studio master, or studio assistant in the specific studio – primarily use participant observation and field notes for research triangulation (Yin 2014:120). The data collection furthermore details the various settings of the research (Cohen et al 2018:543): physical (space and setting), human (student group), interactional (role of the researcher and student interaction), and programme (studio brief for plug-in and ethos of school). When the workshop activities start, observational notes capture the behaviour of the students, document pertinent aspects to decision-making, sequence and response to the brief. The use of 'second life' objects is also noted, and the explicit experiences the students display during the various activities or phases of the workshop. Reflexive notes are captured after the activities, as reflection of the researcher and assistants.

Workshop activities

The workshop activities require students to remove their designer hat and to step into the shoes (Brown 2009:49) of the user through normative dissociation (Panero et al 2019) to assume a human-centred approach. The brief asks of them to reflect with a sensitive awareness, the unspoken needs and requirements of people, by reflecting on experience, well-being, quality of life and emotional demands when negotiating changing living patterns, everyday rituals and narratives of inhabitation. These interactions are encountered at human scale, where the tangible and intangible are made visible through fluid and dynamic conditions of living. Bach (1965:x) refers to these tacit considerations as “the commonly unseen, the commonly unheard and the commonly unfelt”.

Figure 1-2 represents the activities within a four-hour timeline, as inserted into a studio project. A problem statement, with related keywords describe the project, visualised by a series of spontaneous vignettes and made visible by making a critical artefact. Critical reflection of students' own processes, together with peer interaction and sharing, are interspersed at three strategic moments. To follow is a description of the role of each activity.

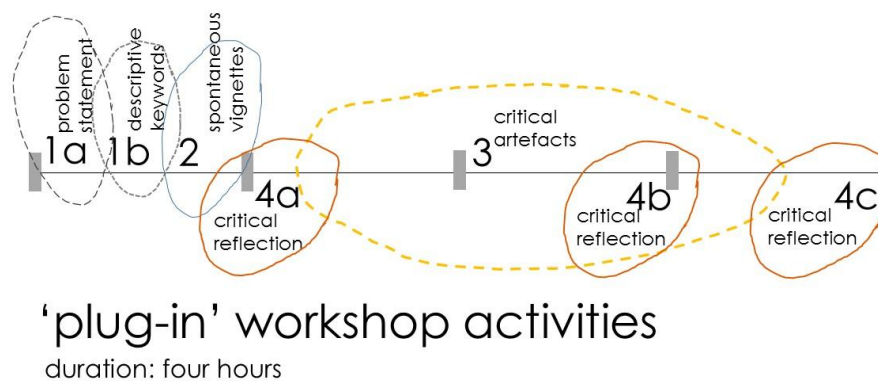


Figure 1-2: 'plug-in' workshop activities

1a problem statement. Students describe the design challenges or issues regarding the studio project by focusing on its context, programme, experience and inhabitants. Students 'imagine' themselves as users of the space, site, building or environment in which the studio project is situated, in order to understand and define the project and to grasp its complex scope.

1b descriptive keywords. Identification of ten keywords to capture the essence from the problem statement and their personal experience as a user, by selecting abstract nouns (ideas or qualities), adjectives (attributes) and adverbs (modifies or qualifies an adjective or verb) (The Oxford Dictionary). No common/proper/concrete nouns are encouraged, as descriptive terms aim to highlight the dynamic and social, over the static and physical.

2 spontaneous vignettes. Through a series of annotated vignettes, students visualise the nature of the textual narrative descriptions and its various meanings according to the view of the user. Vignettes visually describe the situations, moments and scenarios within the context and site where the specific studio project is located. Students deliberately articulate shifts in awareness by making links when they think in words and think in images. Associations, connotations and meaning-making are communicated as part of the students' assumed experience from a human-centred view.

It is argued that if, through normative dissociation (Butler 2006, Panero et al 2019), students dissociate from a designer role and associate with the user, they are able to 'imagine' themselves in a situation as someone other than themselves. The study acknowledges that the experience will not be a pure reflection and perception of the 'assumed user', as the student will project or internalise an 'imagined' experience. However, it is contended that this immersive action could still serve the purpose of creating awareness of another reality or perspective, albeit one that is lacking or fragmented in certain respects. The intention is for any preconceived ideas to be highlighted or challenged and for predictable responses to be replaced with ones that are richer, informed by a deeper understanding and empathy for others.

4a critical reflection 1 – self and peers. In pairs or in small groups, students share their personal experience from the perspective of the user. Discussions revolve around the selection and meaning of descriptive words and illustrative vignettes by communicating an understanding of how it could affect the design process to follow. Written notes are captured.

3 critical artefacts. The building of critical artefacts is an extension of the provocation of the workshop, where students are faced with other means of 'creating' to the familiar spatial design context. They are required to make an artefact that has no physical purpose, but aims to elicit a critical conversation regarding the issue(s) they identify as a discursive object that elicits "harder-to-reach issues involving core values, attitudes and beliefs" (Tharp & Tharp 2018:127). The brief requires the three-dimensional expression to be abstract or symbolic, serving as a synthesis of the project challenges and represent its invisible, intangible or temporal aspects.

To further the intuitive and spontaneous expression, the workshop introduces a selection of materials that are unconventional, non-traditional and alternative to general spatial design or architectural model building materials. These are unrelated to the mind set promoted by the conventional scale ruler and cutting mat. Instead, options include daily use items, objects and materials, which have been discarded by the original owner as 'second life' or 'prior use' items and not necessarily categorised as waste materials. A few random examples include, but are not limited to toys, shoes, automotive accessories, kitchen utensils, clothing, swimming gear, and packaging material.

4b critical reflection 2 – written reflective essay. The reflective essay outlines the workshop experience and its potential influence on the larger design project. In addition, students reflect on direct and related societal issues, how it can be addressed through matters arising from the workshop. They

also consider attitudes to design and awareness of social, temporal and fluid conditions. They re-evaluate the complexity of their understanding of intangible matters, beyond physical spatial expressions and formal solutions in spatial design. For consideration, the brief gives suggestions as prompts for discussion, such as behaviour, meaning-making, appropriation and identity formation. Students are also required to reflect on the use of 'second life' materials in the making process, and the potential for increased expression, richness and complexity.

4c critical reflection 3 – self and peers. The third feedback is the final critical reflection of self and with peers at the end of the workshop, where students share their written reflective essay, in pairs or in small groups. When students select words to describe their experience, they make cognitive and affective links between the different modes of engagement. During the verbal articulation, they internalise the perspective of the user in a personal way and are exposed to views other than their own.

Definition of terms and concepts

_affective attributes: aspects of a person to complete the holistic representation or being of an individual, together with the cognitive and skills domains. The affective domain completes the wholeness of a person, through attributes related to values and attitudes, not only of self, but also towards others (Krathwohl et al 1964).

_biopic: the dynamic and fluid character of a person or setting in a biographical film (Bingham 2010) relates to the actively engaged process of the study. The biopic investigation (Reynders 2012:6) is used as an approach to the case study inquiry, and replaces the static character with a dynamic understanding.

_complex design issues: design challenges that relate to social conditions or scenarios, and meaning-making of people within specific contexts. Also known as wicked problems (Rittel & Webber 1973:160) or matters of concern (Latour 2008).

_critical artefact: an object embedded with meaning, or eliciting a response in the public domain as an 'instrument' for the generation of discourse about a specific topic or complex design issue (Tharp & Tharp 2018:7-8). Critical artefacts in the context of this study are process based, composed of symbolism and meaning, and not meant to be an aesthetic composition as an object or product. It relates to a 'thing' of complexity, instead of a single faceted 'object' according to Sloterdijk (in Latour 2008).

_discursive design: the collective term for design practices that produce critical artefacts to extend conversation and discussion about critical aspects encountered in society (Tharp & Tharp 2018:112).

_disruptive practice: a way of upsetting the status quo within an established discipline. The purpose of disruption is to challenge outdated ideas for positive change. In the context of business innovation (Christensen 1997) and the disruptive design method to promote social and environmental change (Acaroglu 2017).

_dissociation: a way of distancing from the self within a situation and adopting the perspective of the participant or user. In the medical field, this is referred to as normative dissociation (Butler 2006), which is also applied to the performing arts as a way of connecting to the essence of a character (Panero et al 2019).

_human-centred approach: a way of dealing with design challenges, traditionally part of industrial and project design (Norman 2013) and of design thinking (Brown 2009). Critique of this approach, with an object-centric priority, excludes the complexity of social system priorities where human-centredness takes a situation-centred perspective instead (Janzer & Weinstein in Resnick 2016:288).

_interiority: as an abstract concept, interiority is “mobile”, “elastic” and “not an absolute condition”. It reveals possibilities, is referred to as a “transferrable and reusable condition” and does not subscribe to absolutes (McCarthy 2005:112-113) as compared to the physical architectural interior.

_method: a documented and predetermined way of performing a task.

_process: a series of actions performed to accomplish a task. The sequence can be random and recursive and is not prescribed to be linear and fixed (Lawson 1990).

_represent(ation): communicating abstract and complex ideas to an audience, visual or verbal.

_spatial design: refers to all creative disciplines in the built environment, this study includes interior architecture, interior design and architecture.

_threshold concepts: reflective moments where students become aware of new or other ways, where shifts are possible in their learning. According to Meyer and Land (2005) characteristics of threshold concepts are transformative, irreversible, integrative, troublesome and bounded.

_transformative engagement: within cognitive and development science, transformation is referred to when individuals demonstrate growth and change within a specific area of themselves. Perry (1970) particularly demonstrates this along a scheme of development, Belenky et al (1986) through ‘ways of knowing’, Mezirow (1991) relates transformation to frames of reference and perspective transformation and Krathwohl et al (1964) includes the affective domain to development.

_translate: the action of internalising complex issues and making something of that understanding. This is understood in a spatial and abstract sense, not only related to language.

Document outline

Part A contextualises the real-life conditions in which the research inquiry is situated. *Chapter 1* describes the background, problem statement and theoretical context. The research opportunities through an ‘interior’ lens, focus on a micro scale understanding of living conditions and scenarios. The purpose of the study and research questions are framed by the delimitations and limitations. Focus on methodology as a way of creative yet critical engagement, includes as example a plug-in workshop

description created to probe the research issues. Part one is concluded with a definition of terms and concepts and an overview of the structure of the document.

Part B integrates the theoretical conditions of the study by integrating three different theoretical discourses in an interdisciplinary inquiry of literature in separate chapters. *Chapter 2* contextualises spatial design pedagogy by tracing the dissatisfaction of the current situation. Discusses disruption as a way of dealing with complex design challenges by challenging the status quo of a design inquiry. The introduction of dissociation, as a psychiatric condition, relates to creative fields in the form of normative dissociation where levels of dissociation are revealed. *Chapter 3* discusses a human-centred design approach, by addressing design thinking (DT) and designerly thinking (D!T) and the debate around empathy, or no empathy. *Chapter 4* combines transformative learning, ethical and cognitive development of students, graduate attributes and design citizenship under an overarching understanding of transformative engagement. Various developmental and educational psychology theorists are discussed in order to formulate an in-depth understanding.

Part C outlines the research methodology and biopic investigations. *Chapter 5* gives a full description of the method, data collection and qualitative data analysis consisting of five steps and includes recursive abstraction and keywords in context (KWIC) analysis. A personal account clarifies how the various aspects to the method is personalised as a hands-on manual process of investigation. *Chapter 6* is structured in two parts. *Section A* is an in-depth account of the data analysis of the four separate case studies, as detailed-biopic investigations. *Section B* makes a comparison between the thematic narratives emerging in the data analysis and presents the syntheses as a relational biopic investigation from which threshold concepts, as moments of transformation, are identified.

Part D is a discussion of the integrated understandings and insights emerging from the study, informed by the threshold concepts. It outlines the small shifts and transformations and contextualises this in the context of a wider view of design intent, agendas and agency. *Chapter 7* gives postulations and provocations and highlights noteworthy observations as discussion. *Chapter 8* concludes the study by outlining the areas in which the research can make a contribution and points to areas of future research.

intermission

As an inductive study, it is not built on theory, but on data. It is active and alive. When I introduced the 'plug-in' workshop, I realised the emphasis on the process of asking 'how', instead of 'what'. The workshops continued one after the other, without me having knowledge of all the related literature that would later become integral to understanding the biopic analyses and contextualising the findings of the relational syntheses. I started to understand the meaning of an inductive study, where the qualitative data analysis guided the theory identification because of the concepts and themes emerging from the students' work.

To be honest, my exposure to practitioners in the field, their processes, tools and techniques provided me with an initial understanding of other ways of critical and creative design inquiry, as compared to theoretical views or academic literature. I am grateful for introductions to practices whilst in Chicago – passionate and committed individuals, meeting some in person and pursuing desktop studies on others. Networks of like-minded persons and practices, representing informal or other ways of design engagement, within spatial design that combines education and practice. I am excited to be presenting the literature review in an integrated format that combines all voices – design pedagogy, professional design practice – and feel that the overlap or interrelation is the point where the magic of possibilities for engaged learning lies.

PART B SITUATING THEORY: ACADEMIA AND PRACTICE

Theoretical foundations and professional practice interpretations

The literature review is an integrated discussion to investigate the interdisciplinary nature of transformative learning in the context of design studios where spatial problems are being explored. It explores how disruptive tactics upset the status quo of design practice in the studio environment, to become stimuli for transformation when various perspectives are acknowledged and internalised during the design process. It formulates a narrative to explore the potential value of empathy, including rival opinions and furthermore considers normative dissociation to adopt an 'insider's voice' on complex design issues. In the process, it reveals how another approach can prompt connectedness and meaning-making within the milieu of design education, by considering theory from designerly thinking and design thinking. Competing positions and criticism are considered to obtain an understanding of different views. In addition, practice formats and conventions typical of industry provide an overview of current and active ways of engagement to delve deeper into design issues.

The review weaves emerging developments in the discipline and profession with that of disciplinary specific theory and intends to demonstrate the validity of exploratory practices in the educational design studio, and its relation to industry. In addition, it considers the opposite, how the nature of the profession informs the relevance and validity of educational activities to promote transformative engagement. In this way, the interrelation draws a holistic picture of the aspects under investigation, with active links between the chapters in *Part B*. The literature review demonstrates the significance of intersections between disciplinary fields, and the integration possibility from a research *through / by* design approach. The related literature is therefore presented in terms of a collective understanding crossing boundaries in an interdisciplinary approach, and not disciplines as individual silos. Therefore, the researcher is considered a strategist in assimilating and interpreting the literature, and not an expert in all individual fields.

The review aims to demonstrate the challenges still facing design education, and the search for other methods to expand the traditional 'mechanistic pedagogy' to a 'systemic pedagogy' (Salama 2005). Seminal texts, landmark studies and current sources are integrated to refine the dialogue in search of modalities in spatial studio engagement that are underutilised and ignored. The investigation focuses on discovering how the affective domain development can be revealed through active student participation in order to reveal whether emotionally connected learning is possible and how it could benefit transformative development. The inquiry includes potential shifts in worldviews, by considering ontological shifts and epistemological transitions.

Part B is divided into three chapters, *Chapter 2*_Disruption by dissociation, *Chapter 3*_Human-centred design and *Chapter 4*_Transformative engagement, each dealing with pertinent aspects as set out in the three research sub-questions:

sq1 *How does the insertion of a disruptive action by dissociation as designer, influence meaningful connection and design action?*

Chapter 2 introduces disruption as a way of engagement in the architecture studio and starts with an overview of the traditional design process in spatial design. The investigation expands to consider other ways, hybrid tactics, which promote connected learning and transformative engagement. Examples from practice orientate the discussion of disruption to compare its different uses. A discussion on research *through / by* design contextualises the understanding from discursive design, creative arts and architectural perspectives.

'Dissociation of self' as designer is contextualised as an action of disruption in the search for deeper understanding and meaningful connection related to complex design issues. It discusses disruption as part of a hybrid design tactic approach and not as a method in itself. It becomes an act of inquiry during the conventional spatial design practice, in order to supplement the familiar and traditional design process. Normative dissociation, as a non-pathological concept, is introduced as a way of relating to the user's intangible and unspoken needs and requirements directly, by presenting examples from the performing and creative arts.

sq2 *How can the adoption of a human-centred approach expand an empathic understanding when dealing with complex spatial design issues?*

Chapter 3 revolves around human-centred design (HCD) by considering the potential interrelation between two historically separate, but related concepts, design thinking (DT) and designerly thinking (D&T). The literature review reveals noteworthy overlaps in the methodological approaches, although not necessarily acknowledged in academic research. The notion of empathy is explored as part of a human-centred approach, as framed within DT. It is explained in relation to its development, use and critique it has received. DT is furthermore contextualised in relation to D&T that is considered the precursor of DT. This study speculates on the value of an integrated approach, combining D&T with an academic / research focus (design knowledge) and DT that is practice-driven (design knowing). It is investigated in the context of complex design issues within the educational design studio, where students' transformative engagement is the focus.

sq3 *How does the shift to insider perspective transform design thinking in students to reveal other design agendas?*

Chapter 4 discusses transformative learning from the perspectives of student cognitive and ethical development, reflective practice, but also within the affective domain and considerations for connected knowing. It provides a background to determine whether a shift towards a human-centred design culture can be identified with related design attitudes, values and ethos to underscore a design culture of a 'connected' perspective. Premise reflection and challenging worldviews are integral to this discussion, which is contextualised by the students' learning ecologies. The final discussion challenges the idea of transformation as a linear, sequential process, versus an open flexible plane for exploration.

Chapter 2 DISRUPTION BY DISSOCIATION

dis•rup•tion noun.

The act or process of disrupting something, a break or interruption in the normal course or continuation of some activity, process, etc (Merriam-Webster Dictionary 2021).

Chapter 2 explores literature related to the idea of disruption as part of the methodology when dealing with complex design issues. As a disruptive design approach for systems change, it is intentional and “about finding ways of reimagining the status quo to make the old obsolete and the new possible, desirable, and sustainable” (Acaroglu 2017:5, 7). The intent of disruption is understood from a design practice perspective and is explored in the context of spatial design education.

dis•so•ci•a•tion noun.

The act or process of dissociation, the state of being dissociated...The process by which a chemical combination breaks up into simpler constituents (chemistry)...the separation of whole segments of the personality (as in multiple personality disorder) or of discrete mental processes from the mainstream on consciousness or of behaviour (psychiatry) (Merriam-Webster Dictionary 2021).

Literature regarding dissociation is founded in psychiatry where an understanding of aspects of dissociative mental disorders are explored in relation to non-pathological dissociation, which are naturally part of our daily lives (Butler 2006). The phenomenon of shifting between dissociative states is also considered (Sar 2014) in the context of a human-centred design approach, where students are expected to ‘put themselves in the shoes of the user’ and experience design issues from another perspective.

Disrupting the *status quo*

Architectural design education

Discourse on spatial design education, with particular emphasis on architecture, expresses a need for a paradigm shift from “the static domain-knowledge traditional approach” to an “interactive dialogic approach” to learning (Salama 2015:6). This ongoing debate received much attention in the 2000s, becoming a springboard for future and contemporary criticism, with the writings of Pilling and Nicol (2000), Salama (2009) and Harris and Widder (2014). This discourse supports a wide inquiry into architecture and spatial design practices and design pedagogy, with critical discourses in a variety of conferences globally. The 2019 conference presented by the international research organisation, Architecture, Media, Politics, Society (Amps), titled *Education, Design and Practice: Understanding Skills in a Complex World*, focuses on the relationship between practice and education, especially in an increasing complex world that requires interdisciplinary work to address complex challenges in the built environment (Amps New York 2019). Keynote speaker, Penny Deamer, presents a provocation and argues that architecture is rhizomatic and impure. Therefore, a systemic way of thinking and agency beyond design is required to address challenging issues in the world. She furthermore states that a

broader sphere of knowledge can support design scenarios which are no longer object based, by adopting multi-scalar views with real-world projects.

Various other presenters from higher education institutions address the notion of alternative methods, tools and techniques in the studio from a variety of design disciplines. Explorations encourage more engaged learning opportunities and experiences in which students can challenge familiar practices in favour of exploring new design pedagogies as other ways of design inquiry (Kenniff 2019). In addition, presenters from practice present qualitative ways of engagement, reporting on real-life projects by discussing multiple qualitative ways of inquiry in the field (Leblanck & Candau 2019). Noteworthy is the dialogue between the profession and education, concerning design inquiry. The papers show interrelated potential for expanded design inquiry in the educational design studio, as the profession proves the value and benefit of introducing rigorous methods of active engagement. In another milieu, an open online repository for hybrid design methods focuses on active involvement from participants to support the practice-led developments for engaging communities in design (Stein et al n.d.).

In this light, Salama (2012:2) argues for “a new thinking about architectural education and design pedagogy” that due to its complexity and intricacy, require “different modes of knowledge production” by shifting from a ‘mechanistic pedagogy’ to a ‘systemic pedagogy’. This can be achieved by refocusing the former’s outdated principles and practices, on student-centred learning. Real world projects, combined with holistic and collaborative skills, elicit curiosity about challenging design issues, to create life-long learners (Salama 2015:6).

It is a sad fact that most design studios do not encourage a more holistic approach to architectural education, one that promotes awareness of social-cultural and environmental issues, collaboration and teamwork, dialogic learning, sensitivity to and awareness of differences, critical discourse, innovative design, and technical competence. Hence, there is a glaring need to harness and holistically form a student’s sense of self, identity, and place through responsible teaching practices and activities (Salama 2015:9).

Research shows that architecture schools are increasingly searching for ways to be agile and remain active in their inquiry, amidst a multitude of institutional obstacles (Spiller & Clear 2014:13). However, the emphasis on problem solving and formal investigations (Awan et al 2011:27) remains a challenge for renewal of design investigation, with the “... dominance of aesthetics, style, form and technique in the usual discussion of architecture ...”. According to Till (2009:167), problems consider the past, and agency hopefully addresses the future. This shift in emphasis could be the stimulus needed to transform design engagement in the spatial design studio. Salama (2012:6) supports this notion by introducing appreciative inquiry that focuses on transformative human systems and identifying positive aspects, as an alternative to problem solving, which relies on fixing what is wrong or broken (Hammond in Salama 2012:6).

This modified perspective brings opportunities for transformations on many fronts, from the development of the student, to a re-alignment of complex issues as design focus. Living situations are mutating, the world is becoming more mobile and temporal in the way we engage with spaces due to technological advancements that allow for asynchronous, remote and indirect work (McCullough

2005:xiv). In comparison, flux extends to contingent scenarios of living and “volatile aspects of building” (Awan et al 2011:27) that requires considering agency, over objects, and highlighting the social, by “negotiating a new set of social relations, to think outside the norm, in order to project a new spatial, and hence social, conditions” (Till 2009:167, 169). The discourse in architectural pedagogy is “calling for a more socially and politically engaged role for architecture, I argue that it is design research which can really drive new agendas” (Fraser 2013:13).

But architecture is becoming increasingly complex and we face challenging times requiring new kinds and more comprehensive skills and modes of thought. [...] Besides, architects are designers and should apply their design skills to more than buildings (Buchanan 2012:17).

The unpredictable and contingent factors related to spatial design bring an “inevitable condition” in which “a dynamic context of networks” are to be negotiated (Awan et al 2011:28). Contingency and agency therefore become integral considerations in situations where people fluidly and temporarily appropriate space. The production of space, as a social act (Lefebvre 1991) that is a “shared enterprise”, dynamic and temporal, becomes a political gesture of assuming power, interaction and control (Awan et al 2011:29-30). The effect of this political understanding brings the role of the architect or designer to the fore, by questioning the traditional position as an expert who has limited power and therefore should be seen as an agent, instead (Awan et al 2011:28, 31). In support, Till (2009:183) explains that the architect or designer enables and empowers, and is in service of, others. In this way, the emphasis on tectonics and aesthetics is seen as superficial, compared to the social and ethical elements and relationships that are integral to rich social contexts.

Reynders (2012:2) echoes this view by referring to an “enabling design culture” or process, aiming at “enabling social infrastructure that redefines notions of the body, of temporality and of belonging within the everyday.” Moreover, the shortcoming that Till (2009:112) identifies when the designer becomes an “agent of control”, is shared, and therefore this study proposes the role of the architect as an ‘agent of contingency and change’. Design inquiry without “a degree of curatorial obsession” and “without the desire to arrive at a universal truth” (Reynders 2012:3, 6) is advocated.

The refocus of the emphasis on the context, situation and scenario, as well as the user, reveals a complex condition that both the designer and user wants to understand in depth. In *The Semantic turn: a new foundation for design*, Krippendorff (2006:xiii) argues for an understanding of design as a sense-making activity. He argues different interpretations, from intentional interpretations, experiences and perceptions through design to the user’s understanding of products and concludes that “[m]aking sense is the result of human activity as well, but not as tangible as objects often are” (Krippendorff 2006:xiii). The emphasis on product design relates directly to spatial design, as meaning is not only found in relation to products, but also to spaces. Thus Krippendorff (2006:xv) asserts that:

Design has to shift gears from shaping the appearance of mechanical products that industry is equipped to manufacture to conceptualizing artefacts, material or social, that have a chance of meaning something to its users, that aid larger communities, and that support a society that is in the process of reconstructing itself in unprecedented ways and at record speeds.

In addition, Forester (in Till 2009:168) suggests to replace “the normative metaphor of design” with “the idea of ‘sense-making’.” Buchanan (2012:10) motivates for the consideration of the experiential to connect to deeper experiences in an educational context, for students to become attuned to a finer articulation of their observations and understandings. Furthermore, Alexander’s (2002-2004) four-volume book series, *The Nature of order*, redefines “architecture for the 21st century as a field, as a profession, as a practice and as a social philosophy” (The Nature of Order n.d.). Book Four, *The Luminous ground*, reveals the essence of his search for meaning in architecture by concluding the need for balance between the objective, mechanical manifestation of buildings, and the spiritual, emotional and personal to be the foundation, as a “new cosmology” (The Nature of Order n.d.). The search for the intangible and emotive in design is considered in the split-brain theory of Salama (2012:5), arguing that “architectural education is unique since it requires the full activation of the two sides ...” where left is associated with cognitive thinking, and right with a holistic and relational understanding of parts.

Historically, deliberate disruption is visible in the ‘Radical Architectures’ of the 1960s and 1970s, “a time when traditions were questioned, destabilised, undermined or even destroyed” (Colomina 2012:2). This came in light of the position of architecture in a socio-political context with the rejection of the pedagogy of the Beaux-Arts School in 1968 and the burning of the Yale School of Art and Architecture in 1969. Further student uprisings were prevalent in other areas of the world, also addressing pedagogical concerns, and furthermore to destabilise traditional structures of institutions (Colomina et al 2012:3)

With a typically short lifespan, these diverse experiments often found one of the following ends: abandonment or dissolution; assimilation into a generic mainstream education; or termination due to financial and/or political constraints. Many radical pedagogies trace an art typical to avant-garde practices, from radicality to conventionality, from subversion to institutionalisation. And yet much of the discipline’s strength came from these experiments. They affected the institutions that swallowed them up and they lie within the discipline, waiting to be reawakened by another generation... (Colomina 2012:6).

The Radical Pedagogies is a research project by Beatriz Colomina and an ongoing group of PhD students investigating “radical strategies of architectural pedagogy”, asserting that the discipline can best be changed by revolutionising the way it is taught by forming new relationships to “technological, social-political and cultural transformation of the time” (Colomina 2012:1). The practices of this approach as captured in the book: *Radical pedagogies: architectural education and the British tradition* (Froud & Harris 2015) receives criticism, when a subtler voice is identified as something other than radical, in an attempt to “define what is at the core of architecture” (Day 2015). The criticism opens the dialogue whether these pedagogies are not reactionary instead of radical, in the fact that they explore situations and user requirements, human needs, utility and comfort of enjoyment (Day 2015).

Perhaps that is why triads of design engagement find their way into design literature, to connect deeper, by considering various ways of operating in a design project. ‘Think’, ‘make’ and ‘share’ (Reynders 2012:4), ‘think’, ‘feel’ and ‘do’ (Fisher & Clarke 2012), ‘see’, ‘feel’ and ‘change’ (Brown in Mezirow et al 2009:10) and ‘say’, ‘do’ and ‘make’ (Sanders in Tharp & Tharp 2018:75) advocating complementary modalities, which each elicits different responses and representations. Upon closer inspection, some

are assigned to a cognitive understanding and way of generating knowledge, 'think' and 'see'. While 'feel' is associated with subjective meaning-making, and the combination of the split-brain (Salama 2012:5), 'make' and 'share' allow for design responses. The two modalities, allowing for engaged action, 'do' and 'change' highlights social agency (Resnick 2016) in the design studio, where the student or designer is motivated and committed to make positive self, or design scenarios. This could be why supposed 'radical' interventions go unnoticed, not because they are radical, but due to its integrated and relational immersion and understanding of complex design challenges.

Change becomes possible when the student in design education or the designer in practice, adopts a social constructivist or anti-positivist worldview. This approach acknowledges, respects and embraces the understanding that there are no universal laws or rules, but that people and communities construct their own realities and ways of being in the world (Salama 2012:6). Transformative learning also speaks to shifting worldviews (Mezirow 1991:107-108). This is significant for design education because transformation only becomes possible when the designer is confronted with personal prejudices and judgements relating to individual 'points of view' and 'habits of mind' (Mezirow 1997:5-6). Simaan (2020) demonstrates this in a study of transformative education in the Global South, through critical consciousness, awareness and reflection.

Interior architecture's expanded field

The expanded mandate of the discipline of interior architecture offers an engaged attitude to the spatial design disciplines, which includes environment-behaviour approaches (Poldma 2009:266) in the way new spatial typologies are emerging. The urban condition is increasing in complexity, with blurred thresholds, urban interiors, multi-scalar scenarios (Attiwill 2009). This brings a revised understanding of the discipline that has expanded over the past 20 years from interior as enclosed building typology, to the notion of 'interiority' as possibility that enables spatial manipulation as a 'condition', instead (McCarthy 2005:112-113).

McCarthy (2005:112) refers to Bachelard in *The Poetics of space* (1958/1994) when he describes spatial elasticity, she notes: "Interiority (climatic, physical, psychological, social) is the point at which the understanding of what an interior is becomes elastic". This is interior architecture's response to complexity – fluidity and contingency embedded in living scenarios within the environment, as energies and forces to construct situations (Attiwill 2011:16-17). It becomes a way to mediate the urban condition that is in constant flux, for meaningful living encounters and experiences as "the in-between, momentary and fluid experiences that one encounters while moving through such blurred boundaries" (Atmodiwirjo & Yatmo 2019:108). Lee (2009:2) makes the argument for interior territories that are situated and "uncover emerging spatial and temporal practices alongside the material and immaterial ecologies ..."

This understanding of the interior as an expended field, expresses interiority, infused with meaning through social relationships. Giunta (2009:59-60) refers to a "transition from *urban place* toward *environmental system*" by considering three actors: bodies (social component), objects and spaces

(relational system of thresholds). In this way, the understanding of interiority and intimacy (McCarthy 2005:117) crosses multi-scalar urban conditions to reveal at its core, relational spatial scenarios with people at the core.

An implied decolonised design pedagogy

The related understanding of interiority and the human condition referred to above provides the grounds for an implied decolonised design pedagogy embedded in this study. “Decoloniality is a humanising and liberating force” and Mabhena (2016) further explains decolonisation as thoughts, ideas and beliefs of individuals or groups, and decoloniality as its practice. Fataar (2018:vii) argues for the inclusion of indigenous and non-Western thinking and practice to restore a “full incorporation of humanity’s knowledge systems”. Santos (2016) concurs by advocating for relevance of plurality and ecologies of knowledge in diversity of intercultural translations of the Global South. “This body of knowledge needs to have ownership by all cultural groups in a way that facilitates accessibility, empathy and sharing” (Fisher et al 2017).

In the context of design education, decolonial thinking lies in both the content and process of design engagement to express cultural hybridity (Fisher et al 2017). They further discuss storytelling as vehicle to explore various identities, visual mediums to reveal multiple intelligences (after Gardner 1983) and the need for compassion to better understand various living situations. Simaan (2020:7) reflects on an occupation science education project that uses different immersive and reflective activities, to question how students “position themselves in relation to the community studied”. In addition, “how they reflected on themselves as collective occupational beings embedded in their own communities ...” (Simaan 2020:2). Lessons learnt reveal awareness, positions, approaches and alternative methods, highlighted through alternative processes of learning. This epistemic reflexivity (Whiteford & Townsend in Simaan 2020:9) surfaces multiple voices of the Global South’s knowledge production and ways of knowing. Wilson (2008:6, 10-11, 39) shares and celebrates indigenous research methods that are focused on building relationships, relational accountability and worldviews as a circular approach.

... I hope that you will come to see that research is a ceremony. The purpose of any ceremony is to build stronger relationships or bridge the distance between aspects of our cosmos and ourselves. The research that we do as Indigenous people is a ceremony that allows us a raised level of consciousness and insight into our world.

If research doesn't change you as a person, then you haven't done it right (Wilson 2008:11, 135).

Berlanda (2017:71) argues for a systemic reform of architectural education, moving beyond the understanding of architecture as the built form, “to develop responsive architectural solutions to the social, economic and environmental realities facing the built environment”. Moreover, he cautions against considering heritage separate from context and history and expresses the potential for “new epistemologies South of the Equator”, to emerge (Berlanda 2017:72). Decolonisation of education furthermore includes empathic-reflective-dialogical re-storying as teaching strategy in a religious education project, to “empower students as agents of their own learning” (Jarvis 2021:68, 74). In this

project, identity capital (after Hermans 2010) enables students to move between various positions or perspectives, self-narrative assists with new constructs of experiences and re-storying create “new interpretations of lived experience” as “co-production of new knowledges” (Jarvis 2021:71-72).

This short discussion on an implied decolonised design pedagogy sets the scene for the study to unfold, as the concepts and ideas shared above are embedded in the plug-in workshop, the design approach and attitude to studio engagement. It outlines the context for theoretical investigations and constructivist interpretations of data analysis and reveal findings in an integrated and inclusive way. This is an attempt to delve deeper into the intangibles of life and living and the complex socio-political interactions being enabled or constrained in the built environment.

Relationship: science and design

The way we view the world and make sense of its complexities through design, present opportunities to engage with academic rigour in the spatial design studio. What does this mean for research in the context of design and of professional practice? In an article, Cross (2001) outlines the trajectory of the design science development from the first intent to introduce ‘design as a science’. In addition, the 1962 *Conference of Design Methods* in London, presents a positivist approach to design methods in the context of engineering design (Jones & Thornley in Cross 2001:1). Archer (1965) contributes with his completed PhD thesis, titled *The Structure of Design Processes*. He aims to identify and establish design as distinct from the pure sciences and recognises not only Design Research and its methods of design, but also its ontology (Davis & Gristwood 2016:1). Simon’s (1969), *The Sciences of the Artificial*, supports this notion, by promoting a systematic design process. These assertions of ‘design as a science’ compared to ‘design as a profession’ elicit reaction due to the systematic focus to design. As a result, the inquiry receives much criticism in the 1970s, especially from (Alexander 1964) and (Jones 1970), due to the advocating for a rational approach to design (Lawrence in Davis & Gristwood 2016:2-3) over an intuitive response. “I dislike the machine language, the behaviourism, the continual attempt to fix the whole of life into a logical framework” (Jones in Cross 2001:2).

The unstable context of the late 1960s puts this discourse of design science in perspective. Rittel and Webber (1973) refer to ‘wicked’ problems, which cannot be solved by the same systematic processes applied to address ‘tame’ (Cross 2001:2) or well defined problems. Cross (2001) identifies a number of new journals of the 1980s and 1990s that continue the discourse. However, with limited practical applications to support the scientific research (Cross 1982). Gregory (in Cross 1982:122) articulates the focus on ‘problem’ from a scientific perspective, to the constructive approach concerning ‘method’:

The scientific method is a pattern of problem-solving behaviour employed in finding out the nature of what exists, whereas the design method is a pattern of behaviour employed in inventing things...which do not yet exist. Science is analytic; design is constructive.

Cross (2001:3) clarifies the relation between design and science by identifying three understandings, scientific design relying on scientific methods to address complex industrial problems; design science

requiring scientific knowledge and a systematic design; and the science of design or the study of design investigating design practices and methods, procedures and techniques, the latter referring to design as a process, being constructive.

There may indeed be a critical distinction to be made: method may be vital to the practice of science (where it validates the results) but not to the practice of design (where results do not have to be repeatable, and in most cases must *not* be repeated, or copied) (Cross 2001:2)

This statement by Cross (2001:2) does not take into account that 'method' could also be used in design where the aim is not to solve problems, but to consider 'method' as an exploratory process, instead. In this light, science can be connected to the designerly thinking's concept of 'solution-led goal analysis' (Cross 2006; Krippendorff 2006) and 'method' to 'dialogue with the situation' (Cross 2006). This notion relates to *Chapter 3* – 'Human-centred design' and to 'discursive design' (Tharp & Tharp 2018) below.

Mini-summary

The literature shows that both the search for a 'science of design' and the developments of 'design as a practice' within the spatial design studio, experience the systematic, objective and rational as an obstacle to immersive and engaged design encounters that are robust enough to address ill-defined problems and scenarios that are temporal, contingent or fluid. The traditional scientific methods remain outcome and product driven, compared to the constructive approach that utilises process, with understanding as outcome. To follow is a discussion on the various design domain positions and the relevance of discursive design, especially in the context of design inquiries not aiming to solve problems, but to provoke. This aim, unaccustomed to spatial design, is explored for usefulness to deepen design understanding and to ask better questions.

Research domains and tacit knowledge

Friedman (2008) argues the relation between theory construction and the domains of research in a critical article, scrutinising Freyling's (1993) research paper, *Research in Art and Design*. His criticism is that Freyling's notions of research *into* art and design, research *by* art and design, and research *for* art, are not understood well in relation to explicit and tacit knowledge and that reference to these are made without proper regard for its application (Friedman 2008:155). 'Research *into*' relates to research into various theoretical perspectives and 'research *for*' with the aim to produce an artefact for communication or representation. In addition, he describes 'research *through (by)*' as materials research, development work and action research as a practical inquiry (Freyling 1993:5). Friedman (2008:154-155) finds the creation of knowledge when using 'research *through / by*' problematic and makes the relation to Polanyi's (1966) book, *The Tacit Dimension*. Friedman (2008:154) agrees that tacit knowledge is needed for being human, but asserts that knowledge or theory cannot be constructed using tacit knowledge. Friedman (2008:155) refers to Polanyi when he says, "Tacit knowledge is

embodied and experiential. Theory requires more.” He thus expresses concern that research *by design* cannot produce theory.

Gourlay’s (2002) rival paper describes Polanyi’s (1974) interpretation from a different perspective – ‘tacit knowing’ instead of ‘tacit knowledge’. Extensive evidence shows in Polanyi’s writings and his own utterance on the matter, supports this view, “Knowledge is an activity which would better be described as a process of knowing” (Polanyi in Gourlay 2002:8) and “I shall always speak of ‘knowing’, therefore, to cover both practical and theoretical knowledge” (Polanyi in Gourlay 2002:8). The interpretation of ‘tacit knowledge’ according to Friedman (2008), therefore relates to theory as an outcome of knowledge, which is not possible using ‘tacit knowledge’. He says “... the misguided effort to propose tacit knowledge or direct making as a method of theory construction ...” is a dead end (Friedman 2008:158). In comparison, ‘tacit knowing’, according to Polanyi, refers to a ‘process of knowing’, or according to Sternberg (in Gourlay 2002:7), refers to ‘procedural knowledge’. Belenky et al (1986) also include ‘procedural knowing’ as part of their developmental understanding, which articulates it as ‘connected knowing’ and ‘separate knowing’. Perry’s (1970) influential developmental research explains a sequential scheme. This discourse is addressed in *Chapter 4 – Transformative learning*.

To further contextualise the discussion Gourlay (2002:8) explains Polanyi’s approach to ‘tacit knowing / knowledge’ as a “part-whole model of perception and cognition derived from Gestalt psychology”. The parts in relation to the whole is emphasised, the integration, in order to understand the “subsidiary” and “focal” elements of tacit understanding (Polanyi in Gourlay 2002:9).

Due to the interdisciplinary nature, holistic understanding and the evidence for ‘tacit knowing’ as a process instead as theory construction, this study supports the views by Gourlay (2002) and Nonaka & Takeuchi (1995) as a reading of Polanyi’s (1966) expression of ‘tacit knowing’. Instead of ‘tacit knowledge’ intended at theory construction, due to the understanding of tacit knowledge being experiential and individual, relating to the model of knowledge creation by Nonaka & Takeuchi (in Gourlay 2002:2). With this understanding, considering ‘design as a discipline’ (Cross 2001:4), shifts emphasis to where a systematic way is balanced with design practice’s intuitive processes from the perspective of a constructivist paradigm, instead of a positivist ‘doctrine’ (Schön 1983).

Schön proposed instead to search for ‘an epistemology of practice implicit in the artistic, intuitive processes which some practitioners do bring to situations of uncertainty, instability, uniqueness, and value conflict,’ and which he characterised as ‘reflective practice’ (Cross 2001:4)

From a creative arts perspective, the knowledge-method debate contributes to this view, as Sullivan (2010:82) describes:

... traditional modes of research have a hard time accounting for the breadth and depth of knowing we associate with the full scope of human understanding. For many, it is the outcome of other ways of knowing and creating knowledge within the studio context of visual arts that offers different yet complementary pathways to coming to understanding things.

The domains of 'practice *around* inquiry' in visual arts address various dimensions to articulate a particular method, discursive domain / method, dialectical domain / method and deconstruction domain / method. Relevant for this discussion is the emphasis on the meaning dimension, which is investigated through discursive methods related to agency and structure. Also relevant is the dialectical method focused on the change dimension combining agency and action (Sullivan 2010:107). These ways of engagement are considered interchangeable and associated to the metaphor of a braid after Murray Gell-Man (in Sullivan 2010:114):

... a simple and complex liquid structure with powerful generative potential for change – is the image of the braid. Metaphors help us to see things differently as we further our understanding of relationships and networks, influences and connections, and this can intrigue visual arts researchers. What is proposed is that the braid, with its infolding and unfurling form that disengages and reconnects with the core themes while continually moving into new spaces, serves as a useful metaphor that captures the dynamic complexity and simplicity of art practice as research (Sullivan 2010:112).

Furthermore, Sullivan (2010:134) explains a framework for visual arts knowing, as a triad containing 'thinking in a language', 'thinking in a medium' and 'thinking in a context', where "mindful practices are *structured* [medium], *framed* [language], and *embodied* [context]". This triad describes a "practical-theoretical" approach that is dialogic concerning the viewer [language], symbolical related to the artwork [medium] and responsive towards setting [context] (Sullivan 2010:134).

Contemporary artists adopt many practices that dislodge discipline boundaries, media conventions, and political interests, yet they do so within a realm of aesthetic experience, cultural commentary, educational relevance. The image of the artist as creator, critic, theorist, teacher, activist, and archivist partly captures the range of art practice today (Sullivan 2010:156).

How does this understanding relate to the spatial design studio?

In *Design Research in Architecture: an Overview*, Verbeke (2013:137, 145) investigates what research *by* design means in the field of architecture by considering its definition in context of artistic developments and introduces a scheme for engaging with a design research project. He deduces that there is much to transfer from 'research by art practice', which is founded on "exploratory and curiosity driven activities", based on experiences, and that "production of art, and of making and performing, as the key paths to develop insight, understanding, and knowledge" (Verbeke 2013:144).

Research by design ... the main pathways to establish new understanding and knowledge. It creates cutting-edge exploration and progress, both in practice and in studio work. It results in the development of spatial understanding and human ecology with daily impacts upon behaviour and living conditions. It is not about analytical thinking in the narrow sense, but rather about exploration ... (Verbeke 2013:157).

Verbeke (2013:151-156) bases this conclusion on the evidence from the research by design work at RMIT University, Melbourne, and also higher education institutions in Ghent and Brussels, together with PhD examples through research *by* design projects. On closer observation, these PhD studies relate closely to a discursive design approach, or making complex issues visible (Tharp & Tharp 2018).

Leon van Schaik asks four questions regarding design practice research in architecture and notes that these are important to the built environment and creative industry professions, where we have the responsibility of “successful adaptations to a changing world” (Blythe & van Schaik 2013:53). The square brackets below, is a short response in the context of this study, to Blythe and van Schaik’s (2015:53) four questions:

- What if design practice matters and is researched? [*Exploratory investigation as provocation*]
- What would we do? [*Introduce disruptive ways of design engagement*]
- How would we do this? [*Refocus the emphasis on the user, consider the intangible*]
- What would we discover? [*Perhaps transformation is possible*]

Salama (2012:9) argues for design inquiry in architecture to equip students with an understanding and appreciation of various types of knowledge, not only as consumers of knowledge, but to “contribute to its production”. The question remains, how can this be achieved?

It is about extending horizons, changing borders, stimulating curiosity and exploration. It is about imagining, visualising and projecting alternative worldviews, as well as developing spatial understanding and making possible future worlds – and thus also contributing to the understanding of underlying process of the present (Verbeke 2013:157).

Discursive design

The quotation above relates to the essence of discursive design, and aligns furthermore to a discussion on ‘research *through / by*’, in a recent publication. Tharp and Tharp (2018) point to four domains of discursive design. First, an outline of its definition:

The creation of utilitarian artifacts whose primary purpose is communicative. It is a means through which ideas of psychological, sociological, and ideological import are intentionally embodied in, and engendered through, artifacts. The ideas are capable of sustaining a complex of competing perspectives and values. Used as tools for audience reflection, the practice is located within the *About-For-Through* framework as *discourse-through-design* (Tharp & Tharp 2018:548).

Considering the plug-in workshop of the biopic investigations, Figure 3-2 below indicates its position within the domain context of this investigation (Tharp & Tharp 2018:344-345), as highlighted. It is positioned as an overlap between practice and inquiry by integrating ‘social engagement’ and ‘applied research’.

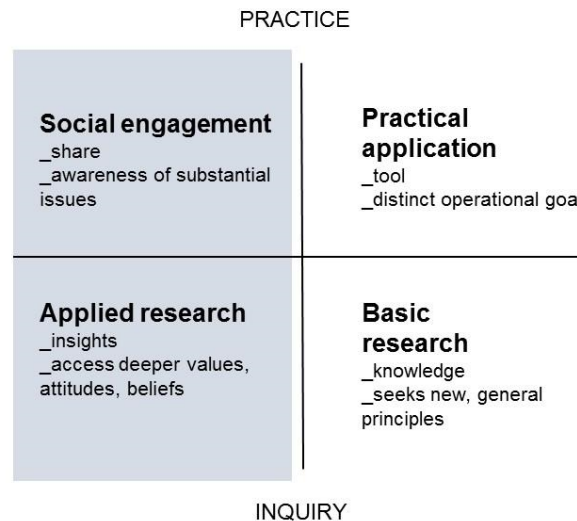


Figure 2-1: Plug-in workshop within discursive design research domains
 (After explanation of Tharp & Tharp 2018:344-345)

While discursive design began as a form of critique or activism opposing typical commercial design and certain sociocultural conditions like rapid consumerism, over the years it has been applied in various other ways (Tharp & Tharp 2018:345).

Historically, *critical design*, *speculative design* and *design fiction* are three examples of practices or “species” of discursive design that Tharp and Tharp (2018:83, 85) assert will in time no longer be considered because of its differences, but “due in part to writers articulating generally similar distinctions” in a wider context. Therefore, this study does not consider these three fields as separate to one another, nor different to discursive design, although there are basic differences. Instead, the historical differences and development are considered in a collective sense and some examples are used below.

We feel discursive design provides a more accurate and appropriate categorization of the broad practice evident today and one that is capable of accommodating new instantiations that might be on or over the horizon (Tharp & Tharp 2018:93).

The inherent purpose of discursive design is not to solve problems by generating products of physical outcomes, but rather with the intent to probe responses by eliciting “another agenda” that “tells a story, often with a moral or message” to an audience (Tharp & Tharp 2018:403, 442). Interaction with an artifact brings a deepened understanding of complex issues due to the audience’s engagement, which can bring immersive experiences. Messages are internalised through various interpretations, which have the potential for impact in a positive way (Tharp & Tharp 2018:474).

An example of a disruptive approach is the work of critical designers, Dunne and Raby, that uses design “as a medium to stimulate discussion and debate amongst designers, industry and the public about the social, cultural and ethical implications of existing and emerging technologies” (Dunne & Raby n.d.).

Critical design is not a movement, but a way of looking at the possibilities of design beyond its “narrow definition”. In *Design Noir: the secret life of electronic objects*, Dunne and Raby (2001) tested the perceptions of electronic objects through a series of Placebo prototypes in self-selecting participants’ homes to find out if people are open to radical ideas being meaningful versus products industry promotes. The intent of the project was for people to think about products in different ways in relation to their environments, providing some sort of “psychological comfort” (Dunne & Raby 2001:75).

Critical design uses speculative design proposals to challenge narrow assumptions, preconceptions and gives about the role products play in everyday life. It is more of an attitude than anything else, a position rather than a method (Dunne & Raby n.d.).

The usefulness of discursive design’s attitude and approach for spatial design is the deepening of understanding and the acknowledgement and internalisation of different potential perspectives due to the engagement with an artifact. This purpose relates directly with Polanyi’s (1966) perspective of tacit knowing as process. No solution is proposed here, but the exploratory engagement with the process, the message embedded within the artefact, and interaction with it, are interpreted as the outcome that manifests in the audience as its user. The biopic investigations aim to explore how the plug-in workshop could align with this view and perhaps awaken potential responses expressing a particular mind set, *declarative* (“something to say”), *suggestive* (“evidence but no proof”), *inquisitive* (“seeks understanding”), *facilitative* (“help others”) and *disruptive* (“wants to interfere”) (Tharp & Tharp 2018:348).

The position of discursive design artifacts within ‘research *through / by*’ emphasises a process-driven endeavour. In this light, Brooker and Weinthal (2017:51) explain ‘research *through* design’ as an operational field and productive activity (Snyder, Van Ouwerkerk in Brooker and Weinthal 2017:51). The discussion associates research through design as a speculative and cognitive activity and aims to “know what doing means by doing” in order to formulate quasi-theories and to validate practices (Brooker & Weinthal 2017:51-52). This study, however, does not aim to develop theories, but instead to provoke by means of a speculative inquiry, using hybrid methods as an approach or tactic in the ‘plug-in’ workshop. The use of an artefact in the study is merely to test how issues can be made visible during the design process.

This approach integrates critical reflection and intends to stimulate a response to make design activity visible without the intention to solve problems. Bowen (2010:2, 5) developed a critical artefact methodology “*within* a design process” of product development with the tactic to “...discuss with users a set of critical artefacts I had produced with expressed provocative alternative possibilities.” Bowen (2010:5) explains the context of critical artefact methodology existing “within a design process ... a tool for opening up the design space ...” Although Bowen’s (2009) process is product-people driven, directly relating to user’s needs, it is argued here that the application could be meaningful to test on a spatial level. The value of such an approach could address design awareness to create added meaning in the built environment.

The fact that critical artefact methodology is not aimed at outcome or solution, but provocation instead (Bowen 2009), allows for a triangulated relationship of 'thinking', 'making' and 'sharing' (Reynders 2012:4). Thinking and making are related to critical inquiry, and sharing enters into a dialogue where the exploration can prompt intentional probes. The main difference between the purpose of discursive design as explained by Tharp and Tharp (2018) and the 'plug-in' lies in the audience. The former relates to an external audience, unfamiliar to the intent and message of the artefact. The latter focuses on the students as internal audience, to disrupt the status quo of the studio, as the traditional intent of spatial design education is to formulate solutions and to create products.

Disruptive design methods

The design approach is comparable to the deliberate introduction by an anthropologist of a refrigerator, mobile phone or a video camera into a community that had never before seen such devices ... [t]he intervention can serve as a catalyst or an inhibitor that brings current practices into sharp relief and provides a focus for reflection and discussion (Coyne 2013:195).

When "disruption as a research method" is considered in spatial design, participants are exposed to scenarios outside their normal daily routine and practice, and through critical reflection (Coyne 2013:198). The shift in a spatial design focus from a "mechanistic pedagogy to systemic pedagogy" (Salama 2012:1) can present such an upset.

The idea of a design intervention is to expose something about the context in which it is placed. If this is true of physical and propositional interventions, as a stimulus to and constituent of research then it is also the case with exposure to other 'others', such as other disciplines, even cultures and histories (Coyne 2013:200).

Background to disruptive practices contextualises the discussion of disruption in design pedagogy, in order to understand its application and purpose. Clayton Christensen is the first to use the concept of 'disruptive innovation' in his 1995 article, *Disruptive technologies: catching the wave* and expands the concept in the book, *The Innovator's dilemma* (1997) within the discourse of business innovation. Christensen founded the Clayton Christensen Institute, "a non-profit, nonpartisan think tank dedicated to improving the world through disruptive innovation" (Christensen Institute – About us 2019).

Disruptive Innovation describes a process by which a product or service initially takes root in simple applications at the bottom of a market—typically by being less expensive and more accessible—and then relentlessly moves upmarket, eventually displacing established competitors (Christensen Institute – Disruptive innovation 2019).

Christensen et al (2018) reflect in a recent publication on the misconceptions and misinterpretations of disruptive innovation's core principles in practice, and evidence of a lack of engagement with its theoretical foundation as an academic discourse since the mid-1990s. After an in-depth investigation of disruptive innovation's history and development, Christensen et al (2018:1043) conclude,

... our understanding of the phenomenon of disruption has changed as the theory has developed ... from a technology-change framework – essentially descriptive and relatively limited in scope – to a more broadly explanatory causal theory of innovation and competitive response.

This goal orientated approach of disruptive innovation is contrary to the intent of this investigation, as the 'plug-in' workshop aims to provoke deeper understandings, instead of creating products or objects. Similarly, Acaroglu's (2017) *Disruptive design: a method for activating positive social change by design*, is dedicated to finding ways to solve complex social and environmental issues. The three-part method of mining (problem loving), building (systems mapping) and landscaping (ideation and intervention) enables action that reaches beyond symptoms and "shift, deconstruct, reimagine and reconfigure the world around us" (Acaroglu 2017:1-3). Disruptive design as a method, directly addresses the way systems work by reframing problems as opportunities through an integrated practice for making change. Included here are "complex problem solving, social innovation, sustainability, systems thinking and activated change (Acaroglu 2017:5-6). The disruptive design method aims to move from innovation, "doing the same things a bit better", to disruption, "making things that make the old things obsolete" (Acaroglu 2017:8). Acaroglu furthermore started the UNSchool, an online training/education platform where the twelve units of the disruptive design method can be explored in its full complexity (Acaroglu 2017), making this method accessible to a wider audience.

This study's attitude of disruption as an approach, instead as a method or tool, is the big difference. However, Acaroglu's (2017) bigger purpose for social innovation, systems thinking and activating change, present synergy in the intent of the biopic investigations. It relates to a design approach of investigating undefined futures or problems using iterative design, through interconnected systems consideration in search for positive change by applying hybrid methods.

The disruptive design method advocates for sustainable change – social, economic and environmental – and uses an 'iceberg' diagram to demonstrate visible symptoms as complex design challenges, caused by hidden deep-seated underlying problems (Acaroglu 2017:12). This understanding relates to the 'knowledge iceberg' where explicit knowledge is visible above, but implicit and tacit knowledge perhaps hidden below, but giving flexibility to support explicit knowledge (Haider 2009:78).

In *The Design Way: Intentional Change in an Unpredictable World*, Harold and Stolterman (2012:1-3, 5) motivate for a "reconstituted culture of inquiry and action" to equip designers able to address emergent challenges of today and the future by focusing on "generative human agency" through "good judgement – not problem solving". The reference to human agency highlights the disruptive aspect of modal shifts (Cross 2006:88) when designers are expected to shift between different modes of working and of refocusing their attention to different design perspectives. Discussions concerning various modes of operation and different perspectives of multiple stakeholders are presented in detail in *Chapter 3*.

Mini-summary

Considering the above literature, a process-driven approach to design inquiry, which is open-ended and fluid, appears conducive to promoting deep engagement, making critical connections and gaining insight. Experiential and intuitive aspects of a constructivist approach are understood from a creative arts perspective, considering a fluid and interchangeable approach to exploring other ways of knowing in favour of making challenging issues visible. To transfer this way of thinking to spatial design education, discursive design brings opportunities for provocation to the studio, where students can ask better questions and connect directly with difficult issues through a process of critical reflection, without solving problems. The integration between examples from practice and developments in academia, are evidence of its value. Research *through / by* design therefore offers opportunities for tacit knowledge to emerge as part of the process of knowing, integral to constructing meaning, instead of knowledge.

Dissociation

The process of constructing meaning relies on the perspective of a person. In the spatial design disciplines, adopting another's view is integral to a well-rounded understanding of a design project. The 'point of view' and 'habit of mind' (Mezirow 1997:5-6) influence an individual's response within a situation, which is dependent on the contextual scenario and the person's own prejudices and perceptions. The role of the designer often takes the position of the expert, and in a traditional sense, takes precedence, which Till (2009:151) suggests should change from "expert problem solver to citizen sense-maker". This study agrees and challenges the traditional understanding and argues for a human-centred approach, where the user's needs and requirements are acknowledged and incorporated from the outset, as a fundamental part of the process (Brown 2009). The related literature directs the discussion to the concept of dissociation, which proves valuable within the performing and creative arts, in the form of normative dissociation (Panero et al 2019; Pérez-Fabello & Campos 2011).

A background understanding of the psychiatric origin of dissociation brings a clearer picture of its use within the spatial design field, as a pathological condition (American Psychiatric Association 2013). The understanding of dissociation for this investigation draws a relation between its meaning and interpretation from psychiatry as pathological condition, normative dissociation as non-pathological phenomenon (Butler 2006:45), to application in the performing and creative arts, and design knowledge (Goel 2001).

Psychiatry

Definitions from the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), fifth edition (2013) are used as background to define the pathological conditions identified in support of this investigation.

Dissociative disorders are characterized by a disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behavior. Dissociative symptoms can potentially disrupt every area of psychological functioning (American Psychiatric Association 2013:291).

Morrison (2014:13) describes mental disorders as processes instead of people, to avoid labelling where individual diagnoses are made. The dissociative disorders under investigation are depersonalisation/derealisation disorder and dissociative identity disorder (American Psychiatric Association 2013). The purpose of this inclusion is to find a broader contextualisation within the health sciences, to better understand the action of separating the self as designer, and adopting another person's reality for increased insight within a particular and new design situation. The difference, however, is that this study employs a deliberate dissociation, as non-pathological or normative dissociation (Butler 2006), and not as pathological "unbidden intrusions into awareness and behaviour, with accompanying losses of continuity in subjective experience" as with dissociative symptoms in a psychiatric context (American Psychiatric Association 2013:291).

Depersonalization / derealization disorder: depersonalization can be described as "[e]xperiences of unreality, detachment, or being an outside observer with respect to one's feelings, sensations, body, or actions" and derealization as "[e]xperiences of unreality or detachment with respect to surroundings", where a person has no control over the condition, due to "persistent or recurring episodes" (American Psychiatric Association 2013:302). *Dissociative identity disorder:*

Dissociative identity disorder is characterized by a) the presence of two or more distinct personality states or an experience of possession and b) recurrent episodes of amnesia. The fragmentation of identity may vary with culture (e.g., possession-form presentations) and circumstance ... the disruption in identity involves marked discontinuity in sense of self and sense of agency, accompanied by alterations in affect, behaviour, consciousness, memory, perception, cognition, and/or sensory-motor functioning (American Psychiatric Association 2013:291-292).

These definitions only provide a background understanding of the extreme manifestations of pathological dissociation that are not within the control of a person. The symptoms of detachment from self and context derived from depersonalization / derealization disorder, and the shift between personalities from dissociative identity disorder (American Psychiatric Association 2013:292), highlights its embodiment. The researcher is not a medical or health expert, thus this inclusion as overview to contextualise the discussion about non-pathological dissociation.

Normative dissociation and art practice

... the term *nonpathological dissociation* implies an altered state of consciousness that is not organically induced, that does not occur as part of a dissociative disorder, and that involves the temporary alteration or separation of normally-integrated mental processes (Butler & Paley in Butler 2004:5).

In contrast to pathological dissociative disorders, normative dissociation is a non-pathological experience of dissociation, with its forms of “absorption in activities, daydreams, fantasies, and dreams”, and functions such as “processing, escape and reinforcement of dissociation in daily life” (Butler 2006:59). The ‘dissociations of everyday life’ happen through *absorption* and *attention*, where absorption is the “intense focal concentration and cognitive involvement in one or more aspects of conscious awareness” (Tellegen & Atkinson and Tellegen in Butler 2006:46). Attention, first identified by Janet (van der Hart & Horst in Butler 2006:47) is described as,

... the narrowing of focus and commitment of cognitive resources to the attentional object result in the exclusion of other *content* from the phenomenal field and, at times, consequent alternation of the context in which the attentional object is experienced (Butler et al in Butler 2006:46).

Butler (2006:46) further explains normative dissociation:

The excluded content may include sensations, perceptions, thoughts, changes in feelings of relatedness to self or the world, a diminished sense of volition, or loss of self-awareness and reflection (metacognition), as many people experience – or come to realize they have experienced – on a long-distance drive or when watching an engrossing film.

The difference between attention and absorption is in the intensity of focus and attendant qualities. Attention highlights phenomenal awareness and relates to observation, absorption is where a person is totally immersed or engaged, and the context diminishes (Butler 2006:47). Kihlstrom (in Butler 2006:47) notes that dissociation could be present where “awareness and voluntary control are key elements to consciousness; when there are disruptions in one or both of these processes”.

An understanding of normative dissociation states is important specifically in reference to a deliberate engagement in dissociative experiences in daily activities. The study focuses on dissociation as a human-centred design approach, where students deliberately detach from themselves as designers, and directly associate with the conditions and situation of users for which they design. The fact that normative dissociation is voluntary, and can be controlled, provides a platform to enable this design perspective. The study furthermore explores whether the dissociation could become second nature, something that should not need to be ‘switched on’, but rather as an attitude and embedded design value, that becomes a part of the designer’s ‘makeup’ or disposition.

Butler (2006:54) lists one of the adaptive functions of dissociation as important for mental processing, especially daydreaming, which can be related to reflective practice (Schön 1983), due to its opportunities for internalisation “that allows the mind the opportunity to wander where it might or perhaps where it needs to go ... the internal world of thought, imagination, or memory ...” (Butler 2006:6). Absorption and imaginative involvement as normative dissociation reveal a “dimensional construct” versus markers of pathological dissociation that “measure a latent class or typological construct” (Waller in Butler 2006:58).

To be useful as a concept, dissociation should not be applied to ordinary instances of less-than-full engagement with one's surroundings, experiences and actions. Rather, it should pertain to qualitative departures from one's ordinary modes of experiencing, wherein an unusual disconnection or disengagement from the self of the surroundings occurs as a central aspect of the experience (Cardena 1994:23 in Butler 2006:58).

In a study completed by Panero et al (2019), a group of acting students from a theatre conservatory programme is measured according to the Dissociative Experience Scale-II (DES-II) to determine whether they are able to 'become' their characters over a six month period. The study shows evidence of higher scores in acting students compared to the general population and speculates the reason being individual self-reflection of acting students during the process of 'becoming' the character (Panero et al 2019:12). "Actors must realistically portray imagined characters in imaginary circumstances by 'becoming' their characters" (Panero et al 2019:1). Another finding is the phenomenon of depersonalization, where students are able to absorb themselves through an 'imaginative involvement' by recalling personal experiences that are alike to the performance and "may reflect acting students' capacity to shift between different states of mind" (Panero et al 2019). This implies that acting students rely on their own personal experiences, or projections thereof, in order to find that absorption.

What does this mean for design students?

An embodied experience is required in order to immerse themselves in the character and context. Design students often conduct site visits with the hat of a quantitative mapper, someone documenting the tangible and physical aspects, and as a result, the intangible, emotive and experiential are missed. Therefore, this study focuses on the human occupation and inhabitation and the fluid agency and appropriation inscribed within spatial scenarios. This becomes even more pressing, when no qualitative requirements and needs of users are present, specified or observed. How would a design student connect to the unspoken? Westbrook (in Panero et al 2019) relates "being in the moment" to "embodying the circumstances of the script" and "being in character" to "embodying the character". Method acting, a prominent technique used in the US, is referred to as a method where the actor is encouraged to make an "emotional connection to the character" (Konijn in Panero et al 2019:3).

Actors enter into the lives of characters, and thus might "dissociate" from themselves. Method actors strive to "become" another person by taking on their characters' emotional life. This bears some resemblance to dissociative identity disorder. [...] They therefore learn to feel real emotions as they re-experience personal memories, but they feel these same emotions in an imagined situation (to one of their character). This is strikingly reminiscent of dissociation, particularly derealisation and depersonalization (Panero et al 2019:3-4).

Panero et al (2019:12) report that acting students' absorption and imaginative involvement scoring high, suggest their "capacity to shift between different states of mind." A study by Thomson et al (in Panero et al 2019:14) proposes a multidimensional model of dissociation that "would allow for measurement of the dissociative experiences of creative people who might have the ability to shift fluidly between dissociative states.

Similarly, in a study exploring dissociative experiences in fine arts university students, Pérez-Fabello & Campos (2011:39) report on an educational activity that requires "full commitment and promote

absorption that goes beyond mere observation.” The study uses three data collection methods to obtain evidence, the Creative Imagination Scale, the Dissociative Experiences Scale and the Creative Experiences Questionnaire to identify items such as “amnesia, loss of awareness, depersonalization, derealisation, absorption, and identity disorders” (Pérez-Fabello & Campos 2011:40). They speculate that these manifestations of normative dissociation “promote unlimited explorations of convention or reality” (Pica & Beere in Pérez-Fabello & Campos 2011:41). In addition, they found that “[s]tudents who exhibited the greatest dissociative experiences had greater creative imagination and creative experiences than students with low dissociative experiences scores” (Pérez-Fabello & Campos 2011:40). This research does not use formal statistical tools as above, to ensure an exploratory inquiry.

If normative dissociation is possible within the performing and creative arts, why could this also not be achieved in spatial design? This study speculates that through attention and absorption, greater connections within design projects can be realised, to increase understanding and insight into areas that are currently not deliberately addressed.

Design knowledge and dissociation

The book, *Design Knowing and Learning: Cognition in Design Education* (Eastman et al 2001) dedicates a chapter to ‘Dissociation of Design Knowledge’ in which Goel (2001:221-222) provides neuropsychological evidence of dissociation between two types of design knowledge: type 1 (domain-related and technical) and type 2 (procedural, illusive and exchanged by means of subtle, inarticulate ways). The findings reveal that a natural dissociation exists between the two knowledge types, but that type 2 is essential in order to address ill-structured situations successfully. The recommendation is to provide opportunities in design education for students to develop type 2 design knowledge through real-life situations or projects:

My own personal view is that the best strategy may be to put students in situations that simulate the ill-structured, incomplete, and under-constrained nature of real-world design problems and allow them to grope their way through (with some minimal guidance) (Goel 2001:236).

He concludes that Type 1 knowledge is essential, but not adequate to address “ill structured” situations and that type 2 knowledge, which is procedural based, could close that gap. Goel (1995 in Goel 2001:14) furthermore argues that the ambiguity embedded in ill-structured problems enable lateral transformation, by “introducing a degree of coarseness into the problem space” to facilitate overlapping ideas in order to reach “fine-grainedness” in the development of the design. To conclude, Goel (2001:16) states the following:

There is, of course, nothing new in this proposal. It just reinforces the importance of traditional design studios. The reason they work so well – and must remain an integral part of design education – is that they provide students with practice in the deployment and development of the relevant neural mechanisms necessary to cope with ill-structured situations (Goel 2001:16).

This study supports this notion, but proposes to further the exploration by including the elusiveness of 'ill-structured' situations – human occupation and appropriation – in relation to one another, and interface with objects and the environment. Goel's (2001) argument for emphasis on Type 2 knowledge, relates to the earlier discussion of Polanyi's (1974) proposal for 'tacit knowing' that is process-based, instead of 'tacit knowledge' as empirical and factual. Research on educational development shows the same search for understanding and knowledge in the book, *Understanding by Design*, where Wiggins & McTighe (2005), investigate the meaning of the terms in an in-depth study. They refer to Bloom's Taxonomy (1956) that intends to determine increasingly complex levels of understanding in the hierarchical structure of 'knowledge', 'comprehension', 'application', 'analysis', 'synthesis' and 'evaluation' as a benchmark to measure achievement of goals in learning (Wiggins & McTighe 2005:36). The revision of Bloom's taxonomy (Anderson & Krathwohl 2001), where levels are labelled as verbs, instead of nouns (remembering, understanding, applying, analysing, evaluating and creating), brings the discussion closer to 'tacit knowing' (Polanyi 1974), 'procedural knowing' (Belenky et al 1986) and Goel's (2001) argument for Type 2 knowledge in design.

Wiggins & McTighe (2005:43) propose a third way of knowing, not as noun or verb, but through the creation of meaning as another way to transfer knowledge, by referring to Dewey (1993) and stating that "[u]nderstanding is the result of facts acquiring meaning for the learner" (Wiggins & McTighe 2005:37). The focus on understanding of "big ideas", or "signposts to big ideas" (Wiggins & McTighe 2005:44, 106), or threshold concepts (Meyer & Land 2003) brings learning into a new light regarding meaning.

The best questions point to and highlight the big ideas. They serve as doorways through which learners explore the key concepts, themes, theories, issues, and problems that reside within the concept, perhaps as yet unseen: it is through the process of actively 'interrogating' the content through provocative questions that students deepen their understanding (Wiggins & McTighe 2005:106).

Meaning in a design context highlights its social construction to complement the meanings developed in education, as Krippendorff and Butter (2007) write on the meanings and contexts of artifacts, by considering a human-centred approach to object (industrial) design that,

[a]cknowledges the role of humans in actively constructing artifacts – conceptually, linguistically, and materially – being concerned with them, handling them and putting them to work. It acknowledges the diversity of human conceptions that motivate how things are acquired, exchanged, rendered meaningful, and used. Consequently, when we talk of meaning, we must be clear about whose meanings we are talking of and allow for the possibility that we may see things differently (Krippendorff & Butter 2007:2)

Krippendorff (2006:xiii) initially explores the concept of meaning, where design is described as a sense-making activity. Making meaning, relating to a concept or message, finding a way to represent that to an audience, are integral also to discursive design, eliciting various reactions and interpretations (Tharp & Tharp 2018). The dissociative aspect embedded in discursive design, is the abstraction possibilities it offers, as objects do not need a useful purpose, but to provoke thought regarding complex design matters, instead. This noteworthy difference between the meaning-making approaches by Krippendorff

and Butter (2007) and Tharp and Tharp (2018) illustrate the vast array of interpretations and subsequent relatedness to meaning construction in design practice, and therefore also relevant for studio learning.

Wiggins and McTighe (2005:84) propose six facets of understanding, as overlapping and integrated aspects, as “[u]nderstanding is multidimensional and complicated”: *can explain, can interpret, can apply, can emphasize and have self-knowledge*. These are concepts more suited to finding insights, not only students’ understanding of their learning, but also as points of contemplation of students’ personal growth. In this light, it provides a stronger foundation to gauge development, compared to Bloom’s taxonomy (1956/2002) that is concerned with the learning taking place (what), and not with the student who explores, discovers, by traveling on an individual journey of transformative development as discussed in *Chapter 4*.

Mini-summary

Normative dissociation proves valuable considering the relation between theory and practice, as seen in the performing and creative arts. The synergy between ‘tacit knowing’, Level 2 learning (procedural), meaning making and student personal development, present possibilities for connected or engaged learning. The discussion reveals different levels of dissociation for consideration in the biopic investigations to follow:

The student as designer: dissociate with self as designer and associate or assume the role of the user through attention and absorption as a human-centred approach. In addition, personal developmental opportunities are dependent on the students’ personal attitudes and perspectives.

Context and setting: dissociate with context and setting where the site is unfamiliar and / or no access is possible. It includes context with users by means of normative dissociation and imagination or projecting scenarios from the reality of the user.

Focus/scope: issues are revealed through a procedural knowing instead of prior assumptions or information given up-front, due to a process-driven instead of product/outcome focused engagement. In this way, students dissociate or decontextualize from the traditional architectural process by testing, speculating and making meaning versus a narrow focus on products and results.

Abstraction and materials: unfamiliar second life objects and materials provide a space of ambiguity, in which students can create provoking or discursive responses that are abstract and embedded with meaning as another way of engaging with complex design challenges. The potential for deeper understandings of issues, and of self, exist.

Process (of knowing): a human-centred focus brings meaning-making and its generative and responsive qualities to the fore, where non-traditional ways of engagement in the spatial design studio can stimulate an awareness of ‘tacit knowing’.

Chapter summary

Chapter 2 – Disruption by Dissociation, reveals that a constructivist approach to design inquiry allows for multiple interpretations and complexity in the construction of meaning, considering scenarios that are in flux and unpredictable. Process-driven approaches, as research *through / by* design, present the value where students or designers can delve deeper into design projects, because of the emphasis on exploration and understanding, instead of performance, outcomes and products.

The various forms of disruption as discussed, introduce moments of critical reflection in the student designer, as a level of discomfort stimulates either curiosity and engagement, or anxiety and apprehension. The concept of normative dissociation presents opportunities for the establishment of emotional connections to design projects, to create more engaged learning opportunities. This is seen not only in the educational design studio, but also in professional design practice.

Noteworthy is the observation that two ‘fringe’ theorists consulted in this study – Polanyi (1974) and Alexander (1964, 2004) (both operating on the edges of their fields due to their perspectives or approaches), are sidelined by mainstream theorists throughout history. Why? Could we ask whether this is the case because people do not include or regard that which is outside their control, that which is intuitive and tacit? Could this be a phenomenon similar to the design discourse, where traditional and known methods take precedence over other ways of engagement – design practice that provokes, instead? Although it might be leading to deeper understandings, as a way to create connections to learning.

Perhaps the time for answering *why*, is now.

Chapter 3 HUMAN-CENTRED DESIGN APPROACH

These are ethical and political questions deserving of closer attention in future design studies. But these studies also need new kinds of researchers, able to understand complex technological issues certainly, but able to situate them in social practices. Articulate researchers that do not see the now clichéd distinction between practice-based work and more scientific and social scientific forms of design study. Researchers able to put the case for the design discipline and designerly ways of thinking as central to modern ways of working (Lloyd 2019:177).

Chapter 3 argues for the integration or seamless combination of scientific design research (designerly thinking) and practice-based design inquiry (design thinking) as a potential human-centred design (HCD) approach. As the quote above indicates, designers of today and of the future need to be equipped with skills and knowledge to engage with difficult and complex design scenarios that do not rely on distinctions between the different ways of operating in design. *She Ji: The Journal of Design, Economics, and Innovation* launched in 2015, is a peer reviewed, transdisciplinary journal at “the intersection of design, economics, and innovation in various combinations” that includes multiple perspectives, methodological frameworks as an interdisciplinary inquiry (Friedman et al in Friedman 2020:1). It includes papers addressing two streams that are distinct, but strongly related, as editors, Friedman et al (2020:1-2) explain:

... design innovation in industry, business, non-profit services, and government by promoting a framework of economic and social value creation. Design in relation to social sciences ... plays a key role in this area, as does design in relation to the arts and humanities ...

And furthermore,

... design-driven innovation to address complex systems bridging the social world and the technological world. In this regard, we examine design aided by perspectives from the sciences (Friedman et al 2020:1-2).

The *She Ji* journal has gained an audience that includes industry, business and government leaders, and scholars and scientists, within and outside of the design field. It aims to expand its reader and author profiles to include a growing number of professional designers, “[t]hese groups must work together if we are to generate robust design knowledge for the design profession and for the discipline as a unified field” (Friedman et al 2020:3). The journal aims to invite an active dialogue as an example of a recent scholarly initiative to bridge the historical gap between designerly thinking and design thinking that Lloyd (2019:177) warns should be addressed. Rittel and Webber (1973:1) already argued in the 1970s that “wicked” problems do not have “optimal solutions” as social problems are pluralistic and cannot be fully described, as compared to the “tame” problems of science. More than 45 years later, Dorst (2019:117) offers the same argument:

Design might be limiting itself by approaching complex problem situations through a ‘problem solving’ perspective. In this article, a radically different approach is explored, which takes the complex nature of the problem situation as its starting point, and reframes the task of design as system transformation, rather than the creation of a solution (Dorst 2019:117).

Buchanan (1992:9-10) refers to four broad design areas, which contextualise the complexity of “wicked” problems by referring to “signs, things, actions and thoughts”. This description refers to “*symbolic and visual communication*”, “*material objects*” and its complex relationships with people, “*activities and organised services*” and its experiential and connected scenarios of living, and lastly, “*complex systems or environments for living, working, playing, and learning*” that integrate sustainability, people, ecological and cultural environments (Buchanan 1992:10). He argues that these areas are interconnected and merge into design thinking, to become a “point to where design is headed in the future” (Buchanan 1992:10).

The fact that these concerns raised by seminal authors from the 1970s and 1990s are repeated by current authors and as a result, confirm the degree of complexity embedded in the indefinable and fluid challenges facing us in 2020, perhaps now more than ever. “The seeds of one possible future were about to be sown. ‘You make it and you try it out’ turns out to be a lot more complex than at first sight” (Lloyd 2019:178). Complex design challenges are transient and change over time. Lloyd (2019:167) furthermore identifies a “social turn” in the design disciplines, shifting from “an objective (‘scientific’) perspective to one more based on relativist approaches”. Schön’s (1983) constructivist approach to reflective practice and Alexander’s (1964) contextual view on the nature of design and architecture support the shift in emphasis to a design understanding of meaning in context of people and the immediate environment. How do we train designers of the future, today? This is not a new question. Papanek (1984 / 2016) responds to this debate by contextualising the issue in an educational setting:

The main trouble with design schools seems to be that they teach too much design and not enough about the ecological, social, economic, and political environment in which design takes place. It is impossible to teach anything in vacuo, least we have seen design to be. The problem with this dichotomy between the real world and the world of the school, there can be, understandably, many different answers (Papanek 1984/2016:291).

Spiller and Clear (2014:15) concurs and points out in their compilation of diverse projects and methods of architectural exploration that “[t]here is no prevailing orthodoxy, such as the old dogmas and doctrines of Modernism, not happily vanquished.”

Their days are full of thoughts about how to inject noise into the system, to precipitate change, and to find new ways of describing and communicating our evolving spatial conditions and new tactics for creating architectural space within them (Spiller & Clear 2014:13).

If spatial design education has made the shift to being responsive, agile, adaptable, then the “contingent forces of temporal flux” (Till 2009:115) embedded in human living scenarios becomes more prominent and the role and importance of the user is highlighted. In this light, a human-centred design approach is explored, and the potential value of empathy considered, deepening the understanding of complex design issues.

Background

Design thinking and designerly thinking

In order to discuss a human-centred design approach, the meaning and interpretation of two concepts, design thinking (DT) and designerly thinking (DlT) are examined. The notion of human-centred design can be found in the literature and practice of DT (Norman 2013:219), as compared to DlT (Cross 2006). DT has emerged as a methodology of design processes in business, management and innovation (Brown 2009, Hassi & Laakso 2011:54, Laursen & Haase 2019). Over the last 15 years DT has received much critique for having many shortcomings and limitations, and no empirical foundation and scientific value (Badke-Schaub, Roozenburg & Cardoso 2010:43). DT is also seen as an attempt to bring design practice into the business sphere, for people who are not designers by training or profession and is scolded as a superficial practice with the purpose of increasing revenue and creating a competitive advantage in business (Brown 2009, IDEO 2019, Laursen & Haase 2019: 814).

DlT in contrast, is understood in the academic design community as a discipline of design practice and is founded in the writings of Archer (1965) and Simon (1969) as a systematic and scientific study and later Schön (1983) considering reflective practice. Human-centred design is not recognised as a methodological design approach in the academic DlT discourse (Laursen & Haase 2019:821). However, research into DT practice reveals human-centred design as a way of “putting people first” as Brown (2009) explains that empathy becomes the fundamental principle of assuming someone else’s view by “standing in their shoes” (Brown 2009:39, 49).

This investigation speculates on the potential synergy that exists between the two concepts of DT and DlT to diffuse the academic debate that prioritises designerly thinking. By understanding both approaches in terms of its roots, purpose and values, the study of Laursen and Haase (2019), *The Shortcomings of design thinking when compared to designerly thinking* informs the points for consideration.

intermission

When I interacted with the designerly thinking literature and in writing this chapter, I did not feel a deep connection to the content, although the intent and purpose remain clear to me.

*What caught my attention was the almost invisible thread of the affective domain, lurking in the pages, waiting to be revealed. The words 'human-centred' appeared in Krippendorff's (2006) *The Semantic Turn* for the first time and in that moment, a smile found its way to my face. Similar to the engaging narrative of the resident and the supervisor in Schön's (1983) *The Reflective Practitioner*. I realised the potential for interrelatedness between designerly thinking and design thinking, strong and heavy –*

Why the separate thoughts, why the guarding of boundaries, when a breathing membrane, instead, could enable a rich plethora of possibilities...

Origins

Below is an outline of the origins of both design thinking and designerly thinking to contextualise the literature review discussion in this chapter, from the perspective of a human-centred approach.

Design thinking (DT) origin

Design thinking has its origins in the inquiries into creative methods of the 1950s, which culminates in Arnold's (1958) *Creative Engineering* seminar on product development and innovation. Archer's (1965) *Systematic Methods for Designers* further expands the search into design thinking concerning methods and its relation to management. The focus of design thinking, as literature shows, is human-centred, immersed in context and dependent on social behaviour (Platner, Meinel & Leifer 2016:1-2). Wicked problems, as articulated by Rittel and Webber (1973:160) set the scene for business management to take a human-centred design approach to problems, within the constructivist approach in professional practice, explored at the time (Schön 1983).

McKim (1972) presents alternative methods, challenging stereotypical engineering processes. Kelley shares in an interview with Camacho (2016:90-91) that McKim was his mentor at Stanford and "championed 'needfinding', the idea that design thinking is human-centred, not technological or business-centred". Carleton & Leifer (2009) reflect on the Stanford ME310 course and its development since 1967, a radical course in engineering design that includes interdisciplinary work, practice partners and real-life problem-based learning. They identify the pedagogical evolution of the course over 40 years, culminating in 'foresight' from 2009 onwards, focusing on future scenarios for engineering design (Carleton & Leifer 2009). Kelley reflects on the impact of Arnold's pedagogical approach, as a psychologist, on creativity within the field of engineering,

He would say, "You are in this world and it's underwater, and now design something that enables you to plant seeds understeer." You had to come out of yourself and out of your habits, because you had to design for a world that there was no way to experience yourself. That was his way of doing what we do now – which is to get rid of your habits, and look with new eyes, with a child's mind (Camacho 2016:91).

In 1978 Kelley establishes David Kelley Design and in 1991 founded IDEO, with the vision as a "global design company committed to creating positive impact" (IDEO - About 2019). Design thinking becomes part of business management and innovation, where service design takes the lead. In 2005 Kelley founds the d.school at Stanford, with a multidisciplinary focus shifting from (product) design to design thinking (Camacho 2016:92). The d.school Hasso Plattner Institute of Design at Stanford introduces design thinking as a process or methodology to people from all disciplines, not necessarily art or design.

The reason for working on social problems is that if I want to teach students about design thinking as methodology, the best way to teach them is to give them a problem that they care about (Kelly in Camacho 2016:100).

Brown (2009:13) provides a platform for design thinking, by explaining its meaning as "more than a style", its focus on human needs, and considering methods, prototyping, experience and storytelling. In addition, he considers future scenarios, the social contract and design activism (Brown 2009:203). This

focus expands into other institutions of higher learning, for example the School of Design at the Carnegie Mellon University, where a 'design for interaction framework' outlines the holistic focus, 'design for service (existing design paradigms)', 'design for social innovation' (challenging existing paradigms), and 'transition design' (proposing radically new paradigms) (Carnegie Mellon Design n.d.). Buchanan's (1992) article, *Wicked Problems in Design Thinking*, as Head of Design at the time, promotes a holistic design focus. In addition, Design Thinking for Business Innovation at Aalto University's Executive Education is focused to influence creative practices in corporate environments:

Design Thinking is an approach to innovation that is driven by deeper user understanding, early prototyping and iterative testing of the potential solutions. It is a practical methodology and process that guides the development of new, innovative products and services, processes, business models, and strategies (Aalto University – Executive education 2018).

Design thinking becomes a phenomenon appearing in business management and innovation during the 1980s (Johansson-Sköldberg et al 2013:122). An approach primarily addressing the needs and requirements of users or customers and according to the shared paradigm, has its roots in the design research developments of industrial design and product engineering (Cross 2006, Laursen & Haase 2019). Design thinking has been at the centre of attention in design research discourse due to the perception that it is a superficial approach that does not contribute to scholarly practices. As a result, an academic literature perspective claims design thinking is not credible compared to designerly thinking research (Johansson-Sköldberg et al 2013). In contrast, real-life projects in practice show positive change through rigour in design engagement in many practices around the world (Fern Tiger Associates 2013, IDEO 2019, Greater Good Studio 2019). The integrated discussion to follow outlines what design thinking is considered to be in practice, how it aims and intends to make change in the design profession.

Designerly thinking (D&T) origin

Designerly thinking (D&T) has its origin in design research of the 1960s in the United Kingdom with the founding of the Design Research Society in 1966. The 1962 *Conference on Systematic and Intuitive Methods in Engineering, Industrial Design, Architecture and Communications* (London) responded to new conditions influencing design post World War II with "social dependence on designed industrial goods" and by removing the disciplinary boundaries in design fields (Crouch & Pearce 2012:17). As a scientific search *in* design research, Bruce Archer (1965) investigates in his PhD thesis the methods of design as a systematic practice of "ontology as a discipline" (Davis & Gristwood 2016:1, 5). The focus of his investigation is to understand the "nature of design as well as finding better ways of designing" (Davis & Gristwood 2016:2). Further background (Simon 1969) and rival positions (Alexander 1964; Jones 1970) to this development are included in *Chapter 2*, which also contextualises this discussion.

Design paradigm

Shared paradigm of D&T and DT

The collective paradigm of a research community guides the methodological approaches, which is informed by the way presumptions shape a community's view towards situations, people and objects (Laursen & Haase 2019:816). Paradigms are not static, but change over time and are informed by "conception of reality"; "beliefs about the objects/subjects they study"; "scientific ideals"; and "ethics and aesthetics" (Abnor & Bjerke in Laursen & Haase 2019:817).

In order to contextualise the understanding of theoretical paradigms, a Philips Design paper, titled *Rethinking value in a changing landscape: a model for strategic reflection and business transformation* outlines the evolution of value by identifying four value paradigms: industrial paradigm (1950s); experience paradigm (1980s), knowledge paradigm (unfolding); and transformation paradigm (future) (Brand & Rocchi 2011). The model reports on people and business perspectives that are 'unfolding' to 'future' values that shift from 'self-actualisation' to 'meaningful living' (people mind set) and from 'enabling creativity' to 'value networks' (business mind set) (Brand & Rocchi 2011:6). The importance of noting value paradigms relate to its influence on the way we live and work, and the transformation of theoretical paradigms. Laurson and Haase (2019:820-821) posit that DT and D&T have a shared paradigm, consisting of three aspects: wicked problems, abductive reasoning and contextual meaning.

Wicked problems

The kind of problems that planners deal with – societal problems – are inherently different from the problems that scientists and perhaps some classes of engineers deal with. Planning problems are inherently wicked.

As distinguished from problems in the natural science, which are definable and separable and may have solutions that are findable, the problems of governmental planning – especially those of social or political planning – are ill-defined; and they rely upon elusive political judgment for resolution. (Not "solution." Social problems are never solved. At best they are only resolved – over and over again.) (Rittel & Webber 1973:160).

The social context shapes the manifestation of wicked problems due to the plurality and heterogeneity in society. Rittel and Webber (1973:167) further point out that industrial economies were differentiated culturally, with greater differentiation expected in the post-industrial society. Brand and Rocchi (2011:16-17) state that the current knowledge economy (self-actualisation and enabling platforms) was preceded by the experience and industrial economies. They propose a future transformation economy, of emergent value networks that consider global vision and local impact through meaningful living, founded on systemic and transformative thinking, empathy, cooperation and collective issues (Brand & Rocchi 2011:17, 24). Considering this future context, wicked problems are becoming more complex, however, Rittel and Webber's (1973:161-167) ten properties of wicked problems are still relevant. Cross (2006:7) supports the notion regarding ill-defined problems and states that "[t]hey are therefore not susceptible to exhaustive analysis, and there can never be a guarantee that 'correct' solutions can be found for them."

Dorst (2019:118) argues for design to “adapt and change to stay in tune with its new role in its new environment” as new issues emerge because of applying design practices within unfamiliar design contexts. Buchanan (1992:15) refers to the relation between *determinacy* and *indeterminacy* regarding wicked problems and assigns a “linear model of design thinking” to the former. Dorst’s (2019:117) proposition of “design as system transformation, rather than the creation of a solution”, is considered in relation to the latter. This study supports the systems approach and speculates that by using hybrid methods in the design studio, deeper insights and understanding can emerge that are scenario based and pluralistic in expression instead of presenting products or solutions.

Abductive reasoning

Peirce (1903) introduced the concepts of abduction, deduction and induction. “[A]bductive reasoning allows one to conceive ideas from vague, possible or potentially possible phenomena” (Mirza et al 2014:1982) and as “propositions or qualified ‘guesses’ that need to be empirically tested”, or as “propositions of potential futures...” (Laursen & Haase 2019:820, 822). The understanding and application of abductive reasoning is considered not only in a design context, but also in the health sciences. Mirza et al (2014:1980-1981) note key findings that abductive reasoning requires a “complex or puzzling situation and a clinician [designer] who possesses creativity, experience and knowledge” and furthermore “...results in the formation of broad hypotheses [speculation], which lead to an enhanced understanding of care [design] situation.” Abductive reasoning surfaces different ways of knowing and assists practitioners to develop a “broader and deeper understanding of the care [design] situation” (Mirza et al 2014:1980-1981). It is noteworthy that ill-defined problems, in various contexts, can benefit from reasoning in this way. Although Peirce’s abductive reasoning has received criticism regarding its ‘logic’ and ‘perceptive elements’ responsible for the development of “new ideas” (Hoffmann 1999:271), this study does not pursue this critique any further, in order to focus on the topic of investigation.

Abduction can also be considered an alternative action, “starting from the only known in the equation, the desired value, and the adopting or proposing a new how” (Dorst 2019:119-120). Propositions therefore become ‘placeholders’ for responses to the intangible and complex issues that are not yet defined. Buchanan (1992:12) refers to *placements*, as “rich, diverse and changing”.

Placements have boundaries to shape and constrain meaning, but are not rigidly fixed and determinate. The boundary of a placement gives context or orientation to thinking, but the application to a specific situation can generate new perception of that situation and, hence, a new possibility to be tested. Therefore, placements are sources of new ideas and possibilities when applied to problems in concrete circumstances (Buchanan 1992:13).

As a warning, Buchanan (1992:13) expresses caution when designers start to use “conceptual placements” as “categories of thinking” and explains that categories have fixed meanings. Design responses can then no longer be fluid and adaptable, but become superficial and predictable. Abductive reasoning therefore relates to appreciative inquiry (Stein et al n.d.) where the process searches for particular contextual opportunity and potential.

Dorst (2019:119-120) refers to design reasoning, or “design abduction”, where the only known aspect is the “desired value” as outcome and the challenge to determine the elements required to reach that value. These elements include both the *what* and the *how*, to be developed in parallel, as a “double creative step” for developing proposals (Dorst 2019:120). This notion relates directly to the concepts ‘dialogue with the situation’ and ‘co-development of problem-solution’ (Cross 2006). Dorst (2019:119) relates this complexity to situations in the human domain, where the user is not always specified, and often does not represent a single user profile. Therefore, abductive reasoning is context and situation specific.

Contextual meaning

Krippendorff (2006) considers contextual meaning in artefacts by investigating the cultural aspects influencing the philosophical and semantic considerations relating to industrial / product design by saying that “...’design is a sense creating activity’...” related to an objective-subjective distinction (Krippendorff 2006:xiii). He presents four theories outlining how artifacts make sense in a given context, 1) the use of the artefact itself, 2) artefacts and their meanings in language, 3) the meaning of the lives of artefacts, and 4) the ecology of artefacts and their meanings. Moving from the micro or object based, to considering the context of a macro, or ecological scale, they appear similar to the four orders of Buchanan (1992:9-10) that are also multi scalar:

But the “human terms” that people bring to how they connect artifacts pertains to a highly localized understanding. This understanding does not embrace the whole ecology, and it is not generalizable to it. It is distributed, not shared. Whereas ecologies of biological species result from the multiplicity of local interactions between the organisms of different species, ecologies of artifacts result from enacting the multiplicity of local ecological understandings (Krippendorff 2006:195).

The act of “human involvement” brings meaning to how artifacts relate to one another when in use, and are conceived by users (Krippendorff 2006:193). This is a dynamic process, which is unpredictable. Contextual meaning is therefore also related to spatial design, considering Krippendorff’s (2006) explanation and motivation for sense-making of artifacts. The relation to spaces for human occupation are included into this discourse, by considering agency and contingency (Awan et al 2011, Till 2009). This study therefore argues that contextual meaning is not only related to what things mean in their context, but also integrated to the how, or the action of understanding by the designer, through ‘explicit knowledge’, or by ‘tacit knowing’ (Polanyi 1966). This relation to knowledge and how we assign meaning, lies in memory and Norman (2013:97-98) explains this by giving two categories: “[m]emory of arbitrary things ... with no particular relationship”, and “[m]emory of meaningful things ... with meaningful relationships” (Norman 2013:98). Krippendorff & Butter (2007:2) argue that meanings are not universal, and that personal interpretation is integral to its richness: “we must be clear about whose meaning we are talking of and allow for the possibility that we may see things differently.”

Meaning-making is not only considered in terms of objects and environments, but is interpersonal. Wildevuur et al (2013) relate meaning to an aging population where the intangible side to meaning-making is highlighted by considering exchanges, expectations and encounters between people. This

understanding of meaning in a social context reveals another dimension – emotional attachment – that becomes relevant to all people. Contextual meaning, includes not only man-made spaces and things, but is constituted firstly from human interaction and the relatedness and emotional attachment we form (Wildevuur et al 2013:70). However, this is not exclusively the case for attachment to people, as Norman (2013:98) illustrates. Meaningful relationships can also be with things.

Krippendorff (2006:213) outlines “methods for creating spaces for possible futures” by describing and giving examples of design methods as a science for design. It is noteworthy to mention that the focus for Krippendorff (2006:214) is on peoples’ needs and perspectives first as a human centred action, an aspect of contextual meaning and interface that is foremost emphasised as a prerequisite for meaning-making. This is echoed in other DT writings, as a human-centred approach (Brown 2009; Norman 2013), which however, is not the case for DfT literature (Laursen & Haase 2019), expressing an academic approach, instead.

Mini-summary

The investigation into the shared paradigm for DfT and DT contextualises the theoretical framework to allow for a deeper exploration as an integrated discussion of the two methodological approaches. The connections between wicked problems, abductive reasoning and contextual meaning, signifies the potential and importance of personal growth of a designer. The increased complexity contained in wicked problems, requires designers to apply different skills in challenging projects, which implies personal transformation aligning with resilience, responsiveness and adaptability. As a result, designers should be able to absorb ambiguity and uncertainty at different stages of a project and be comfortable to work within vague and often undefined boundaries. Abductive reasoning and ‘qualified guesses’ or grounded assumptions within projects, introduce the concepts of judgement and values. When a project is focused on proposing scenarios and possibilities, instead of creating a solution, designers are required to look beyond the product as an outcome and embrace integrating and considering people.

Considering contextual meaning, the understanding of meaning of physical objects in real contexts inform a spatial cognition. However, the intangible side to meaning-making, brings a deeper side to people-object-environment interface. The value of social interaction and its subsequent emotional connections should be recognised in spatial design, as this elusive dimension links us emotionally. Therefore, human-centred design is the driver for in-depth analysis, as informed by academic sources and accounts from practice, as research articles and conference papers, where practitioners and educators share hands-on experiences. It is expanded by personal discussions with practitioners in the field.

Design methodologies

The section below introduces the disciplinary discourse regarding design thinking and designerly thinking, by outlining strengths and rival opinions in the literature, followed by an integrated discussion.

Design thinking (DT) methodology

In a comprehensive article, Laursen and Haase (2019:825) refer to Arbnor and Bjerke's (1997) methodological approach requirement to be located in a 'problem situation'. They claim in their literature focused inquiry that design thinking is mostly described by 'suggested actions' (phase models, perspectives and organization), instead of methodological approaches (explorative learning) (Laursen & Haase 2019:821, 824-825). Furthermore, DT methodology does not provide guidance on the selection and use of tools and techniques related to complex issues and the context of application (Arbnor & Bjerke in Laursen & Haase 2019:825). Another literature based study, comparing designerly thinking and design thinking (Johansson-Sköldberg et al 2013), conclude that the meaning of design thinking is dependent on the context and focused on creativity and innovation with a popular character, which is considered superficial as compared to designerly thinking's long academic history (Johansson-Sköldberg et al 2013:121).

In contrast to academic literature studies, investigations into practice-based inquiries reveal a different picture. Extensive research into the practice of design thinking has emerged over the last ten years, where authors investigate the theoretical framework and methodological approaches. Vaugh and Ryan (2015) report on a study where 18 industry projects using a structured design thinking process was followed. They used Klein's (2013) triple insight model to "identify, measure and describe the assumption shifts throughout the design thinking process over five business model dimensions." These dimensions are paired with related tools recommended for use in each of the five phases (Vaugh & Ryan 2015: 15). Camacho (2015) explores a model for DT in order to determine its effectiveness across disciplinary boundaries and to determine a design thinking practice. In a follow up study, Camacho (2018:627, 631) presents evidence from twelve global experts regarding a "synthesis of commonalities and variations among effective approaches of design thinking" as a model for design thinking. In addition, her investigation provides "principles underlying current methods and tools, and integrating complementary aspects from different approaches into an overarching view of design thinking" (Camacho 2018:627). The model outlines fundamental principles (system-orientated, human-centred and creation-based), and specifically assigns action principles and process / dynamics principles to the former (Camacho 2018:631), which provides evidence for design thinking methodology. This shows the rigour and depth in methodological approaches, which warrants these to be considered more than 'suggested actions'.

Contrary to Laursen and Haase's (2019:825) findings, highlighting the shortcomings of DT methodological approaches, this discussion includes a practice based inquiry to reveal phased models, perspectives, empathy and collaboration as methodological 'ways of knowing' for design thinking. In addition, the big divide that both sides claim, is not as vast when taking into account designerly thinking's

evolution from a rationalist to a constructivist approach (Dorst 2019) and in the light of design thinking's rigorous methodology in the field. Examples from practice reveal that design thinking has thorough ways of engagement in research activities to better understand people and situations (Martin & Hanington 2012). The history and origin of each is bounded in a different context, but this investigation shows a move towards a common goal, by embracing differences, in favour of the greater good.

An example from the Greater Good Studio's Academy for Global Citizenship (2020), dealing with lunchtime at school is used in the discussion below. "We want kids in the cafeteria to eat healthy and waste less" (The Greater Good Studio 2019). Sara Cantor Aye presents this case study at the IxD13 Interaction Design Conference, *Social Innovation with Impact* (Greater Good Studio's Academy for Global Citizenship 2020).

Designerly thinking (D&T) methodology

Designerly thinking's methodological approach is framed by its theoretical perspectives, which Johansson-Sköldberg et al (2013:124) identify as the *creation of artefacts*, *reflexive practice*, a *problem-solving activity*, a *way of reasoning / making sense of things*, and the *creation of meaning*. This investigation acknowledges the theoretical foundation of this academic discourse, but speculates about the value of focusing on the creation of artefacts as objects or solutions and the emphasis on problem solving.

This section considers the methodological aspects of designerly thinking, reflective practice, framing, co-development of problem and solution, dialogue with the situation, solution-led goal analysis and modal shifts (Laursen & Haase 2019:820). The application is illustrated with an example from Schön (1983:109-127) related to mental health sciences, demonstrating the similarities in level of complexity and difficulty in describing and dealing with ill-defined problems, comparable to examples of spatial design. Schön (1983:109) describes the scenario unfolding between a third year resident in psychiatry and his supervisor regarding the situation of a returning patient. Schön (1983:79-104) also includes a reflective conversation from architecture, however, the psychiatry example demonstrates the concepts from the perspective of an unrelated field to deepen its understanding.

Integrated methodology

The structure to follow challenges the separate theoretical frameworks as outlined by Laursen and Haase (2019). It speculates through an integrated narrative of design thinking and designerly thinking, the possibility of a human-centred approach (Table 3-1). Opposing debates are included to provide a holistic overview of the discussion and to consider the relation to spatial design education.

Table 3-1: Integrated methodological structure (expanded from Laursen & Haase 2019:820-821)

Designly thinking (D&T)	Touchpoints	Design thinking (DT)
	Methodological approaches	
Reflective practice	6 Critical reflection Designer's worldview, mind sets User's reality, context, behaviour	Exploratory learning (reflective practice)
Framing	2 Project / scenario framing Situational, contextual, meaning Understanding and insight	Phase models [framing]
Co-development of problem-solution	5 Scenario exploration Open-ended, possible scenarios, provoking and engaging, stakeholders	Phase models
Dialogue with the situation	4 Dialogue with the situation Scenario frame and possibilities, collaborative, real-time, transaction	Exploratory learning
Solution-led goal analysis	3 Situation-led potential analysis Agency, contingency, responsive, resilient, systems-based	Perspectives and empathy [user needs and requirements]
Modal shifts	1 Perspectives and modal shifts Empathetic knowing Shifts – process and activities, people, 'frame of reference', issues	Perspectives and empathy
	Tools and techniques	
Tools and methods	Collective tools and methods Amalgamation of academic and human-centred tools and methods	Tools and methods

1_Perspectives and modal shifts

Perspectives and modal shifts are positioned at the start of this section, as it contextualises the other methodological approaches. It deals with two aspects, firstly modes of design engagement and secondly, shifts in perspectives in order to understand projects better.

Modal shifts (D&T)

MODES OF ENGAGEMENT (D&T). Cross (2006:88) explains modal shifts as part of process strategies, in which “designers alternate rapidly in shifts of attention between different aspects of their tasks, or between different modes of activity”. He refers to three studies where researchers documented the design activities of students (Akin & Lin, Atman et al, Cross in Cross 2006:88-89). Findings suggest that a quick alternation between activity modes enable students to increase the creativity of work, or the quality of overall design concepts. Furthermore, students with a fluid transition between different modes of activity, “gathering information, sketching and reflecting”, completed projects with success (Cross 2006:89). Till (2009:113) adds another dimension to shifting between activities of inquiry, by introducing the “temporal condition” and its representation. In this way, a deeper level of understanding is reached. Forester (1985:17) refers to “sense-making” when he points to:

Speech or gesture or line or sketch wholly in the abstract would be meaningless, but the metaphor of design as sense-making via conversation situates the designer's work in a historical, practical context (Forester 1985:17).

Organization (DT)

COLLABORATION (DT). Through conversation and collaboration, modal shifts are facilitated during a design thinking process through multi-disciplinary teamwork, co-creation and human-centred design (Laursen & Haase 2019: 825). Camacho's (2018) integrative model of design thinking includes organization in its three fundamental principles. Firstly, system orientated, considering future conditions of people on a strategic level through small incremental changes (Camacho 2018:632-633). Secondly, as human-centred, considering human needs integral to a systemic impact on lives. In order to gain a deeper understanding, various perspectives of situated problems are obtained by workgroups (Camacho 2018:634-635). Thirdly, as creation based which incorporates interaction and various role players to envision and test future possibilities. These are created in shared spaces of innovation where various tools and techniques are used to explore, probe, and develop ideas (Camacho 2018:635-637).

MEANING (DT). Krippendorff (2006:26) reflects on the idea of meaning from the perspective of "possible futures", the designer on behalf of the user. How can this be achieved without an understanding of someone else's reality, experiences, and dreams? The relation to normative dissociation and the ability to alternate between personas (Butler 2006, Panero et al 2019) in *Chapter 2* is noted, by shifting between perspectives of designer and user, to comprehend the frame, full scope and possible goals of a project setting. Modal shifts also include imagining different or unfamiliar contexts in order to increase the designer's contextual awareness and situated meanings (Panero et al 2019). In support, Johansson-Sköldberg et al (2013:132) emphasise a pluralistic perspective within designerly thinking, to support a social constructivist approach to design engagement, which relates to different perspectives and experiences.

Perspectives and empathy (DT)

EMPATHY (DT). Brown (2009:49) expresses the integral need for empathy in design thinking and uses the phrase, "empathy: standing in the shoes (or lying on the gurneys) of others". This statement relates to normative dissociation (Butler 2006) as a way for designers to deliberately place themselves in the situation of the user.

We build these bridges of insight through empathy, the effort to see the world through the eyes of others, understand the world through their experiences, and feel the world through their emotions. [...] We have all had those kinds of first-person, first-time experiences ... In these situations we look at everything with a much higher level of acuity because nothing is familiar and we have not fallen into the routines that make daily life manageable (Brown 2009:50-51).

The notion of empathy has received criticism in design discourse for its limits in effectiveness and usefulness. Heylighen and Dong (2019) present an in-depth study and report on the ethical considerations of empathy and developing empathy as a process. They reference a number of studies that consider empathy as "a way for designers to gain insight into user's experiences, needs, and desires", in the landmark study of Patricia Moore (1979-1982) that motivates for the inclusion of empathy in design to address emotional needs (Heylighen & Dong 2019:108). In other studies a decade

later, they propose empathy to become an approach or “a way of thinking” (Heylighen & Dong 2019:108).

Literature outside the design discourse considers empathy as abstract concepts: cognitive, affective or a combination of the two. Cuff et al (2014:147) define cognitive empathy as the “ability to understand another’s feelings related closely to theory of mind” (after Blaire 2005) and affective empathy as “the experience of emotion, elicited by an emotional stimulus”. The debate continues whether empathy can be recognised only in an emotional context, and if cognitive empathy alone can be considered as ‘empathy’ (Cuff et al 2014:147). Another view on empathy, offered by health sciences’ psychiatric practice, brings another understanding (Ross & Watling 2017:28) by identifying three components within an empathetic continuum: relational empathy (understanding of patient’s perspective and experience to surface meanings), transactional empathy (negotiation and shared subjective understandings) and instrumental empathy (skilful navigation from problem situation to solution space). The psychiatrist becomes instrumental in the relationship treatment, and an empathetic understanding becomes instrumental to the outcome of the treatment through an engaged interaction (Ross & Watling 2017:29-30).

The relation between the psychiatric empathy triad and a design perspective reveals similarities in the understanding of empathy beyond abstract concepts. Although it might seem like a superficial comparison by replacing patient with user and psychiatrist with designer, a well-rounded design scenario is represented. By considering empathy as a continuum that leads to understanding, negotiation and future action proves useful in the discussion of design thinking that aims to make positive change in the lives of everyday users.

PHASES OF EMPATHY (DT). Kouprie and Visser (2009:439-440) present empathetic techniques based on imagination to simulate user scenarios. Furthermore, they propose a four phase framework for application in design situations addressing the different perspectives a designer adopts during the design process. Firstly, ‘discovery’ (designer enters the user’s world with curiosity). Secondly, ‘immersion’ (spending time in the user’s world to expand own frame of reference). Thirdly, ‘connection’ (designer relates directly to the user on an emotional level and constructs meaning and understanding). And fourthly, ‘detachment’ (designer exits the user’s world with a new perspective) (Kouprie & Visser 2009:445). The empathy process reveals modal shifts, where the designer steps outside the mind of a designer and transposes into the world of the user, in order to develop an understanding of various perspectives, as an explicit act, shifting between roles. Kouprie and Visser (2009:446) suggest various tools and techniques for this process, but warn that the empathy process is timeous and that sufficient time should be assigned to the ‘immersion’ phase.

This phase takes time to wander around in and be surprised by various aspects of the user’s world. This phase requires time. Without this phase, the knowledge about the user’s world will not increase. In design practice, this phase is often not given sufficient time. Designers can be reluctant to immerse themselves, as this activity is not directly solution focused and therefore the activity may not be perceived as relevant beforehand. By explicitly having

the task to wander around, to immerse, without making judgements and implementations the designer becomes open-minded and experience the user's world for a while (Kouprie & Visser 2009:446).

INTANGIBLE ASPECTS (D&T). The quote below (Schön 1983:130) contextualises the supervisor's experience of the resident's case illustrating a different perspective to and understanding of modal shifts, as compared to designerly thinking's literature. It points to a current shortcoming in the discourse – modal shifts relating to people, feelings, perceptions and intangible aspects. The supervisor urges the resident to “step into the situation, to make himself part of it” (Schön 1983:131). What he is asking of the resident, is to make a modal shift, not only in activity mode, but to connect with the patient on an emotional level. In this way, the resident can build trust with the patient, and through empathy, establish a connection with the patient through his reflection on the therapy situation. Furthermore, Schön (1983:161) explains that “[t]he creation and maintenance of the virtual world on therapy is both a method of inquiry and a strategy of intervention”. The affective and emotional sides to modal shifts provide a different vantage point from which to understand difficult situations, which will be missed if only a cognitive approach is taken.

PERSPECTIVES (DT). A human-centred approach informed by different perspectives therefore offers a designer a better background understanding of complex project matters. The adoption of a human-centred perspective enables the designer to connect with the user's tangible and intangible needs and requirements. The usefulness of empathy as a ‘way of knowing’ has been debated, but this study sets out to explore this conundrum hands-on in the studio through the biopic investigations. The profession shows that empathy can be integrated in spatial design. Brown (2009:49) describes the emphasis of empathy in design thinking and designerly thinking:

It's possible to spend days, weeks, or months conducting research of this sort, but at the end of it all we will have little more than stacks of field notes, videotapes, and photographs unless we can connect with people we are observing at a fundamental level. We call this “empathy” and it is perhaps the most important distinction between academic thinking and design thinking. We are not trying to generate new knowledge, test a theory, or validate a scientific hypothesis – that's the work of our university colleagues and an indispensable part of our shared intellectual landscape. The mission of design thinking is to translate observations into insights into products and services that will improve lives (Brown 2009:49).

Brown (2009) states the value of empathy in a design thinking context and indicates its relation to designerly thinking by emphasising the difference, in a complementary way. This study, however, considers the two design discourses moving closer together with evidence from spatial design practices that employs empirical research intensive strategies to inform design decisions. These combine a human centred approach as used by Gensler (Coleman 2019), and a people-centric based practice, as the firm, Interior Architects (Midden 2019), advocates. Examples of other design firms combining design thinking and designerly thinking strategies in community projects and social change are Panorama Innovation (Costello 2019) and Fit Associates (du Plessis 2020). The essence of their operations includes collaboration, co-creation and participation.

TRANSFORMATIVE POTENTIAL. Literature furthermore reveals that modal shifts are not only present in different modes of activities or perspectives, but also in transformative potential. Mezirow (in Thompson & Thompson 2008:29) refers to reflective practice, where critical processes of reflection “can result in different understandings of a person’s situation”. Mezirow (1991:107-108) explains ‘premise reflection’ that challenges deep seated understandings and convictions of a designer’s own ontological and epistemological views of the world that directly influences the transformative potential of a student designer. Within the context of transformative education, it includes cognitive, affective and value domains (Belenky et al 1986, Krathwohl et al 1964, Perry 1970). This is discussed further in *Chapter 4: Transformative engagement*.

2_Project / scenario framing

Framing (D&T)

When we set the problem, we select what we will treat as the “things” of the situation, we set the boundaries of our attention to it, and we impose upon it a coherence which allows us to say what is wrong and in which directions the situation needs to be changed. Problem setting is a process in which, interactively, we *name* the things to which we will attend and *frame* the context in which we will attend to them (Schön 1983:40).

FRAMING. Cross (2006:80) explains the development of a problem setting by referring to designers that “select features of the problem space” to *name*, and “areas of the solution space” to *frame*, the situation. Schön’s (1983) theory of reflective practice furthermore relates the “notion of frame in design theory” within a cognitive definition of terms, which are informed by a “set of possible actions”. This cognitive view of framing does not recognise “how value-laden frames can be” (Paton & Dorst 2011:575). They argue that there is wide research into the key characteristics of ‘framing’, but little into how it works, when framing is situated in practice where higher levels of experience is required.

Within a design context, framing is often seen as the key creative step that allows an original solution to be produced. Designers report on the need to get to ‘the problem behind the problem’ (as initially presented by the client), and also about creating a ‘fresh perspective’ (Paton & Dorst 2011:573).

SITUATED PRACTICE (D&T). Paton and Dorst (2011:575) claim that ‘*frames can change*’ and that a practice-based, situated approach to framing is related to the way a situation is seen and represented, and how that is reframed to gather new frames for interpretation of the design context. Their study explores how framing is experienced as a “socially situated practice”. This is illustrated with practitioners that frame and reframe expanded client briefs (Paton & Dorst 2011:576), where the designer takes on different roles to serve different purposes in the framing process: ‘technician’, ‘facilitator’, ‘expert / artist’ and ‘collaborator’. Their results reveal barriers (fixation; problem-solving mental model of design; resistance to journey) and enablers (metaphor and analogy; contextual engagement; conjecture) to framing (Paton & Dorst 2011:585).

Krippendorff (2006:214-215) explains that reframing is a method of “understanding multiple paths to understanding an often-intractable situation.” He lists various devices to derive alternatives, but stresses that,

Reframing makes visible, solvable, or understandable what any one medium of representation hides. All devices suggested above amount to journeys that enlarge the conceptual spaces of designers. Jointly, they provide an understanding richer than either method alone. Their skilful use forces us to not get stuck or prematurely settle on one idea at the expense of better ones – a cognitive trap in which students often find themselves (Krippendorff 2006:217).

The literature shows that framing is an organic process that unfolds in and with a situation. The degree of understanding is directly related to the intensity of the engagement with this process. Students that take difficult situations at face value will not derive at the same complex insights.

Constructivist perspective (D&T)

HOLISTIC APPROACH (D&T). Framing is a critical part of understanding, as Schön's (1983) psychotherapy example combines cognitive and affective mental models for a holistic understanding of the complex issues. The focus can thus shift from solution concepts as an outcome, to the identification of possible problem features (Cross 2006:81). Schön (1983:128-130) describes framing a complex problem by referring to the patient's experiences. Instead of searching for cues of finding a standard solution, the student focuses to “discover the particular features of his problematic situation, and from their gradual discovery, designs as intervention” (Schön 1983:129). Framing a challenging and complex situation firstly requires subject knowledge, but also needs to determine “which problems are worth solving and what role the practitioner should play in their solution” (Schön 1983:129-130).

The student has gotten stuck and does not know how to go further. The teacher, who attributes the student's predicament to his way of framing the problem, tries to make new sense of the problematic situation he is encountering at second hand. The situation is complex and uncertain, and there is a problem in finding the problem (Schön 1983:129).

The supervisor ‘surfaces’ issues in the reflective discussion with the resident and ‘restructures’, or ‘reshapes’ the situation by reframing it “through a web of moves, discovered consequences, implications, appreciations, and further moves” (Schön 1983:131) to reveal further problems, opportunities and issues to be understood. The supervisor urges the resident to “step into the situation” as a way of gaining a more connected understanding of the patient's condition (Schön 1983:131), which brings an experiential or emotional aspect to understanding the meaning of the framing. Gray (1996:576) defines the meaning of frames as a constructivist understanding:

... by inference the reader comes to understand that frames are sense-making devices that establish the parameters of a problem. Depending on one's frame, situations are imbued with different meanings, and different data are required to prove that a problem exists. Thus, when disputants operate out of different frames, conflict is inevitable.

Explorative learning (DT)

PERSPECTIVES (DT). The degree of insight and empathic understanding of a situation depends on 'whose' perspectives are represented to reveal meaning embedded in frames. Norman (2013:218-222) posits that design thinking addresses "solving the correct problem" through a human-centred design process by contextualising the notion of framing. He refers to the British Design Council's *double-diamond design process model* as the "double diverge-converge pattern" (Norman 2013:222). This 'Double Diamond' (Design Council 2019) is focused on moving from challenge to outcome in a non-linear process of exploration. It firstly considers "finding the right problem" ('discover' and 'define') to frame and secondly, "finding the right solution" ('develop' and 'deliver') (Norman 2013:220). 'Discover' (framing) focuses on understanding instead of relying on assumptions (Design Council 2019). This iterative process relates to designerly thinking's dialogue with the situation and co-development of problem-solution (Cross 2006), although the Double Diamond is deliberately human-centred. In addition, IDEO views design thinking as a mind set, to remain open to possibilities and to embrace ambiguity as opportunities for intervention (IDEO – Design Thinking 2019). Furthermore, Brown (2009:15-16) refers to "three spaces for innovation" that enables the iterative or exploratory process – *inspiration, ideation* and *implementation*, illustrating it as a phased process to allow for with feedback from the user and exposing different worldviews.

3_Situation-led potential analysis

Solution-led goal analysis (D&T)

CHALLENGING THE CONCEPT (D&T): This study speculates about the revision of the concept solution-led goal analysis, by integrating aspects from DT and D&T, due to an over emphasis on problems, goals and possible preconceived and superficial responses. Therefore, this research proposes a situation-led potential analysis to refocus design projects, by considering the inclusion of empathy and perspectives.

That is to say, the designer-subjects jumped to ideas for solutions (or partial solutions) before they had fully formulated the problem. This is a reflection of the fact that designers are solution-led, not problem-led; for designers, it is the evaluation of the solution that is important not the analysis of the problem (Cross 2006:78).

Solution-led goal analysis resides within the context of problem formulation and design cognition. Cross (2006:78) argues that one of designers' cognitive strategies is to solve ill-defined problems with the emphasis on solution as articulated within the problem goals. The goals are flexible and subject to change according to the problem development and the evolution of solutions (Cross 2006:78).

PRECONCEIVED NOTIONS (D&T). Schön's (1983:129-130) example of the psychotherapy dialogue between resident and supervisor, highlights the question of "what problems are worth solving". When the resident realises it becomes difficult to solve the initial problem, the notion of flexible goals are important where the resident attempts to "shape the situation to the frame" (Schön 1983:130, 141). The challenge remains to question the positivist epistemology that Schön (1983:165) criticises with this example, by

not being caught in pre-established objectives as a technical procedure. Rather, to follow the interactive dialogue with the situation. The supervisor prompts the resident with a question to provoke further consideration into the unspoken aspects related to the patient's situation, to keep the inquiry active and to prevent the resident from closing the patient's file prematurely by making narrow and limited conclusions (Schön 1983:136).

Solution focused design could lead to "early solution conjectures" (Cross 2006:79) and depending on the awareness and approach of the student, can either be used as a constructive generator of a series of solutions, or alternatively, result in proposals that are ill considered and superficial. Cross (2006:79) illustrates this by reporting on a study by Atman et al (1999) with engineering students that demonstrate that 'problem scoping' before the analysis phase results in "better designs". The findings furthermore reveal that if the problem is not well defined and the solution-led approach is the primary goal of the design process, the outcome of the design suffers. In contrast, some students find it difficult to move beyond the problem analysis phase into the design development. Atman et al (in Cross 2006:79) therefore bring attention to the concept of "problem scoping", which deals with "...adequately setting up the problem before analysis begins'; including gathering a larger amount and wider range of problem-related information".

This investigation identifies preconceived notions as 'traps' in the design process, that endanger the well-intended solution-focused goal analysis, when considered in conjunction with preconceived ideas informed by the designer's own biases, prejudices, beliefs, perspectives and values. The potential within an educational design context is to confront the design students' personal worldview, in order to elicit a critical and reflective response. This could be possible by acknowledging different perspectives through expanding understanding through empathy.

Perspectives and empathy (DT)

PERSPECTIVES AND EMPATHY (DT). The Greater Good Studio's cafeteria project provides an example of the empathy continuum in a literal sense of what it means to adopt someone else's perspective. The designers see through the eyes of the children to obtain a deeper understanding of their lunchtime experience (Greater Good Studio – Academy for Global Citizenship 2020). The effect of the problematic situation negatively affects the children's health and wellbeing and influences negatively on the kitchen staff and lunchroom attendants, as the situation leaves them exposed to an unmanageable scenario. By better understanding the real-life condition, the design team is able to propose alternative strategies in an interactive process with stakeholders and users to facilitate a more streamlined and positive user experience. This is a very simplified explanation to illustrate a design relation. The process contains much more detail, input and effort, which are associated with respect and mutual values.

This example has a pragmatic foundation for intervention, which makes taking an empathetic view, a spontaneous one. The empathy challenge is expanded when an emotional encounter confronts a designer and the question arises whether empathy can be taught, or if it is a personal trait, instead. Cuff et al (2014) conclude with a definition of empathy after an extensive study into literature,

Empathy is an emotional response (affective), dependent upon interaction between trait capacities and state influences. Empathic processes are automatically elicited but are also shaped by top-down control processes. The resulting emotion is similar to one's perception (directly experienced, or imagined) and understanding (cognitive empathy) of the stimulus emotion with recognition that the source of the emotion is not one's own (Cuff et al 2014:150).

EMPATHY AND UNDERSTANDING. Kouprie and Visser (2009) “relate the concept of empathy as developed in psychology” to a design context. They ask a pertinent question: “How does the design team make appropriate design choices for others who are unlike themselves?” (Kouprie & Visser 2009:437) and consider how designers can achieve it in projects. Kouprie and Visser are affiliated with industrial design engineering, noteworthy in the context of this study, as the first human-centred design considerations also emerged from product and engineering design (Archer 1965, McKim 1972). Empathy, as a “way of knowing” is a process that evolves over time and enables the designer to adopt the perspective of another person (Kouprie & Visser 2009:441-442). The concepts of time and perspective are important in the context of design, because when a designer assumes the role of the user, a shift in context and experience is expected that directly addresses different realities of living and possibly other worldviews. According to Mezirow (1997:5-6) ‘frames of reference’ consist of ‘habits of mind (broad assumptions and ontological construction of the world) leading to ‘points of view’ (personal beliefs, feelings and judgements), which are in question when a different perspective is taken.

EMPATHY PITFALLS. The danger of using empathy in design is thus highlighted – the need for the designer to discard personal bias and prejudices. Thomas and McDonagh (2013:50) introduce the notion of “expanding the empathetic horizon”, which relates directly to a designer’s ability or capacity, or lack thereof, to shift perspectives according to a range of users in different contexts. This becomes relevant in light of the “indirect attribution” of empathy, where Heylighen and Dong (2019:114) consider the *Simulation Theorists’* (Goldman 2013; Stueber 2018) understanding of “ordinary mindreading abilities” that are based on a person self, as “egocentric and ‘knowledge-poor’” (Stueber in Heylighen & Dong 2019:114).

Goldman (in Heylighen & Dong 2019:114) refers to two *levels* of mindreading, low-level mindreading as “perceptions, emotions” and high level mindreading as “beliefs, desires, hopes, and intentions”. Goldman (in Heylighen & Dong 2019:114) further refers to two *routes* to mindreading, mirroring and reconstruction. ‘Mirroring’ as low level mindreading, related to discovery, sensations and emotions (Goldman 2013:202), which is prone to error due to personal, subjective bias and judgements. Bloom (2016:68) warns that empathy can be modified in such situations. This study equates this phenomenon to affective empathy that overshadows an experience, and a person loses perspective due to the strong reaction. In comparison, high-level mindreading’s route to empathy is ‘reconstruction’, where a person attempts to “replicate or re-experience their (mental) state via a constructive process”. The reconstructive route’s possible flaws are associated with two concepts, ‘omission’ due to ignorance, and ‘commission’, because of egocentric bias (Goldman in Heylighen & Dong 2019:114-115).

Bloom (2016) warns against the pitfalls and limits of empathy and takes a rival position to other literature promoting its usefulness. He argues that empathy has a “narrow focus” like a spotlight and “spotlights only illuminate what they are pointed at, so empathy reflect our biases” (Bloom 2016:31). Furthermore,

... whether or not we are consciously aware of it, empathy is modified by our beliefs, expectations, motivations, and judgements ... Our empathetic experience is influenced by what we think about the person we are empathizing with and how we judge the situation that person is in (Bloom 2016:68).

TRANSFORMATION AND EMPATHY (DT). In this light, Kouprie and Visser (2009:439) pose the question whether “[t]raining and practical experience can enhance the designer’s empathic understanding of its users”. The question should not only reflect a yes or no response, but also indicate a degree of possibility to transform, as small incremental shifts could indicate change over time. As Mezirow (1997:5-6) points out, ‘frames of reference’ are difficult to modify due to our inner convictions and dispositions. In the spatial design disciplines, with emphasis on designer or architect as expert, this is especially relevant (Till 2009). In addition, architectural theory considers empathy as a highly intellectual and academic discourse,

I would suggest that empathy extends our world spatially. Where imagination reaches into the future, empathy enables us to project ourselves into the inner worlds of the other on the basis of our bodily states. Our bodily states do not overlap with the bodily states of others, they are two distinct points of origin that are bridged by empathy. This inborn pre-reflective capacity to perceive the experience of others through the tissue of our own bodies – regardless of whether those others are persons, creatures, places or things – is a dynamic pattern of relationship that extends our awareness of the multi-layered emotional latency inhering in the situation. Empathy expands the domain of the personal to encompass the felt experience of the other, enlarging, enriching and informing the basis of our possible actions (Robinson 2015:48).

EMPATHY AND ARCHITECTURE (D/T). This understanding of empathy, from *Architecture and Empathy* (Tidwell 2015), emphasise the importance of relating to another’s situation and reality, as a way to influence our future actions. The book is a comprehensive documentation of the relation between imagination and architecture, sensory perception and material characteristics, and the effect of materials and matter on the human body, from a physical and neuroscience perspective. The academic and existential approach of the book provides an intellectual understanding of architecture and empathy. However, the social condition’s relationship with architecture is not considered, which leaves a gap in the understanding of empathy on an interpersonal level.

We architects have never been more urgently in need of the new approaches that a fresh way of thinking can provide. Fed up with the intellectual excesses of architectural theory in recent decades, we have been swept into the mandate for sustainability without a coherent philosophical framework. [...] The tired dichotomies separating mind from body and the individual from social and natural worlds must be overcome with metaphors that are capable of continuing, bridging or weaving other opposing sides (Robinson 2015:54).

Modal shifts and understanding (D&T)

MINDSETS AND MEANING-MAKING (D&T). Ball in Dorst (2019:122) argues for a radical shift from problem solving to a “new paradigm”. He refers to meeting 21st century challenges and emphasises a focus on complexity theory and systems thinking, instead. Dorst (2019:122-123) explains this shift,

... rather than goal-directed creation; change is achieved through influencing the system, rather than implementation of a plan to solve the problem; and a new state of relative stability can be achieved by creating resilience, rather than striving for an immutable structure – that so-called solution.

In this light, Krippendorff (2006:xv) argues that design needs to refocus its “well-trodden path” to conceptualise artefacts to “mean something to its users, that aid larger communities, and that support a society that is in the process of reconstructing itself in unprecedented ways and at record speeds.” Solution-led goal analysis should therefore take cognisance of the direct relation between solution and user. Krippendorff (2006:2) outlines the importance of semantics or meaning-making as a “meaning-action circularity” in a study with Butter that defines product semantics as follows:

- *A systematic inquiry into how people attribute meanings to artifacts and interact with them accordingly*
- *A vocabulary and methodology for designing artifacts in view of the meanings they could acquire for their users and the communities of their stakeholders.* (Krippendorff 2006:2).

Krippendorff's (2006) focus on a ‘semantic turn’ therefore highlights intangible considerations in the context of solution-lead goal analysis. Lloyd (2019:171) introduces a ‘social turn’ that focuses not only on human agency, but reaches further to include the methods, representations and tools that designers use in the process; another social action.

The focus on both methodology and social practice has enriched the study of designing by letting the idea of discourse explicitly percolate through the discipline, allowing different perspectives and ways of thinking to coexist (Lloyd 2019:173).

This shift, from problem to areas of intervention and perspective, therefore brings another understanding of the role of goals in the pursuit of solutions where purpose and people are involved. Various views and various ways of engagement relate to different ways of inquiry.

4_Dialogue with the situation

Dialogue with the situation (D&T)

Thus the practitioner evaluates his experiment in reframing the problematic situation not only by his ability to solve the new problem he has set but by his appreciations of the unintended effects of action, and especially by his ability, in conversation with the situation, to make an artefact that is coherent and an idea that is understandable. But the achievement of coherence does not put an end to inquiry (Schön 1983:136).

IN DIALOGUE WITH (D&T). Dewey (1910/1997) first introduced ‘dialogue with the situation’ in the seminal book, *How we think*. Schön (1983) expands this thinking as part of ‘reflection-in-action’. As a practical

educator and pragmatist philosopher, Dewey directly relates *thinking* and *doing* as a rigorous, active process, creating and testing hypotheses within real world environments (Rolfe 2014:1179). The relation between the inquirer and the situation is *transactional* and the inquirer (designer) moulds the situation, but this transaction is relational and the designer's own "models and appreciations" are shaped by the situation in return (Schön 1983:150-151). As interactive and transactional process, the dialogue with the situation reveals new meanings and Krippendorff's (2006:23-24) proposition of intertextual and textual design matters informs designerly thinking as creation of meaning, instead of artefacts. The dialogue therefore includes both tangible and intangible aspects as an interactive inquiry.

ACTION VERBS (DT). The interaction is enabled through different modalities of engagement between designer, user, context and situation. Considering different action verbs or triads as part of the process ensure different ways of understanding: 'think-make-share' (Reynders 2012:4), 'think-feel-do' (Fisher & Clark 2012) and 'say-make-do' (Sanders in Tharp & Tharp 2018:75).

Explorative learning (DT)

COLLABORATIVE ENGAGEMENT (DT). The Greater Good Studio's collaborative co-design project aims "to reimagine the school food experience" (Greater Good Studio – The Academy of Global Citizenship 2020). They explore the problem space by observing the children's responses, and observe and participate in the preparation of lunches with staff and serve food with lunchroom attendants. This allows for an empathetic understanding of the larger issue, the 'lunch line' or framing of the design challenge. This collaborative process guides designers to develop a scenario synthesis providing cues into the opportunities, testing possible solutions within the studio, which are then tested in real time in the cafeteria with the children. The outcome of this explorative process reveals two noteworthy things: mind sets and behaviours. When new food options are presented, children remain engaged and curious, with less food wastage and better consumption of meals. The exploratory process enables active dialogue between designers, staff and children, through iteration, testing, prototyping and feedback (repetitive observation in studio and cafeteria) (The Greater Good Studio – The Academy for Global Citizenship 2020). The Design Council (2019) contextualises the design thinking exploratory process by emphasising placing people first, considering visual and inclusive communication, being collaborative and co-creative, and focusing on iteration to streamline the exploration process.

WORLDVIEWS (DIL). The exploratory process extends as example of the interactive psychotherapy dialogue between resident and supervisor (regarding a patient), revealing "unintended changes which give the situations new meanings" (Schön 1983:131). The dialogue between student and teacher is both reflective and reflexive. Reflectivity, as the interrelation with the patient, reveals the problem and the unknowable aspects the resident deals with. The resident furthermore reflects on the impact of his involvement in the process and aspects he brings to the patient's healing process that are filtered by his own worldviews, beliefs, opinions and prejudices that confront him directly. Mezirow (1997:5-6) relates this understanding to 'frames of reference' and 'habits of mind', influencing ontological views and epistemological positions within complex situations, respectively. Moreover, these manifestations in the resident affects the way meaning is made and it is critical to shed own preconceived ideas, which

could be tainted and cause interference with a transparent reflective process. Furthermore, the dialogue includes interaction with abstractions, for example, with the problem, with possible interventions, with 'explicit knowledge' and 'tacit knowing'. "Through the unintended effects of action, the situation talks back" and this deep engagement in the dialogue allows new questions to arise, which enables the resident to move forward in working with the patient (Schön 1983:135, 137).

In a practitioner's reflective conversation with a situation that he treats as unique and uncertain he functions as an agent / experiment ... Through his transaction with the situation, he shapes it and makes himself part of it (Schön 1983: 163).

Organization (DT)

ORGANIZATION (DT). The two examples above demonstrate the value of interaction between different stakeholders. However, Laursen and Haase (2019:820, 825) include organization as a suggested action of design thinking, but the practice view indicates it to be integral to the process, instead. As demonstrated above, collaboration can be considered as part of designerly thinking methodology, although not included in theoretical literature. As such, this study speculates that organisation be considered as part of an integrated methodology, because it is not only logistical and operational as academic literature suggest. The practice view provides evidence that a human-centred design approach is not only an operational tool, but also an intrinsic part of the approach, perspective and also overall method when dealing with complex design issues (Norman 2013; Brown 2009).

HUMAN AGENCY. In addition, Awan et al (2011:31) explain an agent's resolve, including a transformative intent within a dynamic spatial context, to be "responsive and flexible" to the unpredictable patterns. This becomes related to human agency and the intangible conditions and meanings embedded in human interrelations and connections. Agency, inscribed in this process, is emphasised by Till (2009:167) who advocates for equal representation of voices as a transformative agency and a shared enterprise. Dialogue with the situation is therefore not an isolated event, but an interactive condition that moves between different modes of thinking and ways of operating. Therefore, time becomes part of the situation, as the dialogue requires moments of reflection and considering representations in different media, to demonstrate the temporal nature of occupying spaces and the contingency associated with a fluid condition (Till 2009:113).

However, time in all its complexity cannot be summoned up in a single system of representation, so one has to resort to multiple modes of communication: drawn, made, photographed, told, enumerated, enacted. The tendency is to concentrate on one mode of representation, and so on one temporal condition (Till 2009:113).

Dialogue with the situation, therefore becomes much broader when details of the situation are considered – dialogue with the process, people, ideas, possibilities, challenges, understandings and values. The context or situation of a design project therefore assists in reflection-in-action, as it provides information to (re)frame problems (Visser 2011:24) in an active dialogue that includes the detailed situation as speculated above. Schön's (1983:40) distinction between problem solving and problem setting, where a constructivist perspective and approach becomes instrumental to delving into deeper meanings that are hidden and difficult to articulate, then becomes significant as,

... the process by which we define the decision to be made, the ends to be achieved, and the means that may be chosen. In real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling and uncertain" (Schön 1983:40).

The link to ill-defined problems can therefore be made to the 'dialogue with the situation', as resident, supervisor, student or designer are actively scrutinising all aspects of the situation in an attempt to find both understanding and meaning of all perspectives. In this way, a connected engagement includes a range of modes, including cognitive, affective and reflective. Cross (2006:12) therefore identifies it as one of the five aspects of designerly ways of knowing. The psychiatric example, however, demonstrates it to be a part of the practice of a variety of professional fields, and is not only reserved for design disciplines.

5_Scenario exploration

Co-development of problem and solution (D&T)

CO-DEVELOPMENT OF PROBLEM-SOLUTION (D&T). Cross (2006) describes the co-evolution of problem and solution as a meandering exploration, instead of a linear process. Schön (1983:165) supports this view by saying that "means and ends are framed interdependently. And their inquiry is a transaction with the situation in which knowing and doing are inseparable". The process of inquiry is therefore not focused on a preconceived outcome, but relies on the interrelation between the various phases to inform the route to action. Dorst (2019:122) considers design to be a learning process, "*name – frame – move – evaluate*", an exploratory process, comparable to design thinking's phase models, as the Double Diamond and the IDEO human-centred design process (Design Council 2019, IDEO Design Kit 2019). This perspective aligns with the study's focus on a constructivist inquiry, where meaning-making is based on a spontaneous investigatory experience. "It seems that creative design is not a matter of first fixing the problem and then searching for a satisfactory solution concept" (Dorst & Cross 2001:434).

The designer's attention oscillates between the two, forming partial structurings of the two 'spaces' of problem and solution. Designing appears to be an 'appositional' search for a matching problem-solution pair, rather than a propositional argument from problem to solution (Cross 2006:91).

ITERATIVE DESIGN PROCESS. In contrast, Maher and Poon's (1996) Problem-Design Exploration Model is a formal model representing the iterative design process, alternating between the problem- and solution space dimensions. Over time, the iteration and evolution of the problem-solution space allows for the generation of alternatives. Diagonal movement between problem and solution spaces are informed by focus and fitness of the solution derived from the problem, and vice versa, refocusing the problem by scrutinising the solution (Maher & Poon 1996:195-199). Although this is a formal model, it allows for 'random' exploration within the problem setting.

Schön's psychotherapy example demonstrates this 'back and forth' motion between problem and solution, firstly as an unconscious process, when the resident is confronted with issues that he is unable to articulate when first interacting with the patient. But with iteration comes "[s]eeing *this* situation as *that* one, one may also *do* in this situation as in that one" (Schön 1983:139). What Schön is referring to here, relates to Buchanan's (1992:9-11) concept of 'placements', as placeholders in situations where too many variables are present to make sense of its complexity. Johansson-Sköldberg et al (2013:125) explain Buchanan's 'placements' to be,

'tools' for intuitively or deliberately shaping a design situation, identifying the views of all participants, the issues of concern, and the intervention that becomes a working hypothesis for exploration and development, thereby letting the problem formulation and solution go hand in hand rather than as sequential steps.

Dorst and Cross (2001:434) concur by describing creative design as a process of "developing and refining together both the formulation of a problem and ideas for a solution, with constant iteration of analysis, synthesis and evaluation processes between the two..." The RIBA practice and management handbook also illustrates an iterative design process with four phases, with feedback loops in-between (Lawson 1990:24). This is not meant as a sequential map, as there could be "unpredictable jumps" between the phases. Dorst and Cross (2001:435) describe the "creative event" as an exploratory space, which is unstable and evolving, in which bridges between the problem-solution appears, as designers identify related information to assist in "partial structuring of the problem-solution". They do however, caution against expectations to answers that can lead to *default* projects (Dorst & Cross 2001:435). In order to address preconceived responses, Dorst (2006:17) makes a valuable proposition by suggesting the "design problem" to be temporarily bracketed, which "allows new frames of reference and descriptions of the design activity to emerge". The space for exploration is expanded in this way, which enables the designer to engage freely with the issues of concern in a project context that does not predict or prescribe proposed outcomes.

Phase models (DT)

PHASED INQUIRY. Exploratory investigation related to design thinking methodology, is described as phase models, or process models (Laursen & Haase 2019: 821). Phase models contain sequential steps of varying descriptions, but all lead to the same goal – addressing the needs and requirements of the user or customer (Brown 2009; Camacho 2016; Tschimmel 2012). Various interpretations illustrate design thinking's integrative actions, in order to deepen understanding and clarify insights in a particular setting and scenario (Table 3-2). IDEO.org, a non-profit design thinking organisation reveals that human-centred design is about mind sets and outlines learning from failure, making it, creative confidence, empathy, embracing ambiguity, optimism and iteration, as key aspects of the philosophy of their design kit (ideo.org n.d.).

Table 3-2: Summary of design thinking phase models

Phase model	Problem space	[Development space]	Solution space
UK Design Council (2019)	discover > define (what, why)	develop	deliver (how)
IDEO 3 I model IDEO 5 HCD model (toolkit) (IDEO 2019)	inspiration discovery > ideation	ideation interpretation	implementation experimentation > evolution
d.school Stanford (2020)	empathize > define	ideate	prototype > test
Darden Business School (2021)	What is? Explore current reality	What if? Envision new future	What wows? Make choices What works? Phases in market
The Greater Good Studio (2019)	framing > research	synthesis > concepting	prototyping > piloting
Interaction Design Foundation (n.d.) (consolidated model)	inspiration understand > observe > point of view	ideation ideate > prototype > test	implementation storytelling > pilot > business model
Evolution 6² model (Tshimmel et al 2015)	emergence > empathy	experimentation > elaboration	exposition > extension

Human-centred design is a problem-solving process grounded in empathy and iteration. It's also a powerful framework for creating alignment among people from diverse backgrounds and turning ideas into action (Greater Good Studio 2019).

The phases relate to other descriptions of phase model's problem space, development space and solution space. Through phase models, the start to investigating design problems are grounded in and directly informed by the context, the tangible and intangible needs and requirements of people. The cafeteria food example of the Greater Good Studio (2019) uses a six-step human-centred design process to engage with difficult projects in a hands-on way:

Framing: the design team aims to “create engagements” not artefacts, through appreciative inquiry and by incorporating the end users at the start (Greater Good Studio – The Academy of Global Citizenship 2020).

Research: the approach to “observing behaviour in context” instead of using surveys or focus groups, allow the team to develop empathy and to immerse themselves in the user's reality. The detailed qualitative data collection provides in-depth understanding through in-context observation of children and staff. This includes the use of Go-Pro cameras on selected children's heads to provide an immersive perspective and ceiling mounted camera footage provides time lapse video to determine traffic flow (Greater Good Studio – The Academy of Global Citizenship 2020).

Synthesis: “Traditional design focuses on finding and meeting unmet needs, but we also focus on assets – the existing tools, habits and relationships” (<https://greatergoodstudio.com/case-studies/academy-for-global-citizenship/> 2019). Qualitative data assist to identify the main challenge, the ‘lunch line’, through emerging themes (as inductive study) to better understand behaviour patterns. “How might we” statements are formulated to address the stressed food decision making process, seeing over the counter and through the reflective screen (Greater Good Studio – The Academy of Global Citizenship 2020).

Concepting: “thought-provoking” tools are used to build creative confidence when engaging diverse stakeholders (storyboards and brainstorming) to defer judgement. Parents are included to brainstorm how to increase time for making food choices and reveal the concept of serving food in ‘courses’ (Greater Good Studio – The Academy of Global Citizenship 2020).

Prototyping: “fast cheap ways to make your ideas tangible, we get closer to knowing what will work, what won’t and why”, in addition, “we create props that simulate the full experience” (Greater Good Studio – The Academy of Global Citizenship 2020). The idea is tested in studio, by presenting prototypes as ‘courses’ to a student group to collect evidence for feasibility and flow as idea feedback through an iteration loop. The team visualises the full service and creates a ‘map’ to test in the cafeteria – no opinions are expressed (Greater Good Studio – The Academy of Global Citizenship 2020).

Piloting: “we test solutions in real time”, through small scale testing. During the process, reflecting on the data recorded provides direct feedback, limits biased behaviours and lowers cost. The process unfolded with two rounds of testing multiple food choices through food presentation with long trays and small bowls in the cafeteria context. Testing the new service style over five days and 50 children results in interested and happy children, due to food choices as a new mind set, resulting in less food wastage and healthier habits as a new behaviour (Greater Good Studio – The Academy of Global Citizenship 2020).

“This project helped us literally see the world from a child’s point of view” – Sarah Elizabeth Ippel (Greater Good Studio – The Academy of Global Citizenship 2020). The value of the phase model lies in the deepening of understanding and insight, through engagement, participation and an embodied experience in the project context. In this way, the design development stage of the project is based on actual evidence, and not based on assumptions or preconceived notions by designers.

6_Critical reflection

Explorative learning (DT)

EXPLORATIVE LEARNING (DT). Contextualises the actions of reflective practice, as each step in the process offers opportunities for feedback through reflection on complex matters. Norman (2013:222) describes the iterative cycle of a human-centred approach (spiral method) consisting of four activities, observation, idea generation (ideation), prototyping and testing. He mentions that iteration is required to ensure “continual refinement and enhancement” or “rapid prototyping and testing” (Norman 2013:229). He places this in context of human cognition and emotion by referring to the interrelated nature of the visceral, behavioural and reflective levels of processing, and argues that “design must take place at all levels” (Norman 2013:49-50. 53). This designerly thinking understanding contextualises the academic relation to reflective practice in design thinking.

Reflective practice (D&T)

The extent of our capacity for reciprocal reflection-in-action can be discovered only through an action science which seeks to make what some of us do on rare occasions into a dominant pattern of practice (Schön 1983:354).

REFLECTIVE PRACTICE (D&T). Schön (1983) considers 'reflection-in-action' and 'reflection-on-action' as part of the exploratory process or iterative design, integral to designerly thinking, as other authors support it as part of a methodology for design inquiry (Cross 2006). Schön (1983:280) believes 'thinking' and 'doing' are integral modes to reflective practice, as "[d]oing extends thinking" and becomes a complementary reflection-in-action. "It is true, certainly, that an inquirer's continuing conversation with his situation may lead, open-endedly, to renewal of reflection" (Schön 1983:280). Thompson and Thompson (2008:16) explain reflection-in-action as thinking during an activity, and reflection-on-action as reviewing a past event or design task, to gain understanding of our experience. They identify a third type of reflection, that Schön (1983) does not present, 'reflection-for-action', in anticipation of what might happen in the future (Thompson & Thompson 2008:16). The value of Schön's (1983) contribution is to consider the limits of technical rationality:

Technical Rationality depends on agreement about ends. When ends are fixed and clear then the decision to act can present itself as an instrumental problem. But when ends are confused and conflicting, there is as yet no 'problem' to solve. A conflict of ends cannot be resolved by the use of techniques derived from applied research. It is rather through the non-technical process of framing the problematic situation that we may organize and clarify both ends to be achieved and the possible means of achieving them (Schön 1983:41).

Schön's reflection-in-action concerning complex problems reveals the need for a 'critical' reflective practice. One that includes both depth and breadth of criticality, with the former addressing unbiased "underlying arguments and assumptions" and the latter considering "the wider social and political context of our practice" (Thompson & Thompson 2008:155). "He [Schön] aptly captured the crisis of confidence that had evolved due to a lack of stable scientific knowledge bases and the failure of instrumental problem solving to deal with the society's heightened complexities" (Craig 2010:191). The question of 'reflective' (thoughtful and analytical action) or 'reflexive' (self-awareness of designers' personal impact in a situation), is discussed by Thompson and Thompson (2008:20), who conclude that reflective practice should include both.

Schön's (1983:129, 132) psychiatry example relates to the reflective discussion between the resident and the supervisor. This interaction assists the resident to frame the issue regarding the patient's condition through a "gradual discovery" of the difficult situation. Furthermore, "new discoveries" are made during the process of "reflection-in-action".

The process spirals through stages of appreciation, action, and reappreciation. The unique and uncertain situation comes to be understood through the attempt to change it, and changed through the attempt to understand it (Schön 1983:132).

Reflective practice can therefore be seen as a transactional process. Tovey (2015:61) relates reflective practice to a dialogue (instead of a directional action), where the designer negotiates between the

desired and reality in a three-step process (framing, moving, and evaluating). Reflective practice can therefore be seen in relation to design thinking's phase models (Design Council 2019; IDEO 2019), where various stages guide the process. In this way, three dimensions of reflection (cognitive, affective and value) are included, compared to practice where the cognitive often takes precedence over the emotional and value dimensions, to the detriment of the designer and the project at hand (Thompson & Thompson 2008:32). This study supports this notion within a design educational milieu. The emotional side, not only regarding reflection, but also considering way of knowing, is neglected and therefore becomes the focus of this study.

WORLDVIEWS. Argyris & Schön's (1974, 1996) single and double loop learning provide the environment for reflective practice, when actions (single) and assumptions (double) are considered, respectively. Triple loop learning is often related to them although they never used the term 'triple loop' (Tosey et al 2012:292) but rather informed by Learning III (after Bateson 1972) that acknowledges a larger situational context. Considerations of loop learning and 'reflective judgement' (King & Kitchener 1994) are discussed in *Chapter 4*. Reflective practice therefore provides opportunities for deepening understanding of complex projects, and in that way, gives scope for better framing of difficult situations. In addition, the designer is confronted with transformative thinking that challenges personal worldviews to include and understanding of other people's perspectives and experiences.

Tools and methods

Design thinking (DT) tools and methods

Literature reveals the availability of a wide variety of tools and techniques, often referred to as the design thinking toolbox (Curedale 2013). Criticism directly relates to its exploratory nature and the seemingly random allocation of tools and techniques to 'match' the right option for a task during the various design stages. Laursen and Haase (2019) argue that it could be challenging for 'non-designers' to make an informed selection. To address the critique, Tschimmel (2012) presents a classification of design thinking tools according to design actions for application in different project contexts and situations:

Table 3-3: Design thinking actions and related tools (adapted from Tschimmel 2012:12-17)

"Tools for observation, getting empathy and clarifying the project task"		"Tools for idea generation and experimentation"	
–	Observation and register on place	–	Brainwriting and brainsketching
	Mind maps and other kind of information maps		Sketching
	Personas and empathy map		Visual and semantic confrontations
"Tools for elaboration and development"		"Tools for communicating and delivering"	
–	Storyboard	–	Storytelling
	Rapid prototyping		Learning experiences / test

Moreover, Camacho (2018:631-637) relates tools and techniques to the process principles of an integrative design thinking model that speak to actions within fundamental principles. Similarly, Hassi & Laakso (2011:59) give an outline of tools and techniques in a three-dimensional framework, each relating ways of knowing as part of a design thinking methodology. The Stanford d.School's Design Thinking Process Guide (2016) (d.school process Guide n.d.) links the five step process to specific tools and techniques and likewise, the IDEO HCD Toolkit (2009) and the IDEO Field Guide to Human Centred Design (2015) (IDEO Design Kit 2019). The UK Design Council has a methods bank, to 'match' various methods to various tasks in three different areas of investigation: explore, shape and build (Design Council 2019). The Evolution 6² Model (Tschimmel et al 2015) includes tools and methods in a six phased model to address pertinent aspects.

A wide variety of methods and techniques are recorded in a study by Fleury, Stabile and Carvvalho (in Laursen & Haase 2019:825-826). Tools and methods are based in ethnography, making the approach human-centred in nature – delving deeper and connecting stronger (Costello 2019). Practices are increasingly connecting specific tools to related process stages (Coleman 2019, Fern Tiger Associates 2013).

Designerly thinking (D&T) tools and methods

The research study conducted by Laursen and Haase (2019:820) provides an overview of the tools and methods used in designerly thinking. They list three overall categories:

Tools for inquiry: Interviews, focus groups, observations, ethnography

Tools for identifying a direction: Narratives of ideal futures, future scenarios, character space, analogy/metaphor

Tools for creating a solution: Combination, mutation, first principles, emergence

A further inquiry reveals that Cross (2006) and Krippendorff (2006) include examples or suggestions. Noteworthy is the overlap in some of those mentioned to design thinking's tools and methods as detailed in the section on design thinking. In addition, some of the tools and methods for designerly thinking are abstract concepts that pose a potential challenge for application if a designer has no prior knowledge. Cross (2006) outlines various strategies or methods to understand design cognition, which Laursen and Haase (2019) consider for the identification of tools and methods, surely in conjunction with other sources. Their selection from Cross (2006) shows an over emphasis on 'problem formulation' as considerations for concepts incorporated in the designerly thinking methodological approach. They consider nothing from 'solution generation' and only include modal shifts from 'process strategy' (Laursen & Haase 2019:820). Krippendorff (2006:207-208) includes a chapter on design methods that, for the first time in the designerly thinking literature, explicitly refer to human-centred design and explains human-centredness in a larger context to demonstrate the complex world that requires responsive design initiatives as a "semantic turn".

It amounts to redrawing the boundaries of design, radically embracing human-centredness and fuelling inquiries into various meanings, design methods, and a rhetoric that enables designers to collaborate with other professions on a more even footing. Much needs to be done, it is part of the discursive nature of design that the project of design can never be complete because it is embedded in culture's shifting conversations and technological developments (Krippendorff 2006:208).

Summary

Empathy and human-centred design

The discussion in this chapter reveals a strong synergy between design thinking and designerly thinking, especially concerning the touchpoints of empathy and a human-centred approach. These are emerging in the spatial design disciplines, but this study speculates that a stronger synthesis is possible. The inclusion of the affective and emotional domain can offer a counterpoint to the heavy cognitive and objective approach, especially in architecture, in the way designers view and understand projects. When users' perspectives are obtained through an empathetic process, real life scenarios are highlighted that are not always visible through a conventional design inquiry. One of the largest benefits of an empathetic approach is the confrontation of personal worldviews of designers as the stimulus for connected and transformative learning. When pre-conceived ideas, individual biases and predictable responses are challenged, ontological shifts and epistemological transitions could become possible.

Table 3-4: Methodological relation summary – designerly thinking and design thinking

Designerly thinking	Design thinking
Reflective practice: role of the designer – not only to reflect on the process – but also acknowledging a personal influence on the process due to individual worldview. Inclusion of emotional and affective domain – determine futures that work well and feel good – incorporate views of users.	Exploratory learning: non-linear and iterative process – enables change in mind set and behaviour in all stakeholders, users and designers included Reflection-in-action and reflection-on-action – integral to development of ideas – collaborative dialogue
Framing: emphasis on situational, specific and particular scenarios – rich in meaning – look beyond problems as a social practice Reference to problem is questioned – proposes reference to project setting / scenario / situation – instead of problem framing.	Phased models: various actions in different phases focus attention on specific areas of investigation – brings greater clarity and comprehension of complex and undefinable situations Three main areas of consideration allow the design team to mobilise the exploration – framing and understanding of social engagements – different points of view as a process of discovery – formulation and articulation of concepts or themes to envision possible scenarios
Co-development of problem and solution: active exploratory process – project description is kept open ended – allow for unintended consequences to appear	
Dialogue with the situation: a stimulus by incorporating a variety of modes of engagement – conversation – transaction – between designer and aspects – bracketed insertions [allows for flexibility] For example, dialogue with	Application of provoking and engaging tools and techniques – guides a collaborative development – testing, simulating and prototyping of ideas in real time and in context – direct feedback from users Phase models considers simultaneously

– [process, people, ideas, possibilities, challenges, understandings, fears, celebrations, values, meanings]	– problem space – solution space
Modal shifts: manifest in a variety of ways in the design process – shifting between different activities or operational modes of design engagement Modal shifts also provide opportunities – refocusing perspectives – including multiple users' explicit and implicit needs and requirements. Shifts in ontological views and epistemological approaches are challenged – deep engagement offers scope for deep transformations in designers as individuals	Perspectives and empathy: (regardless of empathy criticism) adoption of different perspectives through immersion in another's world – unfamiliar context – designer suspends personal bias and prejudices Empathy, as a way of thinking, or knowing – brings designer closer to realities of projects – confronts with challenging details to internalise, [otherwise go unnoticed] Question of time and understanding – capacity of a designer to adopt a different view – possibility of 'expanding the empathetic horizon' – shifting between roles / personas, designer / user
Solution-led goal analysis: presents a challenge in terms of the designer's application and approach to identifying goals and formulating solutions – hindrance and obstacle, when preconceived ideas and biases guide the process Focus on agency, contingency, resilience and a systems approach – worldviews and pre-established objectives are confronted	Organization: multi-disciplinary interactions concerning difficult design issues – possibilities for co-creation and collaboration Organization becomes human-centred – operational based – people, systems, and creation are incorporated – promote incremental change within situated contexts
Tools and methods: related to academic or scientific focused activities – however, human-centred methods are incorporated from the perspective of meaning-making – prevalence of 'connected' methods in educational design environments are emerging within spatial design studios	Tools and methods: hands-on activities to obtain first-hand data about people in places. – activities are 'user-friendly' and coincide with different stages of the inquiry – focused to extract deeper meanings, behavioural matters, intangible aspects and value driven concepts.
Mini-summary – Designerly thinking (D&T) – Methodology reveals a great need towards an increasingly constructive design approach – Strong academic / theoretical base, supported by various research studies. – The inclusion of the psychotherapy dialogue, offers insight to an expanded designerly thinking that includes the emotional, affective, feelings and intangible aspects to complement the strong cognitive and pragmatic approach. – The historical background from the sciences and engineering can be refocused with a wider lens that also includes social conditions, meaning-making and human agency.	Mini-summary – Design thinking (DT) – The discussion emphasises the relation between people and the design project as an interactive dialogue that considers physical requirements, – It also reveals behavioural and emotional needs. – The evidence of integration tools and methods in a rigorous design practice, demonstrates an expanded design thinking methodology – It focuses on the essence of what it means to understand better and to formulate insight into perspectives other than that of the designer.

Design thinking – designerly thinking intersection

The shared paradigm of designerly thinking and design thinking, wicked problems, abductive reasoning and contextual meaning, give a platform from which to relate the two design discourses' methodologies. The discussion in this chapter reveals that there are many points of intersection that could potentially be spaces for designerly thinking and design thinking to move closer together. The individual foundations and origins mean that both bring different aspects of scope of design inquiry, which together, could be considered a richer and expanded design discourse. Evidence from design education and academia indicates the search for more connected methods, and practice shows integration, where research methods are being included in human-centred approaches. Therefore, this study considers the touchpoints as places of action, stimulus and transformation, grounded by perspectives and modal shifts (Figure 3-1).

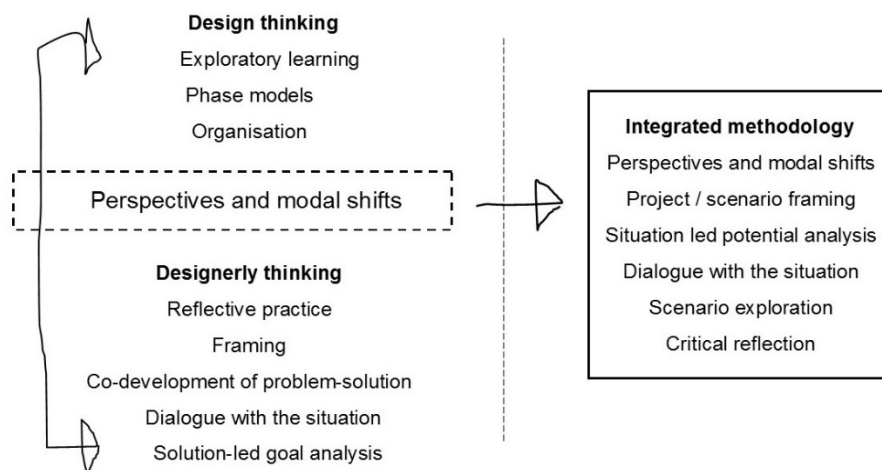


Figure 3-1: Shared methodological areas (DT and D ℓ T)

Chapter summary

Chapter 3 – Human-centred Design shows the potential of designerly thinking and design thinking to move closer together at various points of intersection. The value of this view is the potential impact on student designers, being exposed to a different ways of engagement and knowing within the context of different studio projects as part of their design learning. If the intent is to develop designers that are well-rounded and can work autonomously, then surely their design exposure should include multiple tools and methods in order to prepare them to address complex problems in practice. Different contexts and scenarios require a preparedness that is resilient, adaptable, responsive and responsible. Perhaps this integrated approach (theory and practice) could enable design students that are critically reflective and connected to projects, users and contexts, to show care that reaches beyond the profession of architecture into the everyday life of communities.

Chapter 4 TRANSFORMATIVE ENGAGEMENT

Transformative learning is not an add-on. It is the essence of adult education. With this premise in mind, it becomes clear that the goal of adult education is implied by the nature of adult learning and communication: to help the individual become a more autonomous thinker by learning to negotiate his or her own values, meanings, and purposes rather than to uncritically act on those of others (Mezirow 1997:11)

Chapter 4 considers cognitive and ethical development of students through connected and transformative learning within the context of various learning or human ecologies (Bronfenbrenner 1979) in the design studio. The theoretical exploration is from a developmental psychology perspective to increase an understanding of how threshold concepts affect the response and decision-making of students in an educational environment.

The discussion speculates on the relevance and value of hierarchical educational psychology models in a time where complex design problems require non-linear, responsive and relational design engagement. Especially in a milieu where the role of the designer is changing, no longer the expert dictating a process subjectively (egotist), or giving technical advice, but rather becoming a facilitator or interpreter, taking an entrepreneurial role, or becoming an advocate addressing local interests (Salama 2015:40). This shift from designers involved in making buildings and products, moving towards and expanding their mandate to include “social commitment and responsibility to societal and environmental concerns” (Salama 2015:40) brings another perspective motivating for transformative engagement in the spatial design studio. Design challenges are no longer one-dimensional. The rich and complex layered scenarios that are temporary and fluid bring a multi-dimensionality that requires designers to operate on various levels of understanding at once.

Other disciplinary fields also investigate the relevance of the traditional or hierarchical understanding of student development. In business education, Longmore et al (2017:1-3) propose a triple helix model as “a conceptual teaching and learning model anchored in transformative and constructivist perspectives”. They motivate for learning to enable adaptability, criticality and independence in students. Their triple helix model integrates the ‘whole learner’, ‘content and knowledge’ and ‘other learning agents’ as a transformative learning process across space and time (Longmore et al 2017:13).

Our proposed model moves beyond the emphasis on the teaching paradigm focused on instruction and cognitive mastery of content, toward a more complex, dynamic, and intentional process that fosters an environment for transformative learning and the development of learning competencies (Longmore et al 2017:17).

Sharing the same sentiment, Taylor and Hamdy (2013) argue for a multi-theories model based in clinical medicine education. They combine many theories as a flow diagram or cycle that can be entered at any stage: dissonance, refinement, organisation, feedback and consolidation. The theoretical grounding for their model includes theorists from the 1950s to the 2000s. They do not make explicit mention of hierarchy in development, but refer to actions of learning, instead of content (Taylor & Hamdy 2013:e1562-e1565).

Similarly, this chapter considers development on multiple levels by referring to theories from key texts and authors from the mid to late 20th century. This is a deliberate focus in order to better understand the developmental theory context in which many disciplines find themselves. The spatial design disciplines are not alone in this quest of finding other ways to foster transformative education in a world with increased complexity. Theories included are cognitive and ethical views (Perry 1970, Bloom 1956, Kolb 1984), affective theories considering values (Krathwohl et al 1964) and connected learning (Belenky et al 1986). These influence a person's premise reflection by considering impact on design values and a designer's worldviews (Mezirow 1991:108). Transformative learning is therefore influenced by reflective practice (Schön 1983). The discussion is considered in the context of the ecological framework for human development (Bronfenbrenner 1979) and the threshold concepts embedded in the learning.

Didau's (n.d.) taxonomy brings another interpretation of learning. He makes a radical departure from preceding theories by proposing a model based on modes of interaction. The discussion furthermore includes rival positions and criticism at key points. Table 4-2 towards the end of the chapter shows a broader scope and relation between developmental theories and approaches. It also highlights the authors promoting a hierarchical approach and those advocating for a more relational understanding to student development.

Cognitive and ethical development

Cognitive and ethical development have historically received the most attention (Perry 1970), compared to affective and subjective aspects related to educational growth (Krathwohl et al 1964). Similarly, research from landmark studies are often male dominated. This research emphasises the silent voices in the discourse by integrating female studies (Belenky et al 1986) and also the affective domain of learning and being in the world. Wilson (2008:17) includes indigenous voices as part of the silent voices and argues for new research agendas outside the "hegemony of the dominant system".

Perry's (1970) four-year longitudinal study at Harvard and Radcliffe in the 1950s and 1960s, with (mostly) white male participants (Perry 1970:ix, 3), provides a foundation for cognitive and ethical development of students in higher education. He identifies nine positions within four main categories or characteristics (dualism, multiplicity, relativism, commitment) as a predictable sequence in a student's epistemological growth (Perry 1970:9). The scheme centres on Position 5 ('Relativism Correlate, Compete, or Diffuse') where a student's knowledge and values are "relative, contingent and contextual" (Perry 1970:57). Preceding this position, the development revolves around "dualistic absolutism and towards this acceptance of generalized relativism" and afterwards, the focus falls on a relativist worldview towards "personal Commitment" (Perry 1970:57). According to Lyons (2010:27) the movement toward Position 5 is seen as a "revolutionary leap to understanding that all knowledge is constructed and relative (to something else, values, beliefs, etc.)" compared to the multiplicity that existed before. In a study by Combrinck and Venter (2020:21), findings show similar evidence where

students are able to shift their perspectives to “acknowledging positions different from their own, possibly questioning known values”.

Perry (1970:10) identifies categories that cause delay or regression in development, or deflection of developmental trajectory as ‘temporising’ (delay by hesitation), ‘escape’ (“deny responsibility through passive or opportunistic alienation”) and retreat (stepping back to Positions 2 and 3). This becomes noteworthy in contexts where students are confronted with experiences and situations outside their familiar comfort, which might cause them distress and anxiety, especially when threshold concepts are encountered (Meyer & Land 2003). Perry (1970:44) explains that confrontation of values, assumptions and responsibilities is required for a student’s ethical development in order to re-consider and redefine personal biases, as “an adventure of the spirit”.

Perry (1970:209-215) presents a critique of his study by pointing out the psychological context, educational milieu and limits to frame the investigation. Further critique regarding the one-sided sample representation (males at university) begs the question of the validity of the findings in a broader context and Belenky et al (1986) respond to this by focusing on *how* understanding is formed. It includes female participants that represent “nine different academic institutions and ‘invisible colleges’”, women of “different ages, class and ethnic backgrounds, and educational histories” (Belenky et al 1986:4, 12). The varying context of their study leads the process to “epistemological *perspectives*” instead of stages, where “universal developmental pathways are far less obvious” (Belenky et al 1986:15). They argue that future work might reveal if the perspectives are “stagelike”, as transitioning between them are related to life changes and context (Belenky et al 1986:15).

Lyons (2010:29) points to the epistemological difference between Perry (1970) and Belenky et al (1986) by referring to the female perspective, “not only how they viewed truth and knowledge, but rather how they saw themselves as knowers”. Their interviews reveal aspects related to a woman’s experience dealing with issues of ethical and intellectual development (Belenky et al 1986:11). It therefore considers “their own ‘gut’ feelings, or did they see themselves as users of producers that could deliberately help to validate knowledge?” (Lyons 2010:29). Five epistemological perspectives are identified: silence, subjective knowing, received knowing, procedural knowing, and constructed knowing (Belenky et al 1986). Rapaport (2018) aligns the Perry (1970) scheme and Belenky et al’s (1986) ‘ways of knowing’ in the following way: dualism and received knowledge (“right / wrong answers”), multiplicity and subjective knowledge (“conflicting answers”), relativism and procedural knowledge (“disciplinary reasoning”), and commitment and constructed knowledge (“integration of knowledge ... and reflection”).

Moore (in Lyons 2010:28) points out that ‘diversity and uncertainty’ and ‘levels of multiplicity’ are two important dynamics of Perry’s scheme, where the way in which students confront, cope and make meaning within this uncertain context of knowing or being, is “conjectural and uncertain, open to (and requiring) interpretation”. Within Position 5, students employ “rules of adequacy” for making judgements within particular contexts. Here the student is able to shift between contexts and can apply rules of adequacy to “inform information, concepts perspectives and judgements” (Cornfeld & Knefelkamp in Perry 1999:xxx). The ‘Reflective Judgement Model’ by King and Kitchener (2004) shows a relation to

Perry's scheme due to its sequential progression between seven stages in which students use reflective thinking and reflective judgement within various epistemological perspectives (King & Kitchener 2004:6).

In our attempt to give a description of the "how" of development within this broad philosophical setting, we have emphasized the interweaving of hierarchies of values with hierarchies of thought, of meta-valuing with meta-thinking. We regard this structural linking of valuing with thinking as providing a frame in which steplike degrees of ethical objectivity are possible and in which detachment, choice, and Commitment may function at generalized levels (Perry 1970:202).

The phenomenon of sequential development is also present in the development stage theory of Piaget (1936) from birth to adulthood, however Piaget does not consider individual, contextual or particular differences (Feldman 2004:180). In comparison, Vygotsky's (1978) social development theory, focusing on social interactions for learning within the 'zone of proximal development', offers learning on two levels, social (between people) and intrapersonal (within the self) (Vygotsky 1978:57). Perry (1970:108) agrees that the role of peers as a source of learning is highly regarded, as various opinions matter and it increases diversity of experience. Important to note here is that the process of learning takes precedence over the positions that are taken (Cornfeld & Knefelkamp in Perry 1999:xxxi). Social learning therefore indicates that a linear sequence of development does not promote interaction for spontaneous growth. Bloom's cognitive taxonomy (1956) is based on a series of hierarchical levels or focus areas for content learning. Krathwohl (2002) revised this taxonomy by including verbs as action terms that relate to individual modes of operation or collective actions, instead of a hierarchical approach. Kolb's (1984) learning cycle is grounded in relational abstract concepts (concrete experience, reflective observation, abstract conceptualisation and active experimentation) through which learning takes place. Concepts provide a fluid interpretation of learning moments, which are more conducive to learning in the spatial design studio.

Schön's (1983) reflective practice, as a way of moving between 'levels', links to King and Kitchener's (2004:11) "developmental range" in which students operate within "a space between functional and optimal levels" that is dependent on the learning situation. The question remains, how does transition take place between various stages? Perry (1970:111-112) provides an explanation,

Relativistic thinking, self-conscious in its newness in Position 4, gradually becomes habitual. [...] This expansion, at first conscious, deepens the tendency of the activity to become habitual. When it becomes a habit, then, like any other procedural skill that has become automatic, it ceases to demand self-conscious attention. Attention is freed from "method" to "the matter at hand".

Thompson and Thompson (2008:16) expand Schön's (1983) reflection-in-action and reflection-on-action by including reflection-for-action. They make it clear that reflective practice is non-hierarchical, as reflection-on-action provides opportunities to look backward and forward in the process simultaneously. Transitions between different modes of operation, therefore calls for attention to engaged and deliberate action. To balance student development, the often neglected affective domain

brings equilibrium to an over emphasised intellectual or cognitive perspective as a holistic approach to well-rounded growth.

Affective / connected learning

...develop their own authentic voices if they emphasize connection over separation, understanding and acceptance over assessment, and collaboration over debate; if they accord respect to and allow time for the knowledge that emerges from firsthand experiences; if instead of imposing their own expectations and arbitrary requirements, they encourage students to evolve their own patterns of work based on the problem they are pursuing. These are the lessons we have learned in listening to women's voices (Belenky et al 1986:229).

Continuing the discussion from a connected perspective, Belenky et al (1986) identify two different procedures as ways of knowing: connected and separate. Their understanding of a connected perspective emphasises different aspects to separate learning as the quote above indicates – connection, understanding, acceptance and collaboration over separation, assessment and debate respectively (Belenky et al 1986:229).

The research conducted in their study reflects that women's learning experiences are often not grounded in academic settings, but in "relationships with friends and teachers, life crises, and community involvements" (Belenky et al 1986:4). Their study furthermore differs from Perry's (1970) considering they included women from a varied context as compared to Perry's homogenous grouping. The result of this lies in the reference to the "sequential ordering of positions", which becomes visible in Perry's scheme (although students can retreat and temporise) where the progression is clearly defined. 'Women's way of knowing' takes a different perspective, where "universal developmental pathways are far less obvious" (Belenky et al 1986:15). The focus is on "epistemological perspectives" and Belenky et al 1986:15) state that further research is required to determine whether these have "stagelike qualities" and to determine the reasons and moments for transitioning between their perspectives, *silence*, *received knowledge*, *subjective knowledge*, *procedural knowledge* and *constructed knowledge* (Belenky et al 1986:15). Procedural knowledge focuses on understanding, not only of people, but also of objects,

By understanding we mean ... implying personal acquaintance with an object (usually but not always a person). Understanding involves intimacy and quality between self and object, with knowledge ... implies separation from the object and mastery over it (Belenky et al 1986:101).

In the view of understanding, connected knowing's aim is to get closer and to understand deeper as separate knowing, where a person tries to "enter the other person's frame to discover the premises of the other's point of view" in order to find a connection (Belenky et al 1986:101). Connected knowing is "harder to hear" than separate knowing, "because our ears were not tuned to it and because we never before listened with such care to relatively unschooled women" (Belenky et al 1986:102). Furthermore, they argue that connected knowing is not dependent on demographics nor only concerns women, but

can manifest in anyone regardless of gender. Belenky et al (1986:102) therefore state that connected and separate knowing could be “gender-related”, but not “gender-specific”.

Why is the discussion into connected and separate knowing valuable for this thesis? Procedural knowledge shows that perspectives, as discussed in *Chapter 3* or frame of reference (Mezirow 2018:114), as discussed in the section below, are complex aspects in the context of understanding in design. Moreover, it shows that connected knowing is not easily assimilated as part of the disposition of a person, which brings the question, whether ‘connection’ is achievable in a design milieu? This concern relates to the challenge with empathy and if every designer is able to expand an empathetic horizon (Thomas & McDonagh 2013:50). In order to gain a multifaceted view of connected knowing, pertinent aspects of separate knowing are listed in a comparison, Table 4-1.

Separate knowing is an etic approach, where understanding is gained from the outside, and connected knowing, is an emic approach, where the inside(r) view is sought (Yin 2016:16-17). Belenky et al (1986:104) however draw a distinction between subjectivism and separate knowing and explains that with subjectivism “everyone might be right”, but with separate knowing, “everyone – including themselves – may be wrong”. They point to separate knowers who are “suspicious of ideas that feel right” (Belenky et al 1986:104) and argue that trustworthy knowing is from personal experience and that through empathy, access to others’ knowing can be gained by “seeing the other not in their own terms but in the other’s terms” (Belenky et al 1986:112). The scope of this study particularly revolves around the search for “connected knowing”, a view or position that is more difficult to adopt. The activities of the biopic investigations therefore explore whether this shift in perspective from ‘separate’ to ‘connected’ is possible.

Table 4-1: Comparing separate and connected knowing (extracts from Belenky et al 1986)

Belenky et al 1986	Separate knowing	Connected knowing
(p 229)	Separation, assessment and debate	Connection, understanding, acceptance and collaboration
(p 101)	Evaluation, object at distance, self above, impersonal authority, justification, mastery over	Understanding and acceptance, listen, harmony with, enter frame of another
(p 101)	How they want you to think	How they think
(p 102)	“personal procedures for developing truth”	“emerges through care”
(p 104, 113)	“tough minded”, “opposite of subjectivism, doubting game”	“Personal, particular, and grounded in first-hand experiences”, believing game
(p 105, 114)	“remains suspicious”, “construct arguments”, “try to find something wrong”	“relatively informal and unstructured”, “understand why they feel the way they do”
(p 106, 115-116)	“adversarial form”, against authority”, unequal contests”	“like a clinical interview”, “interest in lives ... gradually shift the focus to other people’s ways of thinking”, “refusing to judge”
(p 107, 115-117)	“Academic game”, disqualify others, “powers of reason”, criticize”	“requires forbearance”, not controlling a situation “respondent to tell her story without interruption”
(p 108, 116)	“Separate knowers speak a public language”, “the primary purpose of their words is not to express personally meaningful ideas but to manipulate the listener’s reactions, and they see	“personality as adding to the perception” “you cannot call anyone’s experience wrong, you cannot call the opinion wrong. Connected knowers do not measure their people’s words by some impersonal

	the listener not as an ally in conversation but as a potentially hostile judge"	standard. Their purpose is not to judge, but to understand"
(p 109, 118	"Separate knowers' procedures for making meaning are strictly impersonal. Feelings and personal beliefs are rigorously excluded", dispassionate	"Authority in connected knowing rests not on power or status or certification but on commonality of experience" "they do not always find it easy to enter perspectives very different from their own. This requires real skill and effort"
(p 110, 121-122)	Disinterested reason	"opening up to receive another's experience into their own minds" involves feeling and thought
(p 115)	"Explicit formal instruction" within disciplinary field (lens)	"learns through empathy", "in the other lens of another person"

Wiggins and McTighe (2005:84) relate the six facets of understanding in *Understanding by Design*, to connected knowing when empathy and self-knowledge is concerned. They refer to value that a designer can find in another's perception and "metacognitive awareness" in personal prejudices and projections. When we realise our own 'habits of mind' (Mezirow 1997:5-6) that are shaped by our individual responses and directly influencing our understanding, or lack thereof, deeper meanings can be revealed. Noted here is the difference between constructing knowledge, compared to understanding, as ways of knowing. The cognitive taxonomy of Bloom (1956) supports the shift, as revised from 'stage' descriptors as nouns, to verbs (Krathwohl 2002), for example, knowledge to remembering and comprehension to understanding. Belenky et al (1986:121) emphasise that it requires skill and effort to "enter perspectives very different from their own". In addition, they state that "[t]he mode of knowing is personal, but the object of knowing need not be" as it might be related not only to people and objects, but also to situations (Belenky et al 1986:119). Mezirow's (1991:108) 'premise reflection' brings into view considerations of personal bias and an awareness of its influence, especially within a design context where preconceived ideas could be detrimental to understanding a contextual scenario.

Krathwohl et al's (1964) affective taxonomy, also known as Bloom's affective taxonomy, introduces attitudes, awareness, attention and responsibility of the affective domain into cognitive knowledge construction. The model considers receiving, responding, valuing, organization (of new values) and characterization by value (to focus personal adjustment). Lynch et al (2009:49) identify that the 'lower order' stages correspond to the cognitive domain, but upon closer inspection, the 'upper levels' relate to ways of knowing on a personal level (or 'on behalf of someone else'), instead of constructing knowledge. The emphasis on values and its ethical implications is of significance for design education where designers act on behalf of and in the interest of others. In a review and criticism of the affective domain, Morshead (1965:166-167) questions the contradictory statements the authors make when explaining that the affective domain, related to affective behaviour, also contains aspects of cognitive behaviour and supports that "internalization" becomes the "central regulative device" in the construction of a "meaningful continuum" of the affective domain. Krathwohl et al (1964:35) argue that internalization within the affective domain is not based on external stimuli, but on values or sets of values that an individual internalizes. When this perspective is taken, it becomes significant in the context of design education, as the designer is confronted by personal values and worldview that has the potential to be adjusted over time, as attitudes shift to become inclusive of other's perspectives (Mezirow 1991:107-

108) that are different to the designer's. Although for complexity of understanding and overall growth, the hierarchical levels (Morshead 1965:167) do promote transformative education, this investigation argues that the 'stagelike' manifestation might not always be applicable, depending on the particular context and nature of the design inquiry. This will be explored through the biopic investigations to follow.

Connected learning therefore considers personal and first-hand experiences to develop understanding and insight to know not only the conditions, but also the scenario leading to that experience (Belenky et al 1986:113-114).

As in all procedural knowing, it is the form rather than the content of knowing that is central. Separate knowers learn through explicit formal instructions how to adopt a different lens [...] Connected knowers learn through empathy. Both learn to get out from behind their own eyes and use a different lens, in one case the lens of a discipline, in the other the lens of another person (Belenky et al 1986:115).

Noddings (in Belenky et al 1986:122) refer to understanding of empathy, "does not involve projection but reception", which emphasises the need for "opening up to receive another's experience into their own minds" instead of projecting or "invading another mind". They furthermore argue that "highly reflective" individuals express a need to intersect "the public world of reason and the private world of feeling and unjustifiable insight" in order to construct a detached understanding of the system in which the making of meaning takes place (Belenky et al 1986:125, 127). This detachment relates to the empathetic cycle discussed in *Chapter 3* that considers detachment as the last phase to gaining deeper insights (Kouprie & Visser 2009:445). The shift to self-criticality and self-questioning (Belenky et al 1986:132) indicates the transformative development that integrates changing circumstances. Belenky et al (1986:138) recount one participant's view,

Circumstances change. Our way of looking at things change. Time may have given us what we think are right answers but it also gives us a different set of problems.

Transformative learning therefore relates to connected experiences, bound in time and space. It offers the opportunity for students to take responsibility for autonomous learning within a particular context that requires greater awareness and understanding of intangible matters. This process is unpredictable and relates to the growth trajectory of each individual student's transformative journey.

Transformative learning

Transformative learning ... is the process of effecting change in a frame of reference. Adults have acquired a coherent body of experience – associations, concepts, values, feelings, conditioned responses – frames of reference that define their world. Frames of reference are the structures of assumptions through which we understand our experiences. They selectively shape and delimit expectations, perceptions, cognition, and feelings. They set our "line of action" (Mezirow 1997:5).

Transformative learning can therefore be understood as a process, instead of an outcome. Mezirow (1978) introduces the concept of transformative learning and argues for a "critical dimension" in adult

learning “that enables us to recognise and reassess the structure of assumptions and expectations which frame our thinking, feeling and acting”. He refers to these “structures of meaning” as ‘meaning perspective’ or ‘frame of reference’ (Mezirow 2018:114). He refers to ‘meaning schemes’ with the potential to be transformed when a person considers the content and / or process of problem solving in a critically reflective way (Mezirow 2009:22). ‘Frames of reference’ are challenged in transformative learning, “which are structures of assumptions and expectations on which our thoughts, feelings, and habits are based”. He identifies two dimensions of ‘frames of reference’, *habits of mind* (based on assumptions) and *point of view* (appropriate another’s point of view), which are informed by cognitive, conative and emotional aspects (Mezirow 1997:5-6).

Frames of reference are primarily the result of cultural assimilation and the idiosyncratic influences of primary caregivers. Habits of mind are more durable than points of view. Points of view are subject to continuing change as we reflect on either the content or process by which we solve problems and identify the need to modify assumptions. This happens whenever we try to understand actions that do not work the way we anticipated. We can try out another person’s point of view and appropriate it, but we cannot do this with a habit of mind. Points of view are more accessible to awareness and to feedback from others (Mezirow 1997:6).

The difficulty within a connected learning context is the adoption of another’s perspective, as Belenky et al (1986) assert in the previous section. In addition, expanding the empathetic horizon (Thomas & McDonagh 2013:50) could pose a challenge to assimilate as an aspect of a person’s disposition, if they are not empathetically inclined. The question of empathy and perspectives is emphasised again, especially where designers are required to make mindshifts to foster deeper understandings. The biopic investigations to follow consider both habits of mind and points of view, and explore whether “deep structural shifts” are possible (O’Sullivan 2002:11). In *Expanding the Boundaries of Transformative Education*, O’Sullivan et al (2002) argue for a holistic or cosmological and integrative understanding of transformative education. Moreover, “[t]hrough *mindful practice* we are *learning our way into* seeing, acting, and understanding that which is not outside our current consciousness” (O’Sullivan & Taylor 2004:3). The value of affective knowing is also acknowledged in adult education, by Taylor (2009:11) referring to Dirkx (2006) that promotes emotional issues within the learning environment, feelings, beliefs and behaviours, which are integral to reflective practice. This view illustrates how complex and loaded the concept of transformative education is, similarly in the context of spatial design, where students are confronted with unpredictable design scenarios of human agency, contingency, appropriation and change.

Transformative education therefore becomes pivotal to the incremental process of modification through critical reflection. Considering reflection on assumptions, we engage in transformation that are “objective (task orientated) or subjective (self-reflective) reframing” (Mezirow 2009:23). The difference between objective and subjective reframing becomes significant to the design studio. Complex project scenarios challenge students with objective reframing, “points of view are changed when we become critically reflective of the content of a problem or of the process of problem solving”. In contrast, with subjective reframing “we become coauthors of the cultural narratives with which we have been inscribed” (Mezirow 2009:23). The latter could enable “significant personal transformations” due to the

self-reflection of personal ideas and beliefs (Mezirow 1997:7, 9). Subjective reframing relates to Schön's (1983) constructivist view of reflective practice, where the participant, user or resident's voice is integrated with that of the researcher, designer, or supervisor as a process of making meaning. It furthermore correlates with the empathy triad of Ross and Watling (2017:29) that proposes a constructive empathy model, focused to guide transformation through responsive, transactional and instrumental empathy.

In seeking the meaning of our experience, we engage in mindful efforts to learn, accepting others as agents with interpretations of their experiences that may prove true or justified, validating contested beliefs and understandings through reflective discourse, and assessing supporting reasons to arrive at a tentative best judgement – as opposed to resorting to tradition, authority, or force to make a judgement (Mezirow 2009:29).

The reference of other's experiences and meanings as agents, link to the design context's consideration of modal shifts (Cross 2006:88, Panero et al 2019) and acknowledging other opinions and perspectives as valuable (Brown 2009). Transformative changes lead to autonomous thinking and learning, resulting in autonomous, socially responsible citizens that can operate in a collaborative context in the twenty-first century (Mezirow 1997:7-8). Transformative learning therefore relates to a human-centred design approach as discussed in *Chapter 3* that motivates for the adoption of a frame of reference from another person's perspective by using the imagination (Mezirow 1997:10). It furthermore relates to normative dissociation as described in *Chapter 2*.

"Transformative learning is not an add-on. It is the essence of adult education" and includes critical reflection, challenging personal assumptions and beliefs and taking action through critical assessment (Mezirow 1997:11). In this way, a shift in attitude results in a different design ethos that reveals design issues and contextually emerging values embedded in problem framing. Kember (1999:23) identify three categories of reflective thinking according to Mezirow (1991:107-108), content reflection (*what*), process reflection (*how*), and premise reflection (*why*). Premise reflection is responsible for the redirection of actions and transforms meaning frameworks (Mezirow in Kember 1999:23).

Kember's (1999) study investigates the degree and nature of reflective thinking in medical students' written journals according to the coding scheme of the three categories mentioned above. In the findings, the authors report that for coding to reflect the premise reflection, a significant change must be identified in the evidence (Kember 1999:24). This demonstrates the rarity of convincing transformative thinking. In such instances, a discrepancy between assumptions and perspectives is revealed, as a "disorienting dilemma" (Mezirow 2009:19). Changing perspectives are seen to be incremental in the transformation process, rather than dramatic shifts (Mezirow in Brookfield 2010:228).

Content, process and premise reflection relate directly to loop learning, originally introduced by Argyris and Schön (1974) in the context of institutional learning of companies. Single loop learning relates to operations within given company goals, values and plans. Double loop learning refers to questioning the given variables and given operations that may lead to changing the variables, resulting in a transformation of operations to a new set of guidelines (Argyris 1977) within operations. Argyris (in Tosey et al 2012:292) refers to initial explanations of loop learning by referring to single loop learning,

that detects and corrects error without questioning its existing underlying values and system, and double loop learning, as introducing corrective action, after guiding variables are changed. Tosey et al's (2012:292, 300) extensive study reveals that triple loop learning does not appear in the works of Argyris & Schön (1974), but is related to Bateson's (1972) 'Learning III' as a "recursive hierarchy" with feedback loops between stages, in his framework of levels of learning. Furthermore, they relate triple loop learning to "deuteron learning", a higher order learning in organisations, first developed by Bateson (1958, 1972) and later introduced in organisational sciences by Argyris and Schön (1974). Triple loop learning deals with questioning the premise behind a framework, where Hawkins (in Tosey et al 2012:293-294) gives reference to treble-loop learning that addresses *why* within a company's values and paradigm. Roux et al's (2008:613) place triple loop learning within a social context by basing their understanding on the work of Argyris and Schön (1996),

In a social context, single loop learning relates to common practices, double loop learning to the assumptions that drive those practices, and triple loop learning to underlying values upon which the assumptions are based (Roux et al 2008:15).

This view of loop learning relates directly to Mezirow's (1991:107-108) content, process and premise reflection and this is noteworthy within a design education context where students are confronted with their own preconceived ideas, biases and prejudices within design projects. Roux et al's (2008:613) interpretation brings a dynamic relation between common practices, assumptions and underlying values that is multidimensional and interrelated – if the values should change, the assumptions and practices follow suit. Why is this understanding significant for spatial design? If we do not ask new, better or more intelligent questions that acknowledge and integrate different perspectives, designers remain within the same loop of learning. In this way, the multi-dimensionality of single, double and triple loop learning can facilitate and enable deeper understanding and better engagement and connection with complex design projects. When a designer acknowledges the value of the different focus areas that shifting between content, process and premise reflection (Mezirow 1991:107-108) offers, its value within the areas of investigation of stages in design, could be invaluable to generating empathetic awareness and contextual understanding. Medema et al (2014:27) relate triple loop social learning to a governance system at different levels, macro-level as "societal structural conditions", meso-level as "actor networks" or stakeholders, and micro-level as "collaborative learning processes" between stakeholders. The power and control, and / or agency and contingency embedded within such structures are aspects for negotiation or collaboration. In the spatial design disciplines, the perspective and attitude of the designer could be instrumental to facilitate the benefit of a larger contextual and human understanding. As Mezirow (1997:7) points out,

We transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based [...] We do not make transformative changes in the way we learn as long as what we learn fits comfortably in our existing frames of reference.

This research investigates what could happen when designers' traditional design practice is disrupted by a shift in perspective where a student deliberately adopts a human-centred approach, which might

be outside their frame of reference. This intervention not only challenges their understanding of a design inquiry, but it also confronts them with their personal worldview.

Learning ecologies

Questions like these highlight the developmental significance and untapped research potential of what are called *ecological transitions* – shifts in role or setting, which occur throughout the life span [...] The developmental importance of ecological transitions derives from the fact that they almost invariably involve a change in *role*, that is, in the expectations for behaviour associated with particular positions of society (Bronfenbrenner 1979/1981:6).

Bronfenbrenner's (1979) seminal work on ecological systems theory, *The Ecology of Human Development: Experiments by Nature and Design*, revised in 2009 as bio-ecological systems theory, introduces a system as context in which transformative learning can be understood. Eriksson et al (2018:419) consider the development of Bronfenbrenner's (1979) system within public mental health research, by first reflecting on the "ecological approach for human development" that introduces micro, meso, exo and macro systems as a nested model for development. Furthermore, they comment on the importance of context, and interaction of people in an environment that influences development, they relate "nature to nurture" and that,

... human development involves interaction between biological and psychological person and his/her environments, and the realization of human potential requires an intervening mechanism that connects the inner with the outer in a two-way process occurring over time (Eriksson et al 2018:419).

In addition, Bronfenbrenner (1986) adds 'chronosystems' where the impact of changes over time, concerning a person, but also within an environment, affects development. This leads to Bronfenbrenner's 'Process-Person-Context-Time' (PPCT) model (Bronfenbrenner & Ceci 1994) that revolves around "proximal processes" (Eriksson et al 2018:420). The emphasis of the PPCT model is on a microsystem scale through the interaction between persons, objects and symbols. The interrelatedness of the initial four-level nested model, the chronosystem and the PPCT model, address multi-scalar aspects, significant for spatial design education. This refers not only to the personal development and growth of a student's life as a learning ecology, but also to the multi-scalar understanding inscribed in a human-centred design approach. When students are provoked by an activity that falls outside their familiar studio practice, and they are requested to adopt a different perspective to that of their own, the disruption can ripple through all levels of their learning ecosystem. Starting with themselves (micro), circling into the studio with peers (meso), into their understanding of the role of spatial design in society (exo), reaching outward towards larger perspectives or worldviews by users, communities and the design profession (macro). It might be that there is conflict between perceptions of the various layers, therefore, the interrelation between systems becomes noteworthy.

When students' beliefs and values are shaken to the core, they have to take an honest and true view of themselves and the world in a critical reflective way, to determine why they want to be designers. Perry's (1970) reference of 'commitment', Belenky et al's (1986) 'constructive knowing', and Mezirow's

(1991:108) premise reflection, together with triple loop learning, present a platform from which to argue for citizenship designers (Resnick 2016). Citizenship designers have the capacity to engage with “the social, which is a multidimensional, complex, and delicate space” that requires a human-centred design approach, embedded within “situation-centred (social systems-centric) priorities” (Janzer & Weinstein in Resnick 2016:287-288).

The complex space in which design projects are situated, introduces unfamiliar concepts to a design dialogue and practice. Meyer and Land (2005:373) refer to their earlier work in which they present threshold concepts – in “certain disciplines there are ‘conceptual gateways’ or ‘portals’ that lead to a previously inaccessible, and initially perhaps ‘troublesome’, way of thinking about something”. They argue, “[a] new way of understanding, interpreting, or viewing something may thus emerge – a transformed internal view of subject matter, subject landscape, or even world view” which can be characterised as one of a combination of the following: *transformative*, *irreversible*, *integrative*, *troublesome*, or *bounded* (Meyer & Land 2005:373; Tucker et al 2014:153). Meyer and Land (2005:274-275) posit that threshold concepts are needed to confront students’ with their own subjectivity and move towards a modified understanding by “repositioning of the self” within the “transitional space / time” situation, or “liminal space” which the threshold concepts create in their thinking. Due to troublesome moments, some students might find themselves in “stuck places” (Ellsworth in Meyer & Land 2005:377) and resort to ‘mimicry’ in an attempt to engage in a familiar way. Traditional design approaches that are mechanistic and focused on the rational, poses a challenge within design education (Salama 2015:76). Biggs (in Meyer & Land 2005:278) argues for a learning environment and constructive approach to be more inclusive and tolerant of ambiguities and intangible aspects.

... she argued that the latter’s humanist, rationalist, universalist (and even dialogic) positionings were inadequate to move students on from their stuck places, owing to the incapacity of rationalist approaches to tolerate the unknown and the uncertain (because unknowable), the affective (because non-rational) and the contextualised / local (because non-universal) (Meyer & Land 2005:278).

Threshold concepts create a “liquid space” and transform themselves, and also enable transformation as students navigate the unknown territory the design scenario presents (Meyer & Land 2005:380). In the context of the biopic investigations, students are provoked with an unfamiliar approach and attitude, and in addition, disciplinary concepts are introduced to further the liminal experience. Threshold concepts require students to reflect critically on their prior experiences, knowledge and ways of knowing, in order to make meaning of the real-world challenges before them not as abstract concepts, but as the reality of people or users within a design problem. In a study concerning learning portals within library and information science, Tucker et al (2014:150) investigate the application of a theoretical framework of threshold concepts and make findings within a learning environment. They argue that liminal learning through threshold concepts is transformative and can cause a “profound identity shift, change in use of discourse and ambiguity about and in recalling the experience itself”, and “a learner’s ability to reconfigure existing conceptual schema or mental models” require time to evolve (Tucker et al 2014:152, 155).

The direct relation to Mezirow's (1991:5, 108) meaning schemes and premise reflection must be noted, also focused on ontological shifts and epistemological transitions. Their findings refer to two concepts that affect the possibility for deep shift to take place, 'praxes' (or ways of engagement) that include the skills and methods of the process, and 'traits', which are personal characteristics and attitude of a person (Tucker et al 2014:159). Meyer and Land (2006) present considerations of threshold concepts within course design in higher education by referring to engagement, listening and understanding, renewal of student's position, tolerance of ambiguity, "recursiveness & excursiveness", "pre-liminal variation", emergent and unintended consequences (Tucker et al 2014:162). Threshold concepts and liminal learning exist at the intersection of different ways of learning, the student's disposition and the disciplinary knowledge within a particular project. Other ways of design engagement can therefore complement traditional ways of design inquiry, as threshold concepts are explored in a more constructivist way as compared to a pure cognitive approach.

Didau (n.d.) reflects on Bloom's (1956) cognitive taxonomy and argues that the triangular representation brings a misleading understanding that the skills at the top are 'higher order' compared to the ones at the bottom. He points out that educators "rush to develop students' analytical and creative skills has had the consequence of making them less knowledgeable" (Didau n.d.) and his argument furthermore focuses on the importance of prior knowledge as a base to support a working memory in a learning situation. Didau (n.d.) proposes a 're-invention' of Bloom's cognitive taxonomy to address this misunderstanding. Didau's Taxonomy inverts the triangle with long-term memory ("crystallised intelligence – propositional & procedural knowledge") at the flat top and working memory ("fluid intelligence – raw reasoning ability") in the apex below (Didau n.d.). In between he introduces what he also refers to as 21st century skills, as declarative and non-declarative knowledge (Didau n.d.) that on closer inspection, can be related to explicit knowledge (problem solving and critical thinking), implicit knowledge (communication, collaboration and creativity) and tacit knowledge (resilience / motivation, metacognitive strategies and self-control / self-perception). Didau (n.d.) asserts that this taxonomy is not prescriptive or hierarchical, but descriptive instead. It relates to an understanding of integrative ways of knowing correlating to Kegan's (1982) *The Evolving Self: Problems and Process in Human Development*.

Kegan's (1994) educational psychology approach brings the development or evolution of the individual to the fore in a model outlining five orders of consciousness in which the position of the individual changes: socialised (stage 3) to self-authoring (stage 4) to self-transforming (stage 5). The underlying structure of making meaning of experiences and the world is 'across categories' that rely on interpersonal relationships (stage 3), 'systemic' that includes self-authorship, identity and ontology (stage 4) and 'system of systems' as the "dialectic between ideologies" (Barta 2019). These stages relate to different areas of manifestation, that Kegan (1994) lists as 'empathy / compassion', 'complexity awareness', 'contextual awareness', 'perspectival awareness', 'relational awareness' and 'self-insight' (Barta 2019), linking to Didau's (n.d.) 21st century skills. As a holistic understanding of a student's learning ecology, the different aspects demonstrate the complex development of transformative learning. The notion of the designer in context of different worldviews and different external perceptions

demonstrates the need for ontological shifts and epistemological transitions in spatial design education that integrates complex issues within a single design project.

The notion of learning ecologies also includes the position of the core design studio in relation to supporting modules, where students make meaning of theoretical content by interpretation as a way of knowing, in design projects. In addition, the idea that learning only happens in an academic studio, should be revisited, as engagements with external stakeholders and sites offer expanded opportunities for learning. Social issues and challenges introduce students to communities where different threshold concepts are encountered as complementary to the traditional studio.

The nature of the studio therefore stretches into the city and includes various people and community groups. The idea that only designers can design (Laursen & Haase 2019), is outdated, as design is open for anyone (Acaroglu 2017, Brown 2009) and the notion that non-designers do not have the academic or professional background and expertise, is an elitist or arrogant position to take. This study embraces the understanding of design thinking as a design practice of inclusivity, empathy and respect, which promotes collaboration and community-designer partnerships. This perspective of citizen designers (Resnick 2016) can permeate the larger learning ecology of the spatial design studio. The intent is to create allies in vulnerable communities and form relationships of trust, instead of eliciting reaction and resistance. Combrinck and Venter (2020:6) refer to reciprocal learning that supports this understanding as a two-way street of impact and development between designer and community. Learning moments exist as a continuum during a designers' life, and to think that knowledge is gained only in an academic context would be a mistake. The opportunities of a relational studio present learning moments where worldviews can shift, where designers and clients are equal collaborators.

Non-hierarchical integrated understanding

The study speculates that a non-hierarchical understanding or relational approach of developmental theories could represent a multi-faceted learning inquiry that is more robust than a linear or sequential way, as most models or taxonomies propose. The arrows in Table 4-2 below illustrate two possible scenarios to support this view.

Concerning Kolb's learning cycle (1984), a design project could require 'reflective observation' within a real-life context, which provides the student with a 'concrete experience' of a site or community that then can be used in an 'active experimentation' process to collaborate and explore concepts that are formulated by 'abstract conceptualisation'. In this example, it shows that interacting with and in a social environment elicits an experience from a connected knowing perspective, where the student receives the experience, and not the project assumptions. The concrete experience therefore contains not only reference to tangible aspects, but also to intangible matters that could have been missed from a superficial encounter. These two inform the modes of inquiry in dialogue with the experimenting process that is iterative and engaging of multiple voices or perspectives (designer and user perspectives) as

well as through collaboration with peers. This guides the development of scenarios and possible responses as part of 'abstract conceptualisation'.

The example using Krathwohl et al's affective taxonomy (1964) shows an interpretation where a designer enters a project with the same understanding as the user or client as partner or ally, and therefore can react from a position of mutual values ('characterising by values') and an equal attitude towards the scope of the project. A matching perspective enables the designer to 'receive' and 'respond' in a way in which a human-centred approach aligns with the project's 'value'. In this way, the 'conceptualisation' of the proposal can support the overall vision that is inclusive of all voices.

The two examples demonstrate firstly, a scenario where the designer needs to make modal shifts in perspective and attitude in order to engage in a connected and unprejudiced way, and secondly, the designer adopts the user perspective and can engage in a collaborative and interactive way. The consideration of Didau's (n.d.) taxonomy shows the possibility of including 'value reflection' to supplement Mezirow's (1991:107-108) content-, process- and value reflection in row F in table 4-2, when considered in relation to Krathwohl et al's (1964) affective taxonomy (characterising by value). Didau's (n.d.) taxonomy is interpreted in this study as different modes of operation, with declarative and non-declarative knowledge that moves between crystallised and fluid intelligence, in support of the non-hierarchical understanding of transformative learning theory. A relational approach to studio teaching is more suited to spatial design disciplines.

Table 4-2: Educational and developmental theory comparison

	Cognitive						[modes]	Affective	
Mezirow (1991)	Biggs SOLO taxonomy (1982)	Kolb's learning cycle (1984)	Gagne's learning hierarchy model (1956)	King & Kitchener (1994)	Perry's scheme of development (1970)	Bloom's taxonomy (cognitive) (1956)	Didau's taxonomy (n.d.)	Krathwohl' taxonomy (affective) (Krathwohl et al 1964)	Belenky et al (1986)
F [value]	Extended abstract	Active experimentation	Problem solving [complex procedure]	7-knowledge outcome of active inquiry 6-knowledge requires action and construction	9-Developing commitment 8-Orientation in implications of commitment 7-Initial commitment	Evaluation [creating]	-self-control / self-perception -metacognitive strategies -resilience / motivation	Characterising by value	Constructed [connected]
E - premise	Extended abstract	Abstract conceptualisation	Problem solving [complex procedure]	6-knowledge requires action and construction 5-contextual specific/shaped	7-Initial commitment 6-Commitment foreseen 5-Relativism correlate	Synthesis [evaluating]	-critical thinking -problem solving	Organising by conceptualisation	Procedural Connected
D - process	Relational	Reflective observation	Rule learning [relationships]	5-contextual specific/shaped 4-situational variables – abstract and uncertain	5-Relativism correlate 4-Multiplicity correlate	Analysis [analysing]	-creativity -collaboration -communication	Valuing	Procedural Separate
C - content	Multi-structural	Concrete experience	Concepts [systematic structures]	3-personal beliefs until absolute	3-Multiplicity subordinate	Application [applying]		Responding	Subjective [separate]
B	Uni-structural		Discriminatory learning	2-direct sensory observation	2-Multiplicity pre-legitimate	Comprehension [understanding]		Receiving	Received [separate]
A	Pre-structural		Basic types of learning	1-knowledge absolute/concrete	1-Basic duality	Knowledge [remembering]			Silenced [separate]

Regarding transformative learning theories and loop learning (Table 4-3), the study explores the value of a simultaneous or individual focused attention in the various stages, instead of a hierarchical approach. For example, within the context of Kegan's (1982) constructivist understanding, a designer might be required to focus on a 'system of systems' approach due to the complexity of the design project, but in another might have to consider relations across categories within a particular localised context. The required learning is therefore related to the nature of the project that matches with the designer's skill and disposition. It is therefore apt to argue that in such a case, the designer needs to be able to operate on all areas of intervention. This study explores *how* this can be achieved.

Concerning Mezirow's (1991:5) meaning schemes or perspectives, the 'model' could also be understood in reverse, where 'premise reflection' guides the focus of a design response and its intensity of understanding, which feeds downward to *how* the process is handled ('process reflection'), concerning the aspects of consideration ('content reflection'). In this view, the interrelation between the meaning perspectives is closer as the one informs the other directly. To illustrate, within a community garden project, the collaborative aspect informs the way the planting process, crop planning and work distribution is handled, versus a large agricultural farm operation, or a back-yard vegetable garden. The overall vision or ontological view directs the process, which is shaped by the sense of community and care.

Table 4-3: Transformative and loop learning

Transformation of meaning perspectives	Loop learning		Holistic (integral) transformation perspective	Constructivist understanding
Mezirow (1991)	Argyris and Schön (1974)	Triple loop learning (after Bateson 1972) – third order learning	O'Sullivan (2002) Ferrer, Romeo & Albareda (2005)	Kegan (1982)
Premise reflection – “an awareness of why we perceive”	---	Triple loop learning (context & principles / values) – transform (change in perceptions)	Inquiry (participatory approach)	5-self transforming mind (system of systems)
Process reflection – “reflecting on how we perform the functions of perceiving”	Double loop learning (frames / assumption & content) – reframe (change in thinking)	---	Training (bricolage)	4-self actualisation (systemic)
Content reflection – “reflecting on what we perceive, think, feel, and act”	Single loop learning (action & process / procedure) – react (change in behaviour)	---	Content (mind-centred)	3-Socialised mind (across categories)

Mini-summary

The discussion in this chapter considers transformative engagement from the perspective of the student, as a personal view, but also reaching out towards a larger contextual understanding.

Cognitive and ethical development. From a constructivist perspective, emphasis is on relational and contextual understanding in which students consider personal biases and assumptions in order to redefine their personal relation to the world and to expand their insight into different perspectives other than themselves.

Connected learning. This revolves around perspectives and shifting views, fostered by first-hand experiences to gain a deeper understanding of other's situations and realities. This is a difficult task and requires suspending individual views and preconceived notions about unfamiliar contexts and scenarios. The value of the affective side to knowing is highlighted which influences attitudes, awareness and responsibility towards the well-being of the user. The development and adoption of new values, to act on behalf of others, are promising in a spatial design learning context. The designer then not only projects the lives of others, but also receives, in order to formulate a deeper understanding.

Transformative learning. This is centred on change in ‘frame of reference’ that guides assumptions that set forth a course of action. The challenge that shifts in perspectives, not only the view of the designer, but also the intent of a design project, might require a designer to modify and re-adjust personal assumptions that could otherwise enable or disable the project. The responsibility of the designer becomes an ethical matter, where practices, assumptions and values are intertwined in the praxis of design and transformative learning. The result of transformative learning is the type of questions students ask within the context of a design project – does the response reiterate a predictable methodology, or reveal new and intelligent issues to better understand complex matters. How do we ask, how do we frame, how do we engage?

Learning ecologies. These contextualise the educational milieu in which transformative learning takes place, where the most difficult shift is on a personal level, which exists within a larger society and design profession. The student as person is highlighted and confronted with unfamiliar concepts, ways of engagement and personal worldviews, and is urged to see design as a collective and collaborate action. The importance for spatial design education is to equip students / designers in a “socio-spatial capacity” when dealing with high levels of design complexity and challenges regarding worldviews (Combrinck & Venter 2020:27). A transitional space of being and growth, allows a student to develop, retreat or to stagnate, depending on the trajectory of the transformation and their personal disposition. The benefit of such disruptive encounters is the value a student will gain over time, when ontological shifts and epistemological transitions are made towards inclusivity of society, of particular users, as responsible and responsive citizen designers.

Chapter summary

Chapter 4 – Transformative Engagement investigates the aspects of transformative learning within the context of spatial design education. It explores another view of current hierarchical developmental models to better support design education, by taking a non-linear or fragmented approach when considering levels of learning and stages in the design inquiry. Furthermore, it argues that connected knowing can equip students better to contribute as professionals in industry, when they are able to relate directly to users, clients, contexts and projects at large. When students confront their own preconceived ideas and superficial responses of separate knowing, they transform and move beyond and through issues in a connected way. Citizen designers can emerge who are able to collaborate with various communities, who can address complex design projects that are ambiguous in its framing, fluid in its manifestation, multi-faceted in its scope, contingent in its occupation, and rich in multiple meanings.

How does spatial design education foster possibilities for transformation?

Literature review summary: situating theory – academia and practice

The literature review chapters acknowledge the critical discourses on disruption by dissociation, human-centred design and transformative engagement. Below is a summary of the main points to integrate the key ideas of related fields and to highlight and address the gap in knowledge. These are relevant for multi-scaler investigations of related spatial disciplines and do not only focus on interior architecture. The human-centred nature of the investigation reaches beyond silos, towards a holistic spatial design inquiry. The study furthermore integrates the disciplinary topics for discussion across the three research questions as stated in the literature review. The interrelated fields require an active integration and synthesis in order to inform fluid and temporal situations and enable designers to engage with complex spatial issues.

Transformation, as a process of engagement, becomes the pivot to connect related themes.

- Shifting perspectives and worldviews are required to acknowledge, accommodate and embrace diversity, multiple experiences and realities within spatial design inquiries.
- An expanded empathetic awareness provides the grounding for a productive and constructive design interaction with various groups, communities and stakeholders to better understand diverse societal scenarios.

An increased integration of academia and practice is representative of transformation.

- The main touchpoint for integration of design thinking and designerly thinking, is the ability to not only shift between different ways of understanding (perspectives and ways of knowing), but also between various modes of operation (ways of engagement), to find deeper insight into fluid and ambiguous living contexts.
- The potential synthesis between design thinking and designerly thinking can provide a holistic approach towards a connected spatial design inquiry, both in academia and practice.

Ways of knowing through connected actions prioritise process over product in the search of deeper understanding.

- An emphasis on knowing as a process, beyond knowledge as a product, becomes the basis for connected and engaged learning.
- Various transformative methodologies are focused on making complex issues visible, instead of solving problems. These are seen in processes embedded in discursive design, design thinking and disruptive methodologies.
- Transformation expands to include diverse and plural expressions of identity to represent multiple intelligences and worldviews.
- A constructivist understanding reveals multiple voices to create opportunities for personal growth and transformation.

Disruption as catalyst to enable transformation

- Disruptive moments and experiences highlight values, both personal and collective, to frame the societal context in which design actions take place.
- Threshold concepts reveal students' tolerance of ambiguous contexts, new disciplinary content and other ways of learning.

intermission

The morning is cold on my skin. I have has been waiting for this day for a long time. I turn the corner with two crates in my arms, carrying a selection of second life materials to the studio. When I look up, a sea of eager faces meets my eyes. Some reveal a little fear for the unknown. Still, the excitement is palpable.

At the end of the session, I am relieved. It was a good experience in many respects. I hope that the students could really take something positive from it. Perhaps not everyone benefitted in the same manner, but still, it seems as if in some small way a shift can be seen on the horizon. Some became aware that there are other ways to approach design projects.

[biopic 1]

PART C METHODOLOGY AND BIOPICS

Research design

If you want to assume a relativist perspective, your theory in designing a case study may very well concern the way that you will capture the perspectives of different participants, and how and why you believe their different meanings will illuminate your topic of discussion (Yin 2014:17).

In light of an investigative approach, a qualitative research design is selected. It uses a case study approach, in particular the instrumental case study, with a focus on the issues of concern instead of the actual case(s) to show different experiences and perspectives (Creswell & Poth 2018:98-99). The case study, as empirical inquiry, investigates phenomena within real-world contexts and relies on multiple sources of evidence (Yin 2014:16-17). This research includes four workshops and thus explores four case studies, as multiple descriptive cases within an embedded design of various units of analysis. The descriptive approach to analysis describes the activities in the workshop as phenomena, within the studio, as real-world context (Yin 2014:50, 238).

Although the case study outlines the considerations for data collection and analysis, this investigation motivates for the use of 'biopic' instead of 'case study', as operative term. The biopic as investigation (Reynders 2012:6) is used as a device of the case inquiry. It is argued that biopic, with reference to biographical film, is dynamic and fluid and relates directly to the 'life' of a person or character in a particular context (Bingham 2010). Current scrutiny of the biopic genre reveals that its character is changing to include groups, not only individuals, in its representation (Vidal in Brown & Vidal 2014:22). Polasek (in Polasek & Cartmell 2020:310) notes attributes of the biopic (after Custen 1992) that are relevant in the context of this study: accurate and true; emphasis on subject rather than the plot; time and place specific; and containing montage or narrative techniques.

Therefore, the thesis focuses on the subject and 'process' of investigation, relating to dynamic and fluid conditions, which align with the meaning of biopic representations and not representing the static words 'case' nor 'study'. From here onwards, the four investigations will be referred to as biopic investigations, where the evidence of the 'life' and 'actions' of the experiences and interpretations of participating students are reflected in the different research activities, through the interpretive lens of the researcher.

Figure 5-1 below illustrates the unfolding of the biopic investigations, describing the context of each spatial design studio where primary data is collected, with a description of the studio project into which the workshop 'plug-in' is inserted. Creswell and Poth (2018:218) refer to 'within-' and 'cross-' case analysis where similarities and differences are noted, before assertions and generalisations are made based on evidence and reasoning. These are referred to as 'detailed-biopic' analysis where each workshop is discussed in detail and then analysed across the four workshops as 'relational-biopic' analysis. Yin (2014:164) refers to cross-case synthesis where individual cases were first completed. These are presented in *Chapter 6* as four pre-planned workshops, as four biopic investigations.

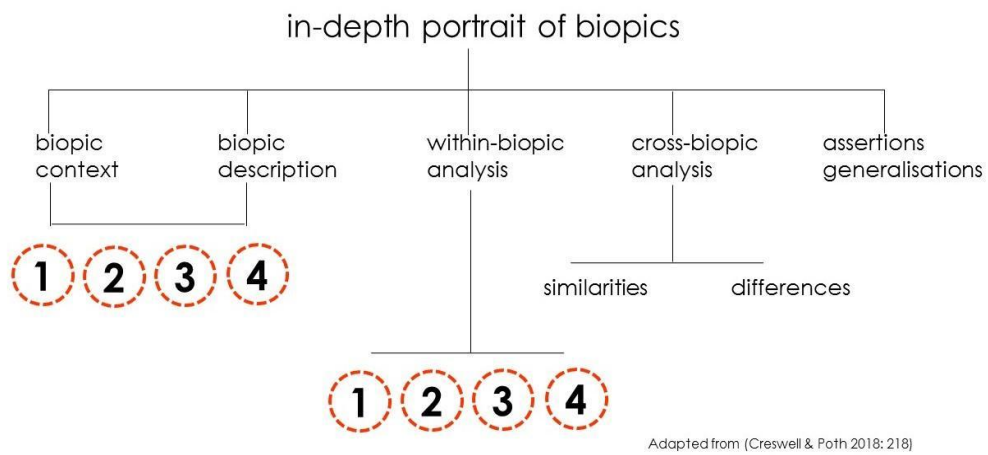


Figure 5-1: Biopic investigation overview

intermission

Students make meaning of the activities in their own way, they assume different personas, sometimes without realising it, in order to delve deeper into the issues they are questioning. Each one finds a 'handle', an 'entry point' into the workshop. For some students it is an intuitive process, for others, forced. The connection is established regardless.

I wonder and observe, student and researcher, each with their own experience, expectation.

Chapter 5 IMMERSIVE METHODOLOGY AND THE 'PLUG-IN'

Paradigm and approach

The reality that life experiences and worldviews of people lead to varied interpretations of what is meaningful is the focus in this part of the research. It relies on the responses of participants and is situated as a constructivist philosophical worldview and interpretive framework (Creswell in Cohen et al 2018:9; Creswell & Poth 2018:24). Where groups of students participate and reflect on the workshop activities, an array of responses, including very personal perspectives, inform the data. Cohen et al (2018:23) explain:

...people actively and agentically seek out, select and construct their own views, worlds and learning, and these processes are rooted in socio-cultural contexts and interactions. In other words, cognition is generative and active...

The generative aspect of constructivism supports the study's spatial design learning focus. Students are actively involved in the understanding of complex issues and decision-making in design. The social side to constructivism relates to the studio environment through interactive peer learning. Here, the processes of design development and iteration assist in the conception, cognition and construction of meaning (Hammersley in Cohen et al 2018:23). As such, the methodology of this study is process-driven and not solely focused on physical or quantifiable outcomes, from both the perspectives of the research participants and the researcher. The constructivist educational philosophy therefore supports the view of students as design researchers and active agents in their own learning, while also contributing to learning of their peers.

This study acknowledges the risk of a constructivist approach that assumes that students have the skills, knowledge and experience to construct meaning on behalf of others and in that way formulate an in depth understanding of different worldviews that are not their own. Alternative worldviews are dependent on "multiple realities, value-bound research, limit to time- and context- specific findings and irrelevant of cause-effect investigations" (Yin 2016:22). The intent of the investigation is to deliberately expose students in the spatial studio to other ways of knowing and making meaning, to create an awareness of other perspectives, to confront personal prejudices and create awareness of different understandings. Although they might not have the required knowledge or skills, similarly, practitioners in industry might also have gaps in their experience to shift their understanding of complexity in design projects.

The biopics are situated in the third year studio, to demonstrate the potential of transformation. It is assumed that they have the capability to become aware, although they might not be able to internalise their experiences. It is not seen as the only place or moment where transitions are possible. In fact, learning is continuous and depends on personal biases and dispositions. However, they are given the opportunity to make sense of the process in their own ways, albeit fragmented or biased from a designer's perspective, instead of a human-centred approach. The study speculates to what degree students (designers) are able to empathise with users, and realises that responses could cover a spectrum of intensity and engagement.

The introduction of a human-centred approach in the studio further assists in the cognition of needs and requirements of users, other to that of the student as a designer. By adopting an emic perspective (from the social sciences), the participant's view reveals an 'insider' perspective on the research (Creswell & Poth 2018:91). The emic perspective serves a dual role in this study: the researcher can obtain the view and experience from the students as participants, but also enable them to be immersed through a human-centred approach as a user/occupant to formulate an 'insider' understanding of matters concerning the project.

The qualitative research tradition supports the constructivist worldview, by placing people at the centre of the study. Cohen et al (2018:288) explain that people create meaning through social interactions in specific contexts and it is up to the researcher to understand and interpret the multi-varied situations and conditions. The inductive process starts with particular observations to discover patterns to make meaning of phenomena (Babbie 2014:22). As one of the characteristics of this qualitative study, it is informed by direct collection of primary data in the spatial design studio, as a natural setting. It provides rich narrative descriptions detailing how behaviour shapes understanding of complex issues in design. Participant perspectives support the emerging and evolving nature of this investigation as the study unfolds (McMillan & Schumacher 2014:345). It furthermore shapes the researcher's understanding and insight during the discovery and exploration of data analysis and findings related to the four different workshops.

The workshop – plug[interiority]

The detailed plug-in workshop discussion in *Chapter 1* sets the scene for the unfolding of the biopic investigations' data collection and analysis. The different activities (listed below) allow students to engage critically during the four-hour duration, in which the students generate primary data as active participants. "Active cognition and deliberate perception" assist in the construction of meaning (Cohen et al 2018:23) during each of these activities, in which students are confronted with their own views. Furthermore, "...this affects the worlds we inhabit and the way in which we interact with the objects and people in them" (Cohen et al 2018:23).

_1a problem statement

Awareness of the macro context, the meso environment, and micro scale encounters

_1b descriptive keywords

Focusing the essence of the initial experience and personal perspective with words

_2 spontaneous vignettes

Translating intangible aspects and scenarios into visual representations

_3 critical artefacts

Making symbolic and abstract representations by internalising of complex concepts

_4a & c critical reflection 1 & 3 – self and peers

Interaction and discussion of personal interpretations; group discussion at end

_4b critical reflection 2 – written reflective essay

Individual critical reflection on frames of reference, perspectives and worldviews

The workshop provides opportunities for students to make personal connections and to immerse themselves, as they feel comfortable, within the discomfort of this disruption in their studio project. They have the chance to reflect on their own identity as a designer in the built environment. Giddens (in Crouch & Pearce 2012:5) argues that “... we have to *work at* discovering our identity.” The question of a design student’s identity revolves around the potential for developmental transformation of the self in relationship to others and the world. Crouch and Pearce (2012:13) say that designers and researchers have a lifeworld or habitus (after Habermas and Bourdieu respectively) that is “formed through informal and unconscious negotiation with institutions that regulate us [...] as a subjective realm...” This forms the context for personal perspectives and bias in the designer’s mind-set and attitude towards design challenges. The workshop aims to challenge these views and judgements in order to set the scene for personal growth and transformation. The question of identity then extends beyond the individual into the designer’s role as agent, to facilitate positive change in situations and contexts where needs of other people are prioritised.

The plug-in is used in the core design studio, as deliberate intervention, but the study hopes to demonstrate that this way of knowing could be central to studio engagement in academia and practice. It is situated within the supporting modules of the particular programme’s curricular content and acknowledges the relational condition as integrated learning. Knowledge is imparted in the supporting modules, and interpreted through actions and ways of knowing in the design studio, which is not seen in isolation. This forms part of the larger debate on design for the future and a new description of design thinking (Figure 5-2).

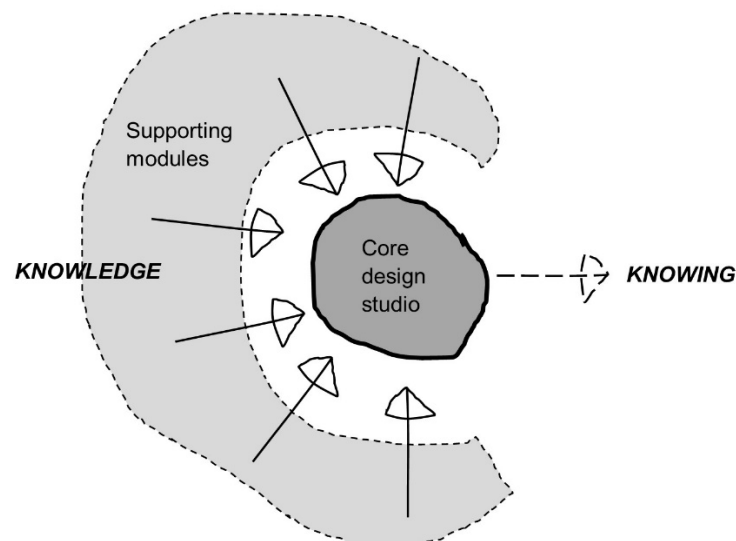


Figure 5-2: Integrated ways of knowing – core design studio and supporting modules

Sample and population

Participants in the research are selected using purposive sampling, where small groups with knowledge of a particular topic, are chosen (McMillan & Schumacher 2014:5). Third year interior architecture and design students from three higher learning institutions (biopics 1 to 3), form the purposive sample for this study, together with a cross-disciplinary student group in biopic 4. The inclusion of the combined student group, representing interior architecture, architecture and fine art, from third and fourth year programmes, was unintended. However, this study embraces the unpredictability as part of the exploratory nature of the investigation, as the students in biopic 4 have a similar understanding of the complexity of the design within an architectural field in the built environment, to the rest. Moreover, as a purposive sample, the student group as a whole is within or close to the exit year of their qualification and selected for the growth potential in their cognitive, ethical and creative development within an educational milieu. These comparative characteristics provide the basis for the researcher to conduct the instrumental biopic investigation in multiple workshops by inserting the same disruptive action in the four biopics.

Research ethics

The University of Pretoria research ethics process supports this study, as all ethics clearance and approvals are obtained prior to the start of any research activities. All students, as active informants, are voluntary participants by giving their permission for collaborating in the research when signing an informed consent form. The researcher explains the details of the workshop during a pre-briefing session, including how it relates to their current studio project. A PowerPoint slideshow introduces the scope and focus of the intended activities, thereafter an interactive question and discussion session follows. The studio project of biopic 4 already has a disruptive nature and thus no pre-briefing presentation is required. The details specific to the workshop activities are discussed in all biopics during an interactive question session on the day of each workshop, outlining the context of the design project into which the insertion takes place.

The students' creative work (primary data) is treated confidentially and anonymity is assured, unless students explicitly give permission to be identified. All students, except three in biopic 3, grant full permission to be identified in photographs. The rest give full informed consent to be identified in photographs and for use of their names associated with their work. Students can withdraw at any stage during the activities. Three students in biopic 3 did not complete the workshop. The full data set is kept in secure storage at the University of Pretoria. Ethics clearance approves that results can be made available in this PhD thesis, can be included in accredited journals and conferences, and will be publicly available on the university's online platforms. However, confidentiality of participants remains assured where requested. Ethics clearance supports the research project at large (reference number EBIT/77/2018). See research ethics approval from the University of Pretoria's Engineering, Built Environment and Information Technology (EBIT) Faculty Research Committee, dated 30 July 2018, in Appendix A.

Role of the researcher

The researcher documents the primary data by means of collecting the hard copy evidence of work produced during the four-hour activities (text, drawings and three-dimensional artefacts). In addition, the entire process is photographed and observational notes made with the researcher in the studio environment with the students, as an observer. This presence as studio master or coordinator is a normal phenomenon in the general studio context, although the researcher is only known to students in biopic 1. Flick (in Cohen et al 2018:310-311) lists four roles of the researcher: stranger, visitor, insider and initiate. This study concerns the first three roles, as the researcher is foreign to biopics 2 to 4 and never becomes a complete participant. However, the in-situ situation informs the unfolding of the activities of each biopic and informs the unstructured observation (Cohen et al 2018:543).

This immersion is part of the qualitative research situation (McMillan & Schumacher 2014:20). The role of the researcher, placed on a continuum between 'insider' (complete participant) and 'outsider' (detached as observer) (Cohen et al 2018:311), is important in relation to participant observation that could facilitate or limit the degree and nature of the students' responses. Whilst mutual understanding of the workshop exists between researcher and participants, the cooperation and buy-in from the students remain the challenge during the workshop activities. This influences the students' perception and experience of the researcher as part of the studio – insider versus outsider.

Various classifications of observation on the continuum of observation become evident and can be seen: b1 – *participant-as-observer* and known to the students with intimate knowledge of their development; b2 and b3 – *complete observer*, with covert observation in the studio; and b4 – *observer-as-participant* with some participation in the studio context (Cohen et al 2018:543). The researcher's entry into the context is transparent and clear, however, buy-in from all the groups cannot be guaranteed at the outset.

Morrison (in Cohen et al 2018:543) outlines various settings in which observation for data gathering takes place: physical setting, human setting, interactional setting and programme setting as outlined in Table 6-1 in *Chapter 6_Biopic investigations*. These frame the research and enable the researcher to make detailed observational notes. In this way, 'critical incidents' can be revealed, albeit seemingly insignificant at the time. These could provide important insights into matters concerning the investigation (Cohen et al 2018:551), as it is inductive in nature, where topics or themes emerge from the workshop data (McMillan & Schumacher 2014:3; Yin 2016:100). The unveiling of small moments of insight are important in the context of the study where the emphasis falls on evidence of transformation and a shift in student development.

Qualitative data collection

Biopic investigation data

The data collection process takes place in the design studio, where students participate in the workshop. Each activity requires students to complete certain actions, which are documented real-time. A series of A2 sheets capture the students' responses. Table 5-1 outlines the nature of the data collected per activity. In addition, the researcher and research assistant document field notes through participant observation during the workshops and reflexive notes afterwards (Yin 2016:152, 169). Data captured by the studio's own studio masters and / or external examiners, complete the data set.

Table 5-1: Workshop data collection

_1a problem statement	_1b descriptive keywords	_2 spontaneous vignettes
Written statement A2 sheet	A series of words on A2 sheet	Five vignette drawings on A2 sheet
_3 critical artefacts	_4a & b critical reflection 1 & 2 (self and peers)	_4c critical reflection 3 (self and peers)
Symbolic or abstract representations, from second life materials or objects	Written notes on A2 sheet	Written notes on A2

Qualitative data analysis

Triangulation

The biopic investigations allow for triangulation of data on multiple levels. Cohen et al (2018:265) list different types of triangulation, which includes those relevant to this study, methodological triangulation and investigator triangulation. Four workshops are conducted, using the same workshop brief, but at different locations with consideration of different studio projects with related contexts, as well as a variety of student groups.

Methodological triangulation makes provision for "the same method on different occasions or...different methods on the same object of study" (Cohen et al 2018:265). The same workshop is facilitated at four different schools, combining different modes of engagement through a variety of activities. In this way, an array of responses is documented, as students are expected to document their observations and experiences in text, images and three-dimensional artefacts using second life materials. Through critical reflection of complex problems, primary data becomes personal representations of active studio inquiry. As investigator triangulation (Cohen et al 2018:265), the researcher and research assistants observe and document the workshop activities by making observatory notes as the activities unfold and by capturing reflexive notes afterwards. Triangulation in this instance exists in the triad between the intent of the students producing the work as original data creators, the assistant who is an outsider to the workshop, and the researcher as primary data collector, who is integral to the process. Each participant is documenting independently to the other (Cohen et al 2018:265) and in this way, a relation between the research voices is established.

intermission

The data analysis phase is an intuitive and manual process where I use coloured pens and markers in a spontaneous sequence of analysis without coding. The mere thought of coding causes my throat to tighten, as the interpretive freedom, in my opinion, would be lost. I also want to stay connected to the data, as an 'old school' analogue approach speak directly to my creative and inquisitive spirit. I am nervous during this process, because the academic support to follow such a route still eludes me. However, I trust my intuition and continue with the process I devised, which includes a variety of rigorous and systematic steps. Although I am a rhizomatic thinker, I know it is important to prove an empirical process of inquiry. One day, quite late in the process, Robert Yin's book, 'Qualitative research from start to finish' (2014) crosses my path when it unexpectedly finds me in a local bookstore. This acquaintance changed everything.

Analytic phases

The analytic process described by Yin (2016:186), contextualises the qualitative data analyses of the biopic investigations through a cycle of five phases: 1-compile, 2-disassemble, 3-reassemble, 4-interpret and 5-conclude with an interactive movement between the stages to ensure rigour and critical reflection. The data of the four biopics, detailed-biopics as individual investigations (Part 1, *Chapter 6*) and relational-biopics as cross-comparisons (Part 2, *Chapter 6*), are analysed between September 2018 and June 2020.

1-compile

Stage one of the qualitative data analysis includes compiling and sorting of primary data as a database of evidence. This is a methodical process where the hardcopies of various A2 worksheets by students, researcher and assistants' field notes and reflective notes, examination evaluations, including external feedback, students post feedback, together with photographic evidence of the process and artefacts, are sorted and categorised using manual and computer assisted tools (Yin 2014:124; Yin 2016:184). The chain of evidence supports the triangulation of analysis and findings of data sources, evaluations, perspectives and methods (Yin 2014:120). Access to raw data and detailed analyses can be requested from the researcher.

Primary data compilation occurs during the workshop duration, between August 2018 to March 2019. Data sets are rearranged in order to systematically collate evidence from 56 students, including three assistants and three examiners, within four workshops. The examiners did not participate in the workshops; their comments were only noted for the purpose of further triangulation of data. A first round of preliminary analysis contextualises the data to orientate and familiarise the researcher with the scope and initial topics emerging related to research questions (Yin 2016:191). Refer to Figure 5-3.

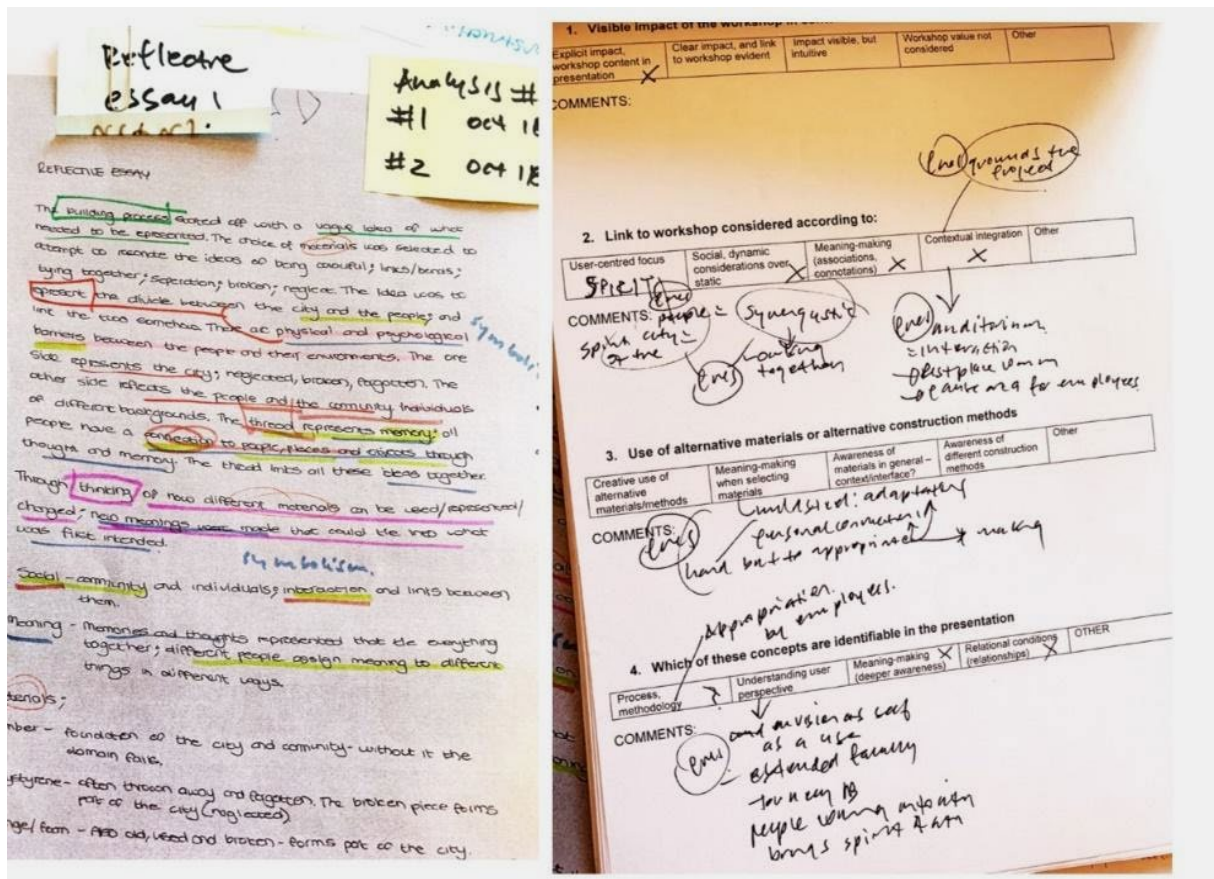


Figure 5-3: Compilation of primary data

Detailed-biopic analysis (within)

2-disassemble

Stage 2 is a recursive process that critically reflects on the workshop brief, the research questions and literature review during the disassembly. In this study, connection to the data is maintained by using coloured pens and markers and working on copies of the students' worksheets to identify concepts and topics, especially in the analysis context without coding. Each student's work is considered individually and a summary per activity in each biopic is written and the findings captured in a matrix or diagram.

In spite of the uncertainty, many researchers prefer to disassemble their data without formal coding because creative ideas seem to move faster and better. To overcome the inevitable pitfalls of inconsistency and inaccuracy that might occur, these researchers will then return to their original data many times and make sure that their disassembled topics are as faithful to the original data as possible (Yin 2016:200).

Figure 5-4 shows an example of the disassembly stage, where vignettes are analysed as visual data. Researcher notes are included using strategically selected colours that relate to different topics emerging. These are transferred to a separate sheet to record findings of each activity per student.

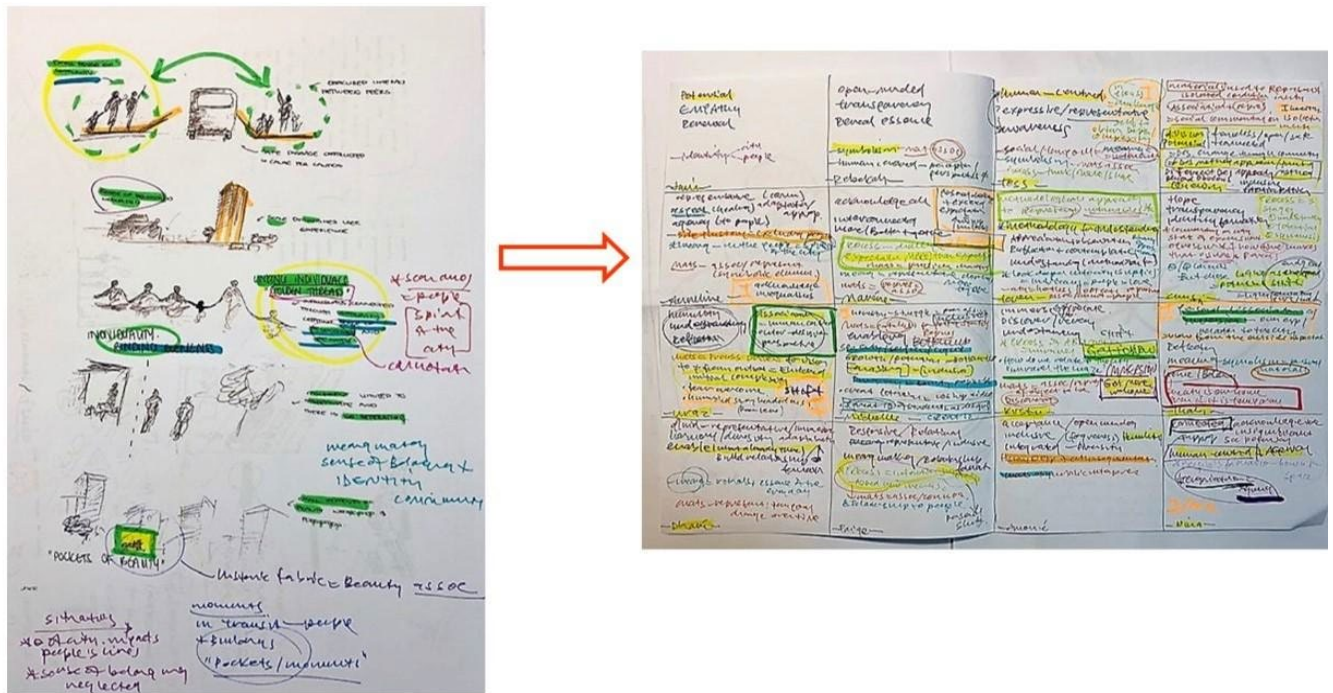


Figure 5-4: Disassembly of primary data

Derived notes

Yin (2016:200) points out that during this phase, the compilation of derived notes is useful when the process is conducted without coding. Figure 5-5 below illustrates the way derived notes are integrated. The primary data is transcribed into a table and the adjoining empty column is used for hand-written derived notes, colour-coded as per the highlighted sections in the transcribed data to the left. The visual analysis of vignettes and related notes are also exemplary of derived notes.

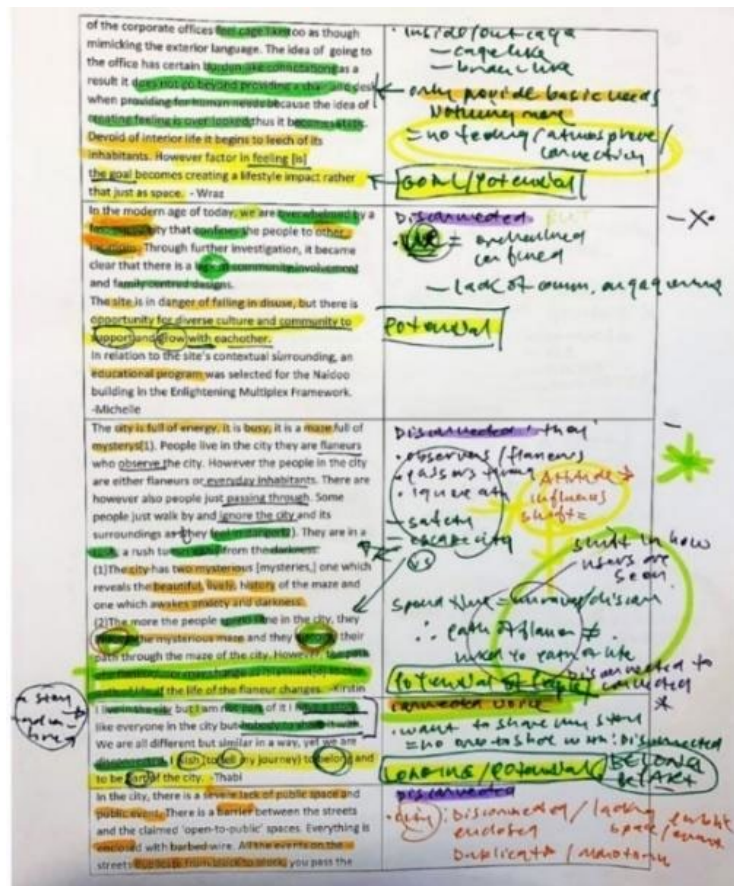


Figure 5-5: Derived notes during disassembly

Recursive abstraction

To supplement stage 2-disassembling of Yin's (2016) qualitative data analysis cycle, recursive abstraction as qualitative data analysis tool is introduced, where data are condensed systematically in six steps to disassemble phrases into a condensed collection of patterns (Polkinghorne & Arnold 2014):

- 1: *record* phrases or responses of participants
- 2: *transfer* highlighted phrases into a table related to research questions
- 3: *paraphrase* data into concise units of data
- 4: *combine* similar responses to create themes
- 5: *code* responses as themes
- 6: *identify* patterns.

Table 5-2 below shows an example of the recursive abstraction steps with the use of a student quote (b1_Dhané). Step 4-combine shows that the analysis reveals manifest (data interpretation from the brief) and latent (emerging data findings identifying other related topics) (Schreier 2012:176).

Table 5-2: Example of recursive abstraction

1. phrase	2. transfer	3. paraphrase	4. combine	5. themes	6. patterns
"...the aim however is not to formalise the 'singing in the streets', but to merely extend it."	-not to formalise -but to merely extend	-not formalise -extend	-not formalise -extend -appropriate -choice	-fluid -user control	HUMAN -CENTRED

Recursive abstraction has been criticized in that it is a method that could disregard data as part of the abstraction process and as a result, not be reliable (Oun & Bach 2014). Polkinghorne and Arnold (2014: 2) argue that when steps four and five (combine and themes / codes) are repeated, the researcher moves between topics to look for common links informed by control data that was collected by the researcher at the start, to contextualise the analysis. They recommend the referral to original transcripts when patterns are identified, in order to ensure validity in meaning. Oun and Bach (2014:256) further recommend the researcher to declare the data omitted and included after every stage, with a motivation for validity and accuracy of data analysis.

This study adapts recursive abstraction as described above, by including diagrams or mind maps (Martin & Hanington 2012:118) as a visual means to organise the data in order to find relational meanings (Figure 5-6). In this way, the analysis moves beyond tables of data, into interconnected fields of data, revealing relationships and integrating steps four to six of recursive abstraction visually. The study integrates the disassembly of each activity for each biopic as detailed-biopic investigations, aligning with the research sub-questions.

An adapted recursive abstraction process is used:

- 1: record responses of participants in a two column table (transcripts left, notes right)
- 2: highlight pertinent phrases in coloured pens and markers to identify different topics
- 3: identify the context of use regarding the topic in the adjoining column
- 4: transfer the data per topic to a separate sheet (includes all students per biopic)
- 5: create a mind map of the data to indicate the (inter)connections
- 6: simplify the mind map into a condensed graphic

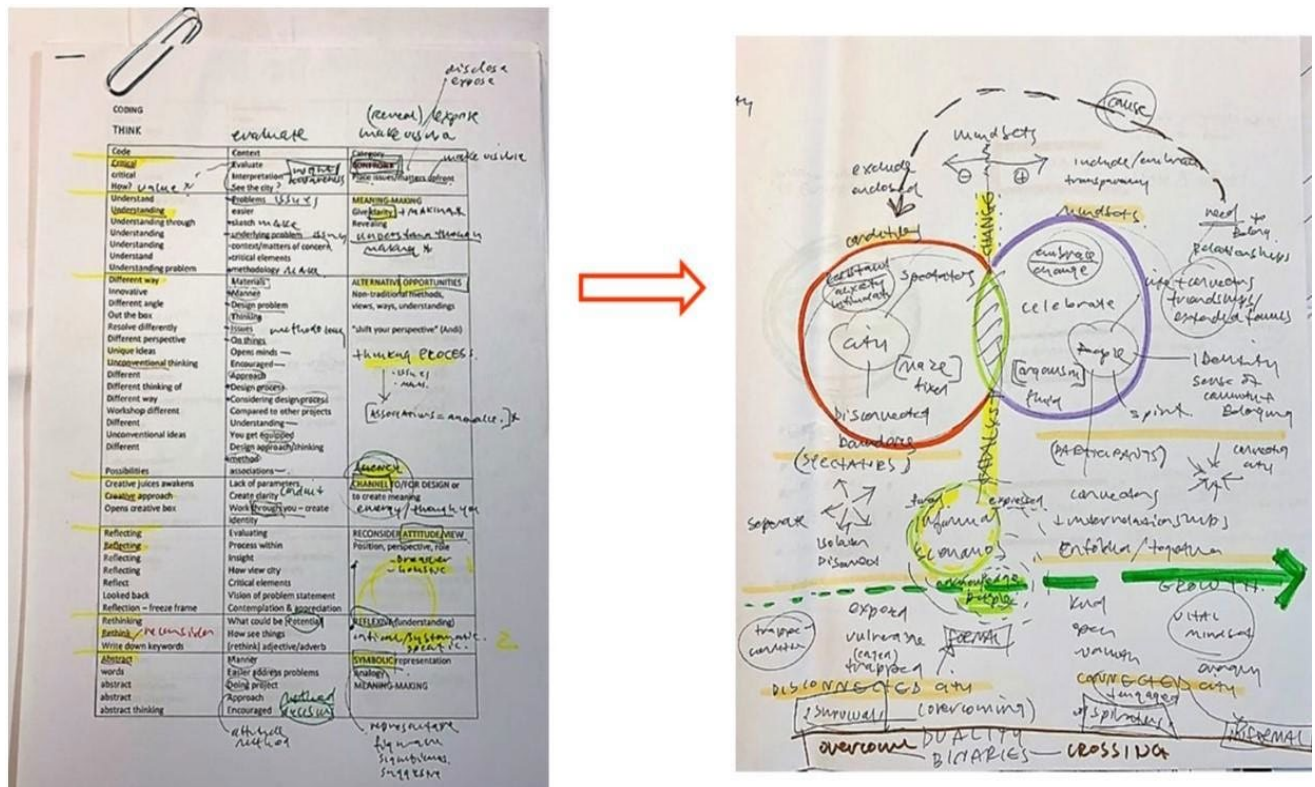


Figure 5-7: KWIC analysis and visual representations

Phases 1-compile and 2-disassemble of the Yin's (2016) analytic phases are used in the detailed biopic investigations to delve into the essence of each of the individual workshops. Stage 3-reassemble facilitates the relational biopic investigations, where cross comparisons are made between the four schools, across the various workshop activities, and according to themes and topics emerging.

3-reassemble

The third stage, reassemble, is a continuation of the hands-on process of inquiry and according to Yin (2016:202) this is where ideas are sorted, comparisons are made and new insights are revealed. The relation of various experiences and expressions by students linked to research questions, result in the identification of patterns. The use of data arrays (tabled analyses) of topics emerging as shown in Figure 5-8 becomes part of the inductive process (Yin 2016:204).

During 3-reassemble, seven patterns emerge from the data: 1) disruptive modes, 2) levels of dissociation, 3) empathetic routes, 4) ways of thinking, 5) process in action, 6) developmental transformations, and 7) challenge : shift. These are highlighted to form the interpretive framework of the thematic narratives in the next stage, 4-interpret.

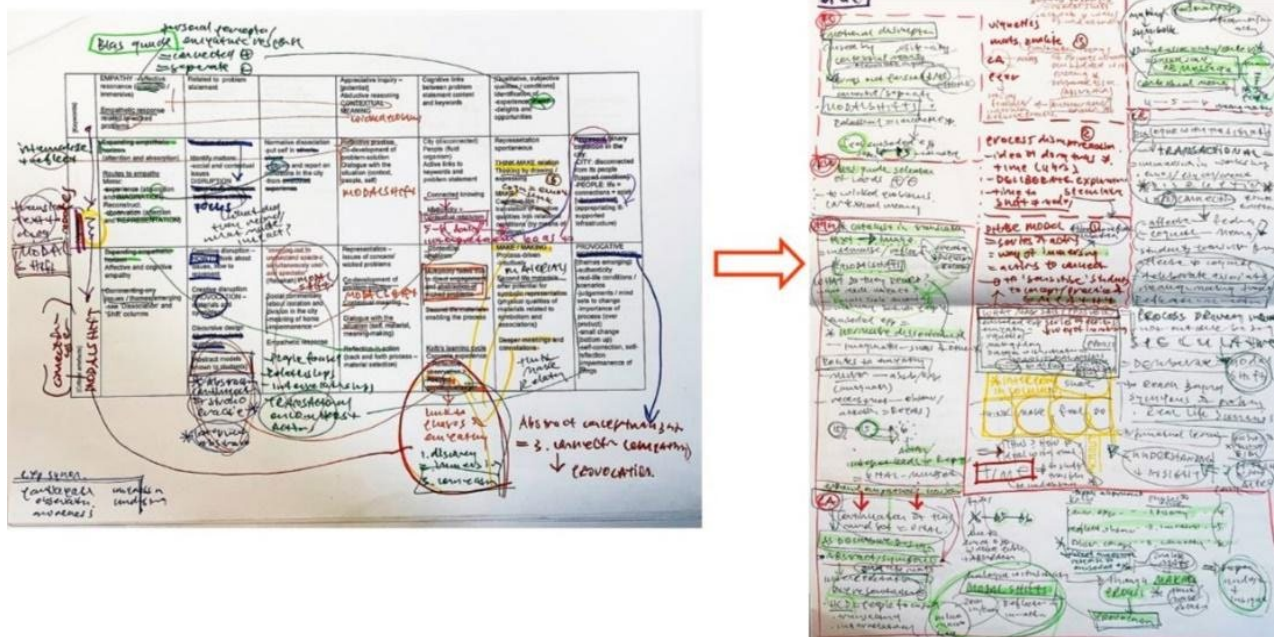


Figure 5-8: From data matrix as an array to biopic narratives

Thematic matrices (Figure 5-9) are completed per detailed biopic, which are reassembled as relational biopic investigations. The analysis cuts across the four workshops in comparison as summary frameworks for findings. The hierarchical relationships between the patterns are used to structure the interpretive frameworks: “To get started in this process, a chronological matrix would enable you to search for patterns of change” (Yin 2016:205). This is especially useful where the research aims to investigate possibilities of transformational shifts in student development within the context of research-through-design (Tharp &Tharp 2018:126) and design education.

During this phase of the analysis, direct quotes are included to ensure the analysis stays close to the data and to avoid the researcher’s own bias. Robustness of interpretation is critical, as rival thinking is considered in order to refine interpretations (Yin 2014:210). Empathy is an example. It could be seen as a beneficial way to connect to other’s needs and situations (Kouprie & Visser 2009), but rival thinking argues it to be a hindrance and obstacle (Bloom 2016).

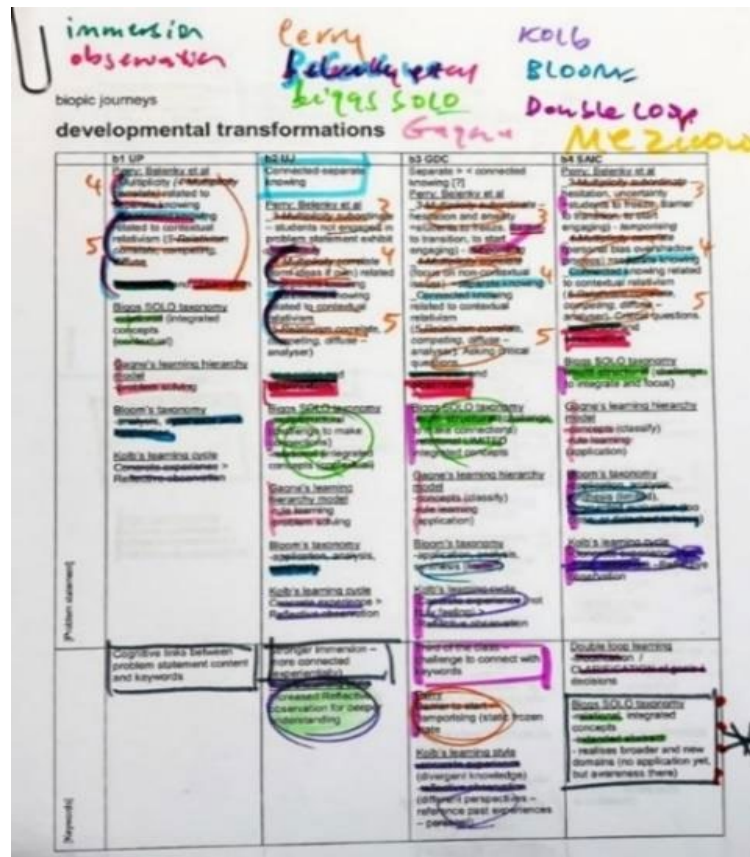


Figure 5-9: Thematic matrix as summary framework

4-interpret

Interpreting may be considered the craft of giving your own meaning to your findings – that is, your reassembled data and data arrays. This phase brings your entire analysis together and stands at its pinnacle (Yin 2016:220).

The analysis journey is a sequential process from derived notes in 2-disassemble, to data matrix as array and biopic / thematic narrative writing in 3-reassemble. The meaning of findings is consolidated in 4-interpret, where the condensed workshop journeys are documented. These are written as detailed accounts of the relational findings across the four biopics, according to each of the seven themes as listed above. The fourth phase, 4-interpret is where the significance of the study emerges and the discussion relates to what the finding of patterns means in the research context as a comprehensive interpretation (Yin 2016:218-220). Since this is an inductive and interpretive research project, Yin (2016:219) describes the implications of data,

Use of the term *interpreting* deliberately signals the possibility that others might interpret the same data differently. If you are ambitious, you may want to strive for an interpretation that anticipates the main alternatives and addresses why those may be less compelling.

By going into a descriptive mode, the summary frameworks developed for the seven patterns in 3-reassemble are used as detailed baselines to write the workshop journeys of the relational biopics

(Figure 5-10). The literature review supports the said narratives where theoretical grounding for concepts and interpretations are corroborated and references noted in an interpretive way (Cohen et al 2018:20).

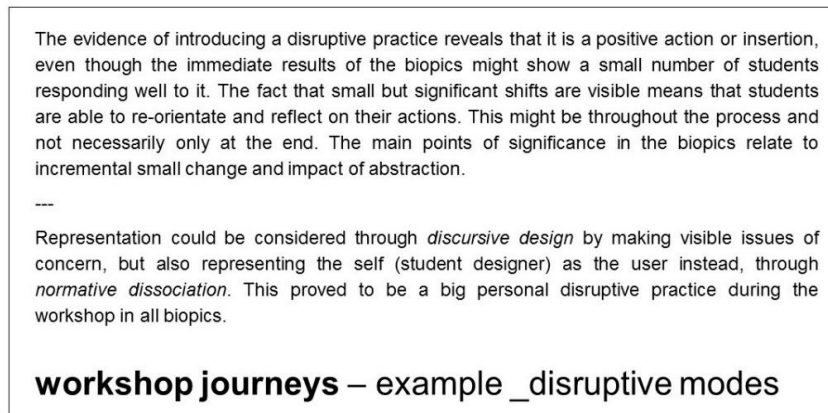


Figure 5-10: Workshop journey per thematic narratives

Yin (2016:222) outlines three modes of interpreting in order to ‘craft’ the interpretation section with a specific aim: description, description with call for action, and explanation. This study uses a combination of the first two. In description, the meaning and interpretation of findings are focused through a descriptive framework guided by the researcher’s interpretive discretion. In this study, the reference to ‘framework’ is reconsidered and the use of ‘guideline’ preferred instead. As the investigation is speculative, probing and asking questions not aimed at finding solutions, a fixed framework becomes too prescriptive. Guidelines are interpreted as fluid and responsive to various contexts and interpretations. In this light, the patterns emerging in 3-reassemble, are used for the discussion, which could have been different, depending on another researcher’s interpretive discretion (Yin 2016:223). “[D]escriptive frameworks can aim at interpretations about much broader issues...” and be used as a “mode of interpretation”, according to Yin (2016:224). Thick descriptions (Geertz in Yin 2016:227) reveal deep understandings of the research context where new lines of thought can emerge directly from the participants’ perspectives. Combining these experiences with relevant literature can lead to an understanding of broader contextual insights.

Description with call for action flows from the main description, as in this study, the call for action is not considered beforehand (Yin 2016:228). The need for action is revealed during the analysis and is not a true call for action, but a call for continued critical inquiry, an extended provocation for speculative design education to further research-through-design in the spatial design studio. Yin (2016:230) cautions for a declaration of bias and reflection of scholarly care at this point, where advocacy issues need to be grounded in related literature, to be credible.

Journey mapping and visual confections

Visual representations of findings are communicated by means of complex diagrams, visual confections (Tufté 1997) or journey maps (Marin & Hanington 2012:196). The study maps the biopic journeys to reveal the reflective moments, where evidence of transformation becomes visible in order to view at a glance the student experiences. This includes the degree of engagement of the workshop, the threshold concepts, impact moments and shifts appearing. These include detail regarding emotions, engagement, peer interaction and transformation across the four-hour timeline, together with a summary of threshold concepts also appear (Figure 5-11). The interpretive phase is empirically grounded by integrating research findings, related to the literature review and three research questions.

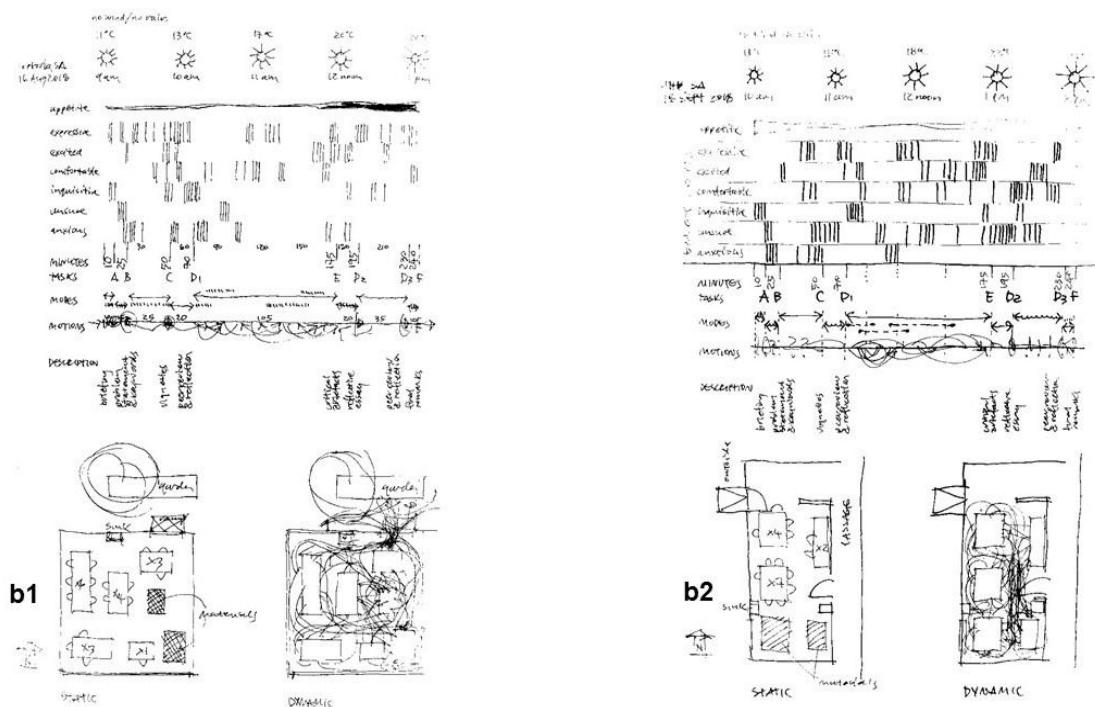


Figure 5-11: 'Working' journey mapping and visual confections example

5-conclude

A conclusion is an overarching statement or series of statements that raises the interpretation of a study to a higher conceptual level or broader set of ideas (Yin 2016:235).

The conclusions are based on evidence from the empirical process in the preceding phases. It should speak to the "so what" regarding the research and also consider the relevant types of conclusions listed by Yin (2016:233-242):

- 1) *Making substantive propositions*: The research extends its provocation to reveal substantive issues (Yin 2016:236), or wicked problems.

- 2) *Challenging conventional social stereotypes*: Challenging conventional or traditional design practices in the spatial design studio, by refocusing on a human-centred approach.
- 3) *Discoveries about social behaviour*: New ways of thinking relate to point two above, where perspectives and ways of design engagement could be transformed.
- 4) *Generalising to a broader set of situations*: The exploration of the idea of a plug-in workshop in various contexts, programmes and typologies, to determine the value across a wider audience and participatory sample. The research however does not attempt to generalise, but to acknowledge the influence of contextual meaning. In this light, replication of methods and duration of workshops are all in an attempt to upset the current status quo in order to ask questions and find deeper understandings of social and living scenarios.
- 5) *Concluding by taking action*: The provocation remains; however, the study excludes the creation of an implementation plan. Future actions are dependent on the attitude and values of like-minded academics, researchers, practitioners and students, continuing the discourse and provocation.

Chapter summary

Chapter 5 described how intuitive data collection and analysis processes were grounded in methodological literature for reliability and credibility of the findings. This contextualised the methodology of the study and described the data analysis in relation to the plug-in workshop's purpose and intent. The various phases of qualitative data analysis provide the basis for Section A (Detailed biopics) in *Chapter 6_Biopic investigations* to follow, as the analysis relies heavily on narrative accounts by participating students. The thematic patterns identified earlier, guide and extend the discussion into the relational biopic-integrated comparison as Section B.

Chapter 6 BIOPIC INVESTIGATIONS

Introduction

Chapter 6 presents the qualitative data analysis and findings of the workshops, as biopic investigations. The analysis is conducted with reference to the research questions and the analysis process described in *Chapter 5*, Yin's (2016) qualitative data analysis cycle without coding. The narratives and findings to follow are derived from the keywords in context (KWIC) analysis (Bernard & Ryan 2010:192) and an adapted recursive abstraction (Polkinghorne & Arnold 2014) to support Yin's analysis stage (disassemble). An example of detailed analysis sheets, including data matrices and biopic narratives are included in Appendix C as empirical evidence of the process.

The chapter is structured in two parts. Firstly, (*Section A*) condensed biopic narrative details that provide background and overview of the four individual workshops by reporting on the main considerations and themes emerging related to impact moments, threshold concepts (Meyer & Land 2003) and the degree of engagement. The analyses situate the plug-in workshop as a disruption onto the active running design project of each biopic. Primary data as evidence include workshop activities, field notes during the workshops and reflective notes thereafter, documented by the researcher and research/workshop assistant(s). Secondly, (*Section B*) the relational biopics that highlight the results and findings as an integrated discussion across the four workshops. As thematic narratives, the discussion searches for 'sense-making' that traces the chronological sequence of the workshop activities in order to highlight the transformative journey of students. The individual threshold concepts identified for each biopic are reassembled as seven thematic narratives emerging from the detailed investigations. Readers who are less interested in the detailed data analysis and considerations of evidence are welcome to skip to *Chapter 7* for the discussion or *Chapter 8* for the conclusion.

The sub-questions inform the analyses in the following ways:

sq1: *How does the insertion of a disruptive action by dissociation as designer, influence meaningful connection and design engagement?*

Shifting the focus from designer perception to user understanding, in an attempt to connect deeper to design challenges, is informed by the problem statements, keywords and vignettes.

sq2: *How can the adoption of a human-centred approach expand an empathic understanding when dealing with complex spatial design issues?*

By deliberately considering not only the users' tangible needs, but also intangible or unspoken needs within a specific contextual understanding, by focusing on the making of critical artefacts using second life materials and obtaining peer feedback.

sq3: *How does the shift to the insider perspective transform design thinking in students to reveal other design agendas?*

The reflective essay forces students to critically consider different modes of interaction during the workshop engagement. The analyses trace the potential impact on the trajectory to completion of the active studio project and reflects on the post feedback students provide.

SECTION A – Detailed biopics overview

Biopics in context

The biopic investigations represent four tertiary institutions, purposefully selected for their spatial design programmes in interior architecture, interior design and architecture. Three South African institutions are included: public university – University of Pretoria (UP), a comprehensive university – University of Johannesburg (UJ), a private college, Greenside Design Center (GDC), and an independent school of art and design, The School of the Art Institute of Chicago (SAIC) as the international institution. Background information of each workshop provides the context for the in-depth analyses, which considers the research settings in the following ways (Morrison in Cohen et al 2018:543), as summarised in Table 6-1.

- Human setting: details and characteristics of participants
- Programme setting: ethos and values of the school, design studio brief, pedagogical context
- Physical setting: description of space, organization and contextual conditions
- Interactional setting: group dynamics, peer interaction and the role of the researcher

Table 6-1: Detailed biopic comparison

	b1	b2	b3	b4
Qualification				
<i>Faculty; Department; Programme</i>	Faculty of Engineering, Built Environment and IT, Department of Architecture (UP)	Faculty of Art and Design, Programme of Interior Design (UJ)	Programme of Interior Design (GDC)	Department of Architecture, Interior Architecture & Designed Objects (SAIC)
<i>Qualification</i>	Bachelor in Interior Architecture Degree	Bachelor Degree Interior Design	Bachelor of Arts Degree in Interior Design	Bachelor of Fine Arts in Studio (Architecture and Interior Architecture Pathways)
<i>Ethos of school</i>	Eco-systemic approach; relationship user-object-space; nested systems; human-centred; practical community engagement; regenerative design; environmentally responsible design	Sustainability, technology and human environmental needs; practice into the city; role of design to improve the world; innovative spatial solutions	"different by design " philosophy; innovative creative; workplace simulations; functional, user-centred, technologically driven; sustainable; positive impact	"Provocative thinking and Making"; interdisciplinary; self-directed; symbiotic with city and diverse communities; contradictions of living and complexity
Human setting				
<i>Student group</i>	Third year Interior Architecture Students -16 students	Third year Interior Design students -13 students	Third year Interior Design students -19 students	Third and Fourth year interdisciplinary group (IA, A and Fine Arts) -8 students

Programme setting – active studio brief details				
<i>Programme;/typology</i>	Corporate office - workplace design	Neighbourhood convenience store	Energy efficient luminaire	Critical artefact for public display
<i>Context</i>	Virtual office building in Pretoria CBD	Self-selected suburban neighbourhood	Self-defined domestic space	Exhibition context
<i>Project details</i>	Client derived from context; interdisciplinary urban block vision, agile office design principles	National client – real-life simulation; integration of context in design	Prototyping process and detail; PPC concrete material; effect on mood/space	Abstract representation of issues, artefact as provocation; pluralistic research methods
<i>Duration</i>	14 weeks (1 semester)	4 weeks	4 weeks	16 weeks (1 semester)
	b1	b2	b3	b4
Plug-in workshop				
<i>Date</i>	16 August 2018 8:30-12:30	18 September 2018 9:30-13:30	18 February 2019 8:00-12:00	19 March 2019 18:00-20:00
<i>Timing</i>	Beginning of week 3	Week 3	Week 2	Mid-term/semester
<i>Activities</i>	As listed in brief	As listed in brief	As listed in brief	Adapted procedure
<i>Trajectory</i>	Final integrated November exam	Project presentation end of week 4	Project presentation end of week 4, prototyping phase	Final examination and public exhibition
<i>Assistants</i>	Studio assistant as research assistant	None	Studio coordinator as research assistant	Studio-coordinator (co-supervisor) as studio assistant
<i>Data analysis</i>	1-Compile: Sep 2018, Feb 2019 2-Disassemble: Feb 2019, Aug 2019 3-Reassemble: Feb 2020 4-Interpret: Apr-June 2020 5-Conclude: June 2020	1-Compile: Sep 2018, Feb 2019 2-Disassemble: Feb 2019, Aug 2019 3-Reassemble: Feb 2020 4-Interpret: Apr-June 2020 5-Conclude: June 2020	1-Compile: Mar 2019, 2-Disassemble: July 2019, Sep 2019 3-Reassemble: Mar 2020 4-Interpret: Apr-June 2020 5-Conclude: June 2020	1-Compile: Apr 2019, 2-Disassemble: July 2019, Sep 2019 3-Reassemble: Mar 2020 4-Interpret: Apr-June 2020 5-Conclude: June 2020
Physical setting				
<i>Physical setting</i>	Shed-like structures; access to outside; water; dedicated workspaces	Shared model building room; access to outside; group layout	Studio on second floor; shared studio with cluster layout	Shared group studio; multi-level scenario
Interactional setting				
<i>Students</i>	Spontaneous informal engagement	Spontaneous informal engagement	Little interaction between students	No interaction between students
<i>Workshop relation to studio practice</i>	Workshop focus aligns with pedagogical approach of studio master; other ways of engagement expected	New pedagogical approach to studio practice; disruption of the familiar process	New pedagogical approach to studio practice; disruption of the familiar process	Continuation of pedagogical approach to studio practice; workshop used to clarify ideas
<i>Role of the researcher</i>	Trusted insider	Outsider / visitor, students tolerated and embraced unfamiliar process	Intruder / stranger, outsider	Intruder / stranger, outsider (apprehensive to researcher's interaction)

Below is an overview of the main narrative journeys of the detailed biopics, highlighting the major aspects students consider during the workshop, including the influence in the active studio design projects. The researcher's descriptive and experiential narratives contextualise the discussions (in italics). An outline of the disciplinary themes (*what*) *emerging* from the discussion is mentioned to illustrate how the various studio projects focus and guide the nature of the interaction. The four biopics demonstrate that the variety in the active studio projects offers opportunities for threshold concepts (Meyer & Land 2003) to emerge and that these can be different depending on the particular design discipline in which the plug-in workshop is inserted.

Biopic 1 Condensed biopic journey

It is 4pm on a cold winter's afternoon. We all meet at the State Theatre's open square for a walkabout through the streets of the inner city of Pretoria. The day is slowly ending, a busy time for city life as people are packing up and storing away sidewalk activities and goods of informal trade. Some streets require us to navigate the high density of people and vehicles, constantly moving, for the last sales of the day must still happen before sunset. Bargaining, negotiation, a fluid state of interaction and transaction. The sounds of the city creep into your being. The last rays of sun disappear as we make our way back to our starting point. It is cold. The city shuts down. In the dark, we contemplate the observations we made – the inability of the city to cater for these basic needs. How static architecture stand unresponsive to the transient nature of life and living.

This first encounter with the immediate context of the workplace design project provides a direct emotional reaction, due to the embodied experience of the context and site. An overwhelming meeting, an assault on the senses, for students unfamiliar with the CBD, but an everyday occurrence for those at home in the city.

WALKABOUT experiences and emotional connections

The walkabout experience is at the heart of the workshop engagement, causing an emotional disruption related to the students' embodied immersion in the context. The strong impressions elicit very personal responses showing biases and emotional reactions when re-living the encounter. It sets the scene for the unfolding of the workshop investigation. The analysis reveals the preconceived ideas students hold when reliving the event, which is either a positive response, being at home in the city, or an unsettling and unfamiliar experience. Students relate in different voices of dissociation (disconnected or connected) and reveal certain issues as themes, by expressing these as metaphors, with focus primarily on the potential the immediate contexts holds.

Themes emerging (WHAT) as conduit for engagement

- Socio-economic, political and cultural challenges expressed in the city
- Psychological urge for social interaction, emotional well-being
- Inequality and concerns around accessibility, human agency and appropriation
- Small scale encounters – interrelationships between people, identity formation
- Dynamic and social considerations – human focused, over object / solutions

What is difficult to transfer from workshop to design project?

- Links are mostly intuitive without the richness and complexity expressed in the workshop

- Maintaining the connected knowing perspective throughout
- Empathy as driver for design decisions, focus reverts to practical considerations
- Transferring a connected understanding from:
 - 'empathy to users in context' to deeper understanding of user of the office space
 - Emotional connection beyond contextual absorption, to programmatic relevance
 - Ability to relate complex problems beyond selection of client into creative spatial design
 - Interpretation of own abstract thinking in workshop critical artefact, into spatial strategy for office design with meaning

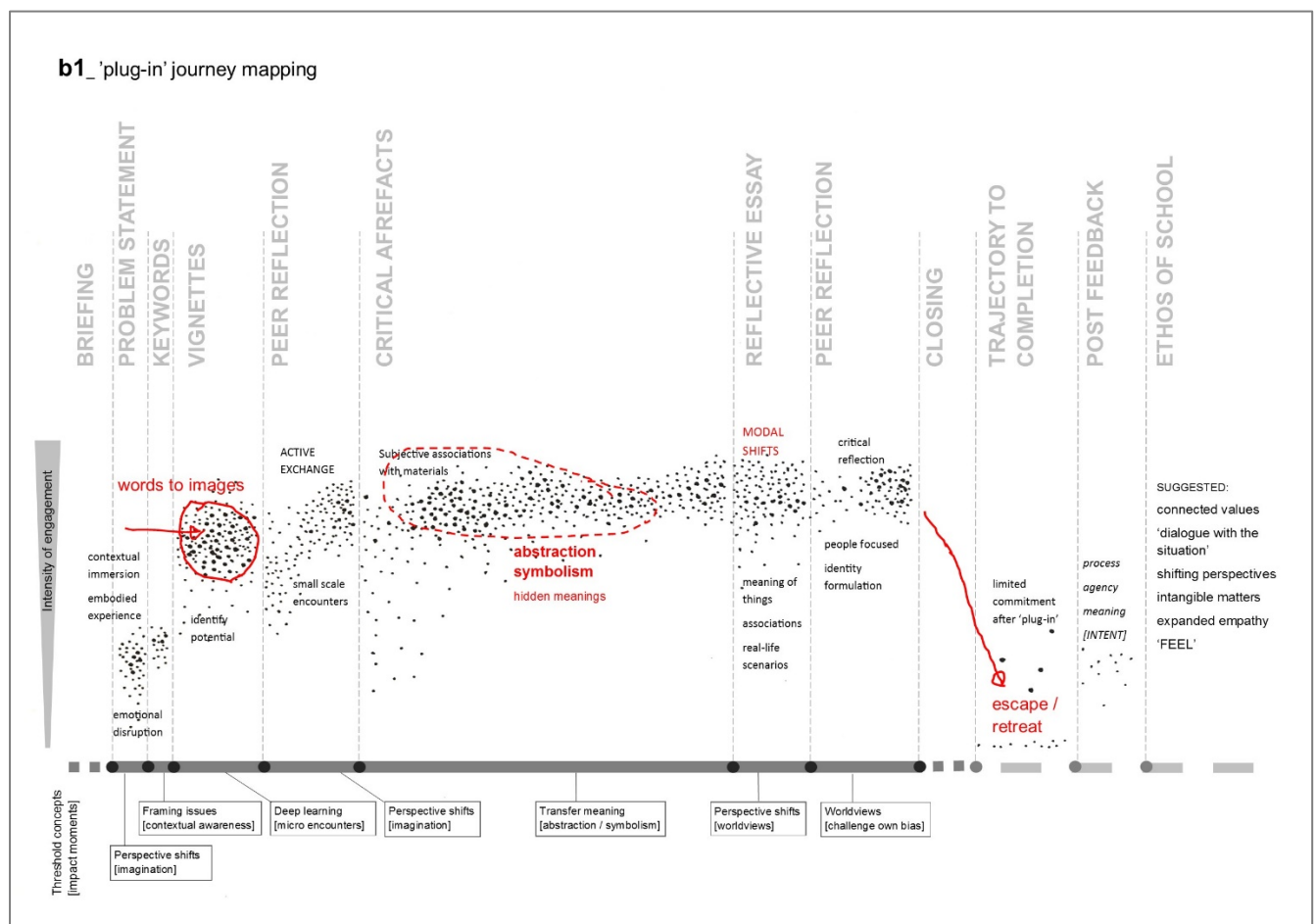


Figure 6-1: b1_narrative journey

Summary of Biopic 1

Biopic 1 exposes students to other types of activities through which they can question design aspects, compared to the familiar design process. The four-hour workshop is an 'accelerated' way of finding immersion in design challenges and contextual understanding. The emotional disruption assists with the connections students make during the process, but also causes some to distance themselves emotionally from the matters arising. The workshop engagement shows that students who make critical connections immerse themselves in the activities by imagining themselves as users or urban dwellers.

During the process, emotional detachment leads to objectivity. This attaching-detaching process appears to be the key to completing the larger design project with commitment to difficult design issues, and to integrate the workshop approach and attitude. However, only a quarter of the class demonstrate this path of action. Second life materials introduce opportunities for associations and connotations to extend meanings during the workshop. The challenge remains to transfer a connected design approach to the design project at large. Biopic 1 demonstrates that students, when exposed to other ways of design engagement, embrace the new attitude. The question then arises, how to transfer the newfound attitudes and design agendas into studio projects. The duration of the engaged activities, the time spent on engaged learning, is a topic for further discussion. Could such a short intervention foster true immersive experiences, enough to shift students' thinking and personal worldviews? Perhaps not, as is the case here. However, a quarter of the class show commitment to make the transition.

Biopic 2 Condensed biopic journey

I waited outside, until called into the lecture. Today, I was giving the introductory talk to the students for biopic two. As the talk progressed, they listened attentively, and made notes in between. We paused every now and then for a question, or to unpack an issue. The students were engaged and intrigued by the prospect of a workshop, focusing on other ways of design inquiry. The workshop could only be scheduled for two weeks after the lecture.

Students were hesitant when the activities started and I had to put them at ease that this is a speculative and exploratory workshop where there are no 'wrong' answers or responses. It only became known at that point, that the larger design project was entering the last week before the final presentation.

PROGRAMMATIC issues and intangible conditions

During the workshop, especially with the drawing of the vignettes, the emphasis shifts from pragmatic concerns to emotional matters regarding the convenience store. Initially, the workshop attention is primarily on the typology and programme of the convenience store. However, when students start to imagine themselves as convenience store customers and they consider their own personal experiences as informants, the emphasis shifts. The critical artefact making brings the realisation that issues can be explored abstractly to achieve a deeper level of understanding and subjective associations to the second life materials are actively explored, expressed and shared. The emphasis is repositioned from object representation, to process of inquiry and emotional needs of consumers resulting in deeper understandings into matters not previously considered in similar studio projects.

Themes emerging (*WHAT*) as conduit for engagement

- Customer focused thinking – physical / tangible (layout, wayfinding, display) and emotional / intangible aspects (social interaction and behavioural issues)
- Experiential design, emotions and subjective meaning-making
- Pragmatic convenience store design concerns

What is difficult to transfer from workshop to design project?

- Maintaining the connected knowing perspective into the studio design project
- Sustaining empathy as driver into design project – reverts back to pragmatic matters
- From pragmatist to constructivist perspective – students finding emotive voice?
- Is there merit in disruption?
 - Students acknowledge other ways as valuable, despite their apprehension at the start of the workshop
 - 'Making' of critical artefacts changed students' experiences from anxiety to an engaged process

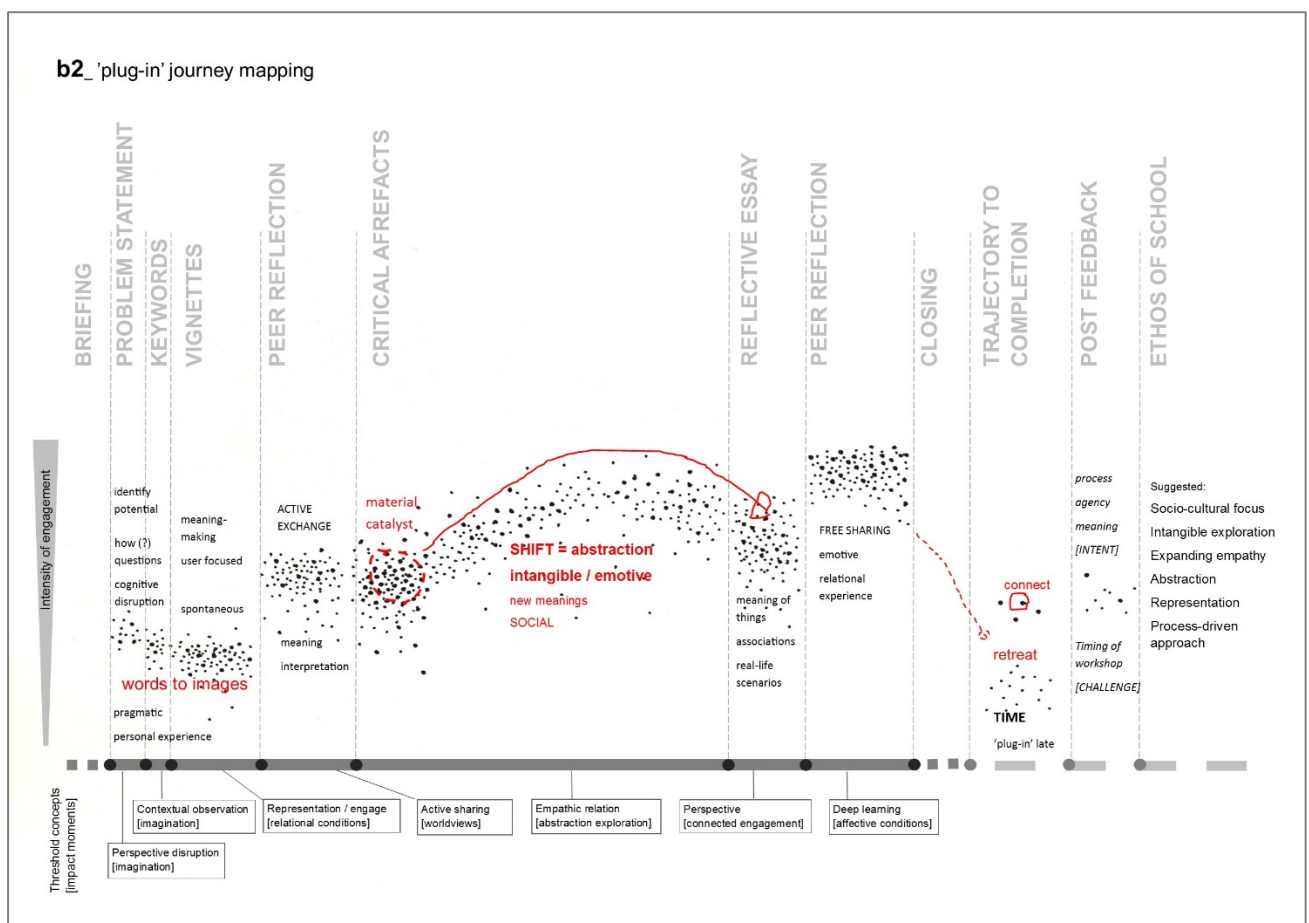


Figure 6-2: b2_narrative journey

Summary of Biopic 2

Biopic 2 unlocks hidden design considerations that would not be revealed in the students' normal studio process, by refocusing on emotional and experiential qualities. The challenge in this biopic investigation is to determine the depth of influence of the workshop on the studio project's design interpretation, as the timing of the workshop is not ideal. This compromised the potential transfer of the design approach to the larger design project. What is evident though, is the students' critical reflection at the end of the project, in which they identify that the workshop could offer them more if timed well. This shows that there is merit in the value of the disruption or 'plug-in addition', as students point out awareness of pitfalls of predictability and superficial responses. Although the research does not aim to develop a method, theory, tool or guideline, the sequential activities provide and facilitate moments of pause and focus on specific matters, as a process of breaking down complexities into relatable aspects.

Biopic 3 Condensed biopic journey

On a clear summer's morning, I make my way to the studio on the third floor, equipped with four containers, filled with a random collection of second life materials. It is early and the students are still to arrive. I unpack the objects on the centralised table, while the students make their way one by one, commenting on the heavy traffic. They seem comfortable in their own space; I noticed snacks and eats as if it could be somebody's birthday.

I reflect on the week before, when I gave the introductory talk in this same studio, where students did not really have any questions. This morning, with the briefing of the workshop, there also were no questions. When we started the activities, there was no response, students remained stunned and nobody moved – I realised in that moment, the magnitude of the disruption. The next ten minutes, we discussed the events of the weekend, and attempted to relate their personal experiences with the activities of the workshop in the context of the design project, an energy efficient luminaire.

PROTOTYPING focus and meaning-making potential

The initial anxiety is replaced with a quiet intrigue to participate in activities that 'force' other ways of critical and creative engagement. The immersion in the workshop of biopic 3 increases exponentially from beginning to end. The impact of the energy efficient luminaire project brief is noteworthy, as students are confronted with complex environmental matters, together with the project focus as object creation and as a result, students find it challenging to make connections to the process focus of the workshop. Activities where shift in modes of engagement are required (vignettes and critical artefact making) serve as the catalyst for students to connect deeper and to see the value of

another process emphasis. Students that connect deeper, show evidence of small transformations in individual aspects of the workshop.

Themes emerging (*WHAT*) as conduit for engagement

- Pragmatic focus with material, manufacturing and prototyping of the actual objects
- Inclusivity, well-being and quality of life
- Agency and control over use of luminaires
- Emotive and atmospheric conditions possible through light

What is difficult to transfer from workshop to design project?

- Maintaining the connected knowing perspective
- Empathy and situational awareness as drivers into design project
- From pragmatist to constructivist perspective – students finding emotive voice?
- Is there merit in disruption?
 - Evidence of value in another way to design inquiry becomes visible, albeit understated
 - ‘Making’ changed their experience into an engaged one, with less anxiety
 - Intense cognitive disruption challenge, due to experienced ‘disconnect’ between workshop and the luminaire design
 - Creative disruption experienced as a spontaneous and engaged process

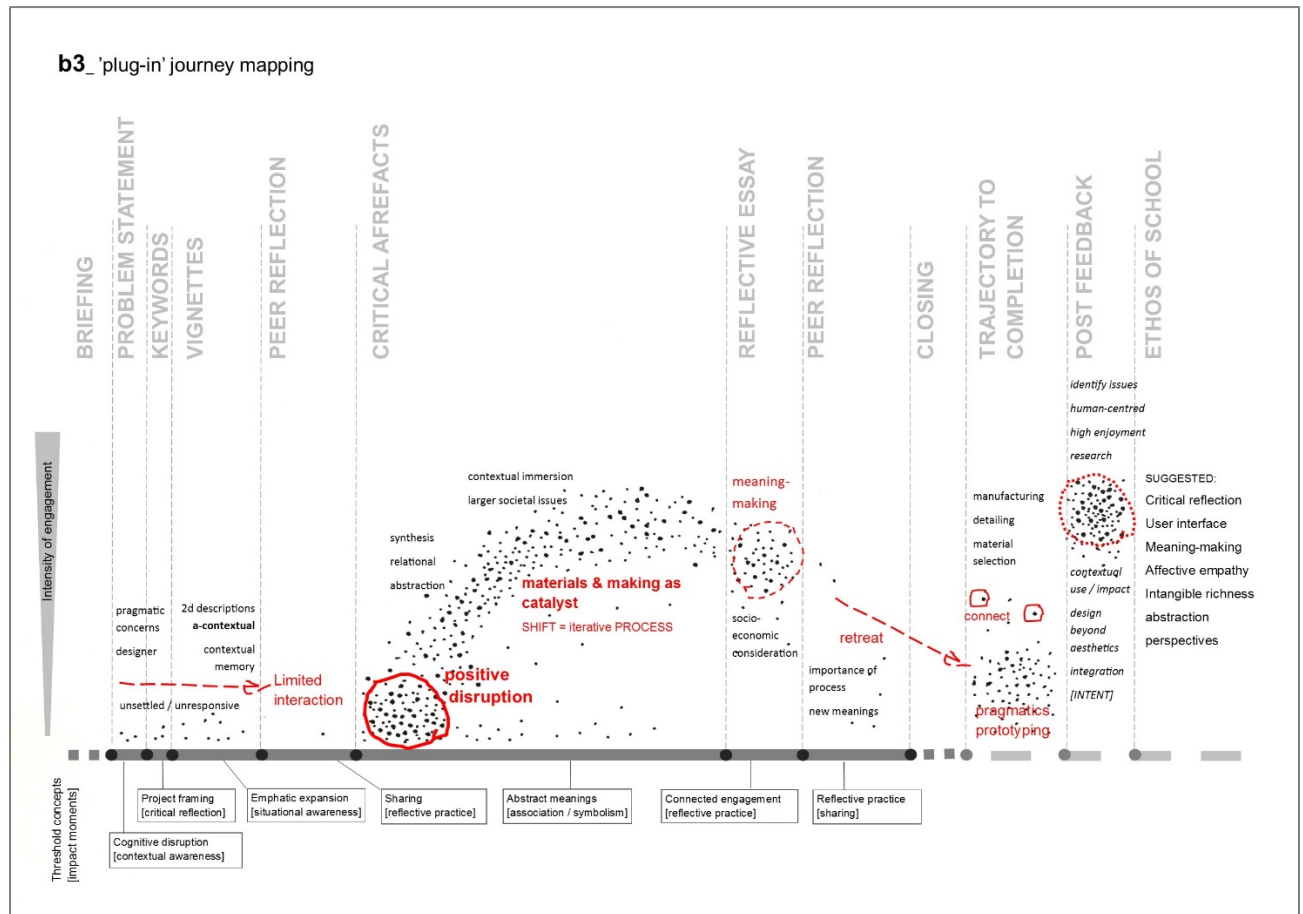


Figure 6-3: b3_narrative journey

Summary of Biopic 3

Biopic 3 shows that students experience the disruptive practice intensely, especially at the start of the workshop. It is challenging to make connections between the workshop and the energy efficient luminaire design focus and students delay taking action, due to hesitation, feeling uncomfortable with the unusual design process, or retreating to what they already know and trust. The critical artefact making itself unlocks new energy by shifting modes of engagement (from thinking to doing), which opened the door to exploring deeper meanings and larger contextual considerations. Their situational awareness increases and a connection in the learning becomes visible. The students' reaction through the eyes of the studio master brings another layer of understanding post workshop, that the influence of the workshop need not be 'visible' to make an impact on the trajectory to completion. He observes that students assimilated the workshop attitude into the design project, through research and development 'behind the scenes'. In this way, they internalise an aspect of the approach to design that reaches deeper than the surface. The students consider the design of the luminaire beyond its expression as an object by addressing the spatial effect and affect, by considering not only the physicality of user control, but also the intangible conditions of user agency in design and meaning-making through human interface with the object.

Biopic 4 Condensed biopic journey

Chicago, mid-March, it is still very cold and I just missed the freezing polar vortex of two weeks earlier. The many faces of the city is a direct introduction to its contrasts and diversity. The workshop was scheduled for an evening studio session. I found my way to the Sullivan Building, got an entry pass and made my way up to the studio. Thick coats and jackets hung from the coat hooks and hot water awaited any eager takers for a cup of infused tea. Students, already seated, were ready to participate in the activities of the evening.

I transported with me, across the oceans, a collection of second life materials (to be honest, they were simulations of second life materials, newly bought, as not to raise suspicion of strange objects at the airport). We had an open discussion to get the session started, and each student situated their discipline in the interdisciplinary studio, and in short, gave an outline of their project focus. The disruptive project students are grappling with appears to be an agitator. I am eager to see how this workshop will unfold, and what my role in this process will be.

ARTEFACT exploration and revealing issues

The purpose of the active design project emphasises the need to only reveal complex societal matters, instead of solving problems or proposing architectural responses. The biggest disruption is the provocation of the larger design project, upsetting the students' familiar way of engaging with design. The workshop is absorbed in the project intent, as cognitive, affective and creative agitation to the conventional design process (solving design problems). Students demonstrate two distinct voices during the workshop duration, firstly through complete immersion as a member of a particular community (insider), and secondly, as expressing a distinct opinion and response as a designer (outsider). In the former, students find a personal connection to design issues, which becomes a hindrance, as they struggle to disconnect from the emotional link and with the latter, students express a detached voice and remain distanced from the challenges and never really connect on a deeper level. The notions of under and over immersion, both seem potentially detrimental to the process and impact negatively on the framing of the projects. When a student appears much immersed in a cause, the danger exists that perspective is lost and design potential is not explored. In comparison, when students keep their emotional distance and remain detached, they fail to connect deeply to the issues and as such, only investigate on the surface, as a commentator or observer.

Themes emerging (*WHAT*) as conduit for engagement

- Liminality and transience – the urban condition, connections and thresholds
- Power and control – spatial agency and revised spatial constructs

- Territoriality and presence – to belong, various perspectives
- Making concerns visible

What is difficult to transfer from workshop to design project?

- Translating issues into tools for provocation and objects for interaction
- Not solving problems, but only to reveal issues
- Finding the focus of the project and appropriate media for representation

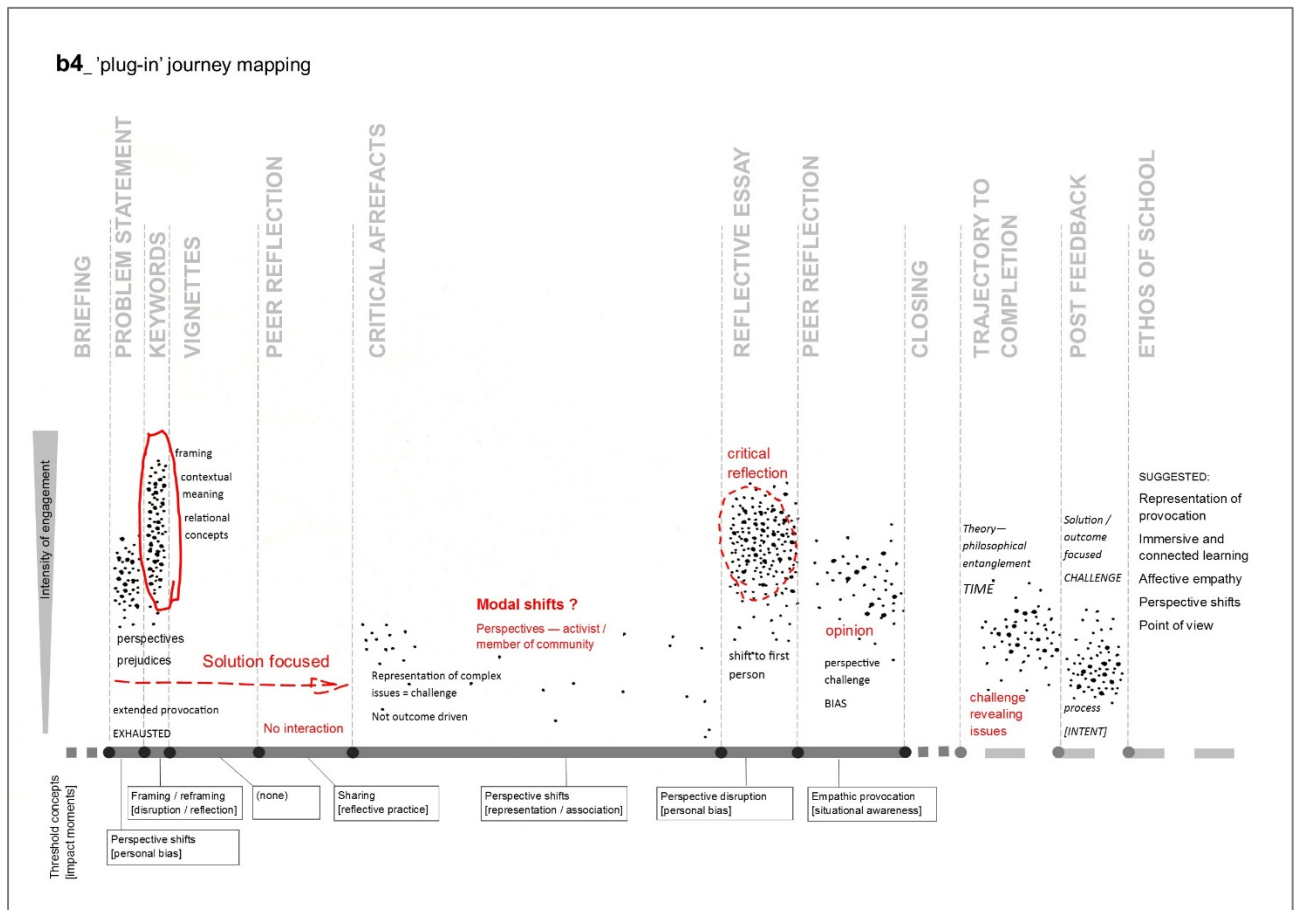


Figure 6-4: b4_narrative journey

Summary of Biopic 4

Biopic 4 reveals that the workshop has no significant impact on the active design project, which is already a disruption and provocation. Students trust the unfamiliar process, initially introduced by their own studio leader, although the translation of complex matters into critical artefacts is not a smooth transition. The data reveal students find the shift in thinking from solving problems, to revealing issues, challenging. However, they produce objects or tools as provocation (according to the design brief), instead of solving a problem, which would naturally have been their response. According to students, they experienced a shift; however, it was not always that clear to the external review panel. Aspects

that stand out above the rest in terms of transformative thinking is engagement with the issue, the students' relation to the topic and the frame of reference of the students individually.

The students, who could find an emotional connection to the issues, seem to have internalised the matters more individually (although they could not detach from the process to gain objectivity), compared to those students who remained emotionally detached and disconnected. Furthermore, the question of time and duration is highlighted again. For a project running for 16 weeks, the degree of upset of the familiar design process is significant. It opens the question – which is more conducive to transformative learning, a short four-hour disruptive workshop, or an extended studio project. At the end of the *Critical Artefacts Project*, half the class present the work in a first person connected voice.

SECTION A – Summary

Threshold concepts and biopic narratives

The threshold concepts emerging across the four biopics demonstrate a variety of issues in the data produced by the students, which are integral to the transformative learning process. The analyses show a broad scale of exploration, from large contextual meaning, to small-scale situational awareness. The data demonstrates that a disruptive practice unlocks concerns and opportunities not previously considered in the conventional design process. Table 6-2 highlights the main concepts according to Meyer & Land's (2005) categories and show that by challenging existing worldviews and perspectives, new design agendas through connected design potential as small signs of new ways of engaging with design becomes possible. For the consolidated impact moments and threshold concepts of the individual detailed biopics, refer to Appendix D.

Table 6-2: Comparative threshold concepts across biopic investigations

threshold concepts	b1 SPACE Context specific Self-assigned client	b2 SPACE Self-assigned context Real-life client	b3 OBJECT Functional Domestic context	b4 OBJECT Abstract / provocation Exhibition context	summary
<i>Transformative</i> (shift perception, values attitudes)	Contextual meaning Connected knowing	Customer focused Expand empathetic horizon Critical reflection Peer interaction	Situational awareness Reflective practice	Frames of reference Worldviews, ontological change	Contextual meaning Situational awareness Entry into projects, different scales -user (micro) -worldview (macro) -context (meso)
<i>Irreversible</i> (concepts change)	Perspectives Spatial agency 'feel' and 'act' modes of engagement	Perspectives Choice and agency	Dialogue with self, situation, challenges, process	Spatial agency New design agendas	Process of inquiry - ways of engagement Project focus Frames of reference

<i>Integrative</i> (not previously known, new information or meanings)	'forces' students to confront issues Worldviews Perspectives	Emotional and experiential conditions Abstract meaning-making	Perspectives Meaning-making through engaged learning	Connected-separate knowing Expanding empathetic horizon	Intangible meaning-making Empathy Dissociation -connection to user Engaged learning
<i>Troublesome</i> (reveal previous preconceptions)	Contextual meaning Emotional disruption	Immersive, imagined experiences Programmatic contextual knowing / meaning	Modes of engagement; process-driven Disruptive practice	Disruptive practice – ways of design engagement Discursive design; abstraction without solving problems	Disruptive action -activator, stimulus of positive change Contextual meaning Process of inquiry and understanding -abstraction
<i>Bounded</i> (reconstruct worldviews)	Refocus design agendas Citizenship designers	Awareness of preconceived ideas ['acting on' not yet visible due to late timing of the workshop]	[Spatial agency; citizenship]	Citizen designers Holistic learning	Design ethics New design agendas Citizen designers Agency

Figure 6-5 represents an overview of the plug-in workshops as a visual indicator of the activities across the four biopic investigations, indicating threshold concepts, shifts and modes of engagement

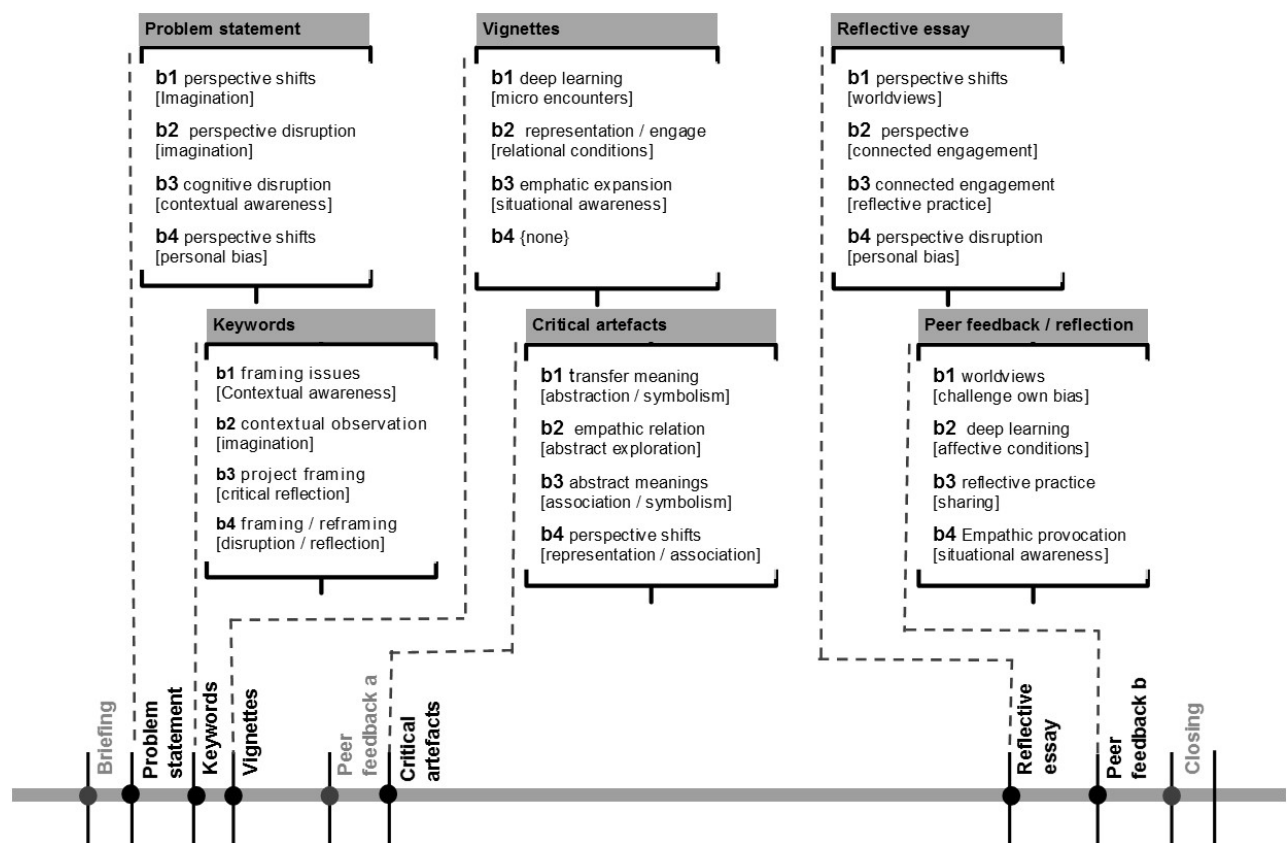


Figure 6-5: Biopic narratives – threshold concepts [impact moments]

SECTION B – Relational biopics

Comparative biopic investigations

We therefore need to find an alternative paradigm to problem-solving as the basis of the architectural practice. In an eloquent paper, the planning theorist John Forester suggests that we should replace the normative metaphor of design as the search for a solution with the idea for design as “sense-making” (Till 2009:168).

Relational biopics are discussed as thematic narratives in the search for ‘sense-making’ that trace the chronological sequence of the activities across the four workshops. The individual threshold concepts identified for each detailed biopic are reassembled as thematic narratives in the discussion of the relational biopics to follow. Seven thematic narratives are identified from the summary of the individual detailed biopics’ threshold concepts as points for the relational biopic discussion:

1_disruptive modes; 2_levels of dissociation; 3_empathetic routes; 4_ways of thinking; 5_process in action; 6_developmental transformation; and 7_challenge : shift.

The workshop activities (problem statement, keywords, vignettes, critical artefacts, peer feedback, reflective essay) form the structure for the discussion. Trajectory to completion of final project, post feedback and the alignment with ethos of the school is added to the analysis to contextualise the findings. In addition, the trajectory to completion of the design project, post feedback, role of the researcher and the ethos of the school are included to contextualise the findings.

Relational biopic thematic narratives

1_disruptive modes

The disruptive modes discussion integrates all the experiences that cause some form of disturbance in the students’ familiar studio practice. It includes emotional, cognitive and creative upsets and details how students respond in the context of the workshop.

[problem statement]

RELATE. The unfamiliarity of the activities and the need to imagine the voice and experience of another, proves challenging. The need to detach (dissociate) from self as designer is therefore an essential part of the disruptive mode – representing the adopted voice with a conscious awareness and connected authenticity. The emotional disruptive mode relates to a contextual immersion prior to the workshop, where the embodied experience of an environment shows evidence of expanding empathy (b1). Cognitive disruption can be seen where a way of thinking is challenged (b2 and b3) where students consider intangible qualities, and not only pragmatics. The creative disruption has a twofold nature, firstly causing anxiety and apprehension to another way of working that is not part of the daily studio

activities (b3) and secondly, responding to the studio project to create critical artefacts as provocation and not solving a problem (b4), which is opposite to the designer's normal response and practice.

I'll never feel at home in my city; between all the hustle-bustle of everyday life, where we're all running through spaces, we never get a chance to give a wave and utter a word. I'm alone, always on the run to get away from home and go home... (b1_Christi).

My main concern is how the customer interacts with the space provided / designed for them. How they take to the space and their worries and concerns about the space. Another concern is the location, because the user might feel familiar with the store and what it offers ... (b2_Suphumelele).

What are the main things I as a person look at when I experience something? Is it actually a concern? Or just something we have to take under consideration? (b3_Lisa)

My greatest difficulty is to think abstractly. My personality and background usually push me to suggest solutions rather than just pointing out the issue (b4_Alba).

Regardless of the nature of the disruption, responses are related to the specific studio projects in which the workshop is inserted. Be it a new and unsettling experience (b2 and b3), or unknown, but strangely familiar due to prior exposure to abstract association (b1), or the continuation of a longer disruption within an educational context where provocation is part of the ethos (b4). In the case of the latter, the workshop has no disruptive impact, since the studio project is unsettling in itself.

[keywords]

REFINE. Distilling the essence of the problem statement relates to a critical reflection, by refocusing using certain keywords. This is a significant cognitive disruption where the initial interference causes anxiety and apprehension (b3). Keyword identification also leads to seeing potential by seeing beyond apparent problems (b1). In the case of a continued disruptive practice, reconsidering the essence of concern is related to refining the problem. It becomes an iterative process (b4) (Table 6-3).

- *isolated, detested, dead, the past TO mind-set, transcending, spirit, equality, fairness, community*
- *vulnerable, isolated, absence, escape, dilapidated TO support, kindness, co-exist, vital, enlighten, stitched, hub, activated (b1)*

Table 6-3: Keyword refinement (b4)

Initial keywords	Revised keywords
<i>tolerance, reflection, quietude</i>	<i>acceptance/tolerance, identity, presence</i>
<i>enabling, disruption, control</i>	<i>control, power, subversion</i>
<i>contingency, folding as framing, liminality</i>	<i>rhythm syntax, typology</i>
<i>standardization, regimes of desire, fear and power</i>	<i>control, truth, identity</i>

[vignettes]

CONNECT. Vignette drawings present a creative disruption and require making critical links between the thinking modes preceding the representation of scenarios described in text, with illustrative vignettes. Students primarily relate words and images through their contextual understanding of the various studio projects by illustrating the interrelation between people, object and space. The vignettes express

experiential qualities, social and contextual matters, meaning making, conditions of being and small scale scenarios (b1, b2 and b3). In contrast, students showing hesitation or superficial engagement, express a-contextual, two-dimensional diagrams and shapes with no relation to people (b2 and b3). No vignettes are considered in b4. Refer to Figure 6-6.

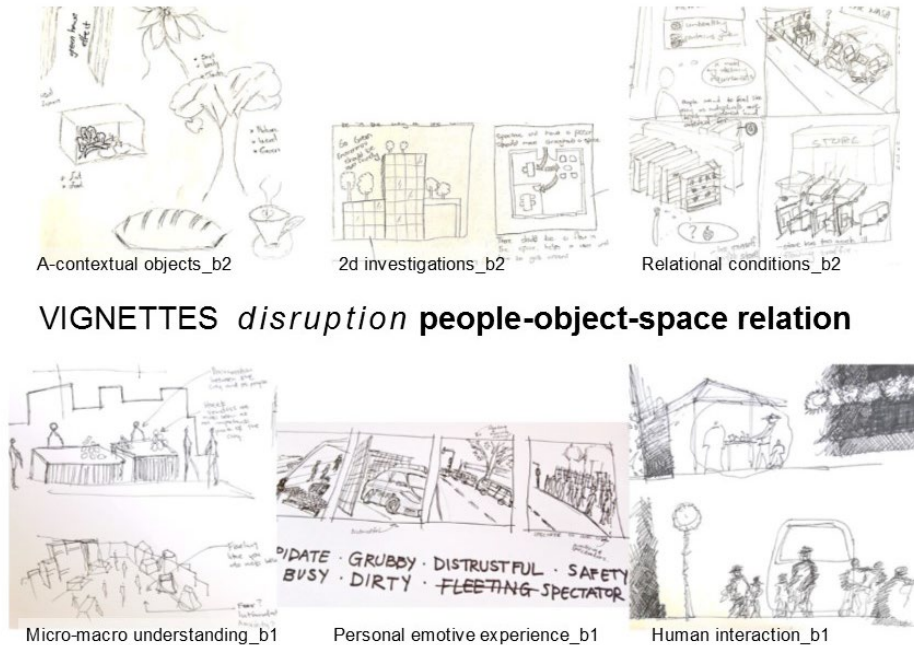
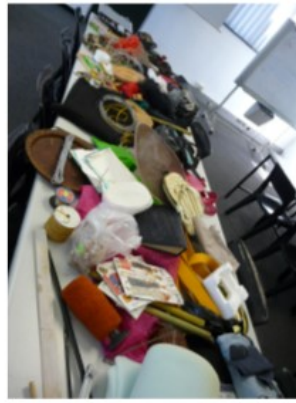


Figure 6-6: Vignettes and disruption

[critical artefacts]

IMMERSE. The making of critical artefacts poses two challenges: ‘what’ and ‘how’ to make – what is the message and how to represent it. Those familiar with abstraction find intuitive links to material associations, albeit spontaneous and expressive, or hesitant and unsure (b1). Students are exploring deeper interpretations with increasing confidence, as second life objects become a catalyst for engagement, where symbolic representations are emphasised (b2). Where students are anxious and apprehensive at the start of the day, the ‘making’ process becomes an icebreaker, a positive disruption, a relief – due to the intrigue and potential of the unfamiliar materials students feel ‘forced’ to use. As creative disruption, it opens a new way of design inquiry, to find their own voices (b3). ‘Making’, as part of a continued disruptive practice, speculates about what materials could represent: metaphor and /or analogy (b4). Refer to Figure 6-7.

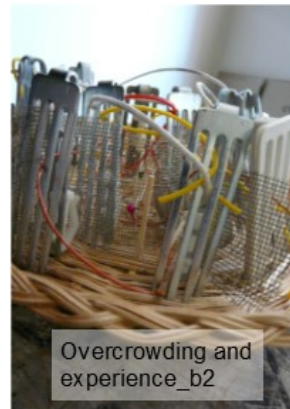
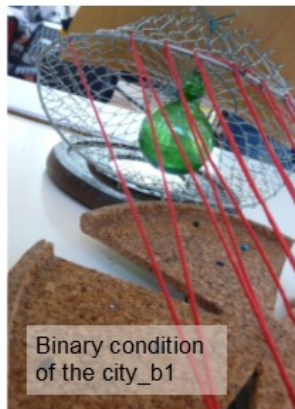
These cognitive and creative disruptions are embedded in the workshop requirement for the critical artefacts to be abstract in nature, revealing issues considered thus far. As provocation, responses are charged with direct metaphor and explorative analogy, using second life materials embedded with prior meanings. Students embrace the opportunity to create new meanings and to re-interpret old objects and materials, in dialogue with one another, revealing new associations and connotations.



CRITICAL ARTEFACTS *disruption* second life materials



Process of abstraction



Representation of issues

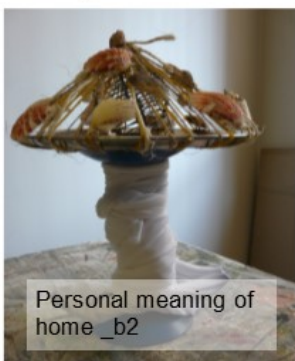


Figure 6-7: Critical artefacts and disruption

[peer feedback]

SHARE. Noteworthy in the peer feedback is reference to deeper meanings, symbolism and abstraction, as the biggest provocation. Especially where the representation of abstract thoughts as continued disruption becomes strained. The process in itself then becomes a disruption (b4). Another explanation for this occurrence is the new and unfamiliar process, which stifles student engagement (b3).

[reflective essay]

DISTILL. Reflective essays consider the workshop as a whole and are informed by the larger context of the various studio projects. Disruption as emotional upset emerges when students are faced with socio-economic and other contextual issues that are real-life scenarios and conditions. These experiences are either embodied or imagined and reveal aspects to students not normally part of a studio project. The ways in which students connect or detach from these experiences become important to how they relate to the workshop and the studio project. Students are able to assume a position of the user, albeit through observation (detached), or immersion (connected). The challenge remains for the articulation of problems beyond problems, especially when the experiences are intensely personal (b1 and b4).

The workshop assisted in creatively consolidating how one feels within and about the CBD from an outer-designer perspective. The lack of parameters allowed for the much needed awakening of creative juices. It provided a means to understand and reflect on critical elements that have been avoided with the CBD. With the creative approach it manage [sic] to create clarity (b1_Wraz).

The issue of representation remains a point of discussion, translating ideas into abstract objects (b4). Student responses reveal that when the critical artefacts are used as a process to explore, without any expectation to achieve something, the result is more spontaneous and beneficial to the learning process (b1, b2 and b3). Comparatively, when the studio project criteria already require the making of critical artefacts as objects for public display, the workshop process is not as conducive for investigation. The process of representation and the exploratory process become forced and engagement becomes predictable and superficial, as students are trapped in the issues (b4).

The project work will begin to explore the answers to these questions without attempting to fixate on a single architectural solution. This work also aims to make the question and speculative propositions visible (b4_Derrick)

Students reflect on cognitive and creative disruption as ways of thinking and acting. The workshop requires other points of departure, other perspectives, to what is traditionally known to students in the spatial design studio. The 'out of the ordinary' modes of inquiry therefore enable various other 'pivots into' or 'handles onto' the workshop to broaden the mind and foster a connection to issues (b2 and b3).

The design process / workshop for me was a step-by-step process of enquiry and curiosity and following that up with exploration without the end goal of finding a solution, but rather with the end goal of seeing where my hands would naturally take me. This gave me some clarity ... (b3_Neo).

[trajectory to completion]

INTERPRET. The disruptive workshop process does not have a deep influence on the trajectory to completion of the studio projects. The embodied experience and emotional disruption of the inner city immersion and the workshop activities assist students to select clients for the workplace design project. Limited further evidence is visible, except for three students reported by the external examiner (b1). The cognitive disruption furthermore addresses design problems in b3, focusing on the purpose of the luminaire design to make small differences in the life of the user, beyond task light or atmospheric lighting, as noted by the studio coordinator. The main disruption in b4 is to reconsider the goal and aim of the studio project – critical artefacts as provocation. In the process, students ask critical questions in order to bring issues to the surface. As such, their attitudes and understanding of the issues shift on paper. However, according to the external examiner, the built artefacts for the exam demonstrate a stagnation in the trajectory of development (b4). Students share that the requirement for abstract interpretations proves challenging at first, but then becomes a way of informing the creative expressions in the active studio design projects in small ways (b2).

[post feedback]

Students embrace the creative and cognitive disruptions as ways of dealing with complex problems, providing new avenues for abstract representation, impelling them to find another way of expressing themselves on behalf of others (b1). The realisation that things can have different meanings and not only have a physical representation, opens up an understanding and realisation that objects can be used and interpreted in different ways to what it was originally intended. This is evident where students use abstract material associations to create meaning in critical artefacts (b2).

The materials used in this process made me think about them in a different way and understand that I should not limit myself to what I know and what they are made from. We can change the uses of a material and make something amazing out of them (b2_Lyse).

Initial apprehension and anxiety were replaced by an awareness of other's views and perceptions. The workshop shows that other ways of thinking and making are possible in the context of a design studio, which are enriched by the views of users and peers (b3). The provocative nature of the engagement proves the most perplexing. The recurring factor in b4 remains, to consider no intension for solutions, instead, only to reveal issues or give social commentary through the artefacts.

[role of the researcher]

The presence of the researcher and the acceptance of such a presence in the workshops has a direct effect on the unfolding of the biopics, and responses vary according to the students' association with the researcher. The effect of these interactions on the nature of the engagement with the process is noteworthy, and summarised from field- and reflective notes and data as evidence in Table 6-4.

Table 6-4: Role of the researcher

b1 – trusted insider known to students as studio master:	b2 – outsider students tolerate the activities and give gratitude and acceptance in the end
Spontaneous participation, peer discussion	Researcher introduced, and presents introductory presentation of workshop purpose (two weeks prior) Interactive engagement
b3 – stranger and intruder initial apprehension and mistrust	b4 – stranger and outsider researcher treated aloofly and with apprehension
Researcher introduced, introductory presentation (one week prior to the workshop); studio master engaged on behalf of the students Students express enjoyment replacing their earlier apprehension to the studio master.	Researcher introduced as workshop facilitator (mid-term informal evaluation), in conjunction with trusted studio master Researcher experienced feeling like an outsider/intruder; students did not acknowledge and consider input and interaction

[alignment with ethos of school]

The disruptive practice within a familiar project setting reveals the plug-in as a positive action or insertion, even though the immediate results of the biopics might show only a small number of students responding well to it. The fact that small but notable shifts are visible, means that some students are able to re-orientate and reflect on their actions. This might be noticeable throughout the process and not necessarily only at the end. The main points of significance in the biopics relate to small, incremental change and impact of abstraction. The effect of abstraction proves to add additional value to the existing ethos of the schools in b1, b2 and b3. B4 already has provocation as part of the school's ethos and integrated in the studio project, however, representation as part of provocative work is an aspect worth considering.

SUMMARY 1_disruptive modes

Representation and challenges with abstract interpretation can be considered further through discursive design (Tharp & Tharp 2018), which has the same aim as making issues of concern visible as provocation, and to activate dialogue. Furthermore, the representation of self as the user, through imagination, observation and immersion, is related to *normative dissociation* (Butler 2006), by adopting the perspective of someone other than the designer. Representation and normative dissociation prove to be the biggest personal disruptions during the workshop in all biopics.

2_levels of dissociation

Levels of dissociation show a continuum in the students' engagement, moving between *attention* (observation – separate) and *absorption* (immersion – connected) (Butler 2006:46). The various workshop activities elicit different responses and students find personal ways of attaching or detaching. Important to note is the 'voices' they adopt when documenting their expressions: first, second or third

person writing, which relate directly to the continuum of dissociation. Reporting on the findings below is a free narrative, without referring to theory concepts or including any literature references.

[problem statement]

Confronting students with the request to put themselves in the shoes of the user, reveals a continuum of normative dissociation due to the background and context the studio projects provide. The majority of students shows 'separate' or 'disconnected' voices through passive writing (third person) as observer or designer, identifying potential within various living scenarios (third in b1 and a quarter in b2), focusing on human-centred issues (quarter in b2) or pragmatic prototyping concerns regarding objects (quarter in b3). However, personal descriptions, connected to self as designer (first person), but separate to user, show an awareness of the requirements for abstract thinking and representation and focus to reveal issues rather than problems (b4). In this instance, dissociation cannot truly be considered, as students' responses revolve around personal issues dealing with self as designer and the interpretation of the issues, instead of the users themselves. Personal descriptions as connected spectator or visitor (but separate to user) are also noted (third in b1).

Only a minority of students finds a connection as user / customer (first person writing). A third of the class in b1 (emotional disruption leading to dissociation) and a quarter in b3 identify meanings and relationships between people and space through personal experience and observation.

Table 6-5: Disconnected and connected experiences

b1

Fully disconnected	Disconnected, with personal description	Fully connected
-as designer/observer -'imagine' how people are able to shift perspectives <i>Third person or passive voice</i>	-personal, but self as outsider, spectator or visitor <i>First person or active voice</i>	-as user or participant -some acknowledge self as observer, but expresses potential <i>First person or active voice</i>
<i>The vision for the community is one where various people groups become knit together, interacting, elevating one another and work together towards a common goal through producing [sic] (Marené).</i>	<i>Looking at the people around me, I notice a sense of uncertainty and disorientation (Amoné).</i>	<i>I live in the <u>city</u> but I am not part of it I have a <u>story</u> like everyone in the city but nobody to share it with. We are all different but similar in a way, yet we are disconnected. I wish (to tell my journey) to belong and to be part of the city (Thabi).</i>

b2

Disconnected (negative)	Disconnected (positive observer)	Disconnected (Identify potential)	Disconnected (as designer)	Connected (as user)
<i>Third person</i> <i>-one student</i>	<i>Third person</i> <i>-quarter of class</i>	<i>Third person</i> <i>-half the class</i>	<i>First person</i> <i>-one student</i>	<i>First person</i> <i>-one student</i>
<i>Convenient stores are generally and typically small and therefore there isn't enough space for movement as well as display of products resulting in people not able to find... (Naelly)</i>	<i>The matter of a convenience store is centred around CONVENIENCE. People want to come and get what they need/want as fast as efficiently as possible (Nadene)</i>	<i>...when one designs a place you need to place yourself in the users' shoes to understand what is needed and how to design better (Kaushal)</i>	<i>My main concern is how the customer interacts with the space provided / designed for them. How the take to the space...(Siphumelele)</i>	<i>The biggest thing for me is a spot to sit and take in life while my car is being washed. An enclosing that will become more than just what it is to me (Khethiwe)</i>

The data shows that it is difficult to put aside the designer's / architect's hat in order to assume the role of the user. The continuum therefore shifts between observation as separate understanding and immersion as connected relation. The latter 'out of the ordinary' request of the workshop presents as a provocation. This poses the question about the likelihood of shifting between 'connected' and 'separate' modes of spontaneous / involuntary, to deliberate action.

[keywords]

Keywords show that observation or experience as designer relate to words identifying pragmatic matters (b2 and b3). Observation of design problems in the urban context (which students feel strongly about) shows that they approach these as activists (b4). Keywords also allow the experience of a contextual meaning to be distilled through immersion (b1) within a particular community as a member of the group (b4).

- Contextual – *resilience, ritual, closeness, inviting, isolation, vulnerability, memory* (b1)
- Pragmatic – *convenient, customisable, efficient, accessible, variety* (b2 & b3)

[vignettes]

Vignette drawings reveal students making shifts in personas by immersing themselves as users by reporting on conditions of the city from an embodied experience. Drawings are relational by showing people-people and people-city connections, especially by identifying direct small-scale encounters (b1). A shift in personas can also be seen in the context of observation-based dissociation regarding wayfinding and typological layout matters (b2), and user-interface with luminaires as objects (b3). (Refer to *Figure 6-6* in the previous thematic narrative, *Disruptive modes*). B4 produced no vignettes.

[critical artefacts]

Empathic responses are shared in the critical artefact making process, showing a shift in thinking from designer to user. Through the use of second life materials, connections to users are represented through symbolism and metaphor (*Figure 6-8*). Dissociate understandings increase when students zoom in on the relational conditions between people-people and people-place (b1).

This object represents a "giant" (city) that has been broken / cut but stitched up back together. As a form of healing. But the people (the sewing needles) have already infiltrated into the body there are embedded in different places on this giants body indicating how people make their own sence [sic] of settlement and place making (b1_Nina).

If you visit a maze then we get to know the maze more and more, as you would get to know the history and the mysterious [sic] of the city ... therefore you discover how the secrets are made. How the city was created. Get more welcome [sic]. Discover how its make you unravel ... (b1_Kirstin)

In this way, social commentary is given about inclusivity in the city, the impermanence of it and the meaning of home (b1). Immersion and observation prove to be entries into a dissociative perspective where students place themselves in the shoes of the user, by focusing on both emotive, interactive and meaning-making issues and pragmatic use concerns (b2 and b3). A continued disruptive practice shows

that dissociation becomes an obstacle in two ways instead of a manner to associate and connect. Firstly, when students remain disconnected and do not assign meaning to objects and materials, the critical link between thinking and feeling does not appear. Secondly, in contrast, when the immersion is too intense and students lose perspective in the personal association, which eliminates the balance in the designer-user continuum. Disconnected and connected voices become challenged, which is brought on by the provocation to only reveal issues, instead of solving problems (b4).



Figure 6-8: Critical artefacts, dissociation and abstraction

[peer feedback]

Peer feedback reveals various responses related to human-centred approaches across the various biopics: b1 makes direct associations with identity formation where the importance of relationships between people and interconnected intimate encounters is highlighted. B2 directly addresses a human-centred approach by means of emotive, relational, experiential matters, but also practicalities. Noteworthy in b3 is that no pragmatic or functional concerns are mentioned anymore, only considerations regarding mood and atmosphere. Lastly, b4 shows how challenging shifts towards various points of view are – a refocus considering observation and immersion, and not being trapped in one of these modes.

[reflective essay]

The reflective essays reveal an important observation – a shift towards connected first person voices as compared to the problem statements at the start. However, the responses are not related to users directly, but report on experiences of the workshop process. Honest accounts as full descriptions are shared, ranging from rollercoaster experiences in emotions during the various activities, discomfort, apprehension and expectation, humility, gratitude and enjoyment. Students also mention the use of

second life materials, meaning-making, peer input, preconceived ideas and engagement in the process (half in b1, quarter in b2 and two-thirds in b3).

The process of creating a conceptually driven artefact pushed me out of my comfort zone. Creating with abstract ideas drove me to create for the sake of it, without overthinking it and the resulting complexity is more than I thought it could be (b1_Marené).

Seeking the problems first allows ones eyes to open to what others are going through and allowing us as designers to empathise and to have compassion (b3_Andreana).

The focus on users behavioural settings allowed the designer to not only sketch and understand the user, but to become the user. By becoming the user, one could understand the conventional problem much easier by being able to respond to it in a much deeper and more complex manner. This approach extracted the essence of what exist, how in relation it exists and why it exists in the form we understand it (b2_Christene).

First person connected voices in b4 revolve directly around immersion in design challenges (half the class); however, the abstract translation poses a challenge. Connected immersion and disconnected observation are under scrutiny. Through direct association, as members of a community, immersion is very intense and causes flux in the student, losing perspective from the aim of the project, where an insider understanding relates to the connected understanding. In this light, a relation between dissociation and detachment can be made.

Immersion: Taking as a starting point the coffee plant and its associated ritual – central to my own immigrant identity – I seek to show the accumulation of information that characterises all places today. I am curious about how to bring this layered complexity of information to the surface ... (b4_Jovana).

Observation: Although we would hope that all societies are in agreement that systems which perpetuate inequality are abject fraud, we still see persistent evidence that certain groups in contemporary society are excluded from the opportunities of urban life (b4_Derrick).

With observation, the activist voice shows limited dissociation, where students remain very disconnected. As separate second person voices, immersed in design theory and societal problems, they remain emotionally detached (half the class, b4). Complex understandings are visible in separate or detached third person responses with an acute awareness (half the class in b1) and as designers related to human-centred issues (third of class in b2). An outsider understanding can be related to a separate voice as the activist, or detached observer.

We are spectators with set views, routines, ideas of the space which clouds potential. Reputation plays a big part (b1_Rebekah).

A noteworthy observation in b3 is a shift toward connected engagement where the critical artefact making proved the catalyst – transformation from disconnected voice (three quarters of class) to connected voice (all but one student) during the four-hour activities.

[trajectory to completion]

The trajectory to completion reveals an unexpected phenomenon to counter the researcher's experience of the workshops, evidence consolidated from external observations, student feedback and exam work. The decline in dissociation where the connection with the user fails to be sustained is only evident in b1. A quarter of the class retains a connected voice with normative dissociation transforming into an 'objective' stance or empathy as cognitive understanding, related to the initial emotional response / empathy in the problem statement. The remainder of the class shows a decline in disconnected knowing.

B3 shows that the ratio between connected and separate voices remains the same; a quarter of the class. In b2, the transformation is visible in shift from one to three students in the trajectory to completion, where students describe their connection in dissociation as objective or pragmatic (functional issues) and subjective, related to meaning-making and social interaction. The largest transformation in shift is in b4, where the designer voice is only one in the problem statement, shifting to half the class connected to societal problems in the exam presentation. In these cases of immersion, students adopting the role of a member of society, respond in a most connected way, regardless of the success of the project according to the external examiner.

[post feedback]

Various observations regarding dissociation are made in the post feedback data, especially in b4. It questions how perspective or objectivity can be achieved when affective qualities are overwhelming. The opposite is also to be questioned, namely how connections can be made when cognitive detachment becomes a barrier. Is dissociation thus limited due to over attachment or over detachment? How could it then be useful? In some cases, students become entangled in theoretical discourses when the project duration is long (semester duration) and thus overshadows normative dissociation. In b2 and b3, the use of observation proves useful in identification of problems and functional matters. Immersion assists with identification of meaning to and impact for the consumer, as a human-centred approach.

[alignment with ethos of school]

The inclusion of dissociation to each of the school's ethos descriptors will extend the scope and focus of students' connected engagement, especially through subjective immersion. In this way, intangible qualities can be identified to make deeper connections and find more complex and richer understanding of issues, contexts and scenarios of living.

SUMMARY 2_levels of dissociation

The question then remains whether dissociation and perspectives can be controlled and purposefully 'switched on' in order to serve design actions. If it can be learned or an awareness thereof be nurtured, then it could be a useful way of creative inquiry in the spatial design studio. The designer's prescriptive intent is therefore replaced by a deeper understanding of the unspoken needs of the user.

3_empathetic routes

The notion of empathy is criticised in literature (Bloom 2016) and in practices of design it is not always perceived to be rigorous (Heylighen & Dong 2019). In this thematic narrative, its usefulness is traced. The discussion shows benefit and challenges when considered in the realities of the studio projects' contexts, the workshop and in the design project at large. The narrative to follow integrates concepts from Kouprie & Visser's (2009) four phase empathy framework, 1-discovery, 2-immersion, 3-connection and 4-detachment. These are not referenced, as the researcher identified these stages through the data analyses process as part of the inductive study and confirmed its academic validity and content in literature afterwards. The integration of theory will continue in *Chapter 7_Provocations and postulations*.

[problem statement]

Both cognitive and affective approaches to empathy are present in the biopic investigations. Through affection, students in b1 reveal emotional empathy due to a real-life embodied experience where the contextual absorption is supported by discovery of and immersion in the city. In b2, students imagine a similar previous experience in context to the convenience store. Students in b3 focus on pragmatic matters regarding luminaire design as an entry into empathy, although here it remains mostly objective, as they move from a discovery mode to an immersion one, albeit pragmatic. The conceptual posters prepared for the workshop in b4 (Figure 6-9), show a continuum: cognitive, where students remain detached, but as an objective activist for a societal cause, and affective, by assuming the role of an active member of a specific community group.



Figure 6-9: Empathic continuum

Students individually emulate or echo experiences and reveal personal bias due to their own preconceived judgement in various contextual understandings. Furthermore, students recreate through imagination prospects or potential of 'what can be' as a positive outlook in challenging scenarios. In b2 students point out problems using pragmatic imagination. In both b3 and b4, students express individual bias, taking an egocentric view as designers regarding lighting design, and as designers / architects regarding societal matters, respectively. In instances where students are emotionally attached to an issue, students are oblivious and show ignorance to consider other opinions (b4). These observations highlight the extremes as observed in the data, but the study does not advocate these stereotypes as dualities. It is noted that complexity is compulsory for richness; sometimes a simple realisation can reveal hidden nuances.

Students show sensitivity in contextual and pragmatic understanding. The two spatial design projects (b1 and b2) revolve around place awareness where b1 shows indications of both personal embodied experience and challenging of own assumptions. B2 mostly relates to pragmatic matters and students' personal experiences. Superficial and complex understandings are in balance in b4, where students consider contextual and societal matters from their own opinion, and projecting needs of others. B3 is fixed on a pragmatic approach and own perceptions regarding people-object interface.

Everyday I travel back to the city in the taxi with my extended family. We are all unable to live our lives with our real families ...my extended family (b1_Anneline).

A space where the user can access informable [sic] products. A space and place that thinks for you. A space where more time can be spent on the useful and useable ... (b2_Christene).

[keywords]

Keywords reveal a human-centred focus in all biopics taking an affective empathetic response towards societal issues (b1), cognitive empathetic view in b3, and a combination of affective and cognitive empathy in b2 and b4.

- *Simple, efficient, convenient* (b3)
- *Utility, variety, enjoyment, ownership, temporal, occupation, memory* (b2 & b4)

[vignettes]

No vignettes are attempted in b4, which proves problematic later in the interpretation and translation of issues from ideas founded in theory and philosophy, towards an abstract expression to represent issues as provocation. The remainder of the biopics reveal an expanded empathic understanding, with focus on pragmatic matters in b2, and a combination of objective aspects and a subjective immersion in b3. As part of a discovery mode, students show receptivity and awareness to context in b1 and b2. Students use imagination in drawings to re-enact contexts and scenarios that become visible as a recollection of spatial conditions. In this light, thinking and making are interrelated as they demonstrate shifting between user and designer to formulate an increased understanding. B3 demonstrates evidence of observation, where discovery is limited and students remain focused on formal expressions and pragmatic concerns. Refer to vignette drawings in Disruptive modes, Figure 6-6.

[critical artefacts]

In the critical artefact making process, students refocus to create subjective connections (b1-4). Emotional empathy drives the making process in b1 where feelings in relation to meaning-making are explored. Through a cognitive approach, students associate meanings and make relational links between second life materials and representations of design challenges regarding people, context and place. Noteworthy in b2, is that students connect with deeper issues than pragmatic and wayfinding concerns in the making process, by focusing on social and interrelation matters. Similarly, b3 also shows a shift in focus from concerns regarding manufacturing towards larger societal issues on the one hand, and meaning-making through second life materials on the other. Limited engagement in the artefact making in b4 results in students missing opportunities for abstract exploration, especially when the studio project is midway through (eight weeks). Students who have strong emotional connections to issues actively participate in the 'making' (immersed as members of a community), whereas, students detached from issues (as observers, although seeing themselves as activists), remain disconnected.

Through being abstract I was able to consider an emotive response to design. Now that I have represented my context and human experience I feel that I have a better and stronger base to build my design onto. I can respond clearly to the problems now that I have focused on them closely (b2_Nadene).

The social aspects I considered were: What my model says about me, what my model says about society and how one would interact with my model. The degree of complexity resulted in the intertwining of thread and how that is symbolic of the complexity and intertwining of people (cultures, races, sexes) in our everyday life (b3_Neo).

[peer feedback]

Active and constructive peer interaction is observed in the first two biopics, which makes a positive contribution to their understanding of different points of view and experiences. B1 reveals emotional, embodied and cognitive connections from personal experience of the inner city, through cognitive and

emotive empathy. In b2, personal experience of the convenience typology informs a connection to the workshop. Limited peer interaction and feedback comments are noted in the last two biopics. Students in b4 choose to work in isolation until the end of the session. Field notes indicate that although students show an understanding of societal problems, it appears as if they are going in circles, trapped in theory and philosophy and struggle to frame the project focus as abstract representation.

[reflective essay]

An expanded empathic range is revealed by tracing its routes through the reflective essays. In b1 and b4, students show a connected relation when they emotionally relate to complex concepts on a deeper level. In b4, some students remain detached without affective empathy. The cognitive approach to empathy results in students advocating for issues, but from a distance, compared to an affective approach, immersed as members of a community. An empathetic continuum becomes visible in b4. Limited emotional connections in b2 and b3, which are mostly pragmatic based, show little affective qualities in the response to experience and interface regarding space and object. However, social considerations are expressed. These are placed at the threshold between immersion into and connection with issues.

The workshop helped me to see the city in a different light and also getting to see the growth and potential it holds Starting from the bottom up is how we see the city today, a fragmented city in need of guidance to link the community and cultures (b1_Michelle).

Designing with a focus on the social should be inclusive, interrelated and interchanging. This allows designers to satisfy needs of end users (b2_Nicole).

In general, the consideration of empathy shifts from reflecting on issues to reinterpreting these during the making of critical artefacts. In b2 and b3, this is especially visible as students find abstract relations between intangible concepts and second life material properties and qualities. Shifts between different ways of thinking enable the transition in translation and interpretation beyond the obvious. This constructive process continues with the activities in b1, where students focus on the meaning of associations through metaphor and thus deepen the understanding of complex social issues.

A ribbon (the user) is being suffocated by the fabric (the interior) in a spiral form. The user gets lost in the maze, the whole process is time consuming and stressful. There is no connection between the space and the user and no room for change. The whole process in the store is impersonal The user should not be an afterthought (b2_Nadene).

The fact that it is a SALE, is iconic of the face that the city almost "sells" its people and the idea of loss and gain is a large aspect in the life in the urban wave (b1_Loren, installation instead of an artefact).

Field and reflective notes observe self-centred responses as designer instead of user, and proves challenging in b4, as evidence of personal bias and individual preconceived ideas in the meaning-making process has been a problem since the start of activities in b4. Similarly, students displaying oblivion towards other matters than their own focus, have difficulty to detach emotionally. Therefore, even though a continuum is visible, perspectives are not shifting. The question worth considering: what

if some people are unable to empathise? In response to this, a concern is expressed in the data – the notion of time to foster empathy in various situations. Some students express this in their own ways:

How do we stop the city? A freeze frame to induce reflection. Contemplation and appreciation. How do we document the city? An observation of the people, the music, the food, the culture, the love, the hate. How do we see the city? (b1_Loren).

The difficulty for me is with the duration of this project: with my project constantly evolving as the semester goes on, and my point of interest slowly shifting around, it is paradoxical to produce a finalised text that precedes my artefact ... its meaning would only start to surface after continued immersion in (or even after) making (b4_Mijia).

[trajectory to completion]

The trajectory to completion exhibits noteworthy findings according to the external observations and the researcher's field notes. The quarter of the class in b1 that integrated the workshop activities in the design examination are able to detach emotionally from complex issues and to integrate their cognitive understanding with the affective understanding. They can imagine, re-enact and simulate an experience to address challenges contained in the scope of the design project, directly. This seems to produce empathy, compared to the remainder of the class did not achieve this expanded empathetic horizon.

Students in b2 find a way to connect, due to the immersive process in the critical artefacts making and as a result, some show signs of detachment in the final feedback after the project presentation. The comments show that even if the interpretation was not executed in full in this project (too limited time), intent is expressed for implementation in future projects. Detachment is not truly reached in b3, because meaningful connections did not reach full emotional immersion. Here, pragmatic and prototyping concerns dominate affective qualities and students remain in a stage of immersion only. The emphasis on the aspect of manufacturing the luminaire, by students as designers, concerns them.

Critically reflecting on issues in the framing of problems through observation and discovery poses a challenge due to personal bias of students' judgements (b4). An exploratory process enables constructive engagement. If students are entangled in an emotional trap, the danger exists that they could become caught up between a one-sided opinion with preconceived ideas of the architect (*egocentric bias*) on the one hand, and ignorance of the designer preventing deeper design considerations on the other.

... hitting on some very relevant and timely themes but needs to find a focus ... work is interesting but self-defeating from a viewer's perspective. If he wants to continue this exploration I think he will need to decide whether he wants to be a trustworthy reporter or a trickster ... mission is unimpeachable but his artistic expression of that mission is as closed and bluntly unambiguous as the villains themselves. Engagement is probably the watchword for him ... (b4_ external comments).

[post feedback]

Post feedback shows that the timing of the workshop as a disruption has a direct relation to the nature of empathy expressed. In b1, the group of students that reached a detached understanding, connected

deeper and showed deeper insight compared to those of their peers. They could convincingly and confidently communicate the integration of workshop and design projects. The connection fades in the remainder of the class. The late timing of the workshop in b2 has an impact on the expression of empathy, due to the insertion of activities three-quarters into the design. True connection and detachment cannot fully be reported beyond the intent expressed by students in the post feedback. However, one student actively made use of the workshop experience and integrated that in the design.

It did add value but only to a small extent. Personally for me because we only did the plug-in addition to [sic] late (3 weeks) into the design. A week before hand-in did not work as successfully as it could've worked in the 1st week of conceptual development phases. It definitely gave me a new perspective towards design to some extent (b2_Christene).

I do get stuck on designing something while closely regarding the aesthetic rather than [sic] for the user ...writing down the problems of my project from the consumers perspective helped me to come up with a more realistic and feasible solution to my clearly defined problems. I feel that in the end the users of my space would take something of value from the design (b2_Nadene).

In b3, no detachment is possible, due to the pragmatic approach and attitude to dealing with user interface problems on a cognitive level. A binary representation is visible in b4, where half the class stopped with immersion (cognitive empathy representing societal problems as disconnected activists for a particular cause). The other half became entangled in an immersed state and could as a result not detach to reach objectivity.

[alignment with ethos of school]

Empathic considerations expanded the students' understandings in all biopics: the eco-systemic approach of b1 can be furthered by including a stronger human-centred awareness, dealing with intangible matters. B2 could benefit from empathetic immersion to expand the students' horizon by looking beyond pragmatic matters and relating directly to user's unspoken needs. Affective empathy could bring deeper understanding and insight, especially in a context where students are exposed to prototyping, interface, and human-centred design by objects. There the conditions of use become important, to further human-centred design beyond object-centred priorities (b3). Extending the educational milieu of provocation with cognitive and emotional empathy could result in more deeply connected student responses (b4).

SUMMARY 3_empathetic routes

In instances where an embodied immersion is not possible, empathy becomes a challenge. This is where dissociation can support empathetic understandings by imagining or simulating real-life scenarios in particular contexts. In this way, deeper insights can be gained, leading to a connected awareness of intangible needs and requirements.

4_ways of thinking / ways of knowing

Ways of thinking combines various modes assimilated from both paradigms and methodological approaches of design thinking and designerly thinking (Laursen & Haase 2019). The different ways of engagement by the students reveal the modes most useful in advancing transformation and development. The discussion to follow uses theoretical terms from the literature, as italicised concepts represented by the references in Table 6-6 with no citations integrated in the thematic narrative below. The terms are used to accurately describe the findings in the context of the study. However, the academic synthesis will be included in *Chapter 7_Postulations and provocations* in a detailed discussion.

Table 6-6: Design thinking and designerly thinking sources

Designerly thinking	Design thinking
<i>Abductive reasoning</i> : (Peirce 1903, Cross 2006) <i>Co-development of problem-solution</i> : (Cross 2006) <i>Contextual meaning</i> : (Cross 2006, Krippendorff 2006) <i>Dialogue with the situation</i> : (Cross 2006) <i>Framing</i> : (Schön 1983) <i>Modal shifts</i> : (Cross 2006) <i>Reflective practice</i> : (Schön 1983, Buchanan 1992, Cross 2006) <i>Solution-led goal analysis</i> : (Cross 2006, Krippendorff 2006) <i>Wicked problems</i> : (Dorst 2011, Rittel & Webber 1973)	<i>Abductive reasoning</i> : (Peirce 1903, Cross 2006) <i>Contextual meaning</i> : (Cross 2006, Krippendorff 2006) <i>Explorative learning</i> : (Brown 2008, Kelly 2001) <i>Phase models</i> : (Brown 2008) <i>Perspectives</i> : (Kelly 2001) <i>Wicked problems</i> : (Dorst 2011, Rittel & Webber 1973) <i>Appreciative inquiry</i> : (Stein et al n.d.)

[problem statement]

Contextual meaning is the way of thinking emphasised in the problem statements of b1, with the immersive experience related directly to empathy with emotional emphasis. In contrast, no contextual reference is provided in b3, where the focus is on people-object interface. In both however, students identify positive aspects through *appreciative inquiry*, which is referred to as potential or prospect in the earlier thematic narratives, for example, integration between users and the city (b1) and the effect of light on space for well-being (b3). In all four biopics, thinking becomes a way into project *framing* and making sense of societal issues, or *wicked problems* by getting behind or into contextual problems (b1), understanding not only pragmatics (b2), asking critical questions (b3) and understanding larger societal challenges (b4). Students take a different *perspective* to the general designer view and focus on the urban dweller, customer or user, respectively (b1, b2 and b3), which assists with making deeper sense. *Dialogue with the situation* becomes a way of engaging actively in biopics where students struggle to make connections at the start of the workshop (b2 and b3). In contrast, b4 has been working on a disruptive project and the workshop becomes a way of *reflective practice*, to see the problem in a new light. However, the challenge here is the focus on *solution-led goal analysis* as attitude, which is stifling and contradicting an *explorative learning*, as the external examiner's comments observe in the previous thematic narrative. Students find it difficult to let go of preconceived ideas.

However, the path of the flaneur / user may change as it is linket [sic] to the path of life. If the life of the flaneur changes (b1_Kirstin).

Spatial design doesn't have to be constricted to four walls, but rather is resolving an issue and making interior space more comfortable and convenient for the user, and this project helped me think in that way (b2_Shu-Chen).

[keywords]

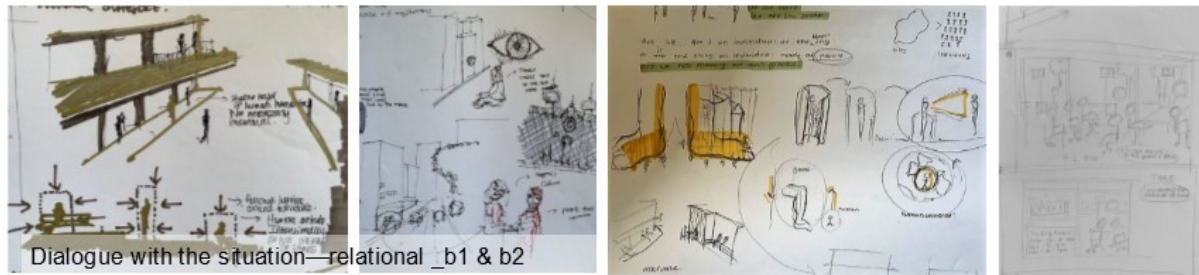
The keyword selection shows an increase in the reference to *contextual meaning* with words describing qualities and attributes of space and place (b1, b2 and b4). Only b3 still has no reference to context. However, *dialogue with the situation* is stronger with a shift from practicalities and anxiety expressed in the problem statement, shifting toward intangible qualities of lighting in the keywords. *Dialogue with the situation* in b4 becomes transactional between inquirer, the situation, and a way of *framing* the project. Both b3 and b4 show *reflective practice*, as the emphasis shifts in former, and a refocus in the latter. In b1 and b2, *appreciative inquiry* is used to identify potential in the contexts of the projects at hand to describe positive future conditions.

Table 6-7: Keywords and ways of thinking

b1	b2	b3	b4
Contextual meaning			
<i>dynamic; identity</i>	<i>uncomfortable; confined</i>	-	<i>ritual; recontextualisation</i>
Dialogue with the situation			
<i>alert; connection</i>	<i>movement; personal</i>	<i>convenient; bold</i>	<i>disruption; control</i>
Framing			
<i>memory; belong</i>	<i>interaction; simple</i>	<i>memorable; generous</i>	<i>identity; significance</i>
Appreciative inquiry			
<i>opportunity; resilient</i>	<i>sensitive; comfort</i>	<i>flexible; rejuvenating</i>	<i>contingency; acceptance</i>

[vignettes]

Dialogue with the situation, concerning context, people and self, becomes prominent in the way drawings represent *contextual meaning* in b1 and b2. In b3 however, students find it challenging to represent descriptions in the problem statement visually, which are highlighted in the keywords and show a lack of *modal shift* between different ways of thinking. *Co-development of problem-solution* in b1 aligns with the students' *reflective practice*, as visual references become more complex and enriched with *contextual meaning*, visible in detailed sketches. Vignette drawings assist in *framing* the problem, where students have to make relational links between aspects observed and experienced in the various contexts. No vignettes in b4.



VIGNETTES ways of thinking relational conditions

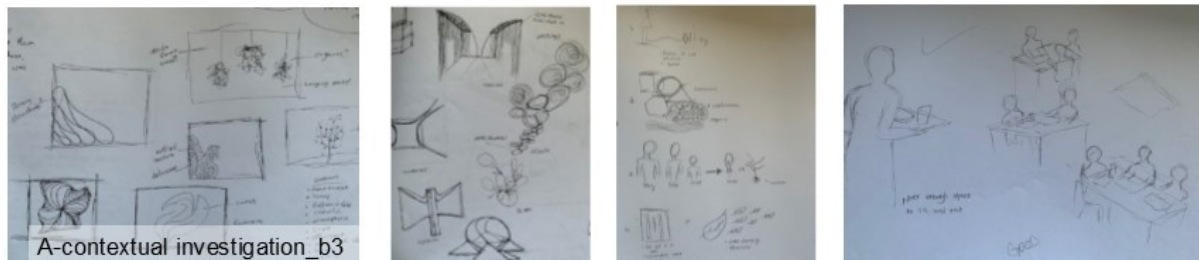


Figure 6-10: Ways of thinking and vignettes

[critical artefacts]

Critical artefact making reveals *dialogue with the situation* in all biopics as the main action for engagement. It allows students to engage in an interactive process of *reflective action*. Dialogue is not only with the situation, but also with the second life materials, posing new interpretations of meaning-making through association, metaphor and symbolism. Dialogue is also with the self, as the representation of *wicked problems* is internalised in a way not normally done in the spatial design studio.

Today's design process was very different from what we do in our normal class ... It was interesting to write down key words of the problems in adjective adverb form. Drawing sketches that followed the keywords were a bit tricky, due to sketching it down I think the workshop was very different and I really enjoyed it because it helped us think and made us work differently from our every day work (b2_Kaushal).

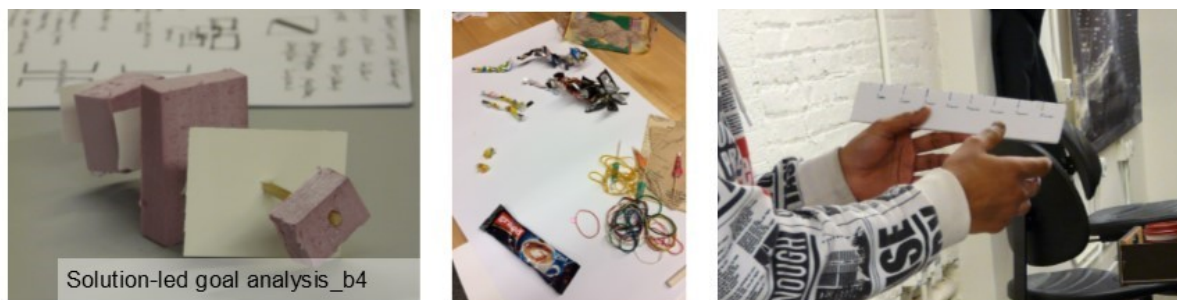
Representing an ascending element, this 'object' is a compilation of various materials that come together in a quite unconventional harmony. There are elements in the composition that will change over time, contributing to the temporal 'being' reflect in the cities [sic] (b1_Dhané).

Contextual meaning emerges in b3 for the first time. Students explore contextual impact on the investigation, looking broader than the convenience store alone, by focusing on larger issues of concern related to lighting, access, inclusivity and interface. *Co-development of problem-solution* features in b1, b2 and b3, where the process of making allows for the clarification of problems in order to articulate possible creative responses. This is an interactive and engaged process. B4 is the only biopic where *solution-led goal analysis* proves to be a hindrance in some cases, where students become trapped in a never-ending cycle of repeating the same response in an attempt to find meaning and to make sense of issues. This is aggravated by a preconceived or set idea of an interpretation. As a result, the translation and representation of the idea becomes limited and predictable. The consideration of a situation-led potential analysis could prove more critical and productive. The challenge then becomes

clear – the making of *modal shifts* – in way of thinking, but also as a way of representation and finding an avenue towards new understandings. Imagining self not as designer, but as the user instead, adopting a different *perspective* is noted in all biopics. The selection of second life materials with the translation of new meanings, allows for *reflection-in-action*, as students have the opportunity to select, and reselect, share and discuss deeper meanings of issues they identify. In b4, the articulation of *wicked problems* is still broad, and the limited engagement and abstraction with second life materials becomes a missed opportunity for generating deeper insights.

The transparent partition shows how the inhabitants have to force space for themselves. The red yard signifies the journey and the spirit travelling with the users. The basket represents the 'land' being an African country and also relates to African cultures weaving baskets. The green signifies the locations people travel from (Anneline_b1).

It is interesting to use different found objects ... it forces our restricted minds to look at space and forms differently and resolve them differently as we usually would have, using positive and negative space to rethink, it gives us a different design perspective and opens our minds to more unique, unconventional and different ideas in terms of our design (b2_Shu-Chen).



CRITICAL ARTEFACTS *ways of thinking* association



Figure 6-11: Ways of thinking and critical artefacts

The alternative use of materials to the spatial expression ... allow for a different approach to design that goes beyond that static interpretation of an interior design but encouraged an abstract representation that showed that even unconventional methods can still portray design as needed and be effective :) A line does not need to be drawn in order to function as a line (b2_Qhawekazi).

[peer feedback]

Through *reflection-in-action*, and *reflection-on-action*, students are able to consider and reconsider decisions (b1, b2, b3 and b4). *Reflective practice* revolves around the process of making, interpretations and meaning-making, abstraction, approach to the project and presentation of ideas. *Contextual meaning* within the two spatial design projects (b1 and b2) informs the workshops where students are considering scenarios and conditions that relate to people-space and people-people interfaces. B2 and b3 highlight *dialogue with the situation* through iterative actions. *Explorative learning* is noted by students in b3, as the workshop ‘forces’ them to think differently to what they are used to, also to participate in activities that are unfamiliar and adopting a user’s *perspective*. This is the first time that *phased models* appear in the analysis, where the focus on various activities provide clarity (b2 & b3).

Starting with the workshop today, I ran behind not knowing and struggling to figure out how to draw my vision of the city. Some kind words and help from a friend got me back on track and I chose some materials that could represent my problem statement and vignettes (b1_Michelle).

Although the concept of spatial design is complex, this workshop has taught me to break down the complexity and design (b2_Sh-Chen).

The design process/workshop for me was a step-by-step process of enquiry and curiosity and following that up with exploration without the end goal of finding a solution, but rather with the end goal of seeing where my hands would naturally take me (b3_Neo).

[reflective essay]

Ways of thinking mostly represented in the reflective essays, are in *dialogue (or dialogues) with the situation*, *reflective practice* and *modal shifts*. *Dialogue with the situation* also becomes dialogue with material and context and relates directly to different modes of engagement, as a transactional process (b1). In b2, students relate thinking and doing with interaction when they create critical artefacts. In b3, *contextual meaning* combined with *dialogue with the situation* allow *wicked problems* to emerge. Through an active argumentative dialogue, students can make decisions informing design interpretation and representation of complex issues found in society (b4). Through *reflective practice* students find a deeper understanding, an enriched and increased complexity of the *wicked problems* they are dealing with, in the context of their own studio projects. The workshop offers ways of entering into these in other ways than normal. Students become aware of the meaning of things through *reflective practice* and challenge their own bias at the intersection between translation, interpretation and representation.

Table 6-8: Ways of thinking and reflective essays

b1	b2	b3	b4
During the process, there were 3 different stages; firstly there was a stage of fixation where elements and their properties were analysed in depth; second there was the impression stage where the action applied to the material became important; and lastly there was a focused investigation of how the elements behave together (Christi).	In trying to create meaning I find myself creating meaning. The ideas and process of creating an abstract sculpture gave me the opportunity to consider my design problem from a new angle. Through being abstract I was able to consider an emotive response to design (Nadene).	Through the course of this exercise I realized just how much of an impact lighting can have on one's daily life and how important it is, when we don't have light our lives and daily tasks start to become chaotic. Lighting can influence how we feel in different spaces it can also help improve the way we react to a space ... (Jodi).	There are often contradictory and co-existing conditions in urban environments that only become visible during certain events or when social behaviours response to new technologies or altered protocols in how the urban environments we inhabit are controlled and subverted (Rachel).

Modal shifts offer students expanded insights in two ways, firstly by shifting between different ways of thinking (textual, visual, making and sharing with peers), and secondly by adopting another person's perspective through *perspectives* and dissociation, where different understandings are explored (b1 and b2). *Modal shifts* in b3 revolve around the intersection between pragmatic issues and emotional or social matters in the making of luminaires, with interfaces explored from different angles. In b4, it is challenging to make *modal shifts*, to step outside the mind of the architect / designer (too detached), but also difficult to step outside the experience of the user (attachment too great).

Co-development of problem-solution in b2 provides students with a better understanding of the *contextual meaning* and in that way, they are able to *frame* the project holistically by also including emotional and experiential matters to the pragmatic concerns that featured by itself at the start. B3 shows noteworthy observations in the reflective essays – the potential of materials are explored and recognised through the potential meaning of things (*appreciative inquiry*). Through this *explorative learning*, the influence of lighting on *context* is considered and as a result, *wicked problems* emerge.

Solution-led goal analysis proves to be a hindrance to design as inquiry in b4. Where preconceived ideas overshadow *explorative learning*, responses become repetitive and predictable. Richness of expression is one-sided and *co-development of problem-solution* out of balance. This is because of the difficulty in making *modal shifts* between modes of engagement, and internalising different points of view.

[trajectory to completion]

Ways of thinking in the trajectory to completion highlighted in all biopics are *problem framing* and *dialogue with the situation*. These two modes become interrelated in the way students engage in order to delineate the boundaries of their project scope. In itself, it becomes an immersive experience of self in context as user (b1), and leading to complex design responses by means of the interrelation between

thinking and doing (b3). This is particularly evident in b3, as the studio master observes the prototyping and manufacturing of luminaires require a hands-on *exploratory and reflective practice*. He notes that this year, students considered the importance of *contextual influence* of lighting which was not the case in the previous year. In addition, the exposure to second life materials expands thinking about material opportunities in prototyping. Interactive *modal shifts* between different points of view reveal considerations of client and community, but also social and dynamic interface between user groups (b1). Where *modal shifts* become a challenge (b4), students are trapped in *solution-led goal analysis*, through their own bias. This relates directly to an expanded capacity for empathetic awareness. Bloom (2016) warns that in such situations, bias could lead to a limited view. If students become too self-centred it could cause detached engagements and predictable design responses. Complexity is narrowly focused and does not include the diversity of the design issues. This observation does not advocate a dualistic generalisation, but acknowledges the continuum of modal shifts, instead.

[post feedback]

Post feedback shows that each biopic has a significant way of thinking that influences the inquiry in a positive way. *Modal shifts*, enabling different *perspectives*, show that students are able to connect with the project on a deeper level, even if only during the workshop and not in the trajectory to the exam (b1). This is grounded in a deep *contextual meaning*, feeding the *exploratory learning* through analogies with second life materials as part of *reflective practice*. *Contextual meaning* is not a main consideration in b2, however, *explorative learning* and *dialogue with the situation* allow students to engage with the process without any filters. It allows new *perspectives* to develop in order to *frame* their project descriptions. In b3, *co-development of problem-solution* directly affects the making of prototypes in an iterative process, where materials and techniques are tested for manufacturing of luminaires. This process is further developed through *critical reflection* of own thinking processes, informed by added research and challenging preconceived ideas. *Solution-led goal analysis* proves problematic if only approached from one perspective. The fact that students struggle to adopt another view, results in ignorance of different perspectives considerations of empathy by only representing an emotionally charged message, or a self-centred designer interpretation that becomes predictable.

[alignment with ethos of school]

The various ways of thinking contribute to expand the ethos of each school, especially in the way students engage with design inquiry. Through *dialogue with the situation*, *wicked problems* are articulated and *framed* in that way, and the project descriptions are clarified (b1 and b3). Where students are able to adopt a user *perspective*, emotional empathy assists them to expand their empathetic understanding in situations that they are unfamiliar with (b1).

In instances where the focus of real-life projects relate to pragmatic matters, the insertion of a human-centred approach introduces intangible and experiential qualities to enrich design interpretation (b2). Human-centredness also brings an increased awareness of interface between people and objects (b3). Continued *critical reflection* from both cognitive and emotional empathy *perspectives* can bring a

balanced response in design representation. *Modal shifts* and *perspectives* are revealed in consideration for different contexts and situations.

SUMMARY 4_ways of thinking

The various activities in the workshop allow students to focus on one aspect at a time, connecting to the intent of the activity. It was never intended as a phase model nor a prescriptive and fixed guide or tool. The intent of the workshop is to offer ways of engagement through different actions that could open new avenues to connect with design inquiry. The engagement remains open-ended and it is important to note that the integration of activities proves to be influential in gaining a holistic understanding and deep insight.

5_process in action

Process in action is framed by suggestions for modes of engagement during the process of design inquiry. To contextualise the discussion, Reynders (2012:4) refers to a speculative framework to enable critical and disruptive practice through a “triangulated relationship that exists between *thinking*, *making* and *sharing*.” In addition, “think, feel and do” are modes promoted by a resource efficient design methodology and eco-systemic thinking (Fisher & Clarke 2012:72). Liz Sanders proposes the triad “say-do-make” as modes of inquiry concerning discursive design (Tharp & Tharp 2018:75). The discussion below suggests ‘feel-act-be’, to extend the already rich collection of modes of inquiry, when considering not only the sense of being as user, but also as designer. The findings are considered independent from the references, and will be consolidated in the discussion, *Chapter 7_Postulations and provocations*.

[problem statement]

THINK. The problem statements are primarily concerned with a thinking mode of process in action. Three biopics note cognitive processes with thinking (b1, b2 and b4) with the inclusion of emotional overtones (b1). Critical reflection is one of the main modes, and relates to contextual awareness, human-centredness and spatial agency (b1, b2 and b4). Empathic thinking in b1 includes feeling connected, showing vulnerability, respect, inclusivity, and authentic responses, when students express the need to belong in the city. Many ‘how’ questions are posed in b1, b2 and b3 addressing pertinent issues ranging from complex problems, to meaning-making and pragmatic matters. The identification of potential is noted in b1 and b2, considering the two different contexts. Lateral thinking is visible in b2 and b3, where unfamiliar activities challenge students to ‘think outside the box’. B4 has a strong emphasis on abstract thinking to focus on framing projects clearly.

The workshop helped me reflect on how I know the city, not only as a user but also as a spectator viewing the city from the outside (b1_Thabi).

My main concern is how the customer interacts with the space provided / designed for them. How they take to the space and their worries and concerns about the space (b2_Siphumelele).

How do we experience as humans? Why does it make us feel as happy? Can we even recreate this? (b3_Kaanita).

How do I clarify my statement ... How do I translate my concern ... How do I pace the audience in liminal state they desire to stay in? (b4_Dylan).

FEEL. The second mode of engagement in the workshops relates to feeling. The embodied experience in b1 elicits a strong emotional response, which informs the remainder of the workshop activities. In b2, students rely on personal experiences of convenience stores, as reference into the problem statement. The manufacturing and prototyping challenges in b3 causes anxiety when the ‘making’ process is considered. In comparison, anxiety in b4 relates to the difficulty to define a project scope within the context of the already disruptive design project. In addition, feeling considers different views in the process. This is present in all biopics – extending an empathetic awareness.

SHARE. Due to the disruptive design project, students struggle with the representation of ideas, instead of solving a problem. The visual translations and communication of messages become an obstacle (b4).

PROCESS. One student in b4 expresses difficulty in working in a fixed sequential process. The need for a non-linear and random investigation is expressed.

[keywords]

THINK and FEEL. The modes of thinking and feeling are used to narrow the scope and understanding of societal / design problems, including contextual consideration. Cognitive thinking skills are combined with lateral thought to address not only pragmatic matters, but also experiential, emotional and intangible aspects and conditions.

[vignettes]

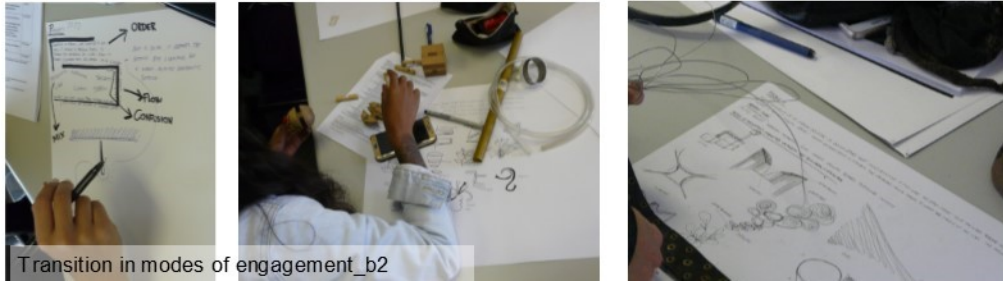
THINK. Vignette drawings require shifts in engagement, from thinking in words to thinking in images. An immersive process and critical reflection assist students to make the transition. This proves difficult in some instances, where some students produce vignettes representing two-dimensional diagrams (b3), or none at all (b4).

SHARE. Vignettes drawings require students to translate abstract and intangible concepts into physical illustrations, supplemented with descriptive annotations. The process is exploratory and spontaneous (b1 and b2), but in some cases students are hesitant and uncertain to share with peers (b3). Where no vignettes are created, sharing of abstract ideas is not possible (b4).



Abstract and intangible concepts_b1

VIGNETTES *process in action* words to image



Transition in modes of engagement_b2

Figure 6-12: Process in action and vignettes

[critical artefacts]

MAKE. Critical artefact making elicits a variety of responses. In b1, this process is intuitive where students choose second life materials for its symbolic representation potential. Physical qualities of materials connote associations for deeper and abstract meanings. Students in b2 find the process tricky and use the word ‘forced’, to express their experience of thinking differently to their normal studio practice. However, field observations reveal that second life materials are the reason they respond creatively, intuitively and hands-on. As an iterative process, students investigate mechanical connections, where detail becomes important. In b3, students also feel ‘forced’ to use unfamiliar materials in the action of making. As an exploration, they find freedom of expression due to the ‘random’ interpretations that become possible. Instead of following preconceived ideas, the process leads to narrative investigations that represents customer experiences in abstract ways. The limited number of students participating in ‘making’ (b4), also follow a process-driven approach and appear to be emotionally invested in a search for meaning.



Connections and expression_b2

Associations and message_b1

CRITICAL ARTEFACTS *process in action* meanings

Figure 6-13: Process in action and critical artefacts

SHARE. In b4, the challenge remains the representation of messages embedded in the artefacts, as the disruptive design studio project brief requires. However, the workshop assists students to explore theoretical concepts, but the overall translation into the different studio project brief categories are not yet developing. Students in the other biopics share freely and express hidden messages and abstract interpretations in the critical artefacts, relating directly to associations with second life materials.

THINK. In b3, the making process challenges students to expand their thinking to 'think out of the box'. Unfamiliar materials challenge them into a process of abstract interpretation, with associations and connections. This new experience stretches their understanding of complex design issues. This causes an unexpected surprise – a revelation and realisation that meaning can be created in many different ways. Obvious and predictable ideas are replaced with artefacts with depth and complexity.

Using alternative materials really opened my eyes because some resources are not always available and a plan needs to be made with what is. This activity really showed me that anything is possible and the use of alternative materials may create solutions that is appropriate and out of the box (b3_Andreana).

[peer feedback]

SHARE. Noteworthy observations reveal different modes of peer interaction. In b1 and b2, students share freely and spontaneously with detailed comments recorded on worksheets (b1) and constructive criticisms for studio project consideration (b2). Limited sharing is observed in b3 and b4, with hesitation and discomfort (b3) and isolated seat selection (b4) limiting interaction. In b4, sharing happens at the end of the workshop as a formal session and feels more summative than formative, although students share freely.

THINK. Thinking expands the cognitive engagement of students in b2. Through reflection, different ideas surface and students identify and define problems with a human-centred approach. Similarly, students in b1 use empathic thinking to channel emotions and experiences to interpret abstract ideas into critical artefacts. In b4, critical thinking activates a speculative approach, however, the thinking process appears to be obstructed and it becomes a challenge to find an exit for discursive design translation and interpretation.

MAKE. The making process in b1, b2 and b3 is messy and hands-on, compared to b4, where limited explorations and preconceived ideas become a hindrance.

FEEL. Emphasis on meaning-making and considerations for people are seen in b1 and b2. Emphasis is on social inclusion and agency, but also pragmatic matters. In b4, students with a strong emotional connection to the chosen design problems, find it difficult to detach from the process on an emotional level, compared to students that show direct relation to users through the process of normative dissociation. They find it difficult to associate with issues on a deeper level and to translate ideas with a connected authenticity. As such, the voice of the architect / designer overpowers the voice of people who are represented.



PEER FEEDBACK *process in action* sharing

Figure 6-14: Process in action and peer feedback

PROCESS. One student in b4 mentions that prescriptive ways of working are hampering her creative and exploratory process, negatively affecting her interpretation and representation. Free exploration, the iterative process, the investigation into problems and solutions as ways of engagement, is compromised in this way.

DISRUPTION. A noteworthy observation regarding the extended disruptive studio design project of b4 is whether such a prolonged disruption is conducive to well-integrated projects. Alternatively, does the entanglement in philosophy and theory cause students to get trapped or derailed in their responses to thinking and making? It appears as if an empathetic response becomes a hindrance – too detached, or too attached. This is problematic for creative engagement; however, students do not refer to duration themselves.

[reflective essay]

PROCESS. Comments regarding process reveal students' personal experiences and realisations of the workshop. In b1, students express a shift in their intentions, by refocusing on process instead of outcome-based solutions. It becomes a 'way of understanding' and identifying potential by sharing different opinions and finding new meanings through material explorations for abstract associations and symbolism. In b2, the workshop activities enable the understanding of underlying problems in the bigger studio project, as students call attention to two activities, keywords and vignettes. The former elicits responses regarding human-centred issues, and the latter reveals the importance of social interaction. Students in b3 relay individual experiences, realising personal judgements and perspectives related to larger design issues. Engaging with unfamiliar activities reveal that unexpected shifts are possible, even if they are small and seemingly insignificant. The challenge remains to represent intangible abstract qualities, when using unfamiliar ways of engagement, without an end-goal in mind. Students embrace the challenge. However, when thinking overshadows the other modalities of design inquiry, the creative and abstract interpretation suffers (b4).

The design process in this workshop was a bit different from the usual design process that I go through when designing ... This process deals with how the designer uses objects, shapes and materials to express situations and problems. In the workshop we had to think out of the box ... (b2_Naelly).

Good design is design that caters for 90% of people, at least 90% of the time ... how convenient / serves [sic] the end user that creates the meaning (b2_Andi).

THINK. The thinking mode reveals notable observations across the four biopics. It appears that reflection assists to identify and explore transactional relations between people-people and people-space (b1). Students consider ‘thinking outside the box’ essential in the process to shift from physical expression and regulation, to intangible meaning-making matters (b2). Students in b3 feel ‘forced’ to think beyond static and physical representations. As a result, a generic approach is replaced with responses filled with richness immersed in personal experiences. Through critical thinking and reflection, students in b4 find focus to define projects.

MAKE. Students that actively participate, find ‘making’ to be the catalyst for expression and finding meaning during the workshop (b1, b2 and b3). In b4, ‘making’ and free explorations are limited. The potential of an iterative and hands-on process remains locked. Explorative learning suffers, with obstacles to abstract interpretation and development of ideas. The question remains, how could active participation in vignette drawings enable modal shifts from thinking in text to images, guiding abstract interpretations to deeper insights? Instances of active engagement with material result in deeper associations (b1). Free, messy and hands-on explorations eliminate preconceived ideas because of the confrontation contained in the reflection process (b2). The making mode in b3, as the biggest positive disruption, enables abstract responses and allows students to ‘enter into’ another way of engagement. They challenge their preconceived ideas by physically ‘making’ things and interpreting abstract potential of second life materials, a transformation through ‘thinking’ and ‘acting’. The identification of descriptive keywords as verbs also focuses on relational and complex concepts. Initial anxiety and apprehension at the start of the workshop is replaced by active participation.



REFLECTIVE ESSAY *process in action* thinking

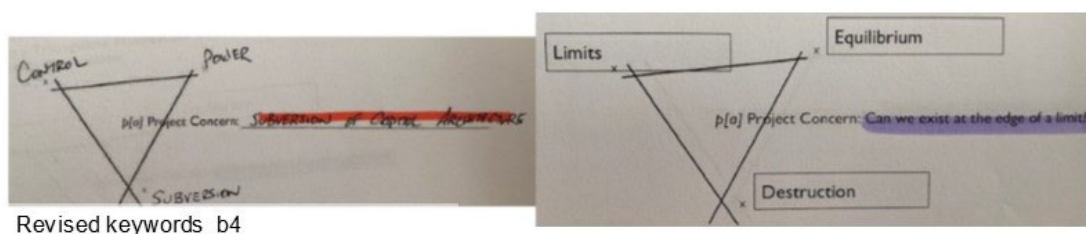


Figure 6-15: Process in action and reflective essays

FEEL. The explorative process expands the empathetic awareness of students in all biopics, especially in b1 where the continuum of dissociation is visible. Students in b4 struggle to either connect, or detach emotionally, which has a direct impact on the trajectory to completion of their projects.

SHARE. Sharing has two different roles. Firstly, interacting with peers to get other opinions and views, and secondly, communicating the design intent through abstract representation. In biopics where peer interaction is spontaneous, constructive collaboration and criticism assist students to understand perspectives other than their own (b1 and b2). Abstract representation of societal problems poses a challenge and students question 'how' relational connotations and associations can represent symbolic messages (b1, b2, b3 and b4). Rendering the intangible visible remains a constant challenge for students in b4. In the context to only reveal issues through abstract representation, it is imperative to have an opinion, to voice an opinion and to make your opinion matter in some way.

DO. In b3, students mention that the critical artefact as 'model' becomes commentary on self and on society. Students express directly what they feel, as the workshop has no final product or outcome expectation. Social commentary also features in b1, where students explore the meanings of conditions and scenarios in the city. Similarly, students in b4 have the intention to become involved in the matters of concern they identify, as activists, or as members of the community. This should however not be understood as dualism, because the shift between the two is considered as a slow process of realisation. In addition, it happens incrementally along a continuum of shifts between degrees of understanding.

The project work will begin to explore the answers to these questions without attempting to fixate on a single architectural solution. This work also aims to make the question and speculative propositions visible (b4_Derrick).

I am curious about how to bring this layered complexity of information to the surface and in doing so, hope to encourage an acknowledgement of this entanglement of immigrants with the unceded Native land and architecture's responsibility to the plurality of the present condition (b4_Jovana).

[trajectory to completion]

Only a handful of students show a concerted effort through their individual commitment to interpret pertinent aspects from the workshop in the trajectory to completion of the larger studio project. Very little to no such evidence is visible in student feedback, external comments and visual data.

FEEL and BE. In cases where commitment is visible, contextual considerations inform the interpretation. Emotional empathy, balanced with a cognitive understanding of the context ground the projects. These students are able to detach and find an 'exit' to close the loop in their project development. They discover a personal commitment in their individual process. For the remainder of the class, 'think', 'make', 'do' and 'share' seem to be part of the normal design practice, and 'feel' and 'be' dissolve along the way. To 'feel' and to 'be' therefore appear to be the most difficult ways of engagement to sustain beyond the obvious and predictable levels of engagement.

Due to the late insertion of the workshop in b2, the trajectory to completion does not show much evidence of its activities. As a result, the true impact cannot be determined. However, feedback express the intent to implement aspects of the unfamiliar approach in future projects, such as the keywords and vignettes (thinking in words and images). Students consider peer interaction and feedback (adopting

new perspectives), working with unfamiliar materials and realising the importance of the meaning of things, as valuable. One student incorporated the workshop thinking and approach in her project, with emphasis on human-centred matters, the value of meaning instead of aesthetic expression.

I will apply this thinking method for future projects as it is valuable (b2_Lyse).

I feel that the workshop is and was a great help when it came to adding value to my project. I wanted to make my design give meaning to the consumer but was lacking in my execution of my concept in ideas (b2_Nadene).

I don't know I personally think that we should do more of these workshops to encourage future designers ... not be another drone in the proverbial [sic] beehive but instead be the difference (b2_Andi).

The prototyping process of luminaires in b3 shows evidence of critical thinking in manufacturing, especially considering ease of assembly. A quarter of the class addresses larger societal problems in the type of luminaires, to extend the use of light beyond aesthetic objects. They interpret issues regarding health and well-being, due to critical reflection and exploratory process. As a result, they close the loop in the emphatic route. The rest of the class shows evidence of creative use of materials and detailing, but does not address complex problems.

The process of inquiry in b4 is caught in a repetitive loop, instead of an iterative one. No evidence of the workshop engagement is visible in the trajectory to completion. Again, the question regarding the duration of a disruptive practice is highlighted, together with the challenges to connect and to detach emotionally to real-life challenges. These cause difficulties in the exploratory process. 'Feeling' and 'being', appear to be more complex modes of engagement as compared to 'thinking', 'making', 'sharing' and 'doing'. These highlight significant avenues of engagement to achieve deeper understanding and richer projects.

[post feedback]

THINK. The unfamiliar process unexpectedly assists students to consider their projects from a new perspective. Lateral and critical thinking, reflective practice and abstract thought all show to impact positively on the exploratory inquiry. The challenge to think outside standard norms, by considering new meanings, was intimidating at first (to varying degrees across the different biopics), showing that students respond with a deeper understanding and less predictable proposals. Abstraction and subjective connotations assist the ways in which students translate, interpret and make meaning of complex concepts.

MAKE. Second life materials as a disruptive catalyst in the making process, enable students to find conceptual and interpretive links to the critical artefacts. Students express spontaneously, by assigning abstract meanings to properties of materials (b1, b2 and b3). Students are no longer trapped in a familiar comfort zone, but free to explore with creative interpretations of unusual materials. They challenge their own self-imposed boundaries and find abstract and symbolic ways to express and represent ideas (b2). The iterative process of investigation unlocks responses to prototyping that are more manufacture

ready, considering materials and detailing (b3). B4 shows that if the making process is not actively pursued, the abstract interpretation later suffers.

The numbered middle relates to a broken down clock, which is all over, which represents the different experiences at different times in a day. The threads of colour is the vast diverse potentials of people ... (b1_Rebakah).

The installation is a representation of a city street vendor's stall, however the items on sale are unusual and have deeper meanings attached to them ... the items on sale are representative of the people in the city (b1_Loren).

SHARE. Interactive discussions assist students to develop their understanding of another's point of view (b1). Noteworthy in b2 is the comment that students feel free to explain things in different ways with an increased understanding of their message and intent. Through shifts between thinking in words and thinking in images, this becomes possible.

I also found that we were able to explain things without the struggle of sketching and not being able to really express what we were thinking (b2_Sh-Chen).

FEEL. The data show that through dissociation and balanced emphatic responses, connected engagement influences complexity in richness and understanding. Otherwise, the interpretations are one sided and personal bias clouds the project.

PROCESS. The impact of unfamiliar actions in the studio, trigger unexpected sparks initially causing anxiety. Students later express gratitude and enjoyment for the experience in the post feedback session (b2). The fact that the workshop is process driven and not outcome based assists in the acknowledgement of other interpretations that would normally not be the case, as it is easy to follow certain 'recipes' to get results. This workshop intention is the opposite; it is exploratory, speculative, and provides students with the opportunity to ask difficult questions without having to solve them. However, when students consider these complexities, they internalise the associated challenges and issues and deal with it on another level – an expanded inner design awareness.

Focusing on issues and resolving them, rather than building conventions helped me think better and work towards resolving an issue rather than begin drawing with a floorplan. This was very helpful as a creative because often we work on computers and rarely get the chance to allow ourselves to be messy and hands on (b2_Sh-Chen).

DO. By actively engaging with complex problems, students can make the choice towards commitment. When they acknowledge and accept the challenge to take action and to become champions of design issues, they become advocates for those that are not able to do so for themselves.

[alignment with ethos of school]

The investigation in b1 shows that students respond positively to the introduction to 'feel' and 'be' in addition to the conventional design inquiry. The data show a shortcoming and need to reintroduce 'feel' in a practical way. Connected engagement through 'feeling' appears absent in the engagement and ethos in b4. Students are able to motivate and formulate an argument theoretically and philosophically,

but find the emphatic process difficult. The design process as an iterative and explorative learning opportunity is highlighted in the findings of b2. Other ways of engaging outside the normal computer-driven environment, prove to unlock creative and lateral thinking. Critical reflection and sharing with peers are two modes that can add value to obtain deeper understandings. The inclusion of iterative practices and interactive engagement contribute to the ethos of the school in b3. Students are 'pushed' to consider problems beyond problems and to find the intangible within the practical.

SUMMARY 5_process in action

'Feel', 'act' and 'be' appear to be the most difficult modes of engagement to activate in the inquiry process. This is where the conscious decision to connect to deeper needs and requirements of users are revealed. In addition, if an emotional understanding can support the cognitive response, the overall engagement is well-rounded and whole. In this way, the designer can adopt the role of an agent, a change maker that cares and wants to make a positive contribution in the lives of others, in society as a whole.

6_developmental transformations

The developmental transformations thematic narrative considers student developmental theories through the lens of transformative learning. This discussion follows a different format to that of the preceding ones, by including theory from the literature in an attempt to contextualise the analyses in the larger discourse. These include transformative learning (Mezirow 1991), a holistic perspective (O'Sullivan 2002), constructivist understanding (Kegan 1982, 1994) and connected knowing (Belenky et al 1986). Developmental transformations are framed by a collective theory from educational and developmental psychologists, Biggs & Collis (1982), Gagne (1956), Bloom (1956), Krathwohl et al (1964), Kolb (1984), Perry (1970), Belenky et al (1986), Mezirow (1991), and Argyris and Schön (1974). In literature, the developmental theories or models are understood as 'hierarchies'.

Table 6-9 demonstrates in a theory matrix, the relation between the various authors. The horizontal rows, C, D and E represent the positions in developmental theory where the biopic investigations are plotted (C before workshop, D during workshop and E after workshop). The discussion below however, demonstrates that there are many permutations of development and not one single route. Krathwohl et al's (1964) lesser known affective domain in the Bloom taxonomies, sheds a new light on the possible insights gained in the thematic narratives (vertical highlighted column). In addition, Didau's (n.d.) taxonomy offers modes of engagements instead of hierarchical levels.

This study acknowledges the concept that learning is a development of skills and knowledge and that one builds on the other (scaffolding, after Vygotsky 1978). However, the study proposes the value of a fluid movement between the 'levels' or 'phases' for integration of different qualities or modes of learning, and not only as progressive steps to development in a hierarchical manner. Instead, it adopts a 'circular'

or 'open matrix' understanding, where the 'level' or 'phase' can be 'entered into' randomly, or more than one be occupied simultaneously according to the modes of engagement. Especially due to the context of the disruptive workshop activities and its unfamiliar approach in a design context, it requires new combinations or entry points for transformative learning and meaning perspectives (Mezirow 2018:117).

Table 6-9: Educational and developmental theory comparison

	Cognitive						[modes]	Affective	
Mezirow (1991)	Biggs SOLO taxonomy (1982)	Kolb's learning cycle (1984)	Gagne's learning hierarchy model (1956)	King & Kitchener (1994)	Perry's scheme of development (1970)	Bloom's taxonomy (cognitive) (1956)	Didau's taxonomy (n.d.)	Krathwohl' taxonomy (affective) (Krathwohl et al 1964)	Belenky et al (1986)
F - [value]	Extended abstract	Active experimentation	Problem solving [complex procedure]	7-knowledge outcome of active inquiry 6-knowledge requires action and construction	9-Developing commitment 8-Orientation in implications of commitment 7-Initial commitment	Evaluation [creating]	-self-control / self-perception -metacognitive strategies -resilience / motivation	Characterising by value	Constructed [connected]
E - premise	Extended abstract	Abstract conceptualisation	Problem solving [complex procedure]	6-knowledge requires action and construction 5-contextual specific/shaped	7-Initial commitment 6-Commitment foreseen 5-Relativism correlate	Synthesis [evaluating]	-critical thinking -problem solving	Organising by conceptualisation	Procedural Connected
D - process	Relational	Reflective observation	Rule learning [relationships]	5-contextual specific/shaped 4-situational variables – abstract and uncertain	5-Relativism correlate 4-Multiplicity correlate	Analysis [analysing]	-creativity -collaboration -communication	Valuing	Procedural Separate
C - content	Multi-structural	Concrete experience	Concepts [systematic structures]	3-personal beliefs until absolute	3-Multiplicity subordinate	Application [applying]		Responding	Subjective [separate]
B	Uni-structural		Discriminatory learning	2-direct sensory observation	2-Multiplicity pre-legitimate	Comprehension [understanding]		Receiving	Received [separate]
A	Pre-structural		Basic types of learning	1-knowledge absolute /concrete	1-Basic duality	Knowledge [remembering]			Silenced [separate]

Table 6-10 illustrates the correlation between Mezirow's (1991) transformative learning and Argyris and Schön's (1974) single and double loop learning, and includes the consequent triple loop learning emerging from their work, based on Bateson's third order learning (1972). In addition, the holistic understanding of transformation (O'Sullivan 2002) and constructivist understanding of meaning-making (Kegan 1982, 1994) are included. The meaning perspectives of transformative learning, *content reflection*, *process reflection* and *premise reflection* (Mezirow 1991), are used in this discussion as the developmental pivots (before workshop, during workshop, after workshop) and relate to rows C, D and E (Table 6-9) as indicated and described in the discussion below.

Table 6-10: Transformative and loop learning

Transformation of meaning perspectives	Loop learning		Holistic (integral) transformation perspective	Constructivist understanding
Mezirow (1991)	Argyris and Schön (1974)	Triple loop learning (after Bateson 1972) – third order learning	O’Sullivan (2002) Ferrer, Romeo & Albareda (2005)	Kegan (1982, 1994)
Premise reflection – “an awareness of <i>why</i> we perceive”	---	Triple loop learning (context & principles / values) – transform (change in perceptions)	Inquiry (participatory approach)	5-self transforming mind (systems of systems)
Process reflection – “reflecting on <i>how</i> we perform the functions of perceiving”	Double loop learning (frames / assumption & content) – reframe (change in thinking)	---	Training (bricolage)	4-self actualisation (systemic)
Content reflection – “reflecting on <i>what</i> we perceive, think feel, and act”	Single loop learning (action & process / procedure) – react (change in behaviour)	---	Content (mind-centred)	3-Socialised mind (across categories)

Below is a summary of the levels of learning according to the theories in Table 6-9 in relation to Mezirow (1991) in Table 6-10:

- *Premise reflection (why)* – row E: Relational, abstract conceptualisation, problem solving, action / construction, commitment foreseen, synthesis, conceptualisation and connected knowing
- *Process reflection (how)* – row D: Multi-structural, reflective observation, rule learning contextual / situational, relative (relativism correlate, multiplicity correlate), analysis, valuing, and separate knowing
- *Content reflection (what)* – row C: Uni-structural, concrete experience, concepts, personal beliefs, multiplicity subordinate, application, responding, and subjective knowing

The discussion to follow uses theoretical concepts as italicized words, as referenced in the tables above, without providing references and should be read in conjunction. In addition, citations are included for the integrative discussion of specific transformative notions in the biopics.

Workshop

The workshop activities provide opportunities for growth and transformation through different modes of engagement and various perspectives. Findings show that some students display a connected view from the start and others develop connection through the process. However, this connection is not sustained in everyone. In addition, a large portion of students remains detached or separate from issues they address directly. The unfolding of this process is described in this section.

[problem statement]

The findings show that students with an embodied experience of a context have a direct relation to the site and its problems, by means of an emotional experience, whether positive or negative. In this way, the route to a *connected knowing* is stronger, because of the contextual immersion (b1). The three forms of reflection according to Mezirow (1991:107-108), *content reflection*, *process reflection* and *premise reflection*, therefore appear as a continuum. In addition, the other biopics reveal *separate knowing* positioned according to *content reflection* due to sensory perception Mezirow (in Kember 1999:23), but relate to Perry's (1970) position *3-Multiplicity subordinate*, where students display uncertainty (b2) and encounter moments of 'temporising', a barrier to transition by 'freezing' (b3 and b4). In contrast, *process reflection* relates to *4-Multiplicity correlate* with focus on a-contextual issues, and personal bias overshadows the process, in b3 and b4 respectively. In *5-Relativism correlate* students are asking critical questions related to the design issues they identify.

I live in the city but I am not part of it. I have a story; like everyone in the city but nobody to share it with. We are all different but similar in a way, yet we are disconnected. I wish (to tell my journey) to belong and to be part of the city (b1_Thabi).

The first difficulty I had was actually thinking of the concern and not trying to solve the problem. I also thought that it was very hard to get out of the architect's mindset ... (b4_Derrick).

According to the Biggs SOLO taxonomy (Biggs & Collis 1982), students' experiences in b1 are *relational*, compared to the other three biopics, which are *multi-structural* where students struggle to make connections and focus projects. Following Bloom's taxonomy (1956) (Krathwohl 2002 - revised), b1 and b2 relate to *synthesis*, and b3 and b4 show limited synthesis, due to being too detached from the project, or being too close emotionally (b4). Kolb's (1984) learning relates to the first two phases, *concrete experience* and *reflective observation* (b1, b2 and b3). Students in b4 find *concrete experience* challenging, due to the emotional connection being too intense, or they keep themselves separate and detached.

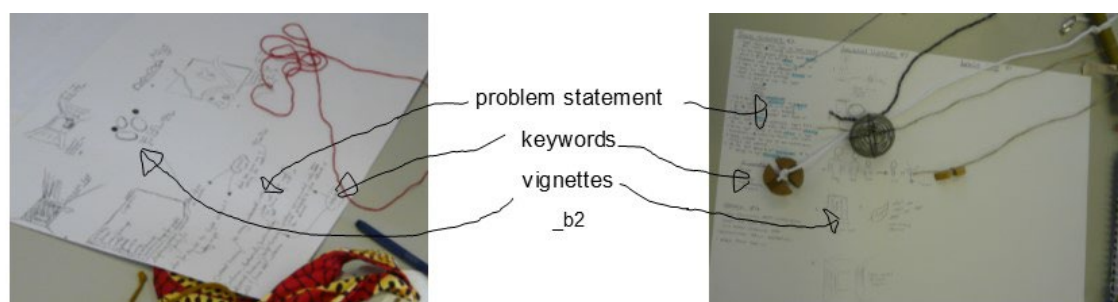
In relation to Mezirow's (1997:5-6, 2018:116) transformative learning, it is evident that students find it challenging to fully shift their *point of view* to that of the user, as their own *habits of mind* are strongly embedded in their own personal judgements and assumptions. There are however, selected students in each biopic that are able to shift their perspective to that of the user through *normative dissociation* (Panero et al 2019) and express *connected knowing*. All workshops display, according to Krathwohl's (1964) affective domain, an awareness and response to the context, or imagined context (*receiving*) in a detached state. In instances where students connect to the experience, their behaviour shifts towards interest and immersion (*responding*) (Krathwohl et al 1964).

There was no electricity for the past week, load shedding is a huge problem in South Africa. I want to create a light that can be wireless, that can create a "homey" atmosphere and can change colour and that can be controlled from your cell phone (b3_Roxanne).

Busy streets with constant flow of traffic. Watchful eyes on every corner. Clutching to valuable objects as we move with the crowd, completely alert and aware. We walk on dilapidated walkways, dirtying our shoes, kicking up dust. (b1_Rebekah).

[keywords]

Keywords provide a cognitive link with the problem statements and because of that, students are more connected (b1 and b2). Students in b2 show a deepening in *reflective observation* (Kolb 1984) for increased understanding. Perry's (1970) barrier, 'temporising', leaves students (a third of the class) in b3 in a frozen state, unable to engage actively with this activity. However, Kolb's (1984) learning cycle of *reflective observation* shows that students are able to recognise personal references to past experiences and thus expand their cognition. Noteworthy in b4 is a loosening of barriers, with a shift towards Biggs SOLO taxonomy's (Biggs & Collis 1982) *relational* concepts on an *extended abstract* level, by questioning issues related to *premise reflection* and formation. Re-framing of projects benefits this activity, which links to *double loop learning* (Argyris & Schön 1974), modifying and clarifying goals and challenging ways of thinking.



PROBLEM STATEMENT *developmental transformation.*

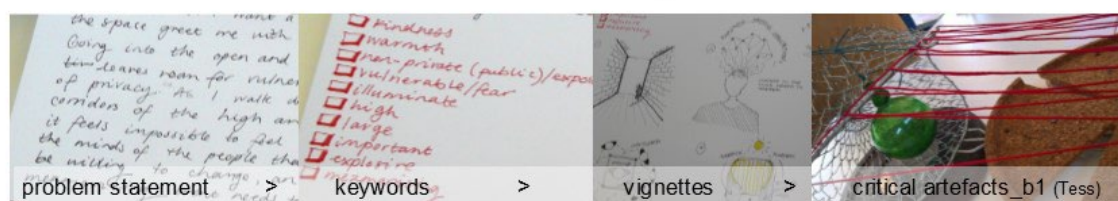


Figure 6-16: Developmental transformation and engagement

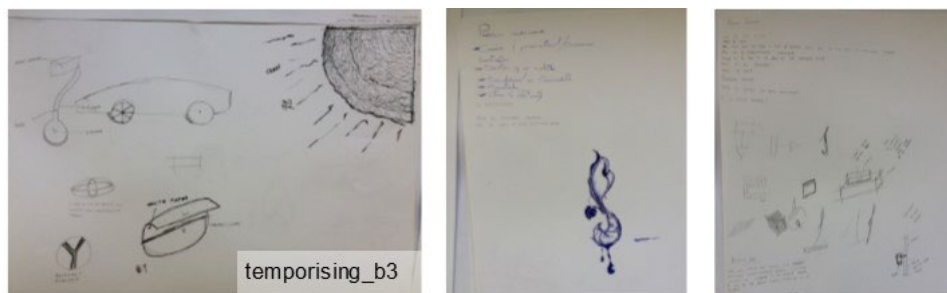
[vignettes]

Vignette drawings indicate a *connected knowing* because of the contextual immersion of students in b1. In b2, both *connected* and *separate knowing* are visible (Belenky et al 1986:100), with focus on emotive and experiential matters, and pragmatic considerations, respectively. In both b1 and b2, Perry's (1970:109) *5-Relativism correlate* is visible in the majority of students, with *6-Commitment foreseen* in some, as they respond to contextual matters in different ways where human-centred matters are concerned. In contrast, students in b3 experience a barrier to start the drawing phase – a static 'temporising' state. This inaction is triggered by hesitation and anxiety because of the unfamiliar activity and the requirement for contextual and relational exploration. *Separate knowing* equates to *4-Multiplicity correlate* by highlighting a-contextual issues. *Connected knowing*, emphasising

relationships, reveal *5-Relativism correlate* is through an awareness of complex issues (Belenky et al 1986:112-115; Perry 1970). In this way, deeper responses to wicked problems reveal *premise reflection* (Mezirow). However, it is unclear if all students find synthesis and deeper understandings.

According to the comparison in Table 6-9, Bloom's (1956/2002) *analysis* and Kolb's (1984) *reflective observation* correlate with a *separate mode*, and *synthesis* and *abstract conceptualisation* with a connected mode, respectively. In the context of *single and double loop learning*, students react to an activity or context's experience in a *single loop* cognition that deals with the self and personal judgements primarily. Shifts to *double loop* learning enable critical reflection and allows for reframing of design engagement in intentions (Argyris & Schön 1974). *Triple loop learning* is not yet visible, as it is too early in the process for transformation, except for one student in b1 who demonstrates a connected voice and full *normative dissociation*, free from bias or personal judgement. No vignette drawings are produced in b4.

Students displaying a temporising state, remain in a *receiving* mode according to Krathwohl et al's (1964) affective domain. However, students making relational and contextual links, show a reaction by *responding* to an experience. The student with a *normative dissociative* perspective shows an immersion and involvement that relates to a *valuing* of the experience because of the direct relation and association (Krathwohl et al 1964).



VIGNETTES *developmental transformations* connect



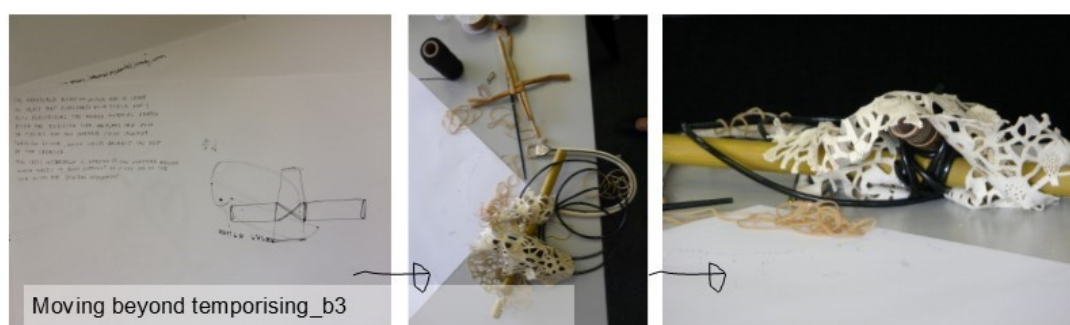
Figure 6-17: Developmental transformation and connection through vignettes

[critical artefacts]

The making of critical artefacts in relation to Kolb's (1984) learning cycle, reveals the consecutive process from *concrete experience* to *reflective observation* and *abstract conceptualisation*, in all biopics. This represents all three "transformation of meaning perspectives" (Mezirow et al 2009:7). Especially noteworthy in b3, is the observation that the 'making' process enables abstract thought and distillation of ideas and perceptions, not visible before this activity. As a result, a deep immersion into

wicked problems emerge, with an increased understanding due to *concrete experiences*. The majority of students show transition out of a ‘temporising’ state of anxiety and respond spontaneously, albeit with hesitation. They shift from *3-Multiplicity subordinate* to *4-Multiplicity correlate* by integrating *content reflection* and *premise reflection* simultaneously (Mezirow 1991:107-8). This enables the application of complex ideas within the mode of *synthesis* or *evaluation*, where students employ ‘thinking’, ‘feeling’ and ‘making’ at the same time. Students revealing evidence of *5-Relativism correlate* ask questions and immerse themselves in the making process (Perry 1970:109).

Transformation according to the Biggs SOLO taxonomy (Biggs & Collis 1982), is considered from a *multi-structural* mode, where they struggle to make connections, previous activities are now replaced with a *relational* understanding where concepts are integrated. In some cases, the *extended abstract* mode brings a broader perspective of the impact of lighting design in society. In addition, Bloom’s cognitive taxonomy (1956) reveals a shift from *application* and *analysis*, to *synthesis* and *evaluation* (b3). In the affective domain, students *respond* actively, and shift towards *valuing*, when they internalise the experience to gain deeper understanding. This results in *organising*, with an interrelation between values (Krathwohl et al 1964). Students make connected and committed decisions on behalf of others.



CRITICAL ARTEFACTS *developmental transformations*



Figure 6-18: Developmental transformation – moving beyond temporising with materials

Ethical and cognitive development in selected students’ critical artefact making (b4) show evidence of *6-Commitment foreseen* (Perry 1970), as they express intention to act as agents, although their work is speculative. In this way, Mezirow’s (1991:107-108) view on reflective practice related to *content*, *process* and *premise reflection* become visible.

[peer feedback]

Peer feedback reveals noticeable observations. Students in b1 and b2 share freely in a constructive criticism session, as a positive experience and relate to Perry’s (1970) *5-Relativism correlate*, where

analysis of scenarios and situations are understood deeper. In contrast, due to the limited interaction between students in b4, the issue of project intent or messages are still being framed. The challenge remains to move from *separate knowing* to *connected knowing* (Belenky et al 1986:100, 131) and in cases where connection is obtained; the difficulty is to find focus and a creative and critical design interpretation. In addition, no or limited interaction in b3 affirms the barriers that inhibit transformation, *temporising* (fear of interaction) and *escape* (feeling alienated and not comfortable to share). In extreme cases, where students are not participating at all, *retreating to dualism (3-Multiplicity subordinate)* (Perry 1970:10), as some chose not to complete the workshop. This demonstrates that the route to transformation is unpredictable, and can end at *content reflection (receiving and responding)* for some, *process reflection (valuing)* for others, and *premise reflection (organising)* where perceptions are challenged, for a few (Mezirow et al 2009:7; Krathwohl et al 1964).



PEER FEEDBACK *developmental transformations*

Figure 6-19: Developmental transformation – peer interaction and retreat

[reflective essay]

The reflective essay provides an opportunity for students to freely share their positive or negative experiences of the workshop. It reveals that Mezirow's (1997:5) transformative learning relates to *frames of reference*, challenging their own opinions in the context of a human-centred approach. The data show that *habits of mind* are the most difficult to change, as very personal judgements and experiences influence its understanding (b1 and b2). Some are humbled by the experience and find it possible to overcome personal challenges (b1). Students adopting a human-centred approach through normative dissociation find a deeper connection to critical issues (b2). In addition, bias from a designer's perspective is highlighted as an egocentric view (designer before user). This is visible in b3 and b4, where students show preconceived ideas. As a result, it becomes difficult to adjust to a human-centred approach and to internalise the translation of abstract ideas (b4). However, in b3 students adopt the view of the user, especially in pragmatic people-object interface considerations. The question of *separate* or *connected knowing* (Belenky et al 1986) is revealed throughout the duration of the workshop. In b1 and b2 students move from *separate* to *connected knowing*. B3 shows that the making process assists to establish connections in student thinking and understanding between issues within a particular context, which were not there before.

Initially for me the process was very goal orientated. It was putting in more thought than feel. Do I want to be a designer that makes an aesthetically pleasing thing OR do I want to make the subject feel something more? (b3_Lisa).

In b4, students are moving back and forth between the two modes of *procedural knowing* because of the difficulty to reframe and focus the project descriptions (Belenky et al 1986:100). Even though some students display barriers limiting transition (static inaction as ‘temporising’, and ‘escape’ where interpretations are abandoned), the majority of students expresses an intent to act on behalf of others as agent, *6-Commitment foreseen*, and some indicate a deliberate choice to commit to decisions taken, *7-Initial commitment* (Perry 1970). Here, the affective domain stretches into *characterisation by value* (Krathwohl et al 1964), where internal adjustments are made in students’ beliefs, ideas and attitudes, see Table 6-11. This seems contradictory, but could be explained by the students’ emotions, either feeling overwhelmed by a theoretical burden, or because of an over emotional attachment to wicked problems.

Table 6-11: b4_Shift observed in reflective essay

Initial challenge articulated	Shift/transition expressed
think abstractly instead of solutions	only ask (and reflect)
to think of concern without solving the problem	explore answers to questions, speculate
clarification of concerns	reflect and see things in a new perspective
concerns are vague (perceptual lacking)	
reconcile different ideas to reveal both	bring issues to the surface
process too strict	render visible the intangible
specify concern – too vague	
	render visible by the way of the ‘inside’

Students in b3 also show ‘temporising’ (but for reasons of unfamiliarity) with the activities and process according to position *5-Relativism correlate*. B2 has one other significant challenge, namely the workshop insertion in the last quarter of the design project. Because of this limitation, barriers to transition are due to students’ abandoning deeper interpretations in an *escape* to complete their larger design projects in time. However, they also reach *5-Relativism correlate* in the process (Perry 1970). A quarter of students in b1 deliberately incorporate the workshop approach and considerations into the design project, by looking deeper into the potential this city holds. Their *habits of mind* are shifted to question their own prejudices and as a result, they make connections to *6-Commitment foreseen* within the domain of *connected knowing* (Belenky et al 1986:113). Premise reflection becomes relevant for multiple reasons; firstly due to the fact that students demonstrate intent to engage with the difficult questions, as they are challenged by their own judgements and bias, secondly, their own values are under personal and collective scrutiny, and thirdly, *content reflection*, *process reflection* and *premise reflection* in concurrent application (Mezirow 2009:7).

At the start of the design process I was apprehensive. I felt unsure of the outcome. My design is a reflection of the process (b3_Nicole).

The workshop opened my mind to the creative potential in the city and even myself. It was very successful and fun to see all the different personalities of my peers coming out (b1_Michelle).

[trajectory to completion]

The trajectory to completion reveals notable results related to sustaining the small transitions made during the workshop. Data shows that it is difficult to keep a *connected voice*, to stay within the perspective of a human-centred approach and to modify goals through *double and triple loop learning* (Argyris & Schön 1974, after Bateson 1972) when the pressure to complete the design project is high. When students shift their priorities in the extended studio process, the potential of the workshop intent and complex understandings generally fade in all the biopics.

Table 6-12: *b4_Transformation in design engagement and thinking*

Students' personal views on transformation				
Question	Expose	View	Engage	Reveal
only ask to reflect	bring issues to the surface responsibility	Reflect / see opportunities new perspective	explore answers question / speculate propositions	render visible the intangible tame the insubstantial way of the 'inside' - interstitial conditions

The emotionally *connected knowing* at the start and during the workshop, is replaced by a *separate knowing* (Belenky et al 1986) in b1. Here, *escape as a barrier* to transition appears due to students feeling overwhelmed to make meaningful connections within the context of the larger design project. In addition, the challenge of limited time available to complete the design project and pressure of other modules' requirements cause stress. However, the quarter of the class showing commitment in their initiative, represents *6-Commitment foreseen* and *7_Initial commitment* (Perry 1970:135, 153), and also reflects Kolb's (1984) trajectory from *abstract conceptualisation* in the making practice of the workshop, to *active experimentation* as an activist in the design project.

Not sure if it was intuitive or intended ... Meaning-making in thinking, but not manifested ... No clear evidence of awareness beyond using terminology ... I am not convinced that this student integrated/engaged the workshop with the design project. She could be nervous and forgot to explain it ... (b1_external examiner).

Although the design never reached maturity, the conceptual approach to material selection and connections to it is very interesting ... There was an energy and excitement around the model evident in studio sessions, but it was not pulled through to the design execution ... Direct link between model and design execution. It is a pity that a larger diversity of the typology was not developed as the model suggests (b1_studio assistant).

One student in b2 implements the workshop considerations into the project, together with a quarter of the class in b3 that consider the manufacturing of the luminaire prototypes. As a result, they show the same trajectory as described for b1. This is an example where a student embraces *premise reflection*, *triple loop learning* and Bloom's affective domain's *organising* category (Mezirow et al 2009:7, after Bateson 1972; Krathwohl et al 1964).

Table 6-13: b2_Transformation themes

Identification of problems	Meaning-making	Importance of user	Feedback
Using keywords Express freely	Emotions and narrative Ordinary materials	New perspective	Constructive feedback
<i>The problems I identified during the workshop were real problems... (Siphumelele)</i>	<i>...and also how just a bit of thinking and using non-building materials to make something of value, actually makes you think about what something means to you</i>	<i>The value it added to my thinking is how important the user is (Khethiwe)</i>	<i>Explaining your problem and receiving feedback was a very useful step too (Khethiwe)</i>
<i>...to identify problems and issues that convenience stores faces without using any straight forward language... (Shu-Chen)</i>	<i>...building something of meaning without using literal objects (Khethiwe)</i>	<i>Writing down the problems of my project from a consumer's perspective helped me to come up with a more realistic and feasible solution... (Nadene)</i>	<i>I received very useful feedback which I incorporated into my final design (Siphumelele)</i>

The use of the term 'activist' in b4 should be considered at this point. Someone who has a strong conviction for a particular cause, but remains detached, could be called an advocate or champion instead. Those students showing an emotional attachment due to the association with a particular community are in fact activists. However, in this instance they find it difficult to detach from the *wicked problems* under scrutiny and discussion.

[post feedback]

The post feedback shows that transformative learning is a challenging process to sustain within the context of a series of disruptive actions. The aspect of time surfaces again, as the process to connect with the needs of the user (Brown 2009) and the *route to empathy* (Kouprie & Visser 2009:445-447), where connection takes place, is timeous. The question whether a longer immersive project or a collective succession of smaller disruptive projects would be more conducive to transformations of greater magnitude, remains. B4's data analysis shows that a long disruptive design project as an extended upset, is not particularly beneficial to enable transformative engagement.

Table 6-14: b4_Emootional and cognitive engagement

Emotional engagement (connected)	Cognitive engagement (separate)
<u>Challenges</u> Loses objectivity Trapped in emotional situation and affective qualities Personally involved in the community / cause / issue Too immersed Dialogue with process, community and self Personal bias, and ignorance of other views	<u>Challenges</u> Struggle to connect at all Too detached, becomes a barrier to active engagement Observer of a cause, or situations Relate from a distance, as observer Instinctive focus on solving problems Personal judgements of own views and preconceived ideas
<u>Barriers to engagement</u> Temporary inaction, not making decisions	<u>Barriers to engagement</u> Abandon other views besides own (designer perspective)

Students showing shifts, however small, towards the trajectory of completion are making the links between all the aspects in the workshop: *connected knowing*, finding *commitment*, detaching emotionally to close the empathy loop and challenging their own premises and preconceived ideas

(Belenky et al 1986, Perry 1970). They also follow *triple loop learning* that modify their own behaviour, thinking and values within a particular context. *Premise reflection*, relates to 'why' questions (Mezirow 1991). The number of students represented here, however, are only a quarter of the entire sample group across all four biopics.

To constantly be aware of the emotions you want to capture and enhance in a space. To be aware of the story and emotions one (designer) wants to express and illustrate to the user in a design (b3_Christene).

[alignment with ethos of school]

According to this research, the optimal positions in student ethical and cognitive development at third year level (exit level for undergraduate degree) oscillates between *4-Multiplicity correlate*, to stages *5-Relativism correlate* and *6-Commitment foreseen* (Perry 1970). In isolated instances, students make the shift to *7-Initial commitment* where synthesis and interpretation are complex and initiative towards action is expressed, beyond the requirements of the design project brief. Krathwohl et al's (1964) affective domain guides students, through emotionally connected qualities, to an understanding of valuing others, and their own role in the process. In addition, they internalise or *organise* their newly acquired design values (Krathwohl et al 1964). Mezirow's (1991) transformative learning correlates to this observation, where students move fluidly through or between *content reflection*, *process reflection* and *premise reflection*, when they challenge their own *habits of mind* and *points of view*.

An understanding of the transformative developmental theories in schools of spatial design will enable curriculum design and project alignments towards content, learning modes and engagement actions that address an integral holistic transformative learning context (Ferrer et al 2005, O'Sullivan 2002) and reveal the hidden curriculum. Jarvis (2021) refers to emancipatory teaching-learning and 'empathic-reflective-dialogic' re-storying, through which identity exchanges enable inclusive worldviews and understandings.

Summary 6_developmental transformations

Brouwer et al's (2015) experiential learning cycle speaks to the ethos of each school as its trajectory moves from feeling > watching > thinking > doing (straight, or with recursive / iterative detours), which culminates in the characteristic of the activist. This aligns with the development of *citizen designers*, promoting design that is value driven (Shea in Resnick 2016:20). Kolb's (1984) active experimentation style relates to the activist, where transformation becomes visible. This is the case in all biopics, where there are selected students surfacing as 'activists' for social design and a human-centred approach. They address wicked problems through empathetic responses and challenge preconceived perceptions within unfamiliar contexts and new ways of working.

We believe that social design can create truly transformative social change through reorienting its theoretical philosophy away from traditional human-centred priorities (object-centric) and shifting, instead, toward new, situation-centred (social systems-centric) priorities (Resnick 2016:288).

7_challenge : shift

The 'challenge : shift' section deals with *threshold concepts* (*transformative, irreversible, integrative, troublesome* and *bounded*) (Meyer & Land 2003). Concepts that are challenging to address and internalise not only during the course of the workshop, but also towards the trajectory to completion of the studio project. These reflective moments reveal students' conception, reconstruction and multiple understandings of scenarios and conditions. It also includes critical reflection of themselves and their roles as designers, which lead to ontological shifts, albeit small.

[problem statement]

A wide variety of challenges is noted at the start of the workshop. The real-life emotional *disruption* of the walkabout in b1 proves a personal provocation and *troublesome* experience. This happens if benefit of possible shifts extend to where students can formulate a deeper understanding of the inner city context, especially where a virtual building is used as a site. The insertion of the workshop in the first quarter of the project means that integration potential exists during the design project. B2 also deals with a real-life scenario, but with a real-life client and a fixed typology within a fictional location / site. This requires students to identify pertinent intangible customer requirements in the *project framing* of the convenience store, to broaden the already pragmatic understanding (workshop inserted three-quarters into the design project). The late timing of the workshop makes it difficult for students to re-adjust at this stage and to adopt other perspectives and ideas.

The workshop was an eye opener, I feel that it would be more effective if it was done at the beginning of a project. The value it added to my thinking is how important the user is, also how just a bit of thinking and using non-building materials to make something of value, actually makes you think about what something really means to you (b2_Khethiwe).

The challenge in b3 does not immediately revolve around the content of the workshop. The *disruption* is overwhelming in itself in terms of design practice and students are anxious and apprehensive to start. The difficulty is to connect with its aim, by not solving any problems and to identify wicked problems related to luminaire design. The unfamiliarity of this experience leaves students unresponsive. The extended provocation of the larger design project in b4 also leaves students stunned, because of the prolonged disruption, of which the workshop forms a part. The pertinent requirement only to reveal issues, and not to solve them within an abstract representative design approach, proves to be the biggest challenge. The question of representation of big societal problems is another concern, as students' thinking is immovable at this stage. However, pertinent topics (liminality and transience; power and control; and territoriality and presence) and themes (empathy; meaning-making; social agency; and urban condition) emerge in their inquiry.

Students sit with paralysed expressions, too scared to touch the page, in anticipation for someone to say a word to relieve the pressure. The black sheets remain blank, no one moves. I wonder how we are going to address this stalemate and start to share my experiences of the past weekend to break the ice (Reflexive note_b3).

[keywords]

The keyword selection in b1 and b2 assists students to identify potential in the two very different contexts and are taken directly from the problem statements. In b3, it is a challenge to identify keywords that capture the essence of the problem statement, due to the luminaire design's assumed object focus, however words describing quality of life and meaning-making are identified. A shift from social processes to meaning-making is identified in the keywords in b4. The engagement in all biopics becomes more integrated at this point.

Table 6-15: b3_Keyword responses

Functionality / use	Aim / purpose	Emotive / immersion	Meaning-making
<i>convenient, customisable, simple, efficient</i>	<i>What people want to feel Earthy, organic, lively, simplistic, originality</i>	<i>calm, warm, quirky, sleek, elegant</i>	<i>Quality of life, meanings homey, colourful, atmospheric</i>

[vignettes]

Vignette drawings show that by shifting modes of engagement as ways of thinking, they become significant in the workshop trajectory, as students are required to translate text from the problem statements and keywords into sketches to represent complex problems. In b1, a binary condition between the city and people emerges (city represents a trapped condition, disconnected from its people; people as the vital mind-set, and the connecting elements in the urban condition). Students in b2 also make the shift from text to vignettes by addressing themes such as meaning-making (identity and value), memory and interaction, and human-centred associations. Shifts that reposition students' mindsets represent transformative actions. In comparison, vignette drawings prove a challenge for students in b3, with a third of the class producing relational sketches, and the remainder only formal shape based associations or no vignettes at all. Students in b4 produced no vignettes, which means that due to a lack of modal shifts between 'thinking in words' and 'thinking in images', little relational interpretations are explored, impacting on later activities.

Table 6-16: Vignette summaries and shifts

b2			
Isolated objects	People only	Flat 2d diagrams	Complex relational
A-contextual objects Objects associated with activities/qualities	Users drawn in various activities	Layout, circulation diagrams Elevations indicating issues pragmatic challenges No or few people included	Relational conditions between space and users Experiential quality Populated to indicate intent
b3			
No vignettes	Literal objects	Objects with associations	Relational vignettes
Sheet empty	superficial non-spatial a-contextual literal	Annotated vignettes Associations with shapes and feelings / emotions	Meaning-making / relational experience Symbolic – memory, contentment (depth of meaning) Awareness of surroundings

The making of critical artefacts as a positive disruption in the workshop, becomes a catalyst towards action in many biopics. Threshold concepts emerge that have *transformative* and *irreversible* influences on students' thinking and engagement. B1 is a natural continuation of the workshop activities, where representations are symbolic and abstract, addressing various themes: authenticity, real-life scenarios, judgements and mind-sets to change, importance of process over product, small change as a bottom-up approach, self-correction / reflection and impermanence of things. In this way, students apply a reflective approach and engage directly with an exploratory process, as enabling actions of inquiry. The trajectory in b4's design project is also a continuation of the same approach and attitude – not solving any problems, but only revealing issues. The question of personal shifts and transformation remains *troublesome*, where representation is the biggest provocation: not finding a solution or creating a product as end-result.

The critical artefact stage in the workshop proves to be a positive disruption in b2 and b3. It becomes an icebreaker for students to respond to freely, without any hesitation compared, to the first experience at the start, especially b3. As a creative and cognitive catalyst, even though the process is different to the normal familiar studio practice, students engage with eagerness and excitement, some with a little hesitation. Making in b3 proves to be the catalyst needed for students to continue with the workshop activities. Up to this point, they were outside their comfort zone, but are now comfortable to express freely. The value of second life materials is significant, as abstract associations and symbolism become possible, something which students embrace. In this way and without being judged, they connect to the making process. Table 6-17 highlights the notable expressions of process, meaning-making and human-centredness.

Table 6-17: Critical artefact process and meaning-making

Process	Meaning-making & materials	Human-centredness
More possibilities – eye opening	Try new things	Appropriation
Process more important than product	Forced into different directions	Users to transform the form
Reflect on process – exploring ideas	Use of second life materials	Balance in design:
Focus on how – feel vs goal	Materials representative in making	Interface object, space, user
Narrative – expands the mind	Action of making – verbs	Temporary
Encourages power of knowledge	Symbolic – use of materials:	Inclusive
Way of thinking – out of the box	interconnectedness	
Unexpected	-memory, meaning	
Reflected – critical view	-association, intuitive, emotive	
Inquiry= exploration vs solution	-linked to people, interpretations	
Shift = thought vs feel		
<i>The process of weaving the thread [...] was more important than the end result. It revealed to me that my process of making my light will be more telling of the narrative I create, than the final product (Neo)</i>	<i>However, I enjoyed the idea of looking at it from a personal experience making the design more meaningful opposed to something you would usually just design and have no connection to (Kaanita).</i>	<i>Seeing the problems first allows one's eyes to open to what others are going through and allowing us as designers to empathise and to have compassion. Designing for people is important as it benefits everyone (Andreana).</i>

I found this workshop beneficial because I tent to struggle with putting my ideas down on paper and exploring them as well as reflecting on them. I enjoyed this workshop, it was fun and eye opening :) (Rozanne)

The process of creating in this lecture was slightly nerve wrecking as there was a lot of material and I am used to building models with an idea and materials in mind as opposed to letting my imagination work its process (Kemang).

I consider all elements, what colours could portray or how a certain shape could make someone feel. Dealing a lot more with the emotional aspect of creating and not the actual technical part of it...as of yet (Isabella).

The design should be enhanced by the people using it (Lisa).

Students make their way to the tables stacked with second life objects and materials. I see their expressions, excitement, curiosity, amazement. The atmosphere lifts as students search through the array of materials, looking, picking, reflecting, and collecting. The thought of free expression must be the catalyst here. With arms filled with a wide selection, demeanours change and the prospect of making lies like a blank canvas (Reflexive note_b3).

[peer feedback]

Peer feedback in b1 highlights the transformative nature of the embodied experience of the site and context. Students identify themes related to identity formation, physical and social significance, meaning-making through interconnectedness of people. Interaction is constructive and students participate spontaneously, compared to the limited feedback in b2 and b3, where evidence shows only a few written comments, as if sharing with peers is not something that happens regularly. In b4, students work in isolation for the majority of the workshop and only share with each other at the end of the session in a formal discussion. Ideas are well framed verbally, but once students articulate the interpretation of the critical artefact, they are trapped in arguments without finding a conceptual exit to represent ideas. The question then arises, how to use critical reflection as a way of finding hooks between theory and practice? Themes emerging here are project framing, project approach, revealing issues, process / sequence of activities, translation of complex design issues and representation to an audience.



Student interaction_b1



Student written feedback_b1

PEER FEEDBACK *challenge* : shift opinions

Fig 6-20: b1_challenge : shift and peer interaction/feedback

Reflective essays are personal accounts of the experience of the workshop as a whole. In b1, half the class noted a shift in some way: perspective of user, contextual awareness, immersion and empathy, social and spatial agency, fluid living scenarios, bottom-up approach, potential and relational human-centred interaction. Following unfamiliar ways of design engagement make the discovery of new meanings, abstract interpretation and increased depth and complexity possible. The one aspect that is highlighted by a student is the concept of time, and that it takes prolonged involvement to make things visible, or to understand them deeper. This discussion links to disruptive practice and educational psychology as threshold concepts.

The aim however is not to formalise the “singing in the streets”, but merely to extend it. Extending the delight from street to urban block, to urban interior and into the interior interaction and experience (b1_Dhané).

The small pins show how something small can make a big impact – limiting the giant’s joints to connect and heal. I think as soon as you start focusing on the people and how they use the space you start to realise how important human interaction is (b1_Nina).

Shifts noticeable in b2 relate to another approach to that of traditional processes of design. Students discover that the concept of speculative inquiry opens other doors to how problems are expressed. An abstract approach allows the importance of human connections and social interaction to emerge. This mind-set brings the realisation that design and asking critical questions about it, is not only about solving issues, nor only about physical and spatial expression, but also about social interactions and connections. A student notes that the fragmentation of the activities allow for increased focus and understanding. However, complexity in the workshop is shown to become visible due to the shifting modes in engagement and perspectives.

This workshop makes you shift your perspective, rather than being a designer, who’s primary focus is to fix a problem, it makes you step into the shoes of the end user, what do they experience ... (B2_Andi).

The process has allowed me to critically consider different issues that peoples face inside a convenience store, human interaction and experiential elements that weren’t present prior (b2_Mahesvaran).

The biggest challenge in b3 is to break preconceived ideas regarding object-based luminaires and replace that with considerations of intangible qualities of light as a medium. In response, questions exploring human-environment interface emerge, and not only human-object interface. Students note the shift from initial outcome based or goal orientated solution, to a narrative focus at the end. In this way, connection with the process increases and students are more engaged. Significant is the transformation in how connectedness influences individual responses, shifting from a quarter of students connected at the start of the workshop, to nearly all students at the end considering the reflective essays. Themes are human-centred, meaning-making, social agency, fluid and flexible conditions of living.

Controlled mess. As much as we try to control things, it cannot be DONE. We try to control a situation or an environment, and to an extent we can, however it is what is placed in that situation of which will determine the feel of the space. Its about balance, we set up a base, we put in half and the rest unfolds before us. It is not a bad thing, mess is beautiful. Chaos can be an adventure. We should embrace CHAOS (b3_Isbella).

The workshop was informative and interesting. Was different to how thinking out of the box can be so creative. When you limit your thinking span it creates static designs. The workshop forces you to try new things what you would normally not do (b3_Vernaya).

Students in b4 find the abstract and representational design requirement the main challenge during the workshop, but also in the extended design project at large – making issues visible, instead of solving it. The difficulty remains to step out of the mind-set of the architect / designer, as dissociation is a challenge. Students in this group find it demanding to connect on an affective empathic level and as a result, remain detached from the issues. They address the workshop only superficially, although understanding of the matters is complex. In contrast, students that are too emotionally attached, find it difficult to detach from the matters of concern and as a result, struggle to detach emotionally from the empathic process. In this way, they lose perspective and struggle to zoom in to focus on one aspect for representation of the critical artefact. This shows that empathy is needed to connect and relate fully, but the opposite is also revealed, that affective empathy out of balance, can be destructive (to student, client or community). Equilibrium is required between cognitive and affective empathy for optimal design response.

The more I read the reflective essays, the more I note that students are aiming to satisfy the studio project requirements. I see the same words used in the brief and wonder how forced some of the responses actually are, especially when I consider the difficulty in engagement I observed during the workshop, for them to find their own 'voices' (Reflexive note_b4).

[trajectory to completion]

The studio projects underscore the emphasis towards the trajectory to completion for each biopic. Furthermore, the timing and influence of the workshop influences students' subsequent response. In b1, students that integrate the workshop into the design show an increased awareness of empathy. The remainder of the class revert to the conventional approach and disconnected attitude of a traditional design process. As a result, richness in design expression fades, and the complexity of interpretation becomes superficial and predictable. Technical requirements of supporting modules in the integrated examination overshadow the insights and depth of understanding that students gain in the workshop.

The influence of the trajectory to completion in b2 is limited, due to the late insertion of the workshop. As a result, only one student truly incorporates the considerations into the design development and presentation. Other students show intent to do the same in future projects, as the workshop reveals how thinking differently can bring new meanings in design. In this way, their preconceived ideas are challenged. Noteworthy is the mention of meaning-making to the consumer, the process of abstraction and value customers find in design.



Figure 6-21: Timing of workshop in studio projects

The majority of students in b3 do not include their own experience from the workshop as considerations in the design trajectory of the project. The pragmatic matters of prototype manufacturing dominate the richness and abstract thought uncovered earlier. The workshop shows no apparent link to the final design development, besides creative use of materials and only students who challenge the meaning of a luminaire, address larger societal issues in the process. These remain pragmatic, although the approaches are topical and relate to human wellbeing and health (child night-light, laptop screen glare and legibility, adaptability and choice). According to the studio master, students show a need for more background research to inform the design and challenge the 'normal table lamp' as object, by considering stronger user interface and atmospheric qualities in relation to spatial experience and effect.

The aim and purpose of a design response (eliciting a conversation and giving social commentary) are a challenge to students in b4. Throughout the project, translation and representation of big societal problems remain a challenge. Nonetheless, students reflect on their work in a positive light, but the external examiner does not give the same response. The need exists for more criticality, stronger focus/framing, adopting other points of view, increased creative exploration of media and integrating a theoretical balance with the design dialogue.

[post feedback]

Post feedback shows that some students feel they benefitted from the workshop in some way, regardless of how visible it is in the data. They comment that they are able to overcome barriers, generate meaning in spaces and express concepts abstractly by association and connotation because of the use of second life materials and considered detailing and connections (b1). In addition, emphasis no longer only includes aesthetics, but also meaning-making, increased customer experience and agency in the context of convenience store design (b2). Remarkable in b3, is the fact that students communicate their enjoyment of the workshop, in contrast to their anxiety and apprehension at the start. The disruption has a positive influence on their ways of working although it was an upset to their normal studio practice. The number of students who consider the workshop benefits in their design projects, increases significantly, and the focus shifts from task lights to atmospheric lighting, and from light as object, to light becoming spatial.

At the start of the design process I was apprehensive. I felt unsure of the outcome (b3_Nicole).

The process was relaxing because I reflected to what I experienced and saw during my weekend so I didn't focus on the main project but decided to look at other things to get my first step for the luminaire project (b3_Palesa).

B4 reveals that the workshop as disruption does not have an effect, as the active studio project is a provocation already. It only becomes a continuation of the same design thinking and intent. The question of time is prominent, as the long duration of the design project contradicts the mention that more time is needed to immerse with empathy, and to gain deeper understanding (as mentioned in b1). The challenge to integrate a theoretical standpoint as part of a design discourse, slowed down the process. In addition, personal traits of students also prove to affect the process, where some are not able or willing to connect emotionally. Figure 6-22 shows the emotional-objective continuum.

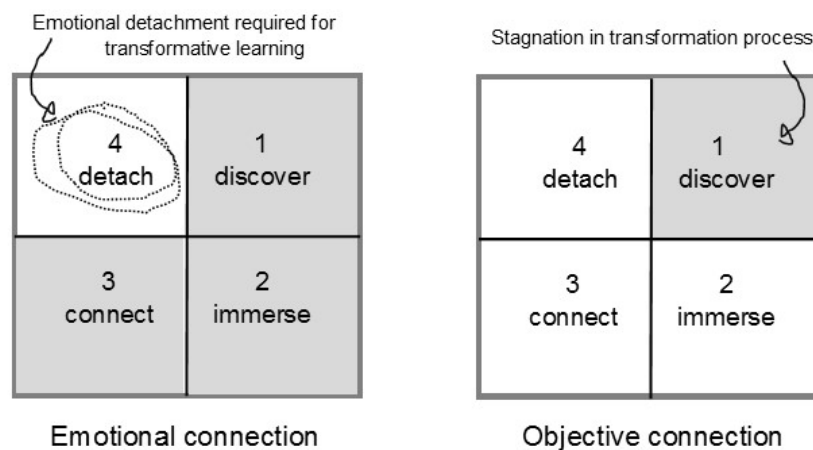


Figure 6-22: Emotional-objective connections and empathy

[alignment with ethos of school]

The findings from the investigation as 'challenge : shift' reveal a repositioning as agents of change in some students (b1 and 4). In addition, the importance of meaning-making and social agency shows in design in all biopics. It appears that the existing ethos of each school is extended beyond physical expressions of architecture and design. Instead, it moves toward an awareness of social conditions and fluid interfaces that require the attention of designers, especially today. It therefore supplements and expands the traditional and conventional methods of design. It adds to the focus on technological and sustainable aspects, by including matters concerning people by introducing a situation based human-centred design approach, empathic awareness and disruptive practice to foster small change.

SUMMARY 7_challenge : shift

The findings show that students in general find the challenges of the workshop difficult to sustain during the course of the studio project: the disruption, the question of empathy, the abstract representational focus, or discursive design (Tharp & Tharp 2018) and the normative dissociation (Butler 2006, Panero et al 2019). This can be ascribed to either the timing of the workshop, or its short duration. Students identify complex problems during the workshop, which are difficult to articulate and fully integrate into the context of the studio project. The disruption leaves students suspended in a state of uncertainty. This space between, or liminal state (Tucker et al 2014), is where students are trapped, if the momentum to engage is lost. For those entering and moving through the threshold and embracing the ambiguity, ontological shifts are made to represent the transformation in their own being. Roughly, a quarter of all students could make critical connections between the focus, approach and attitude of the workshop and still complete the studio project convincingly. In such instances, the project benefits through the students' deeper understanding and subsequent richness in the design engagement.

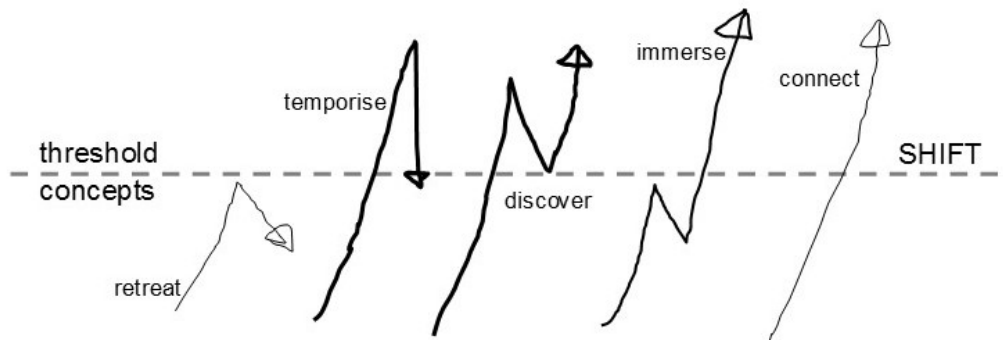


Figure 6-23: Threshold concepts and transformation trajectory

Nevertheless, small but significant shifts reveal that change is possible. It is now a question of how to implement active incremental small change in the studio environment that can build toward making a bigger impact on the ethical, affective and cognitive development of students. Becoming citizen designers (Resnick 2016) has much to do with holistic integral learning (O'Sullivan 2002, Ferrer et al 2005).

By means of:

- disruption
- the question of empathy
- discursive design focus
- normative dissociation
- design thinking

To achieve:

- meaningful design engagement
- deeper understanding and connection
- shift in attitude and focus
- changed design attitudes, values and ethos

Within contexts of:

- collective – wicked problems and situational awareness
- individual – ethical, affective and cognitive development

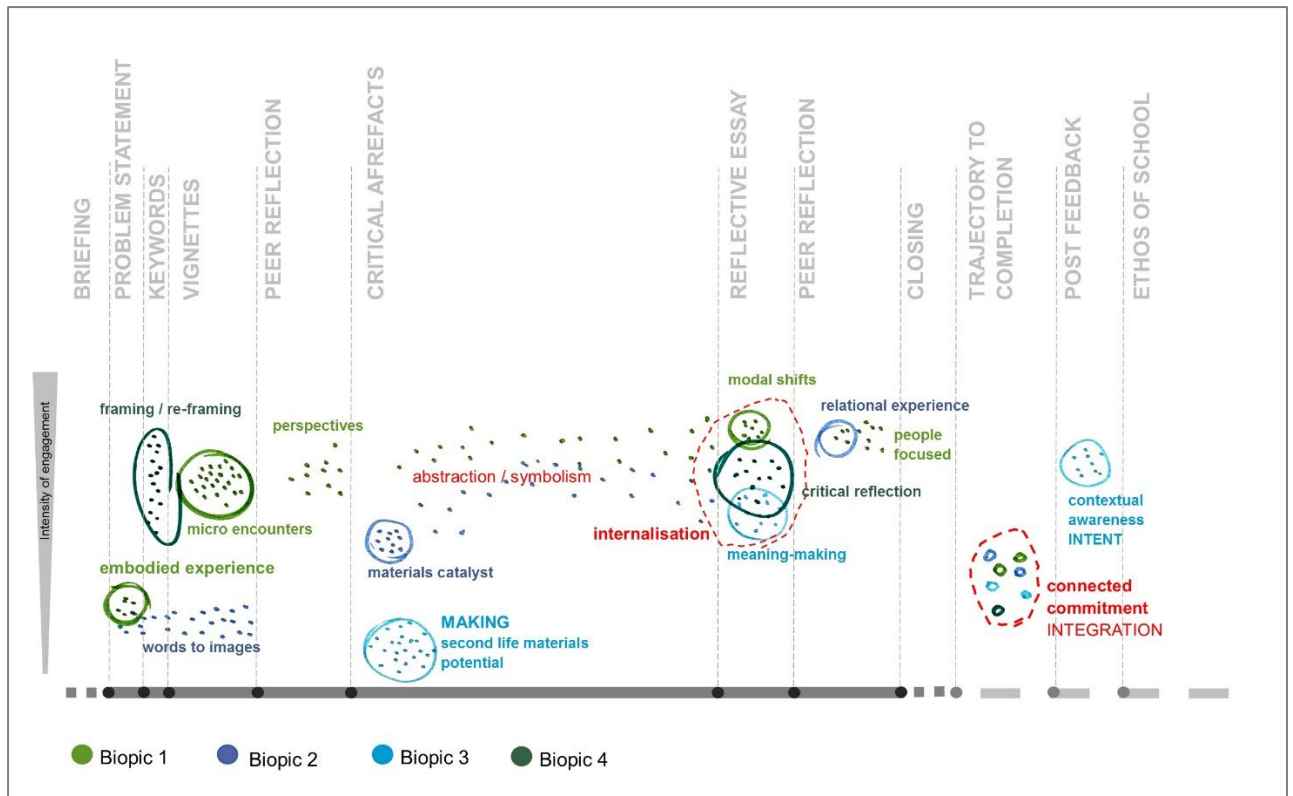


Figure 6-24: Biopic journeys shift summary

Relational biopic summary

All characteristics of threshold concepts (Meyer & Land 2003, Tucker et al 2014) are represented in the study. *Troublesome* experiences regarding unfamiliar praxis and design intent develop opportunities for *integrative* actions. Through active engagement in the workshops, *transformative* realisations emerge for some students. In these instances, *irreversible* changes become visible in the way students take ownership and make decisions. A quarter of the sample group deliberately decide to take their commitment into the studio projects. As a result, they are *bounded* in disruptive practice. The study is optimistic to say that if students can make bounded shifts, immersed design engagement could transform them into citizen designers as future practitioners.

In the thematic narratives of the relational biopics, small but notable moments are identified that point to the understanding that some degree of transformation is possible within the context of the study. In addition, the findings show another challenge, namely how transformation can be sustained for positive future impact.

The benefit of transformative engagement is varied and unpredictable, and relates to the development of the student as an individual. By supplementing the conventional design practice in a disruptive way, it can potentially activate transformative design engagement, where future spin-offs could ripple into society. This study does not make a claim to present all the answers or to solve critical design pedagogy challenges. It shows that a limited number of students could sustain the disruptive challenge beyond

the end of the workshop. However, it asserts that minor shifts in design actions can cause small adjustments in students. These minor adaptations, over time, have the potential to transform habits of mind (Mezirow 1997:5-6, 2018:116). In the context of complex societal and design issues, research-through-design (Tharp & Tharp 2018) has the agency to influence future design praxis, discourse and disposition of students positively. It is noted that the process of transformation is an intrapersonal journey of each student as an individual. The discussion and findings to follow in *Chapter 7_Postulations & Provocations*, offer an integration and interpretation of the threshold concepts from a holistic design approach.

intermission

Preparing the discussion of the last chapters, I had to remind myself that everything is interconnected and that the concluding part should reflect that. The sub-questions were guiding pointers at the start, but now they are like a touch screen, where if you touch the one, the others move in synchrony. Concepts relating to another as in an active web.

Regarding shift, change and transformation, I often wondered during the process, what constitutes being significant. If a small shift is worth mentioning. It turns out that even the smallest and seemingly trivial change can mean someone is adjusting, in attitude, in approach, in some way. I keep wondering, what could be the impact on the designer as a person, on the individual values and ethics related to challenging design projects?



*I reflect back to the balcony scene
its profound impression on my being –
how it touched me, to look with different eyes
a place in time –
by just being there, existing, living
commanding its way into my field of vision*

how did I change during this study?

In the small cracks of our supposed designer opinion, the human voice can be heard in the distance, louder and louder until my own preconceived ideas are washed out and replaced by what truly matters.

PART D SHIFT IN FOCUS

Part D presents integrated discussions and conclusions regarding the data analysis and findings from the biopic investigations. *Chapter 7* offers points of discussion, or threshold concepts (Meyer & Land 2003), related to the patterns identified in the relational biopics. However, these are integrated into broader topics, presented as threshold categories that cut across as overlapping patterns as a networked field of relational concepts. The liminal space of threshold concepts provides scope for the known and unknown (Meyer & Land 2005:373) which this study interprets as explicit and integral concepts. Explicit concepts are embedded in the workshop brief and mostly relate to disciplinary aspects as conduits for investigation, whereas the integral concepts emerge from the qualitative data analysis, as process-driven consideration. These are in direct dialogue with the research questions, which are framed as *how* questions, addressing process considerations of how things are done. Therefore, *Part D* starts with a critical reflection of the workshop brief that, at the time, was an intuitive response to the concerns of the study and then moves to discuss the ‘plug-in’ as a way to connected learning. The discussion positions the findings in a relational context between design pedagogy and design practice as a synergistic relationship or interactive dialogue.

The discussion to follow shows that by contemplating small, but noteworthy changes – as a way of connected action in the way we engage with other people and the world – clues are given as to how and where transformation can creep in. Our designer perspectives and judgements are replaced by the acknowledgement and internalising of the realities of the human condition, of social situations. This becomes significant in context of the study, where threshold concepts are considered in relation to their characteristics, ‘transformative’, ‘irreversible’, ‘integrative’, ‘troublesome’ and ‘bounded’ to enable reconstruction of the self by means of seemingly small, but notable ontological shifts and epistemological transitions (Meyer & Land 2005). The study however, makes threshold concepts visible that emerge from the data findings as a default consequence of the plug-in workshop engagement, and does not intend to create a theory of thresholds as outcome. In addition and even more profound, the transformative journeys of students reveal more about themselves in their own intrapersonal transformations, than to formulate in depth understandings of the realities of others. If the same research is facilitated in other contexts, other threshold concepts could be highlighted instead of the ones identified in this research. The one constant remains – the way of engagement and the intensity of design inquiry in relation to the process – the *how* instead of the *what*.

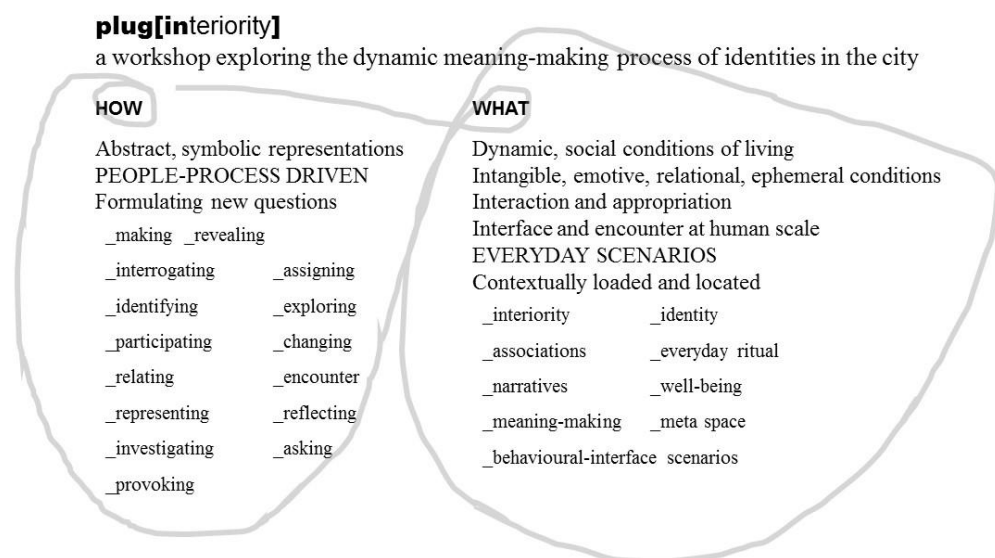
Chapter 8 concludes the study by giving a critical reflection of the main points and then presents contributions of the research ranging in scale and scope. It includes the research context from micro to macro, by focusing on the student as individual, then contextualised in a community of peers. The discussion then shifts to the personal development capacity of the lecturer and ends with research through design within an academic community. The emphasis falls on design pedagogy and interdisciplinary education, with the entanglement of theory and practice. Furthermore, it unpacks the relation of other hybrid ways of design engagement in practice by considering the design professions and the impact of the research considerations on a larger view of society. Lastly, areas for further research are proposed.

Reflecting on threshold concepts – what did I want students to explore in the workshop?

I took the brief out today, it is two years since I prepared this document, a complete intuitive response, but with conviction and a passion to address engaged learning in the studio. With coloured markers, I highlight phrases, words and concepts. At the time, I did not consider these being threshold concepts. In hindsight, I realise that is exactly what I did, spontaneously, according to an inductive study. The aspects included I believed were missing in the spatial design studio, things absent from the students' projects and from their ways of engagement with the process.

I did not expect the workshop to serve as a disruption; I simply wanted students to reconsider their familiar habits and to refocus on the dynamic and social conditions instead of the physical and static matters of architecture. I did not know about normative dissociation, discursive design, or empathetic horizons at the time. Nevertheless, I knew I wanted students to connect with what they were dealing with, to understand deeper and to be changed in some way.

It is strange to consider the workshop again at this late stage of the study. It is important for me to reflect on where everything started, in order to contemplate a discussion chapter in any way. I documented the 'how' and the 'what' written in the brief, to capture the essence of my intent and summarised it for my own reflection.



'How' remains constant as a way of engagement. 'What' becomes a changing variable related to the particular design intent or disciplinary focus depending on the studio project. This can change. Now I can reconsider the threshold concepts, in context of the qualitative data analysis of the detailed and relational biopics, with my intuitive response situated in the empirical situation of the workshops and theoretical discourse of the study.

Chapter 7 POSTULATIONS AND PROVOCATIONS

With a holistic understanding of a situation, citizen designers can facilitate solutions by synthesising ideas from key stakeholders and celebrating them. The true value of design is not about personal ideas, but rather about empowering the voice of others and sewing together ideas that might never have synergised without the direction and commitment of someone looking at the whole system of complex, delicately interconnected parts (Janzer & Weinstein in Resnick 2016:289).

The plug-in critical reflection

At this point of the study, a critical reflection contextualises the spontaneous workshop brief, developed as a serious attempt to address issues in the studio, to increase students' engagement with the learning process. The plug-in is seen as a complementary action to the larger curricular content of the programmes and function in synergy with learning taking place holistically. Reflecting on the nature of project issues arising, two aspects are identified: discipline specific concepts (content / subject focus / *what*) and process related aspects (design actions and ways of engagement / *how*). The discipline specific concepts are embedded in the brief, to give focus to the workshop activities and exploration. In hindsight, these are threshold concepts, due to the unfamiliarity and subsequent influence on design considerations as situated in the design studio: dynamic, social conditions of living; intangible, emotive, relational, ephemeral conditions; interaction and appropriation; interface and encounter at human scale and everyday scenarios that are contextually loaded and located.

The study assumes that the threshold concepts can be replaced by other disciplinary considerations, when reflecting on the threshold concepts emerging from the qualitative data analysis. The investigation's emphasis on process means that other discipline specific threshold concepts could be substituted, and can still facilitate the speculative nature of the workshop as provocation to transformation. The emphasis on process lies implicitly in the workshop brief by means of verbs or actions words:

- Provoke / encounter / confront [disrupt]
- *Relate* [*associate* / *identify*]
- Identify / assign / address / articulate [frame]
- Interrogate / question / ask / reflect [critically reflect]
- Make / build / design [create]
- Participate [collaborate / share]
- Represent / reveal [share / communicate]
- Investigate / explore [inquiry / probe]
- *Interpret* [*imagination* / *translate* / *make meaning*]
- Change [transform]

Noteworthy is the absence of verbs that prioritise an affective relation to the activities, for example; connect, feel, perceive, experience, empathise, associate or engage. While 'relate' and 'interpret'

assume a personal interpretation or internalisation by the students. Upon further scrutiny of the meaning to 'internalise', it became evident that the threshold concepts become a probe for students' own design attitude and values in relation to that of other people, communities and their peers. 'Embody', 'manifest', 'absorb' and 'accept' are synonyms pointing to a potential transformation in both disciplinary and process threshold concepts – students integrating the newly discovered ways of engagement and complex concepts within their being as designers. Intuitively, the verbs relate to the modes of engagement in the workshop, associated with the descriptors in square brackets. It shows the spontaneous inclination of process over product.

Disruptive process. Reflecting on the purpose of the 'plug-in', the workshop is intended to refocus the student's approach and attitude to be aligned in a human-centred way, which they experience as a disruption, emotionally, affectively, cognitively and creatively. The sites and communities of the studio project foster this awareness. The shift to relational, social and dynamic conditions and the focus on revealing design and contextual matters without solving problems, prove most challenging, where shifts in terms of perspectives and modalities of interaction are concerned.

Time and duration. Questions of time, disruption and degree of understanding, present noteworthy observations that will be unpacked in the discussion to follow. However, in short, the disruption can be either detrimental or productive, depending on the inclination of the student and other related aspects that are outside the control of the researcher: for example, the effect of the studio project brief, duration of disruptive practice, troublesome threshold concepts providing a barrier in development and the continuum of connected-separate design engagement.

Tool vs approach. The argument whether the 'plug-in' can or should be considered as a tool or not, resurfaces. The workshop offers open-ended procedures, or flexible ways of engaging with complex issues that are not prescriptive, but open to interpretation by the students. In the design disciplines, where time spent on design development is a luxury, the plug-in introduces a 'short cut' with built-in contingency that requires rigorous work and action with speed in order to reveal hidden and intangible considerations of unfamiliar scenarios. It releases an understanding of interrelations and dependency of temporary and fluid living conditions. Furthermore, it is robust and adaptable, to insert different activities for various intentions. Upon critical reflection, it can be extended or built out over time to increase depth and insight into complex matters and include various social, economic and spatial conditions.

The plug-in workshop offers an approach to the design process, and the critical artefact is one of many possible tools that can be used to make concerns visible. The value of an approach means that it can be integrated in a spontaneous way into the students' daily design practice, where they take ownership of their own learning, by experimenting with hybrid methods resonating with their critical and creative spirit. However, it could be seen as a way of demonstrating an approach, although that is not the intention, as the perception of a tool can be distorted. This can also be useful in a professional capacity, not only in an educational milieu. The plug-in could also be used in direct community engagement and participation, outside the academic studio setting.

Role of the researcher. The effect of the presence of the researcher in the workshop is different to the researcher's initial expectation. The data shows that the initial apprehension and suspicions of students are replaced by expressions of gratitude and a realisation of matters the workshop exposed them to, in half of the sample. The analysis shows that they are more distrusting of the unfamiliar process they are forced to use, the impact on their grades and who will be involved in the assessments of the studio project, than the researcher making observational notes. In the instance where the students are already engaged in a disruptive project of extended duration, students experience no productive influence of the workshop. Nor do they express a contribution from the researcher during an interactive session; they find the presence of the researcher a disruption, as stranger and intruder, instead. They distrust another voice and opinion in their already troublesome experience and resist constructive feedback and input. The question of time and especially extended time necessary to deepen understanding, is therefore not always the issue. The dependency on the degree of complexity and effect of other external aspects to the workshop, such as entanglement with theory and personal world views, could add to the difficulty in design interpretation, internalisation and representation.

Research context

The research questions provide the focus and intent for the purpose of the discussion, and contextualises the thematic narratives and threshold categories and concepts.

main question

How can a human-centred approach as disruption by dissociation enable transformative engagement in the spatial design studio?

sq1	sq2	sq3
<i>How does the insertion of a disruptive action by dissociation as designer, influence meaningful connection and design engagement?</i>	<i>How can the adoption of a human-centred approach expand an empathic understanding when dealing with complex spatial design issues?</i>	<i>How does the shift to insider perspective transform design thinking in students to reveal other design agendas?</i>
_disruption, dissociation, meaningful connection	_human-centred approach, empathy, complex design issues	_shift / transform, insider perspective, design thinking, other design agendas

How are threshold concepts identified?

Threshold concepts are identified by observing students' emotions, especially where anxiety sets in. When students are confronted with activities they are not familiar with, they are provoked into engaging in other ways compared to their normal design practice. Disruption causes an unsettled nature, in which the liminal space of threshold concepts manifest in students (Meyer & Land 2005). It is up to them to either embrace or reject that. In addition, they reconfigure concepts by revising previous understandings or perceptions, in order to develop new mental models. They furthermore contextualise complex

concepts by transferring new meanings to concept and situations (Meyer & Land 2005, Tucker et al 2014). For example, students that show connected and transformative learning identify selected threshold concepts and show their commitment to a different creative inquiry that is also critically reflective, by integrating it in design project presentations and exams.

How is transformation measured?

This study uses no assessment or evaluation rubric to interpret how transformative learning can be measured. The usefulness of the Learning Activities Survey (LAS) as an instrument is considered, especially in context of using the Perspective Transformation Index (PT-index). Three indicators are scored: transformation during educational experiences, shifts not associated with education and absence of transformation (King 1998). As an empirical tool, the PT-index offers data that is too statistical in nature to be of value to ascertain the subtle nuances present in the transformative learning visible in this study. It is not a question of whether shifts are possible, but the degree and nature of intensity of the transformation, instead. These often small, seemingly insignificant moments do not claim grand announcements of deep ontological shifts. However, upon closer investigation, in spite of the short four-hour duration of the workshop, they offer discerning insight into students 'entering into' complex matters not previously considered. Instead, it considers qualitative indicators emerging from the primary data the researcher observes and identifies during the qualitative analysis and synthesis in the biopics:

- Connected / separate voice (first person / third person writing)
- Personal associations or experiences relating to workshop focus and process
- Integration of threshold concepts during the workshop and / or thereafter
- Degree of acceptance or resistance of the unfamiliar process
- Internalising of unfamiliar methods in the studio
- Revert or retreat to familiar processes, patterns and ways of working

Transformation is an organic process that is difficult to articulate. Sometimes, a small clue or cue makes visible a shift in thinking, or the way a student articulates an understanding, or how they reflect, and what the subject of their reflection is. It is not a direct science; however, the structured empirical investigation reveals pertinent moments of reflection and of shift that would otherwise not have been identified in the studio. These relate to both objective and subjective clues, behavioural responses of students, the nature and degree of immersion in the process, and the awareness expressed and engagement shown in the discipline specific aspects.

Discussion points

Reflecting on the discussions that follow as provocations, the research reflects on Yin's (2016:236-242) observations of the five types of conclusions a study can follow. In *Chapter 5*, these are outlined as part of the considerations for the study and at this point, they become noteworthy markers to contextualise the discussion.

Making substantial propositions. The research shows that inserting a deliberate disruption reveals complex problems and creates an awareness in students of unpredictable and open-ended spatial conditions not previously considered in design projects. They find a way to inquire deeper, using hybrid methods and moving beyond superficial understanding to realise connections, meanings and aspects of engaged learning. As a result, shifts are observed in the context of spatial design projects, which are discussed in detail in the provocations below. The study acknowledges that learning is continuous, and that these shifts could happen at various points in a learning process, be big or small and could also include practitioners in the field.

Challenging conventional stereotypes. The 'plug-in' brings another understanding to the traditional design process, by extending the depth and insights gained because of more deeply engaged activities that probe not only the issues of investigation, but also challenges the students' personal convictions, perspectives and opinions. By introducing the 'micro lens' of human-centredness, grounded in fluid and transient scenarios, the process reveals a continuum of empathy, dissociation and connected knowing. Students become aware of other opinions and in their interactions with one another, realise the importance of respect, inclusivity and relationship formation between stakeholders. In addition, the individual attributes, beliefs and values of the students as individuals, and also as peer groups, are questioned.

Discoveries about social behaviour. The integration of data findings and related literature brings new concepts into the field of spatial design that are not normally associated with the design studio. Normative dissociation and empathy are derived from the health sciences (Butler 2006, Ross & Watling 2017), disruption from business innovation (Christensen 1997) and established disruptive design methods from social and environmental design (Acaroglu 2017), with transformation practices grounded in educational psychology and developmental theory (Belenky et al 1986, Perry 1970, Mezirow 1991). By considering interdisciplinary research, the spatial design disciplines benefit from these insights. Because of the different perspectives, insights and understandings emerge and as a result of employing these concepts in the workshop activities (albeit only known after the fact), the depth of inquiry increases. Connected knowing (Belenky et al 1986) as a way of engaging the affective domain (Kratwohl et al 1964), has been missing from spatial design education for some time. As social creatures, adopting a well-rounded approach is needed in order to acknowledge and identify the intangible, emotional, subjective aspects that are integral to complex living scenarios in which we make meaning.

This renewed way of thinking about design depends upon an equally reinvigorated concept of who the human being is. For too long we have simplified our world and thought of man in abstract terms, as if there were a single, universal human being who can serve as the common denominator for all of us. And for too long we have avoided delving seriously into the emotive, sensory, and phenomenological impacts of design (Caan 2011:53).

Generalising to a broader set of situations. The potential of a 'plug-in' workshop in other contexts and design projects is highlighted, in light of the explorative nature of the investigation. The possibility of replicating it in other schools of design could extend the contextual meaning and engaged learning that could facilitate transformation in students. Things to consider include design activities, duration of

the workshop and the nature of the questions that emerge as a result. Perhaps by provoking further, one could reveal new situations of understanding.

Taking action. The provocations to follow are not meant as a formal call for action that is supported by an action plan or timelines. Instead, the call for action addresses the scope for continued practice by means of research through design that can equip students with lifelong learning skills, promising to cross the education-profession lines of engagement.

Provocations

The postulations and provocations offered here are integrated considerations of the qualitative data analysis, its deeper understandings and insights, as revealed by the participating students and interpreted by the researcher. The research questions and related literature prove interconnected and the discussions take a holistic view of the patterns as it reveals various topics as threshold concepts, organised under threshold categories (Figure 7-1). These are discussed as provocations.

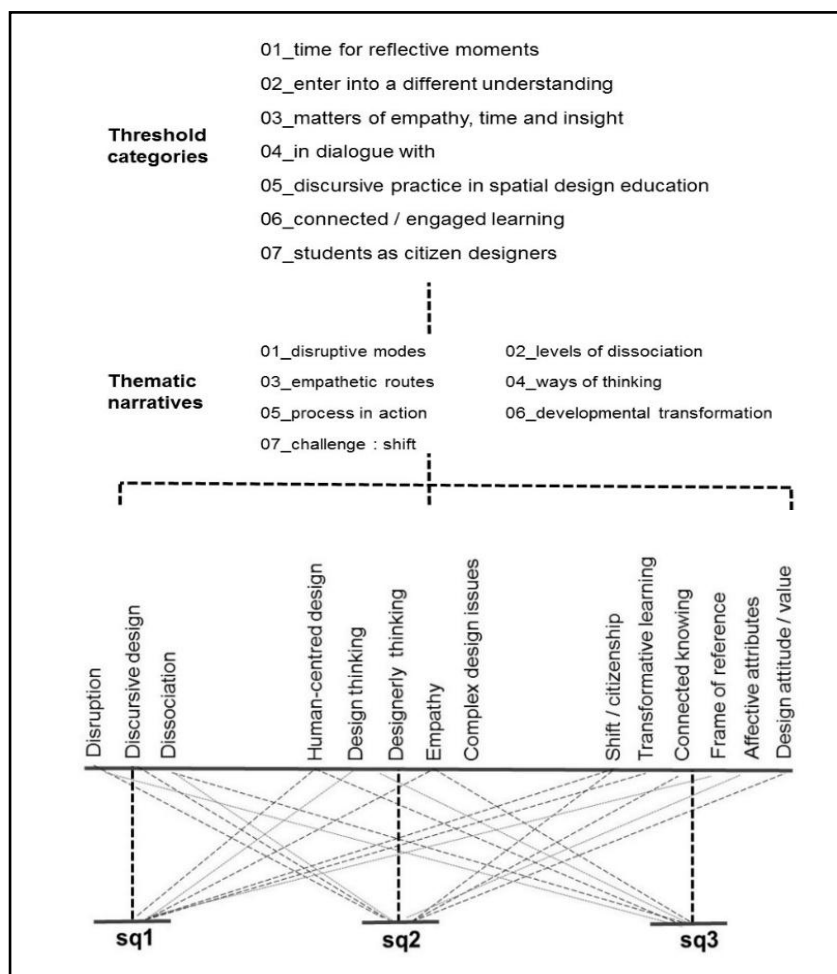


Figure 7-1: Relation: Sub-question - related literature - thematic narrative - threshold categories

Upon further reflection, reference to human-centred design is integrated and present in all threshold categories, due to the realisation that the threshold concepts collectively describe a human-centred

approach, embedded with situational richness. The threshold concepts' characteristics, 'troublesome', 'integrative', 'transformative', 'irreversible' and 'bounded' (Meyer & Land 2003) are found in combination in this study. For example, threshold concepts can be both integrative and irreversible, or transformative and bounded.

Table 7-1: Threshold concepts characteristics interpreted

troublesome	integrative	transformative	irreversible	bounded
normative dissociation disruption discursive design question of time -ambiguity and uncertainty	modal shifts engaged learning -connected – immersive experience dialogue with the situation -recursiveness meaning-making relational awareness	frame of reference (different understanding) empathetic horizon -disposition / praxis engaged learning relational awareness	frames of reference commitment agency as designer	meaning-making citizen designers agency as designer -learning ecologies -21 st century graduate attributes

Provocations are threshold categories, in which threshold concepts are discussed. These are interrelated, and a concept might appear in more than one category. The threshold concepts are divided in two aspects: subject (discipline) specific and focusing on the process of engagement. Noteworthy is the observation that if the study is conducted in the context of other design projects, the situations, programmes, typologies, users and intangible conditions can result in other threshold categories and concepts. This is the value of qualitative research, why repetition is needed to build the scope of such investigations, to benefit the discourse of disruptive practices, and to stimulate design research in the spatial design studio as engaged learning.

Table 7-2: Threshold categories and related threshold concepts

	Thematic narratives	Threshold categories	Threshold concepts
01	_disruptive modes	_reflective moments [troublesome; integrative]	<u>SUBJECT</u> Contextual meaning and understanding Situational awareness -site and studio <u>PROCESS</u> Critical reflection (shift) and disruption Empathy -responsive, transactional, instrumental Bias, judgements, contextual meaning Time and understanding
02	_levels of dissociation	_enter into a different understanding [troublesome; integrative; transformative; irreversible]	<u>SUBJECT</u> Human-centred approach Small scale encounters <u>PROCESS</u> Normative dissociation Perspectives -personal, users, context Disruption
03	_empathetic routes	_matters of empathy and insight	<u>SUBJECT</u> Dissociation and empathy - responsive, transactional, instrumental Social, dynamic conditions Spatial appropriation and meaning

		[troublesome; transformative; integrative]	PROCESS Affective relation to design challenges Perspectives -designer / user Critique and reflection -time, connection, intent, point of view Disruption -expanding the empathetic horizon -connected learning Frames of reference -point of view, habit of mind
04	_ways of thinking	_in dialogue with [integrative; transformative]	SUBJECT Contextual meaning User-centred interface and meaning PROCESS Engaged / connected learning -process, context, user, self, peers Bias, judgements Critical reflection
05	_process in action	_a discursive focus in spatial design education [troublesome; integrative]	SUBJECT Abstraction, representation and message Communication to audience (provocation) PROCESS Dialogic inquiry Meaning-making, metaphor
06	_developmental transformation	_connected / engaged learning [integrative; transformative]	SUBJECT Personal experiences Real and imagined situations and conditions PROCESS Modal shifts -perspectives, actions Meaning-making Dialogue with the situation -self, context, process, users, peers
07	_challenge : shift	_students as citizen designers [transformative; irreversible; bounded]	SUBJECT Wicked problems Design ethics and responsibility -Representation on behalf of individuals and communities -Personal design identity / worldview Leadership and agency -Design agent, activist, advocate, champion PROCESS Commitment, values Situational empathy : situational awareness Human-centred design attitude / approach

The provocations to follow critically reflect on the complex nature of the research questions, the consolidated data findings, considerations from practice, the literature review, and the disruptive practice introduced by the 'plug-in'. No answers are provided, nor are any problems solved, but the provocations are intended to stimulate further discussion and exploratory design engagement.

Provocation 1_reflective moments

[troublesome; integrative]

It is our capacity to see unfamiliar situations as familiar ones, and to do in the former as we have done in the latter, that enables us to bring our past experience to bear on the unique case. It is our capacity to *see-as* and *do-as* that allows us to have a feel for problems that do not fit existing rules (Schön 1983:140).

Moments of pause and contemplation, caused by the unsettling experience of a disruptive plug-in workshop inserted into the traditional design process, elicit critical reflection at various points. The relational biopic synthesis of *Chapter 6* reveals reflective moments stirred, because of other ways of engagement that students are unaccustomed to in the spatial design studio, which students experience during the workshop activities. In the context of the active studio project, impact moments reveal threshold concepts that are both process driven and subject led.

What causes disruption? How does disruption affect critical and creative responses?

The workshop process, also extending further towards the trajectory to completing the design project, allows for pivots in awareness. Other design agendas are revealed when students reconsider their design attitudes and approaches (Awan et al 2011, Till 2009) through a critical reflective practice (Schön 1983). When this happens, the current values and ethos of design are under scrutiny. These moments can be small realizations brought about by certain aspects and activities of the disruption. The degree of influence, moving from value > impact > shift, is a slow process. Literature explains this happens in stages, as the student becomes receptive to transformation (Perry 1970). However, this study argues for non-sequential shifts that do not follow a hierarchical order, supported by the data findings that show evidence of students moving between different types of developmental aspects, as per the mode of engagement. The link to transformative learning that speaks to 'premise' reflection (Mezirow 1991:108) opens a door to the nature of transitions in the students' ontological and epistemological understandings of the world.

MODES OF ENGAGEMENT. Different modes of operation and engagement to the normal, conventional spatial design studio process bring new insights to students' understanding of the complexity of the design challenges in the projects at large. Introducing unfamiliar activities 'forces' an intensity in the inquiry process, one where students are requested to delve deep into their own points of view and habits of mind (Mezirow 1997:5-6). They are obliged to step out of their familiar 'human ecosystem' (Bronfenbrenner 1979) and all its layers, to transpose themselves into that of another person or community. This is a difficult task and it is the cause of much anxiety and hesitation. The students step out of their comfort zone, the place where they can respond with confidence. Suddenly, the security of a 'recipe' that works for the individual is turned upside down, and a different way of working is expected. For example, the abstract representation, or discursive design (Tharp & Tharp 2018) which focuses on a three-dimensional object with no spatial solution, aimed at eliciting discussion, is required instead. The symbolic nature of the activity opens other avenues to engagement and representation. Students realise that by focusing on intangible conditions, abstract concepts emerge that relate to subjective association and connotation of meaning-making. They make deeper connections in their learning (Belenky et al 1986), and understandings shift by making a 'semantic turn'. As Krippendorff (2006:xiii)

argues, “[d]esign is making sense of things ...” and “... to conceptualize artifacts, material or social, that have a chance of meaning something to their users, that aid larger communities, and that support a society ...” (Krippendorff 2006:xv).

INSIDER VOICE. In order to formulate an awareness of another’s situation or context, the adoption of other perspectives to the designer’s own, brings about a different understanding – the insider or emic voice (Creswell & Poth 2018:91, 94). The shift in focus from the self as designer / architect moves to the user, customer, audience or community as a first consideration in the design process. In spatial design disciplines, the focus on the static expression of architecture often outweighs the softer considerations related to people. Salama (2015:331) argues for an epistemological balance and thus, a mind shift requires a whole transformation in the being of the designer. The design thinking discourse integrates empathy as a point of departure to human-centred design (Brown 2009; IDEO 2019) and design practice extends empathetic awareness beyond a superficial observation. The workshop data show that when current architectural praxis refocus their attention to people, complexity of understanding increases and students are able to make complex connections with larger issues in which the studio projects are situated.

MEANING-MAKING. The next point where reflective moments provide a sense of realisation of engaged learning, is through meaning-making – a consideration rarely contemplated in the spatial design process: what things mean to people on an intangible level. Here the reference to meaning is not related to a superficial understanding, for example, warm colours’ association to comfort, but rather the realization that through abstraction and symbolism, people are able to assign deeper meaning according to their perspective and contextual significance. The intrinsic design value is not dependent on a message that is universal to all as a preconceived idea, but allows multiple interpretations as contextual meaning (Krippendorff 2006). The particularities of the situation of the living scenario and the human-object-environment interface and interaction, are integral to the meanings that are constructed.

Discursive design assists with meaning-making, especially when associations of second life materials create deeper connotations. In addition, the focus is on the communication of a message through related meanings and messages (Tharp & Tharp 2018: 105, 166). The shift in focus from solving problems, creating products and giving answers, to only revealing issues, presents a challenge for the spatial disciplines that are accustomed to solving problems (Cross 2006:78). The data findings indicate that when students are focused on a solution-led goal analysis (Cross 2006:79), they are hindered by their preconceptions and as a result, the exploratory process suffers. Therefore, a scenario-led potential analysis might be more conducive to connected learning. However, when students are too emotionally attached, they lose perspective. In contrast, a separate voice emphasises preconceived ideas, where students never make an emotional connection, but remain at a distance without realising the interpretation potential of the intricacies embedded within a project. In both cases, disruption combined with preconceived ideas, have a negative impact, regardless of the students’ opinion. They either ‘retreat’ to what they know and are familiar with, or ‘abandon’ (Perry 1970:10) the new idea and understanding. Due to the discomfort they experience the more troublesome the exercise becomes. In

this way, students find it difficult to transition the liminal space that threshold concepts present (Meyer & Land 2003).

However, the contrast is also visible: when students make critical connections, they embrace a dialogue (Schön 1983) with the process, themselves, the activities, and their peers, and face the challenge presented by the 'plug-in' head-on.

PROCESS. The workshop reveals shifts in students, which are mostly small transitions, but with a deliberate display of action, or a specific expression of intention for change. As a result, disruption becomes a positive catalyst to action for students that challenge themselves and their learning, through an active and productive engagement with an unfamiliar process. The biopics show a continuum of responses: a deliberate decision to include the workshop into the design presentation (b1), the deliberate expression to integrate the new practice in the future (b2), the integration of the workshop influence in the purpose and response in the completion of luminaire prototypes (b3), and an entanglement with the framing of challenging societal problems (b4). In terms of transformative learning, this means students are making decisions towards commitment, connected knowing, and the other complex, higher developmental categories (Belenky et al 1986, Didau n.d., Krathwohl et al 1964, Perry 1970). Pinpointing the moments of reflection during the workshop offers insight into the degree of transformation and brings another understanding of the nature of transformative learning.

Problem statements. The notion of the term, problem statement, comes into question, when appreciative inquiry (Stein et al n.d.) emphasises potential, instead of problems. This leads to engaging with project descriptions in a completely different way. Thus, this study argues for project description, or design situation, instead.

- Threshold concepts –
 - content (disciplinary): wicked problems, human and spatial agency
 - process: perspectives, personal bias and judgement

Keywords. Focusing on the essence of the project, by zooming into the significant matters related to contextual understanding, assists in the framing of questions (Design Council 2019, Dorst 2019:123), especially when students consider human-centred matters pertaining to the intangible and emotional.

- Threshold concepts –
 - content (disciplinary): human-centred matters, intangible conditions, emotional aspects, subjective well-being and sense of community
 - process: framing of project, articulation of the essence

Vignettes. These enable modal shifts (Cross 2006:88) in modes of engagement, by shifting between thinking in words to thinking in images. It brings new understanding of fluid, ill-defined contextual matters and challenges. Modal shifts are also considered in terms of perspectives (Brown 2009, Panero et al 2019), not only from the opinion of the designer self, but also according to the view and experience of the user, related to intimate scale and interactions. In this way, a multi-scalar approach integrates complex understandings across various contexts and situations (Till 2009).

- Threshold concepts –
 - content (disciplinary): relational conditions interrelationships and person-object-environmental interface, systemic considerations, normative dissociation (assume role of the user)
 - process: modal shifts, connected learning

Second life objects and materials. Students construct new understandings (Krippendorff 2006) as provocations to connected learning, because of the potential meanings embedded in the objects and materials. They make intuitive connections that result in symbolic or abstract interpretations, as discursive design (Tharp & Tharp 2018) responses. These are internalised as reconstructed meanings to convey deeper understandings and explorative ideas of difficult matters.

- Threshold concepts –
 - content (disciplinary): meaning-making (deep association)
 - process: abstraction, symbolism, discursive design considerations

Making of critical artefacts. The processes of making, reflecting and reconsidering, facilitate opportunities for critical reflection of students' view of the world. They are confronted, in an indirect way, with a "reconstruction of self" and to deal with its "unintended consequences" (Meyer & Land in Tucker et al 2014:162). The deeper effect of engaging with the workshop activities reveals itself during the process of engagement and it is up to each individual student to either be receptive to its impact, or to resist its influence, which Meyer and Land (2006:202) refer to as recursiveness and excursiveness.

- Threshold concepts –
 - content (disciplinary): meaning of things, association to spatial design
 - process: metaphor as a way of exploring difficult concepts or challenges, dialogue with the situation (Schön 1983:136, Tschimmel et al 2015), self, process, context, insight

Peer interaction. Personal bias and judgement are revealed in the free sharing of peer interactions. Students' own perceptions and perspectives are challenged in a safe environment, where critique is constructive as they interact with honesty and transparency. Noteworthy is the emphasis on intangible and emotional matters pertaining to relational encounters of people in places. Regarding sharing, opposing aspects of student designers emerge, namely ego and humility. Students confront themselves, and are confronted with their own preconceived ideas, which are different for each one. This demonstrates their tolerance for uncertainty (Meyer & Land 2006:201) and ambiguity contained in the process, but also their own understanding of threshold concepts.

- Threshold concepts –
 - content (disciplinary): meaning-making, intangible and emotional aspects
 - process: epistemic transitions and ontological shifts, humility vs ego

Reflective essay. Students reflect critically (Schön 1983) on the workshop activities and the disruptive experience, which highlight the matter of time required for immersion and understanding (Kouprie & Visser 2009:446). The emphasis of their reflection is mostly focused on the process and a personal re-evaluation of themselves and their worldview, because of their own process of engagement. Students

convey an awareness of deeper meanings, which did not always feature at the beginning of the workshop.

- Threshold concepts –
 - content (disciplinary): meaning-making, associations and connotations, human-centred matters, relational conditions and human agency
 - process: modal shifts – perspective and ways of design engagement

Trajectory to completion. Sustaining the connection to the user and ‘hidden’ issues regarding the studio project remains a challenge during the trajectory to completion with the active studio project. In addition, maintaining an extended empathetic horizon (Thomas & McDonagh 2013:50) also poses a difficulty. However, students who make committed decisions to incorporate aspects of the workshop in the design project, reveal active transactional empathy. This transitions into instrumental empathy (Ross & Watling 2017:28, 30), where they act to benefit the community, albeit in an academic studio project. Their personal convictions shift in epistemological ways (Combrinck & Venter 2020).

- Threshold concepts –
 - content (disciplinary): human and spatial agency; meaning-making, sense of community, student as citizen designer
 - process: critical reflection, modal shifts, connected knowing and transformative learning ecologies

Post feedback. Not all students provide post feedback, which demonstrates that not everyone has the same receptive capacity for disruption, especially where personal views are challenged. The way students handle the liminal space, due to the threshold concepts and the process of engagement, reveals a ‘pre-liminal variation’ (Meyer & Land 2006:202-203) in their being that can tolerate various degrees of uncertainty. As a result, their empathetic responses are influenced by initial engagement (relational empathy), full engagement (transactional empathy) and commitment, because of the realisation (instrumental empathy) (Ross & Watling 2017:28, 30) of deeper requirements posed by complex design situations.

- Threshold concepts –
 - content (disciplinary): empathetic awareness, situational understanding
 - process: other ways of knowing and understanding, internalisation of challenging concepts

Alignment to ethos of school. In general, the ethos of the schools are extended by introducing a connected learning approach, which promotes holistic learning, and activates the affective domain of development (Krathwohl et al 1964) in students, not only focusing on the cognitive side. The emphasis on people brings deeper awareness and understandings of increased design complexities. Other ways of engagement in the spatial design studio encourage a dynamic focus instead of the traditional static approach to design inquiry (Salama 2015:6).

- Threshold concepts –
 - content (disciplinary): disruption, empathy, human-centred and relational conditions and situations
 - process: relational and dynamic design pedagogy, holistic learning, connected transformative learning

Students consider threshold concepts as a way to reconsider and critically re-evaluate their role in the process of transformation, which make space for epistemological transitions in the ways they engage. However, the ontological shifts remain the challenging part of the disruptive experience, requiring time and effort of the students to reflect critically on their own judgements and biases. These shifts are not spontaneous, and boundaries, obstacles and resistance are experienced in the process. However, when there is commitment (Perry 1970), small signs of transformation appear. Unintended consequences become visible as they slowly move through the liminal space (Meyer & Land 2006, Land et al 2006) in their own time, which may only be after this workshop and within the completion of the studio project.

Provocation 2_enter into a different understanding

[troublesome; integrative; transformative; irreversible]

To be useful as a concept, dissociation should not be applied to ordinary instances of less-than-full engagement with one's surroundings, experiences and actions. Rather, it should pertain to qualitative departures from one's ordinary modes of experiencing, wherein unusual disconnection or disengagement from the self or the surrounding occurs as a central aspect of the experience (Cardeña in Butler 2006:58).

People do not always notice and recognise realities, experiences and perspectives other than their own, and designers are not exempt from this conundrum. It is not in our nature and certainly not easy to comprehend another's worldview or understanding of what is at the fore of a spatial design problem. Designers are often viewed as the expert or at least the bearers of expert knowledge based on their education and professional experience. These realities exclude the perspectives of extra-disciplinary collaborators and actual users and by default, subjectively render the framing of design projects incomplete.

MODAL SHIFTS. Data from the biopics demonstrate that modal shifts (Panero et al 2019) are integral to making transitions from one perspective to another, moving between connected and disconnected modes of engagement. A continuum of dissociation with self-as-designer reveals three modes; from a separate third person observer as designer (identifying potential of a situation); to a separate first person designer (expressing intent to reveal issue); and a connected first person as user (acknowledging meanings and relationships of fluid scenarios).

According to Belenky et al (1986:100), procedural knowledge introduces connected knowing and separate knowing, which can be aligned with emic (insider) and etic (outsider) perspectives (Yin 2016:335-336), respectively. From a health and behavioural sciences view, absorption (connected) and

attention (separate) relate to normative dissociation, which is part of normal daily functioning as “absorption in daily activities, daydreaming, fantasy and night dreaming” (Butler 2006:46-47). The motivation for introducing normative dissociation as a non-pathological component of psychiatric disorders (Butler 2006:45), relies on the reality that studio projects sometimes have fictional sites and / or users and pose a challenge for students to connect to the actual contextual conditions. In addition, when real-life contexts are included, access to sites or buildings might not always be possible for many reasons. Students are then reliant on ‘imagining’ and ‘reconstructing’ experiences of these contexts in their own ways (Heylinghen & Dong 2019:115), including the intangible aspects that enrich the physical conditions. Dissociation is therefore related to decontextualisation or derealisation (American Psychiatric Association 2013:302) due to the designer’s detachment from place and the need to reconstruct that in the mind using the imagination.

NORMATIVE DISSOCIATION. It becomes useful where contact with potential or real users or clients is not possible, and students are left to their own devices to create a connection to the human dimension. Reverting to a standard project accommodation list does not provide the required qualitative details to adequately connect to people on a deeper level. Therefore, normative dissociation enables layered meanings to emerge, when employing its two types of experiences: attention and absorption (Butler 2006:47). It is argued that ‘attention’ can be likened to cognitive empathy, due to the detached observation required, and ‘absorption’ compared to affective empathy, due to the deep immersion and degree of intensity of the experience.

How can students connect the two modes of engagement as a deliberate action of engaged learning?

In acting and performing arts training, normative dissociation is used extensively to prepare student actors to formulate direct associations with characters. “Actors enter into the lives of characters, and thus might “dissociate” from themselves. Method actors strive to “become” another person by taking on their characters’ emotional life” (Panero et al 2019:3). In the context of spatial design, this could be considered an extreme psychological transition. However, significant is the capacity of acting students to “shift between different states of mind” (Panero et al 2019:12), when considering possible transitions between connected and separate engagement of design students with complex and often ill-defined challenges. In support, the biopic data shows that selected students effectively make transitions and in the process, could make deliberate shifts between user and designer views.

MEANING-MAKING. The critical artefact making activity, where second life objects and materials are used, presents opportunities for exploration of deeper understandings and as a result, becomes the catalyst for integrating different activity modes and perspectives in the ‘plug-in’. Abstract interpretations become possible, as objects embedded with prior meaning due to a previous use, are considered a-contextually. Symbolic representations of complex design issues therefore result in re-contextualising of materials with new meanings and associations, expressing layered messages. The workshop’s critical artefacts are related to a discursive design intent of revealing and asking questions without solving any problems (Tharp & Tharp 2018:7). However, for the purpose of the plug-in, no public displays are presented (except for the public exam exhibition in biopic 4). Students reconstruct

meanings during the making process and from this active engagement, there emerges contextual meanings that are open to interpretation and become fluid in their understanding.

... words, or artifacts for that matter – after all, words are artifacts as well – can change their meanings as they travel through different uses, different situations, different times, and different people's lives. In the course of their journeys, words designate and accomplish different things (Krippendorff 2006:xiii).

As process exploration, the workshop artefacts become ways of connecting to the deeper meanings of things (objects and materials) and experiences, situations and contexts as represented by the studio projects. The symbolic and often metaphoric interpretations directly address complex problems. Students identify these as part of the process, focusing on small scale and intimate encounters in the city, and on human-object-environment interface considerations. As threshold concepts, these are human-centred and speak to the intangible, fluid and transient situations of living, where human agency and contingency are emphasised.

What happens when students find it difficult to dissociate?

NORMATIVE DISSOCIATION. Conversely, the constructive mode of normative dissociation, can also be challenging for some students and as a result, they remain detached from the issues of concern by staying with their preconceived ideas. A focus on 'attention' instead of 'absorption' shows evidence of predictable responses. In comparison, when students overcompensate with dissociation, the equilibrium in connected-separate experiences are disrupted – students find it difficult to detach from the immersion (Kouprie & Visser 2009:445-446) and remain in a dissociative state, which undermines a productive design process. The relation between empathy and normative dissociation becomes significant, as the empathy process starts with discovery, leading to immersion and connection, and ends with detachment. Detachment is integral to making deeper connections and finding increased understanding of the user's world, which is not possible for some students during the workshop. In addition, it is also challenging for students to achieve this during the studio project. Kouprie & Visser (2009:445) explain this as the empathy process, which is then employed in design practice to bring different perspectives.

Time is needed for the designer or design student to immerse themselves in the process of dissociation and of empathy. Due to its exploratory nature that is not focused on solutions or outcomes it is often perceived as irrelevant, although this process allows experience without judgement and encourages an open-minded design approach and attitude (Kouprie & Visser 2009:446). The workshops demonstrate the aspect of time and the challenge for students to connect, also in the extended disruptive studio project of biopic 4. The research therefore questions how the workshop can be augmented in order for students to not only enter into a different understanding, but also to sustain that understanding during the extended trajectory to the completion of the active design project.

Provocation 3_matters of empathy and insight

[troublesome; transformative; integrative]

We propose that it is more productive to discuss 'empathetic engagement' as a situated practice as opposed to 'empathy', which is often seen as an abstract concept ... (Ross & Watling 2017:31).

The discussion around empathy, time and insight, considers the experiences of the students and speculates whether empathy is an attribute that can be learnt, or if it remains an internal quality or trait a person either has or not. This seems to be an ongoing debate, also in the medical sciences, where a distinction is made between abstract concepts of empathy and the contextual approach contained within an in-situ experience, with motivation for the latter (Ross & Watling 2017:31). The distinction and emphasis are noteworthy, especially in this investigation where the plug-in workshop shows that contextual meaning and understanding are integral to formulating insight into complex design challenges. The empathy triad of 'relational', 'transactional' and 'instrumental' empathy underscores the active engagement in the workshops, whether met with excitement, or apprehension. This significant difference between empathy as a concept and empathy as engagement, appears to be the pivot in gaining connection as a 'performative' action to understanding within a spatial design milieu.

EMPATHY TRIAD. Through relational empathy, students meet the workshop and themselves head-on. They are confronted with their own judgements, prejudices, and opinions, not only regarding the requirements hidden in the active studio design project, but also the unconventional activities of the 'plug-in' disruption. They negotiate their way, as a transactional empathetic process, by critically reflecting on unfamiliar concepts and ways of inquiry. Instrumental empathy reveals itself when students relinquish control and submit to the process that requires modal shifts, both in ways of engagement and perspective. When they acknowledge and internalise the complex conditions related to a human-centred design approach, the designer's ego is suspended in favour of human agency and the contingency of the situation.

LEARNING FROM INDUSTRY. Practice confidently uses empathy as part of the investigative process and vocabulary of inquiry, integral to the design thinking discourse. Empathy is integral to design and "... reveals the true scale and complexity of the challenge of understanding a complex social situation in order to design a system that supports many and various needs" (A lesson in empathy 2013). Many practices are combining the design thinking and designerly thinking approaches in projects, which proves beneficial not only to the users or clients, but also to the designers (Panorama Innovation n.d.). In this way, they extract deeper understanding and insights into the lives of users when using hybrid methods. In comparison, spatial design education following a designerly thinking discourse as design science, relies on traditional methods that focus on cognitive and intellectual aspects, which this plug-in workshop shows is not sustainable in the context of design presently. Dorst (2019) argues for a system transformation. The sentimental perception and emotional connotations to empathy do not aid in creating links between design thinking and designerly thinking (Laursen & Haase 2019). This study motivates for an increased integration of the two approaches, as is currently seen in social innovation and human-centred design practice, to foster a holistic learning ecology within higher education of design that embraces transformation. The study argues that empathetic engagement has the potential

to inform transitions in design attitude and approach, in order to stimulate connected learning engagements. Various authors motivate for empathy, understanding, compassion and responsiveness to a multitude of complex issues; these directly address a decolonial pedagogical approach by including social, cultural, economic and environmental considerations (Berlanda 2017, Fisher et al 2017, Jarvis 2021, Simaan 2020).

CHALLENGES WITH EMPATHY. When empathy is considered an abstract concept that speaks to cognitive, affective and behavioural aspects only, the danger exists for a damaging effect on student engagement. Students without an empathetic disposition become despondent or resistant to the notion of empathy, and remain detached from the issues under investigation, resulting in superficial responses and preconceived ideas. In contrast, students who are too immersed, become lost in the issues and find it challenging to detach from the empathetic process (Kouprie & Visser 2009:445-446) in order to find an objective perspective. The evidence also shows that a few students find a balanced view and are able to integrate the empathy triad, by taking committed action by transferring complex understandings from the workshop to the studio project. However, in the rest of the sample, the enthusiasm and connection fades for multiple reasons.

The question therefore remains, how can empathetic engagement be sustained?

This brings into the discussion, the matter of time and duration. The data show that a four-hour workshop introduces students to other ways of working and to perspectives other than their own. However, additional time is required for that to be internalised and integrated. Only exposing students to troublesome or unfamiliar concepts and design activities prove not adequate for deep engagement and additional time is needed to invest themselves into the unsettling experience. The fact that they are confronted with their own beliefs and views of the world makes this an even more difficult process. Students challenge their own understanding of disciplinary content and process, but also reflect on their individual premise to life (after Mezirow 1991:107).

Empathy is difficult and complex. To have empathic concern for another requires effort and understanding. It requires that I set aside my own selfish needs and think about the experience someone else may be having ... [i]t asks me to invest precious emotional energy into another, a cause, or a social concern that is not directly related to me, or what I value (Kaza in Resnick 2016:292).

VALUE OF EMPATHY. The two routes to empathy, 'mirroring' and 'reconstruction', as proposed by the Simulation Theorists (Goldman in Heylighen & Dong 2019:114-115) prove valuable in the workshop engagement, as students are able to relate to the context of their active studio project in a direct way. They do this either by mimicking what they experienced and in that way absorb complex concepts, or by imagining 'what can be' by reconsidering their experiences with a critical lens, from the perspective of the user. This is also seen as appreciative inquiry (Stein et al n.d.). The components of empathy: cognitive, affective and behavioural (Cuff et al 2014:147), therefore do not support the empathetic requirement effectively, as students are prompted to make relational and contextual links beyond only one individual's requirements and needs. Therefore, the empathy triad that promotes empathetic engagement, is more conducive to transformative learning.

EMPATHY AND THE 'PLUG-IN'. The word 'empathy' was not written into the 'plug-in' brief, however, students were asked to assume a user perspective, and not the familiar designer view during the workshop. This disruptive request interrupts their comfortable design space, by introducing normative dissociation (Butler 2006) to serve this purpose and in the process reveals a continuum of empathy, those that are immersed or absorbed, and others keeping an observatory distance by paying attention only. This is especially evident in the modal shifts required in transitioning between thinking in words or images, and the shift to making as an active process. With vignette drawings and critical artefacts during the workshop, a shortcoming in students' depth of understanding and complexity of insight into the wicked problem's they identified is revealed. The ability to gain deeper meanings, intangible and symbolic interpretations, together with abstract representations, is lacking as a result.

In addition, Mezirow's (1997:5-6) 'frames of reference' furthermore give context to the understanding of an expanded empathetic horizon (Thomas & McDonagh 2013:50), as students are faced with fundamental questions within themselves. 'Points of view' and 'habits of mind' address epistemological and ontological understandings of the world, respectively – challenging aspects for students to meet, especially within a disruptive experience, where little is known or familiar. Regardless of the emotion and experience of the workshop, the study illustrates that it is possible to expand an 'empathetic horizon' or to widen a perspective, or to deepen internal understanding, to extend relational insight or to enrich situational awareness. This study does not propose this workshop as the only way of achieving that, as the inquiry remains open-ended and exploratory. The data shows that an empathetic approach reveals complex issues and threshold concepts, as captured in the 'plug-in' brief. The ways students find their way through the liminality of threshold concepts (Meyer & Land 2003, 2005), determine their trajectory of ethical and affective development individually.

The threshold concepts emerging through the empathetic lens, such as human agency through an awareness of social and dynamic conditions, together with spatial appropriation and meaning, highlight the acknowledgement of perspectives and 'frames of reference' (Mezirow 1991, 1997). Not all students reflect critically on the connectedness of their engagement with complex issues, but the re-evaluation is focused around their own process experience and understanding, in light of how the nature of the activities unsettle their familiar design world.

PROPOSED TERMINOLOGY. Due to the biased connotation of the term 'empathy' as an abstract concept, as Bloom (2016) warns against, and likewise the possible subjective association with 'empathetic engagement', this study considers other terms as active handles into the field of spatial design. It conjectures whether 'internal understanding', 'relational insight' or 'situational awareness' could not be terminology or concepts more relatable to design students, considering the absence of perceived sentimentality and subjectivity.

Provocation 4_in dialogue with

[integrative; transformative]

“Seeing” ... means to explore beyond the obvious, to challenge existing perspectives, and to construct a deep understanding of what we perceive by examining and re-examining our frame of reference through careful observation, physical interaction, and imaginative inquiry ... [m]aking involves “conversation” with a material (Miyasaka 2014:3, 6).

Designrly thinking literature refers to ‘dialogue with the situation’ as a reflective practice (Schön 1983) as one of its methodological approaches (Laursen & Haase 2019:823), but the findings from this study reveal that the dialogue is rich and layered, warranting a discussion to reveal the aspects related to the ‘situation’ within the context of disruption. This can be correlated with design thinking’s ‘exploratory learning’, dealing with ill-defined problems where solutions are not always complete (Laursen & Haase 2019:824). The data findings from the biopic investigations show multi-layered challenges emerging and as a result, ‘ultimate’ solutions would not be possible. The contextual meaning of the situation is embedded with specificity and particularity (Krippendorff 2006). As a result, there can be no universal or right solution. The designer, however, strives to find the most appropriate response, according to a holistic understanding of the design challenges. This study intends to contribute to the research-through-design (Tharp & Tharp 2018:126) discourse, by deepening a complex human-centred understanding to obtain better responses, due to an immersion into the issues under investigation. ‘In dialogue with’ therefore considers dialogue concerning the following matters: contextual meaning (awareness), process and unfamiliar activities, users, peers and self.

Contextual meaning (awareness): Both designrly thinking and design thinking have contextual meaning as one of its design paradigms, focusing on the value of the design response in its context (Laursen & Haase 2019:822, 824). This view articulates contextual meaning as an outcome of the design process, but this study relates contextual meaning to contextual awareness, as a verb, instead of a noun. Why? This is seen as something that shifts and mutates as the students’ worldviews, experience and perceptions transform. In this way, the process inscribed in contextual awareness, as discovered by students, is instrumental to the transformations they reveal as part of the exploration, compared to a physical outcome or product. The relationship between ‘dialogue with the situation’, and ‘co-development with problem-solution’ (Cross 2006), therefore becomes significant, as both these ways of engagement are then exploratory and process-driven. In this light, the complexities embedded in design projects and in their contexts become actively engaged processes of discovery and making sense of situations and conditions (Krippendorff 2006:xiii). Contextual meaning then not only becomes a topic of understanding, but also a way of internalising complex issues.

Process and unfamiliar activities: The unconventional process inscribed in the disruptive ‘plug-in’ introduces other ways of engagement, compared to the familiar techniques students are normally introduced to/ confronted with in the spatial design studio.

PROCESS TRIADS. The triad, ‘think’, ‘make’, and ‘share’ (Reynders 2012:4) is familiar to students, and they spontaneously relate to these modalities of engagement. As a constructive process, the

introduction of 'feel' (Fisher & Clarke 2012; Brown in Mezirow et al 2009:10) and 'do' (Sanders in Tharp & Tharp 2018:75) bring additional complexity to the process. This study argues for two additional modes, one related to commitment to 'act' (Perry 1970), and the other linking to the affective domain (Krathwohl et al 1964) of engagement, to 'be'. To 'act' brings students into the field of citizenship and agency (Resnick 2016), which becomes their motivation to implement their internalised understanding and re-constructed meanings. To 'be', or 'being' speaks to the students' personal development and transformation of epistemological transitions and ontological shifts (Mezirow 1991) toward holistic learning. The refocused engagement of the workshop on the process, instead of the product, exposes deep revelations and recognitions, emphasising deep learning (O'Sullivan 2002).

MODAL SHIFTS. The designerly thinking approach to modal shift (Cross 2006:88) remains process driven – alternating between different tasks and stages of the design process as a cognitive activity, with modes associated with drawing, examining and thinking (Akin & Linn in Cross 2006:88). In contrast, the design thinking approach includes a shift in perspective to include multiple stakeholders in a project to obtain a holistic understanding (Brown 2009). Another perspective includes the creation of not only new markets or technologies, but also new meanings (Verganti 2009).

What do new meanings, derived from modal shifts, signify for spatial design?

Practice has a seamless integration of modal shifts between ways of working and frames of reference as part of its design inquiry and process, by means of empathy and journey maps as part of the conventional 'architectural' design process (Coleman 2019). The synthesis of modes of operation and perspectives allow for a deeper understanding of complex user requirements that are changing according to the situation or context and as a result, influence people-object-environment interface. The 'plug-in' workshop introduces students to this approach during the course of the four-hour activities. They express their experience of the workshop activities as a gradual introduction of new aspects, in a sequential way, perhaps as a phased model (Brown in Laursen & Haase 2019:825), although that was not the intention of the workshop. Their critical reflections support a deepened understanding and awareness of issues, not considered before.

SOLUTION-LED-GOAL ANALYSIS. In comparison, solution-led-goal analysis (Cross 2006:78-79) proves to be detrimental to the development of students in this study, when the framing of the project is not considered from multiple perspectives. In such cases, both the designer's view (no emotional connection with issues), or user's experience (too immersed in the emotional losing perspective), cause the students to stagnate and/or retreat in their understanding. Solution-led-goal analysis has at its core the user's spoken and unspoken needs (Dorst 2011), but when this is compromised due to difficulty in making modal shifts in perspective by means of normative dissociation (Panero et al 2019), the 'sense-making' and meaning-making processes suffer. In this light, the literature review in *Chapter 3* speculates that 'solution led goal analysis' is no longer useful in complex design projects, and that 'situation-led potential analysis' becomes more relevant to elicit meaning and contingency.

Although the emphasis of solution-led goal analysis is on "... creating the right solution rather than qualifying the goal" (Laursen & Haase 2019:820), the right solution might be elusive and indefinable.

As discussed above, the conditions to determine the 'right' solution are in flux, and the social fabric influencing its situations, remain fluid. Because of the contingency and agency inscribed herein (Awan et al 2011), the solution-led-goal analysis could be tainted with preconceived ideas and personal bias of the designer. Krippendorff (2006 in Laursen & Haase 2019:823) argues, "... the identified solution is meaningful to both the users and the context", although the goal might shift in the process (Cross in Laursen & Haase 2019:823). Thus, the productive intent by solution-led goal analysis is not constructive where disruption upsets the students' inner and outer worldviews.

Users: The various workshop activities elicit an unconscious activation of empathy, whether cognitive, or affective (Cuff et al 2014:147). Normative dissociation (Butler 2006) relates to the complex needs of users. Some students find it challenging to immerse themselves in a connected perspective (Belenky et al 1986:113) of the users' experience. Human-centred processes in practice show the value of embedding the design inquiry in the world of the user (Coleman 2019, Costello 2019) to better understand ill-defined design challenges. Spatial design education can benefit from this approach (Luebke 2015) to increase the intensity of engagement in the studio.

Peers: Sharing and interacting with peers bring a dialogue to the surface that would remain hidden otherwise, as students are sometimes hesitant and shy to disclose their opinions. They expose their personal views, which is a daunting experience. However, they experience the studio as a safe space to share, and in the process learn from another's perspectives. In instances where students do not share freely, dialogue with the process is stifled. Thus, the iteration runs the risk of stagnating into a never ending spiral of repetitive concern without exit from the process in some way, compared to 'detachment', which provides closure and objectivity to the phases of empathy (Kouprie & Visser 2009).

Self: Critical reflection on everyday scenarios of living reveal a people-process driven approach to design inquiry. The awareness of others' needs, other than the perspective of the designer, brings another level to self-development of the student, challenging personal design convictions and worldviews. Individual biases and judgements surface and students are confronted with themselves, their roles as designers and the position of the user in the project description. When the student realises a need for integral shifts in epistemological and ontological concerns, and only then, can a transformed approach and attitude towards emphasis for another over the self, emerge. Until then, predictable and superficial understandings remain. Each student determines the pace for development as an individual journey, and the trajectory is dependent on the readiness and openness of each on a personal level.

Provocation 5_a discursive focus in spatial design education

[troublesome; integrative]

The discursive work gets users or stakeholders to reflect in potentially the same way as when orientated towards social engagement, but their responses are synthesized to produce insights that get folded back into their broader design and development processes ... discursive work still emphasizes systems of knowledge that deal with substantive topics but insights from this are subsequently applied to the specific concerns ... (Tharp & Tharp 2018:126-127).

The purpose of introducing a discursive design approach in the spatial design studio is to supplement its traditional ways of design inquiry, in order to increase and deepen understanding and insight. The focus on “... critique or activism opposing typical commercial design and certain sociocultural conditions ...” (Tharp & Tharp 2018:345) highlights the notion of ‘discursive’ as a way to elicit critical reflection and response. This research study is situated at the intersection between discursive design’s practice and inquiry based domains of social engagement (awareness and understanding) and applied research (relevant insights).

... as a means through which ideas of psychological, sociological, or ideological import are embodied within, situated as, and engendered through artefacts. These ideas are capable of sustaining a complex of competing perspectives and values; so, we say that they deal with *substantive* topics (Tharp & Tharp 2018:74).

The difference between the use of artefacts in discursive design and in the ‘plug-in’ workshop lies in its intent and purpose during the process. In discursive design, the intent is generating an artefact as a tool, embedded with meaning to provoke conversation within an audience regarding a particular ‘substantive issue’ (Tharp & Tharp 2018:122). The critical artefact, as employed in the biopic investigations, is equally embedded with abstract meaning and associations to evoke a discussion. Here, it is for the development of ideas of the students as an exploratory process, and not meant to ‘present’ a message to an outside audience. The active engagement with making the artefact is emphasised for deepened understanding of design complexities.

In this way, deep learning is stimulated, with no pressure or expectation on the students to solve any problems or to derive an outcome. It is not focused on achievement, but rather on transformative engagement. This study recognises the potential synergy between discursive design’s critical stance of ‘making things visible’ (Tharp & Tharp 2018) and design thinking’s immersive way of understanding users’ intangible needs (IDEO 2019). The data findings show that when students pause for a moment, with the purpose to immerse themselves in the users’ world, they relate to the difficult concepts and design challenges on a personal level and in that way increase their understanding of the situation. The value of this approach, especially in the spatial design studio, is the emphasis on understanding and relating to the project challenges upfront, before the student continues in the design process, where spatial results are expected. The Double Diamond design process offers an example of the nature of this approach (Design Council 2019), which can be useful in a spatial design context. In this way, preconceived notions borne from the designer’s opinions and perceptions are balanced with the users’ perspectives and experiences. This is a deliberate act and it is up to the student or designer to consciously take the time and invest emotional energy (Kaza in Resnick 2016:293-293) and commitment to deeper understand complex human-centred matters, which are better framed and carries ethical responsibility (Tharp & Tharp 2018:367).

The applied research domain of discursive design focuses on “... accessing deeper values, attitudes, and beliefs” (Tharp & Tharp 2018:345) and in this way enables different mindsets. The data findings of the biopic investigations reveal that students respond to the workshop in two ways. Firstly, they project what they know as the ‘correct’ course of action, as a form of solution-led goal analysis (Cross 2006:78-79), which aligns with the ‘declarative’ mindset that “... has something to say ...” and “... feels that she

knows". Secondly, they want to investigate to gain knowledge by adopting an inquisitive mindset that "... seeks understanding ..." (Tharp & Tharp 2018:345).

How does a discursive approach benefit the spatial design studio inquiry?

DISRUPTION. The students experience the discursive focus of the workshop as a disruption to their normal studio practice, with the added emphasis to reveal issues only, and not to solve problems. This interruption requires students to make modal shifts in their perspective and in that way, elicit a connected way of engagement by relating to the user on a personal level. The workshop activities facilitate an active dialogue with the process, especially a critically reflective one (Cross 2006). The co-development of problem-solution (Cross 2006) becomes a synergistic process of inquiry and students confront their own biases. The meaning of things is scrutinised and explored, which affects their interpretation and representation of the issues at hand. The data findings reveal that in order for students to respond in a connected way, they have to actively engage and immerse themselves in the contextual meaning (Krippendorff 2006) of the active design project. When this does not happen, they find themselves suspended in the liminal space presented in the threshold concepts (Meyer & Land 2003).

But architecture is becoming increasingly complex and we face challenging times requiring new kinds and more comprehensive skills and modes of thought ... besides, architects are designers and should apply their design skills to more than buildings (Buchanan 2012:17).

TRANSFORMATION. When threshold concepts are troublesome, they stimulate in the students an awareness and opportunity for change. However, not all students are receptive to the potential transformation. Educational psychology and transformative learning theory support the knowledge that unsettling experiences can either cause a student to retreat, or to excel (Mezirow 1991, Perry 1970). The disruption is too severe for the individual and thus stepping into a known and familiar territory brings comfort and safety, particularly in the design disciplines, which are traditionally determined by the designer or architect's view and interpretation (Till 2009:109). The biopic investigations reveal that other opinions also matter. In fact, it demonstrates students' acknowledgement of the importance of integrating unspoken voices into projects that previously did not represent all stakeholders equally.

Adopting a user's perspective brings another layer of understanding to the table. By expanding the empathetic awareness (Thomas & McDonagh 2013:50) into a situational awareness or relational understanding, human-centred issues are highlighted early in the design project, in order to formulate a better framed project description at the outset. In spatial design, the consideration of users and intangible needs are best addressed as an integrated process. The complexities embedded in human-centred matters do not allow for an ad-hoc insertion into the design process. When this happens, the integration remains limited and the true needs are never addressed to the level required for human-object-environment interface, due to its fluid and transient condition.

METAPHOR AND MEANING-MAKING. Intangible conditions related to being human, includes meaning-making and a sense of community, as the workshop data reveal. When students engage with challenging topics and concepts, they find expression through abstraction and in that way, represent

their internalised meanings and messages in the studio. This dialogic inquiry, where metaphor is used to make sense, enables them to engage on a deeper level with the issues that are inscribed as part of their active design project. The lesser used modes of engagement extracted from the process triads (Brown in Mezirow et al 2009:10, Fisher & Clarke 2012, Reynders 2012:4, Sanders in Tharp & Tharp 2018:75) discussed earlier, prove to be the ones creating active connections, relational understanding and deeper insights – ‘feel’, ‘act’ and ‘be’. These modes allow students to operate on a connected learning plane, propelled by their own individual convictions and commitments towards transformation (Mezirow 1991, Mezirow et al 2009, Perry 1970;) and citizen designers (Resnick 2016).

Provocation 6_connected / engaged learning

[integrative; transformative]

Connected knowers develop procedures for gaining access to other people's knowledge. At the heart of these procedures is the capacity for empathy. Since knowledge comes from experience, the only way they can hope to understand another person's ideas is to try to share the experience that has led the person to form the idea (Belenky et al 1986:113).

Developmental and transformative learning theories supporting this investigation are presented in the literature mostly as hierarchical models of sequential development. Belenky et al (1986:14-15) argue that the ‘ways of knowing’ are not a linear progression although it is often interpreted as such. Kolb (1984) also presents a non-sequential theory, supported by abstract concepts instead of stages. Perry's (1970) scheme of development follows a progressive line of growth, similar to models from other theorists (Biggs 1982, Bloom 1956, Gagne 1956, King & Kitchener 1994, Krathwohl et al 1964), which build onto the next level of development, as scaffolding (Vygotsky 1978). This study acknowledges the value of a hierarchical approach to the development of students. However, it proposes an alternative view on the nature of development where students engage with complex societal matters. Didau (n.d.), Longmore et al (2017) and Taylor and Hamdy (2013) agree with a relational learning approach.

NON-SEQUENTIAL TRANSFORMATION. The data findings resulting from the biopic investigations reveal a different approach to a linear understanding and interpretation of the theoretical models, taxonomies, cycles and schemes. Due to the nature of the various workshop activities, assorted modes of engagement are activated, which stimulate different responses. These are focused on particular aspects in a design inquiry and do not necessarily require prior learning, compared to the ‘zone of proximal development’ that relies on a continuum of learning that increases in difficulty (Vygotsky 1978). In contrast, the disruptive action of the ‘plug-in’ workshop introduces activities and modes of engagement that provoke students. Two responses are possible, firstly, they are stretched beyond the limits of what they can handle in that moment and retreat due to anxiety (Perry 1970) and secondly, they stay within a familiar comfort zone (Vygotsky 1978). When students operate in the learning zone, they engage with learning material from a receptive stance and relate to the cues embedded in the workshop activities. Sometimes, peer interaction assists students to make critical connections and to confront their own judgements and opinions in the process.

The role of the designer furthermore supports this view, as the designer is not always the expert within a situation, which links to the critical re-evaluation of levels of learning. The data findings show that the designer becomes a “servant of urban society” (Campbell 2018:289) that sometimes facilitates, leads, supports, emphasises and provokes in favour of the greater good. These roles, which cannot always be predicted beforehand, require different modes of engagement and are supported with the ‘random’ appropriation of ‘levels of learning’.

The findings below (Table 7-3) support the discussion by demonstrating the students’ performance according to the various levels or stages (hierarchical theories) and concepts and perspectives (relational theories). A non-sequential development is evident from the table. It shows that various activities are represented on different stages or concepts simultaneously, regardless of where these is situated in the workshop duration. No sequential growth pattern is visible. This supports the notion of contingent and fluid ways of learning and working in spatial design, due to the need for different modes of engagement at different stages of design projects. The levels or concepts per author below, read from the bottom upwards.

The following learning theories are listed in the Table 7-3. Hierarchical theories include: cognitive (Perry 1970, Bloom 1965/2002), affective (Krathwohl et al 1964) – overlapping levels, Transformative (Mezirow 1991) – hierarchy implied through transformation, and holistic (Kegan 1994) – development according to age. Relational theories include: cognitive (Kolb 1984) – abstract concepts, affective (Belenky et al 1986) – perspectives, and modes (Didau n.d.). This study argues that sometimes a particular way of engagement requires a specific learning or developmental mode, or combination thereof, applied or considered in a non-sequential way compared to its theoretical context. Theories with hierarchical levels show the same outcome as relational models – fluid and contingent responses. The relational theories have various level descriptions in relation to design actions. The workshop activities demonstrate that even through affective ways of engagement, a non-sequential nature of development is supported due to the diverse modes of inquiry, which are mutually supportive in the overall context of the ‘plug-in’.

Furthermore, the curve of each individual student’s development is unique and does not follow a pure linear trajectory as described in theory. The transformative learning process is a troublesome one and often met with resistance and or retreat in certain situations (Perry 1970:10). Every student follows a personal path that fluctuates according to the openness of the student in the specific moment of learning. Some students flourish and others might have difficulty in their acceptance and absorption of ambiguity and uncertainty (Land et al 2006).

Table 7-3 furthermore includes additional concepts (in italics and highlighted) to selected learning theories. The research findings reveal scope for expansion to better represent transformation in spatial design: Bloom (1956/2002) (*reflect, internalise*), Mezirow (1991) (*value reflection*), Kolb (1984) (*reflection, internalisation*), Belenky et al (1986) (*resilient / responsive*) and Didau (n.d.) (*situational meaning*). The darker shaded rows toward the middle of each theory represent the area of development most prevalent in third year students.

Table 7-3: Non-sequential transformation (hierarchical theories and relational approaches)

Workshop activities		Problem statement	Keywords	Vignettes	2 nd life materials	Critical artefacts	Peer interaction	Reflective essay	Trajectory to completion	Post feedback
Developmental learning theory										
Cognitive	HIERARCHICAL THEORIES									
	Perry 1970 (hierarchical)									
	Developing commitment (Position 9)									
	Orientation in implications of commitment (Position 8)					o			o	
	Initial commitment (Position 7)	o			o	•	•		o	•
	Commitment foreseen (Position 6)	•			•	•	•	•	•	•
	Relativism correlate (Position 5)	•	•	•	•	•	•	•	•	
	Multiplicity correlate (Position 4)	•	•	•	•			•	•	•
	Multiplicity subordinate (Position 3)	•	•	•	•				•	•
	Multiplicity pre-legitimate (Position 2)	•	•	•					•	
	Basic duality (Position 1)	•	•						•	
	Bloom 1956/2002									
	<i>Internalising</i>			•		•	•	•	o	•
	<i>Reflecting</i>	•	•	•	o	o	•	•	•	•
	Evaluating – creating				•	•			•	
	Synthesis – evaluating				•	•	•	o	•	
	Analysis – analysing		•	•		•	•		o	o
	Application – applying			•	•	•			•	
	Comprehension – understanding		•			•		•	•	
	Knowledge – remembering	•			•				•	
Affective	Krathwohl et al (1964)									
	Characterized by value	o		o		o		o	•	•
	Organising by conceptualisation		o	•	•	o		o	•	
	Valuing			•		•	•	•	•	•
	Responding	•	•	•	•	•	•	•	•	o
	Receiving	•	•		•	•	•		o	
Transformative	Mezirow (1991)									
	<i>Value reflection (who / attitude)</i>	o	o				o	o	o	o
	Premise reflection (why / understand)	•					•	•	•	•
	Process reflection (how / engage)		•	•	•	•	•	•		
	Content reflection (what / relate)	•	•		•	•	•	•	•	•

Holistic	Kegan 1994								
	Self-transforming mind (system of systems)							o	•
	Self-authoring mind (systemic)	o	o	o		•	o	•	o
	Socialised mind (across categories)			•	o	•	•	•	o
	Instrumental mind (categories)	•	•	•	o				
	Impulsive mind (single point)	•			•				
RELATIONAL THEORIES									
Cognitive	Kolb (1984)								
	<i>Internalisation</i>			o		o	•	o	o
	<i>Reflection</i>	•	o	o		•	•	•	•
	Active experimentation				•	•			•
	Abstract conceptualisation			•	•	•		o	•
	Reflective observation	•	•	•	•		•	•	
	Concrete experience	•	•	•			•	•	
Affective	Belenky et al 1986								
	<i>Resilient / responsive (connected)</i>				o	•			o
	Constructed (connected)	o	o	•	•	•	•	o	•
	Procedural (connected / separate)			•	•	•		•	•
	Subjective (separate)	•	•	•	•		•	o	•
	Received (separate)	•	•	•					
	Silenced (separate)	•	•						
Modes	Didau (n.d.)								
	Self-control/-perception, meta-cognition, resilience / motivation	o	o	o		o	•	•	•
	Critical thinking, problem solving	•				•		•	•
	Creativity, collaboration, communication		•	•	•	•	•		•
	<i>Situational meaning</i>	•	•	•	•	•	•	•	•

Table 7-3 shows a general migration towards the 'higher order' levels, but also indicates that it is not a sequential process. The 'lower order' levels remain integral to both the understanding and internalisation of complex concepts, even towards the completion of the active design project. Noteworthy is the observation that 'final' levels of theories are focused on different developmental aspects. For example, active experimentation (Kolb 1984), creating (Bloom 1956) and character by value (Krathwohl et al 1964). This means that they are not all necessarily achievable within the scope of a third year, exit level student, because time is needed to practice 'tacit' skills that can be gained during experience over time, aligned with post-graduate studies and working as a professional in industry.

Students in postgraduate studies have a wider exposure to the nature of projects that require more autonomy (Mezirow 1997:7) and independent work, which allows them greater internalisation and introspection, as compared to the undergraduate students. In addition, the focus of the 'higher levels' also differs. Kolb's (1984) and Bloom's (1956) (revised by Krathwohl 2002) terminologies suggest an operational mode of engagement, which supports the workshop activities. The study proposes adding 'reflection' and 'internalisation' to Kolb's (1984) theory, and 'reflecting' and 'internalising' to Bloom (1956) in order to cover the missing aspects that are currently not considered. In comparison, Krathwohl et al's (1964) affective domain, integrates in its last two levels, 'organisation by conceptualisation' and 'characterising by value' of internalisation and deeper values embedded as part of its theory. These speak to the designer's epistemological perspectives of the nature of knowledge and ontological worldviews, due to the emphasis on attitudes and values required for citizenship designers (Resnick 2016).

The discussion regarding a general understanding of undergraduate student development, as pointed out in the relational biopic synthesis in Part 2 of *Chapter 6_Biopic investigations*, argues that exit level third year students are plotted on the process reflection band of development, as indicated in Table 7-4. According to Perry's (1970) scheme of development, the transition between '4-multiplicity correlate' and '5-relativism correlate' represents the complex stage of development of a student during a third year design programme. It is also the point in design learning where the potential for a shift from 'separate knowing' to 'connected knowing' in learning is explored and discovered (Belenky et al 1986).

VALUE REFLECTION. The emergence of value reflection in this study brings another layer of understanding to the project between student and the community of users. When value reflection is considered in a fluid and contingent learning environment, students are able to find commitment in themselves. The notion of value reflection therefore extends the reflective trio by Mezirow (1991) to address aspects of citizenship design to contribute to positive change in all communities (Table 7-4).

Table 7-4: Level of development of undergraduate students

Transformation of meaning perspectives	Loop learning		Holistic (integral) transformation perspective	Constructivist understanding	Developmental theorists
[Value reflection] – including those <i>who</i> are involved					
Mezirow (1991)	Argyris and Schön (1974)	Triple loop learning (after Bateson 1972) – third order learning	O’Sullivan (2002) Ferrer, Romeo & Albareda (2005)	Kegan (1994) (levels)	1) Kolb 1984; 2) Bloom 1956/2002; 3) Krathwohl et al 1964
Premise reflection – “an awareness of why we perceive”	---	Triple loop learning (context & principles / values) – transform (change in perceptions)	Inquiry (participatory approach)	5-self transforming mind (systems of systems)	1)Active experimentation 2)Evaluating 3)Organisation by conceptualisation
Process reflection – “reflecting on how we perform the functions of perceiving”	Double loop learning (frames / assumption & content) – reframe (change in thinking)	---	Training (bricolage)	4-self actualisation (systemic)	1)Abstract conceptualisation 2)Analysing 3)Valuing
Content reflection – “reflecting on what we perceive, think feel, and act”	Single loop learning (action & process / procedure) – react (change in behaviour)	---	Content (mind-centred)	3-Socialised mind (across categories)	1)Reflective observation 2)Applying 3)Responding

Subsequent to proposed additions to Kolb’s (1984) learning cycle and Bloom’s (1956) cognitive taxonomy are indicated in Table 7-5 with the addition of ‘reflecting / reflection’ and ‘internalising / internalisation’, according to the requirements of critical reflection and internalisation posed by spatial design education as discovered in the data findings of the biopic investigations. Didau’s (n.d.) taxonomy confirms the understanding that hierarchies are not conducive to revealing the finer nuances of student development. Instead, modes of working that address values, process (action) and constructive speculation demonstrate transformation far more effectively. This study shows that Didau (n.d.) can benefit from adding situational awareness to his taxonomy to provide a context in which spatial design student development can take place.

Table 7-5: Proposed amendments to developmental learning theories

	Cognitive						[modes]	Affective	
Mezirow	Biggs SOLO taxonomy (1982)	Kolb's learning cycle (1984)	Gagne's learning hierarchy model (1956)	King & Kitchener (1994)	Perry's scheme of development (1970)	Bloom's taxonomy (cognitive) (1956)	Didau's taxonomy (n.d.)	Blooms' taxonomy (affective) (Krathwohl et al 1964)	Belenky et al (1986)
F – [value]	Extended abstract	Reflection and internalisation	Problem solving [complex procedure]	7-knowledge outcome of active inquiry 6-knowledge requires action and construction	9-Developing commitment 8-Orientation in implications of commitment 7-Initial commitment	Reflection and internalisation	-self-control / self-perception -metacognitive strategies -resilience / motivation	Characterising by value	Constructed [connected]
E - premise	Extended abstract	Active experimentation	Problem solving [complex procedure]	6-knowledge requires action and construction 5-contextual specific/shaped	7-Initial commitment 6-Commitment foreseen 5-Relativism correlate	Evaluation [creating]	-critical thinking -problem solving	Organising by conceptualisation	Procedural Connected
D – process	Relational	Abstract conceptualisation	Rule learning [relationships]	5-contextual specific /shaped 4-situational variables – abstract and uncertain	5-Relativism correlate 4-Multiplicity correlate	Synthesis [evaluating]	-creativity -collaboration -communication	Valuing	Procedural Separate
C – content	Multi-structural	Reflective observation	Concepts [systematic structures]	3-personal beliefs until absolute	3-Multiplicity subordinate	Analysis [analysing]	Situational awareness	Responding	Subjective [separate]
B	Uni-structural	Concrete experience	Discriminatory learning	2-direct sensory observation	2-Multiplicity pre-legitimate	Application [applying]		Receiving	Received [separate]
A	Pre-structural		Basic types of learning	1-knowledge absolute/concrete	1-Basic duality	Comprehension [understanding] Knowledge [remembering]			Silenced [separate]

RELATIONAL APPROACH TO TRANSFORMATIVE PEDAGOGY. The research shows that a relational approach to transformative education is supportive of the complex demands spatial design place on student development. Multi-faceted project contexts and richly layered user scenarios ensure an increase in complexity encountered in the design studio. Students are required to consider various aspects simultaneously and this is not a simple one-dimensional process. The benefit of moving between different modes of engagement and adopting various perspectives, support the relational approach.

AFFECTIVE ENGAGEMENT. The study reveals small shifts in design engagement, when the affective side of design inquiry is re-introduced into the process. Alexander (2004) supports the emphasis of the subjective, by combining the scientific, objective side to spatial design and the personal, emotive and feelings associated with deeper meanings. Although this approach has been acknowledged widely it is met with criticism and as such has not been integrated as part of mainstream theory of spatial design.

Tim Brown shares in an interview with Luebke (2015:37) that “[i]f the field of architecture is to remain relevant, it must focus more on the meaning and less on the mechanisms of the trade”. Educational literature furthermore expands this approach, when the value of the affective side to development, brings into focus its impact on values and attitudes (Lynch et al 2009:52):

The affective domain is a necessary complement to the cognitive domain. It focuses on the development and refinement of interests, attitudes, and values. It is intensely personal and focused at the individual level. The writers' objective is not to prescribe a list of interests, attitudes, and values that one must hold. Rather, from an educational perspective, it is important that educators have the opportunity to expose students to the affective domain, challenge them to think more deeply about real problems, and thereby lay a foundation for more holistic development throughout their careers. It is critical that the profession help the leaders of tomorrow think more deeply about their own evolving interests, attitudes, and values, and recognise and respect the interests, attitudes, and values of others that we have been entrusted to serve (Lynch et al 2009:52).

An area of difficulty is balancing the domains of learning according to Bloom's (1956) cognitive and Krathwohl et al's (1964) affective domains. This study does not focus on the psychomotor or skills domain, because of the exploratory and speculative approach to ways of engagement in the workshops, nor does it propose a set of threshold concepts for spatial design education. The disciplinary focus remains a vehicle to demonstrate the effect of the disruptive 'plug-in' workshop, with its emphasis on process and ways of connected engagement.

DISRUPTION. The biopics show that students more fluently absorb disciplinary threshold concepts into their understanding, such as human agency and appropriation. However, the ways of engagement that include for example shifting perspectives, prove most difficult for students to internalise and apply into their personal practice. As such, the 'zone of proximal development' explains the panic zone, when students are unsettled beyond their comfort (Vygotsky 1978). One of the major obstacles according to the data remains the shedding of the designer's opinion or ideas. Students are not only confronted with difficult issues, but their personal human and learning ecology as a whole (Bronfenbrenner 1979) is disrupted individually, extending to their macro or ontological worldview. Suddenly, the familiar perspective and preconceived notions are no longer adequate and the student realises that perhaps they are also not appropriate anymore and that other responses or options could be better suited for a certain situation or scenario.

PREMISE REFLECTION. Mezirow's (1991) transformative learning theory includes reflective thinking which proves to be integral to students' development, comprising content, process and premise reflection. Kember (1999:21) notes that both content and process reflection are associated with cognitive functions, and that premise reflection is related to the affective dimension of introspection.

How can introspection be measured?

The research of Boud and Walker (1993) and Kember (1999:21) align with the data findings of the biopic investigations, revealing that emotional discomfort or disruptive experiences result in introspection or critical reflection. Mezirow (1997:5) relates transformative learning theory to shifts in a frame of reference, which includes “cognitive, conative, and emotional components”. The two

dimensions of frame of reference, 'habits of mind' and 'point of view' frame the students' internal reference and external worldview.

Habits of mind are broad, abstract, orientating, habitual ways of thinking, feeling, and acting influenced by assumptions that constitute a set of codes. These codes may be cultural, social, educational, economic, political, or psychological. Habits of mind become articulated in a specific point of view – the constellation of belief, value judgment, attitude, and feeling that shapes a particular interpretation (Mezirow 1997:6).

Therefore, habits of mind are associated with ontological positions that are more difficult to change than points of view relating to mere epistemological approaches when engaging with problems or searching for meaning. The students' engagement in the biopics reveals an intuitive acknowledgement of complex matters pertaining to human-centred issues and a cognitive understanding that perspectives other than that of the designer are valuable. However, internalising that and making it a part of the students' internal make-up, is challenging to sustain, especially outside or beyond the context of the workshop. When students are not able to set aside their personal biases and opinions, transformative learning is delayed. Critical reflection therefore is not just a re-evaluation of the actions performed to achieve transformation, but also self-reflection, to confront the self with difficult questions. It becomes a provocation to honesty and humility and as such, a reflective form of criticality.

We transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based. We can become critically reflective of the assumptions we or others make when we learn to solve problems instrumentally or when we are involved in communicative learning ... [s]elf-reflection can lead to significant personal transformations (Mezirow 1997:7).

Instrumental and communicative learning (Mezirow 1996) represent the two opposing approaches to design intent. Instrumental learning contradicts the views of this study with its focus on control over people and the environment, albeit for efficiency's sake. Communicative learning on the other hand, aligns with the purpose of a 'plug-in' workshop, due to the focus on participation of people to reach a consensus, where understanding of others' values, feelings, intentions and beliefs are paramount (Mezirow 1997:6). Communicative learning therefore relates to a discursive design approach, where the representation of messages is instrumental to obtaining different opinions and perspectives to increase insight and deepen understanding of ill-defined challenges (Tharp & Tharp 2018). In this light, the normative position driving spatial design is questioned, due to the subjectivity of preference expressed by the designer or student self. Normative positions can be inclusive or exclusive of human-centred considerations, which open the debate of the purpose of design, especially today, with a world in flux. Design has the potential to change lives for the better, but it is up to the designer's personal conviction and perspective to contribute to positive transformations that cut across scales, from the urban, to the intimate and personal: "Making massive small change" by means of incremental shifts on local level (Campbell 2018). Students, as future practitioners or agents, have the capacity to facilitate and enable human and spatial agency (Awan et al 2011).

PERSPECTIVES. When students imagine or refocus their attention on another, other design agendas are revealed, because the realisation includes aspects to living and the urban environment that was

unknown before. Disruptive personal experiences bring out the inner convictions and struggles that students are unaware of. By means of normative dissociation (Butler 2006, Panero et al 2019) and expanding the empathetic horizon (Thomas & McDonagh 2013:50) into situational awareness and contextual understanding, complex challenges are better framed and articulated. As a result, layered scenarios of living, requiring relational understandings and holistic or systemic integration, can be addressed. By allowing open systems for human agency for users to appropriate, permeable boundaries (Campbell 2018:30) facilitate the contingent flux contained in the complex social situations (Till 2009:71).

Students connect to these scenarios because of their personal or imagined experiences (Butler 2006, Panero et al 2019). When studio design projects are situated within a 'fictional' site and with 'fictional' users, the project lacks an active link and students find it difficult to relate to contextual issues and meanings that are embedded in the social condition. The 'plug-in' workshop proves useful to bridge this gap, as activities prompt certain modes of engagement. Depending on the student, the response can lead to transformation in small increments, when modal shifts (Cross 2006:88) in terms of ways of engagement and perspectives are made. When this happens, students construct new meanings (Krippendorff 2006) derived from different experiences and opinions, for possible personal introspection and reflection for interpretation into the studio project. Dialogue with the situation, self and others (Mezirow et al 2009:9) enables the process of sense and meaning making (Krippendorff 2006), when an open mind meets new and unfamiliar ways and ideas.

Provocation 7_students as citizen designers

[transformative; irreversible; bounded]

Transformative learning involves experiencing a deep, structural shift in the basic premises of thought, feeling and actions. It is a shift of consciousness that dramatically and irreversibly alters our way of being in the world (O'Sullivan 2002:11).

The relational biopic syntheses, situated in the spatial design studio, reveal that transformative learning is related to modal shifts concerning ways of engagement and shifts in perspective. On the surface, one may argue that it is easy to adapt to other ways of working and that it is intuitive for a person to see another's point of view. This research shows the opposite when deep transformations are intended. Modal shifts become hugely challenging, as it touches the individual's inner core, as well as worldview. The students' learning ecologies (Bronfenbrenner 1979) are disrupted, but the research shows that upon critical reflection by some students, the disruption is productive and becomes a stimulus to refocus their attention to other spatial agendas.

How do students become, or move towards becoming citizen designers?

SELF-REFLECTION. It proves to be an integral part to transformation and without this, no shift is possible. Mezirow (1997:7) argues that transformative changes happen when our learning's familiar frame of reference is disrupted. The data findings show that a quarter of students from the overall data sample actively chose commitment to aspects discovered and uncovered during the workshop, which were

internalised in some way, into the studio project. This evidence demonstrates students' self-reflection and individual convictions, relating to autonomous thinking (Mezirow 1997:7). When students adopt connected learning and critical reflection, autonomous engagement enables students to become agents for positive change.

Transformative learning is not an add-on. It is the essence of adult education. With this premise in mind, it becomes clear that the goal of adult education is implied by the nature of adult learning and communication: to help the individual to become a more autonomous thinker by learning to negotiate his or her own values, meanings, and purposes rather than to uncritically act those of others. This goal cannot be taken for granted; educational interventions are necessary to ensure that the learning acquires the understandings, skills, and dispositions essential for transformative learning (Mezirow 1997:11).

Negotiation of own values, meanings and purposes are related to the capacity to make modal shifts. When students can manage this in their own learning, they are able to act in the best interest of the project and not spontaneously respond according to their own opinions. Transformative learning brings together various aspects of metacognition (Flavell 1979) that support a student's individual development. When students become aware of their own trajectory of learning, they consider their design inquiry in a new light. The emphasis on self as a designer fades, and the other stakeholders in the project are highlighted. Their perspective shifts from the outsider to the insider by developing a situational awareness and contextual understanding. In this way, the empathetic horizon expands from 'relational' in terms of response, to 'transactional' where they negotiate their interactions and opinions, to 'instrumental' (Ross & Watling 2017), where students' design actions contribute to social and systemic change, in favour of human agency and spatial appropriation. The effect of empathy, in a theoretical sense, should not be discredited for creating emotional connections. However, the learning process can be scarred when this connection is not in equilibrium between cognitive and affective conditions of empathy (Cuff et al 2009:147). Over-emphasis on cognitive empathy can furthermore result in aloofness, promoting the perception of preconceived notions of control over a situation.

When students are confronted with threshold concepts, they find themselves in a liminal space (Meyer & Land 2003, Land et al 2006). Their individual response to this in-between condition is dependent on their receptiveness or resistance to change, especially within a difficult situation, such as the disruptive 'plug-in'. The threshold concepts are not only discipline specific, but also related to the ways of design engagement prompted by the various activities during the workshop. The latter offers more challenges and causes students anxiety and discomfort, which makes it difficult for them to suspend their own judgements in many ways. The realisation that not every problem has a right solution, and that not every issue can be addressed in the same way, is a discovery that is troublesome for some students, and liberating for others. This is the influence of situational awareness and contextual understanding, that the human-condition is dependent on many fluid and transient factors and forces outside the control of the designer (Till 2009:104). It is therefore up to the student to explore immersive ways to deepen insights and to create a personal connection to the complex design issues in some way, in order to reply as an agent of change.

CITIZEN DESIGNERS. Triple loop learning supports the notion of students as citizen designers, as context, transformation and shift in perspective (Medema et al 2014:27), are considered. Triple loop learning, inspired by single and double loop learning (Argyris & Schön 1974) and influenced by 'Learning level III' (Bateson 1972), considers "how do we decide what is right?" Medema et al (2014: 27-28) argue for multi-loop social learning, following a web of 'content-context-process' factors, considering what to change, why change is possible or not, and how change can be implemented.

The 'plug-in' workshop addresses all three factors, by emphasising the need for shift in perspective and adopting supplementary ways of design inquiry in the spatial design studio. Whether change is possible relates to the individual students' receptiveness when disruption upsets familiar ways of working in a place of design comfort. In addition, the ethos of the school and the students' worldviews play an integral part to the possibility of epistemological transitions and ontological shifts. Change in the studio is implemented by the disruptive 'plug-in' workshop, introducing unfamiliar practices that are met with initial anxiety and apprehension.

Can transformative learning be related to personal traits of an individual disposition only, or can it be integrated as design praxis?

The data findings reveal noteworthy shifts in students' engagement, suggesting that some started the workshop with a deep connection, motivated mostly by an emotional disruption and immersion in the contextual meaning of the site, or pressing issues under investigation. Some of the students in this group sustained the connection through the workshop and into the active design project. However, the majority reverted to the traditional detached engagement, due to the external pressure of the studio project, the realities of making prototypes or the challenge of producing a discursive object for exhibition purposes. In comparison, there are students who found their connected voices during the workshop, by critically reflecting on the process and honestly confronting their preconceived notions or opinions as self-reflection.

The small and seemingly insignificant shifts inform small changes, resulting in big impact. Students that adopt hybrid ways of engagement display an agility in their personal design exploration and as a result, flourish in certain areas introduced in the workshop. Students with a high tolerance for ambiguity and active exploration question their own design response to allow the process to unfold. This observation is separate to the understanding of learning styles, identifying the 'reflector', theorist', pragmatist' and 'activist' (Honey & Mumford in Caple & Martin 1994:17). The detailed biopic analyses demonstrate that students are able to move across learning styles and that adult learning (Mezirow 1991, 2018 Mezirow et al 2009), focusing on self-reflection and autonomous learning, enables students to be aware and take responsibility for their own development.

Wicked problems are addressed with more awareness of its complexity and the potential and layered richness contained within. When students engage deeply, embodied or imagined experiences are internalised and students connect with the dialogue within the design challenge. This process, as dialogue with the situation (Schön 1983), with the process, self and peers, provides a platform from

which to consider and represent hybrid design scenarios, embedded within a particular context and community.

The multi-scalar approach emerging from the data reveals that when students zoom in and out of project contexts and design challenges, they formulate a deeper understanding of social complexity in spatial design. A continuum of macro, meso and micro scales allows a human-centred emphasis to gain insight into multi-faced and diverse living scenarios. The design attention is refocused to the human scale or direct and intimate encounters, rich with meaning, memory and ritual. In this way, students develop their situational awareness, with emphasis on the intangible needs of complex living scenarios. Design activism, design leadership, design agency, design ethics and responsibility become integral to student transformation as citizen designers (Resnick 2016).

Changes in consciousness take place below the surface of action, and so they're hard to measure. But every once in a while they break out. They break through the surface. And only then do you realize that a change in consciousness has taken place (Zinn in Tharp & Tharp 2018:112).

Therefore, the human centred approach explored in this study highlights three important components. Firstly, people as users, customers, clients and communities who are served by designers. Secondly, the student as designer that uses hybrid design methods and ways of critical and creative inquiry. Thirdly, the student designer is also the receiver of challenging disruptive experiences embedded within design projects. The response to such experiences can guide and support a process of transformative development towards students becoming design activists, advocates and champions of design for positive change. When they act with design values and an attitude of commitment to promote a larger community of student designers, pioneering research-through-design for the greater good.

Summary

The postulations and provocations presented in *Chapter 7* provide issues for consideration in the discourse of spatial design education. The interrelatedness of the seven points of discussion proves significant in the context of a human-centred approach, filled with layered meanings and embedded within complex scenarios and situations. The people-process driven workshop brought to light noteworthy shifts in students' engagement with design inquiry and the hybrid methods revealed pertinent process threshold concepts, brought to light due to the identification of disciplinary aspects. The reference to time, for reflection, to expand empathy, to realise another's perspective or experience, proves to be an important consideration to transformative learning. When students are able to spend more time, the understandings are deeper and the insights more complex. This is especially the case when they refocus on small-scale encounters.

The key message from the seven provocations revolves around potential richness of complexity offered by the question posed earlier in the chapter: What do new meanings, derived from modal shifts, signify for spatial design? There is clear evidence that transformative learning is possible when introducing deliberate and productive modes of disruption into traditional, single-solution driven design processes. One can only imagine how much richer and significant transformation will be when introducing real-life contexts, alternative formats of design studio organisation and a broader willingness to accept contingent conditions as part of a designerly way of knowing.

This seems to be changing.

Reflecting on this research journey, as an exciting adventure, I attempted to capture the intent of the study in one sentence:

The research set out to explore how the disruption, by refocusing the attention on the complex, interconnected and situational needs and requirements of the user instead of the opinions and perceptions of the designer, can enable transformative learning where empathy and complex design issues are concerned, to determine other design agendas.

I reflected on my first attempt and realised that a more specific description is needed:

The research explores first, how a productive and deliberate disruption of out-dated spatial design processes can render complexity visible and refocus designers' attention on the interconnected and context specific needs of the user. Second, to establish an enabling and transformative learning environment in which a willingness to deal with complexity and an empathetic approach allows for alternative forms of thinking and practice.

After writing this, after reading this, I considered in silence, the vast array of topics I synthesised in this study. Still, I am not an expert, specialising in each of them individually, but I am a facilitator, a strategist on how to combine seemingly unrelated fields within a research through design discourse.

Caring for others through design has always been my passion. Let me rephrase, imparting this attitude to students, has been a life-long aim. I realise I have an empathic disposition and that not everyone is like this, however, this study excites me, as I've seen, first hand, how students find a connected voice. Even if it was for a short moment, or internalised into a longer trajectory into a design project. The scale of the impact of the disruption does not matter, as the magnitude lies in the effect the experience has on students as people, within their own being. During this process, I tried to stay as close to the data as I could, with coloured notes and reflective writings as proof. I remember the feeling when I discovered evidence that seemed trivial or inconsequential at first, but with another iteration of analysis, realised the value in the scope of the student's path of development, also the larger context of the biopic investigations.

This study was like an expedition, a passage into engaged learning, shifting perspectives, shifting perceptions. Definitely for me, but perhaps also for the participating students, even though they might not have experienced it that way, even if the workshop attitude and approach did not have an immediate impact on their design projects. I do want to believe that the upset stirred something within them, which will keep stirring until it can find an expression for each one individually, even in a small way. One day.

Chapter 8 CONCLUSIONS

...with the opportunity to experience making a meaningful and positive contribution to society while redefining what it means to be a designer will surely empower them to play a more empathetic role in improving the way they interact and communicate with each other and within their communities – as citizen designers (Resnick 2016:13).

Chapter 8 concludes the explorative investigation by raising main points in a critical reflection that relate to the aspects introduced by the research questions. It furthermore highlights the contribution of the research, addressing various scales: individuals as students and lecturer, communities of teaching and learning, design pedagogy, design practice and the relation to a wider society. Last concluding words are presented and opportunities for further research are proposed.

Critical reflection

The intention of the study was to extend the discourse of critical and creative design engagement by introducing hybrid ways of inquiry in the spatial design studio and by introducing a ‘plug-in’ workshop as a disruption. Various insights into transformative learning were revealed when the focus shifted to fluid and transient conditions of living that are human related and small in scale. As an exploratory investigation that emphasises an “interactive dialogic approach”, the evidence expands the “static domain-knowledge traditional approach” (Salama 2015:6) of spatial design education practices. This study demonstrated what could happen when a disruption is inserted into an active studio project, using established design methods, tools and techniques and upsetting the status quo. Students were confronted to make modal shifts in terms of the ways they engaged with the workshop activities, as well as making transitions in personal perspectives, judgements and bias.

The research questions introduced aspects to the traditional spatial design studio, which are outside the norm. Users and their needs, tangible and intangible, were prioritised by means of a deliberate disruption by using normative dissociation, connected learning, a human-centred approach, empathy and an insider’s view to engage with the workshop activities. This disruptive action was seen as a provocation with the intent to establish a connected design engagement as a continuous design approach and attitude. The main research question summarised the broad scope of the investigation, whereas the three research sub-questions focused on three separate, but interrelated aspects. These were all framed as *how* questions, suggesting a focus on process and making meaning of actions, instead of finding facts and answers to problems.

main question

How can a human-centred approach as disruption by dissociation enable transformative design engagement in the spatial design studio?

sq1 *How does the insertion of a disruptive action by dissociation as designer, influence meaningful connection and design action?*

sq2 *How can the adoption of a human-centred approach expand an empathic understanding when dealing with complex spatial design issues?*

sq3 *How does the shift to insider perspective transform design thinking in students to reveal other design agendas?*

The interrelatedness of the sub-questions became evident during the detailed biopic analysis and relational biopic synthesis in *Chapter 6*, with one sub-question reaching into the domain(s) of the others, and vice versa. These aspects were therefore integrated, not only in the discussion of *Chapter 7*, but also considering the contribution of the research by addressing the influence on various scales and related conditions, instead of focusing on the individual concepts themselves. The thematic narratives of *Chapter 7* are thus relevant to the seven provocations discussed below, and are embedded holistically within each. They alternate between individual and collective engagement, understanding and future impact. 'Individual' includes students and lecturers, where 'collective' ranges from a student and academic community, to the field of design education, design practice and society.

Contribution

The findings of the research show contributions that reach multiple scales and various stakeholders, starting small, by focusing on the individual as student and lecturer. It branches out to the various contexts (micro, meso, exo and macro) to represent the social-ecological model of human development (adult learning ecosystems) of Bronfenbrenner (1979/1981). The figure below is an adapted version of Bronfenbrenner's concentric circle model to indicate the circular influence of the different areas of impact that touch designers, communities, and society as a whole. The contribution reaches beyond an interior architectural scope, as the research becomes representative of the spatial disciplines from a holistic perspective. Disciplines operating in silos have become outdated. What is needed is a new mandate for spatial practices that cross boundaries to activate skills, understanding and insight needed for greater complex issues. The study highlights the conflict between accreditation requirements of professional bodies and the changing needs of a discipline, which no longer remain constrained by typologies. The contribution highlights the expanded needs of studios and processes of the future.

The points for discussion are summarised below are indicated in Figure 8-1:

Individual student development

The understanding of a student's transformative journey provides lecturers with an awareness of opportunities for constructive disruption towards engaged learning. Instead of fully understanding someone else's reality, the students become aware of their own transformations during the process.

Student in community of peers

When a student is in the company of peers, an expanded and inclusive learning ecology is created that emphasises the value of critical reflection as a collective. As a result, diversity, multiple perspectives and worldviews are embraced.

Lecturer personal teaching development

Additional development highlights the urgent need for lecturers to integrate learning methods and tools (which could be non-spatial) to disrupt conventional ways that pose critical questions as a productive spatial inquiry.

Lecturer in academic community

Interdisciplinary collaboration is critical in order to address complex societal issues. The academic community is responsible for learning opportunities where students can expand their skills set to include situational and empathetic awareness.

Design education / pedagogy

Connected approaches to design education can reach deeper and directly address complex societal challenges. Design education has a responsibility to formulate an expanded approach for design inquiry for the future, one that combines design thinking (human-centred/practice) and designerly thinking (scientific/academia).

Design practice / profession

Design practice is the place where the integration between design thinking (working with users directly) and designerly thinking (architectural processes) becomes entangled. It is time for action and for spatial design disciplines to remain relevant in a rapidly changing world.

Impact on larger society

When emphasis is placed on process over product, spatial design has the capacity to build reciprocal relationships between academia, the profession and communities, and to create deeper understanding of complex, fluid and hybrid living situations and contexts.

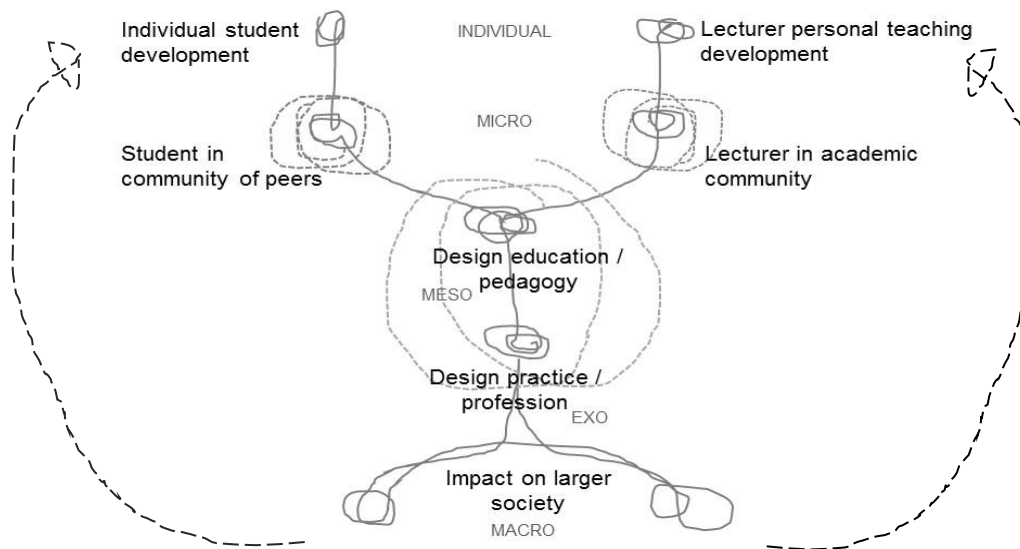


Figure 8-1: Research contribution context

1_individual student development

The contribution of the research in the context of the students' individual development, relates directly to the student's potential for perspective transformation (King 1998), where premises are re-evaluated within the student's understanding of the world. The individual, as pivot for his or her own learning, is dependent on influencing factors within and outside the control of the student. The workshop shows that a disruptive practice awakens thoughts and perceptions previously unknown. It allows the student to re-evaluate a personal position in the design discipline, by being confronted with difficult and troublesome situations. Not all students responded productively, however, the research still maintains the view that the disruption was a shake-up, much needed at the end of the first degree, in preparation for the workplace.

Furthermore, the workshop demonstrated the much debated 21st century skills that graduates need for industry, especially making a contribution by extending the awareness of soft skills, such as empathy, awareness, situational understanding and a deliberate focus on the intangible and emotive aspects of design, which are so often disregarded, or not always found within the scope of commercial projects. When students can acknowledge perspectives other than their own worldviews, their understandings shift and they are able to respectfully engage and collaborate with communities. Human-centred values are prioritised to gain a deeper understanding of societal challenges embedded within design projects, by focusing with a micro lens on the relational encounters within complex situations. When this is possible, the insider voice of the student as user is activated, and the opinion of the designer is balanced as an ally or partner and not as a threat or intruder. The potential exists for students to adopt other attributes and other design values to challenge conventional social stereotypes.

2_student in community of peers

The workshop presence within an active design project highlights the microsystem or context students find themselves in during their studies. Peer interaction, reflective and collaborative practices all contribute to graduate attributes. This learning ecology promotes sharing of opinions in a context where it could sometimes be daunting, due to the perceptions and fear of recognition of various voices within a design milieu. The plug-in workshop put everyone on the same platform for interaction, however, it was up to the individual students to actively participate and engage. Within this micro environment for design development, the physical aspects of the studio, the workshop, the design project, are all important considerations for the livelihood of the peer group. Even more so is the emotional and intangible health of the learning environment, as students either flourish or perish, depending on the studio culture and experience of the studio practice. The workshop provided conditions of transparency and constructive learning, although students did not experience it as a positive encounter at first. They found ways to expand their empathetic horizon and to relate to opinions of their peers, which could be very different from their own. In this way, respect and acceptance were nurtured. By reflecting together, they engaged with the process actively and in a connected way, not only with their own process, but also with the potential of another's influence on their own engagement.

The learning ecology of the studio furthermore provided the environment for students to internalise knowledge from supporting modules and sharing that with peers. The overall curricular content forms the grounding for the studio projects as an integrated system. This highlights the notion that design learning and knowing can happen outside the studio too and that interaction with peers and stakeholders as partners are critical to well-rounded designers.

3_lecturer personal teaching development

The 'plug-in' becomes an example of another way that spatial design students can actively engage with complex design questions contained within studio projects. The tried and tested methods and tools are no longer supporting the layered and rich contexts and situations of design. The workshop shows that when students are exposed to other ways of 'thinking', 'making', 'sharing', and 'doing', different responses emerge. In addition, when 'feeling' and 'acting' are introduced, the design inquiry is steered in another direction altogether, by acknowledging a human-centred approach from the outset. Lecturers should thus be confident to explore other methods and ways of studio inquiry, without fear of failure. The workshop showed that disruption of conventional ways could be productive and constructive and could include non-spatial ways to ask critical architectural questions. The research demonstrated that the discipline specific knowledge (studio project itself, *what*) becomes a conduit for the investigation. Therefore, the scope of intervention into the way students engage creatively and critically (*how*) remains open for exploration.

Cognisance should however be taken, that when unfamiliar ways are introduced, students need some background as to the threshold concepts they will be interrogating. In that way, the severity of the

disruption can be minimised and students engage more freely and without anxiety. This workshop serves as an example of how lecturers can expand their personal teaching and learning portfolio in the context of the curriculum, to the benefit of research through design practices and furthermore, geared towards promoting a scholarship of learning.

Reflecting on my own personal journey, I also changed. I became aware of my responsibility as a facilitator of this approach, because of the unsettling effect it has on students. When they are disrupted to their core, some form of constant should remain, in order for each one to stay confident on their own path of discovery. This is a different 'place' for everyone.

Furthermore, I realised that the inner voice I nurture for connection can become part of increased immersive practices in the spatial design studio. This excites me greatly!

4_lecturer in academic community

The workshop combines various disciplinary knowledge areas. Some are fringe concepts that align with the intent of the plug-in, to promote interdisciplinary learning. Every society has its challenges that influence the way we design. Even more so, today, the complex challenges we are facing cannot be addressed as a whole by just relying on one discipline. We need to collaborate in order to become well-rounded designers, equipped with the skills and knowledge needed. The workshop shows that soft skills embedded within design projects could be supported by other research areas, spliced into design competencies needed currently. For example, how can we engage with projects by only using the cognitive modality as active inquirer? By collaborating with other fields and balancing the cognitive with the affective domain by introducing situational awareness of intangible aspects this engagement can be achieved. This engagement is assisted by understanding the benefits and pitfalls of empathy and by embracing the soft skills required in projects. Here, aspects from psychiatry and health sciences (normative dissociation) assisted with placing the student in the shoes of another person or community. By considering social and educational sciences, transformative learning is emphasised. If a wider understanding within the design community of educators emerges to address design projects from various perspectives, the students will also adopt other views and experiences in their personal processes. This was clear, considering the role of the researcher in her own studio, as compared to the other studios where she was experienced as an outsider, stranger and ever intruder.

The opportunities for collaboration could provide a platform to share and investigate other critical and creative practices that have not been seen in the spatial design studio. This explorative study intended to uncover possibilities in order to develop the discourse of design learning into another direction as design research or design science. The main aim should always be, within this learning context, to make a difference in the lives of users and the lives of students. By sharing, across different schools of design, new thinking, new actions and emerging developments of engaged learning can be highlighted within an educational community of inquiry. Integral to this is the sharing of insights (Shea in Resnick

2016:21) and presenting of new discoveries within the design studio, to supplement and complement the conventional and traditional methods.

5_design education / pedagogy

If a design community in higher education embraces connected and hybrid ways of design engagement, the influence on design pedagogy could shift and refocus on aspects of human-centredness, situational awareness and social innovation. When disruption is seen as a constructive action, and not as a process detrimental to the development of students, new concepts can be introduced to initiate other discourses about social and human behaviour to become a part of a daily design approach. Here, the relationship and entanglement between theory and practice become noteworthy, considering real-life scenarios as sites for projects. But, what happens if there is no access to these sites, or users as inhabitants? The workshop shows the value of embracing interdisciplinary concepts, such as normative dissociation and empathy, as activators, to increase understanding and insights, although it might have some shortcomings. This is even more relevant now, where the impact of a global health pandemic in 2020 resulted in a society subscribing to social distancing and isolated working conditions due to social restrictions.

Design education is dependent on ways to find active and connected relational understandings, also in these unprecedented situations. So, when students can recollect a related embodied experience, or imagine a fictional one, the link to the project becomes much more real and convincing. In this way, new situations can be conjured up, other contextual meanings constructed. Design pedagogy should not be blinded by ways of engagement that become too universal or generalised. Spatial design education is after all embedded in contextual and social richness and complexity which cannot be ignored. The design profession itself is already incorporating other ways into its practice.

The study furthermore demonstrates that other ways of engagement in the studio contribute to hybrid ways of knowing that expands students' understandings. Multiple intelligences are revealed to support and enable an inclusive learning environment. These actions are not necessarily architectural in nature and include approaches from the arts, health sciences and discursive design practices. In this light, the research motivates for a new language of representation to complement the traditional drawing and model building as spatial communication. By revisiting a visual language that is non-spatial, architectural questions can be elicited with more intent and criticality and also speak to a larger audience other than designers, and in that way engender wider insights. This is not only a decolonised approach, but also a way of eliciting empathy, care and relational understanding for all design scenarios. The emphasis is not on the idea of doing things differently, but to become inclusive and holistic as part of an everyday design practice. This study becomes meaningless if translations cannot be considered in alternative ways, in order to have meaning for the user. Perhaps it is time to question the traditional plan, section, elevation and perspective by opening up the representation of spatial issues. The challenge remains the parameters and restrictions of accrediting bodies and professional expectations that guard activities in academia.

6_design practice / profession

This study speculates that with increased research through design projects in design education, focusing on real-life scenarios and human-centred matters, the design profession will experience a positive influence by graduates making their way into the workplace. With a shift in design thinking and engagement, design pedagogy prepares students for increased work readiness, by introducing hybrid methods. Critical and creative inquiry by students in higher education means acute experimentation of ways of engagement that are hands-on and direct as this study illustrates, but could also include technology and related social media applications to address wicked problems in ways not yet considered. The workshop opened the door, first causing anxiety, but later tolerance, or acceptance of unfamiliar practices, for which several students were grateful.

A further benefit of the workshop highlights an awareness of students' own judgements and bias, exposing them to other opinions, perspectives and views, different from their own. Design ethics, respect and responsibility of a designer as an agent in service to others are values that come to the fore. Design education does not only introduce abstract concepts to students, but also prepares them with intangible skills. Even more so, the workshop inserts unfamiliar considerations that students can choose to utilise to the benefit of the design profession at large. This understanding of an expanded architectural practice is important, because change happens slowly. Just as the discipline and profession of architecture and design is slowly transforming its white male-domination, we see how much "decolonizing effort" is required to rebalance histories, educational agendas, and those narratives that we import into the academy.

7_impact on larger society

When students address issues that lie close to their heart, they make different choices in design: they engage in a connected way, they relate to users on deeper levels and in this way develop into citizen designers (Resnick 2016:12). They are differently equipped for complex design challenges, they are responsive, they advocate for inclusivity as active citizens for "massive small change" (Campbell 2018:276). The 'plug-in' opened the door to asking design questions in different ways, to asking difficult questions, or reframing the same concern in a different way. The study hopes that continued practice into making positive change will further stimulate research through design and become a way to address the challenges facing societies and facing designers today. The study shows that through connected engagement and empathy, increased understanding can be found. This is only possible as a reciprocal relationship between the design academia, design profession and communities. It cannot be a one way street. Mutual respect and insight into other worldviews, realities and perspectives are key to harnessing kindness through design. By forging links between academia and the profession, critical connections between different stakeholders can be established for a shared better future.

Future research

Concepts and themes emerging from the discussion relating to interdisciplinary study are highlighted as future research topics. In addition, the scope of the study excludes some aspects in order to delineate the focus, which can now be considered for future research. It proposes to extend the use of the plug-in workshop into different directions by considering the opportunities presented below. Lastly, it highlights future research potential into new directions.

Interdisciplinary themes

The study introduced interdisciplinary research overlaps that provide opportunities for further research in the context of research-through-design projects.

- Relate learning styles to the transformative development in the context of the 'plug-in' disruption;
- Further investigation into transformative learning theories, considering a linear or hierarchical understanding to a non-sequential manifestation;
- Focus on modes of engagement, emerging from the biopic investigations as related to the affective domain verbs in this study: 'feel', 'act' and 'be';
- The effect of time on the students' transformative development as an argument of disposition to design practice in the context of critical self-reflection, normative dissociation and empathy;
- Investigation of 'solution-led goal analysis' in comparison with 'dialogue with the situation' to obtain the impact on the epistemological transitions and ontological shifts of students, in light of a 'scenario-led potential analysis', instead

The 'plug-in'

Quantitative research methodology using the same plug-in insertion in the spatial design studio

The study uses a qualitative research methodology in order to uncover the fuzzy, messy, rich and engaged qualities of the investigation as a speculative study. By introducing a quantitative approach, a comparison can be made between the nature of the data and its interpretations in order to extend the academic rigour of the exploratory research.

'Plug-in' workshop insertion in other design disciplines and or human-centred project contexts

Determining the value of the plug-in within other design milieus can determine the robustness of this speculative approach, as a stimulus to engaged learning in other disciplines such as graphic design, fashion design, multi-media design, eating design and design for social innovation. It could prove a possible wider impact where the user is prioritised in fluid and transient situations to deepen understanding for better framed projects.

Exploring other activities of critical and creative inquiry within the same spatial design focus

By inserting other activities into the plug-in workshop to promote modal shifts in perspective and modes of engagement, besides the ones used in this study (problem statement, keywords, vignettes, peer interaction, critical artefacts and reflective essay), it could reveal other threshold concepts and reflective moments. This approach can be used to test validity of expanding the tools and techniques for engaged learning, beyond the traditional, conventional design inquiry, whilst keeping the workshop intention the same.

Disruptive action of various duration and frequency

Exploring the use of the disruptive principle can determine how engagement during disruptive practice can be sustained over time and still have a productive influence. Perhaps the introduction of a series of small disruptive activities, accumulating to a larger project, could track the transformation over time. If the workshop brief was created with a fluidity and flexibility between various types of activities, the disruption could perhaps be sustained for a longer duration, deliberately shifting focus according to the scope and context of the investigation. This notion of duration can also be explored to investigate the effect of disruptive exposure as a longitudinal study in order to gather data across different student groups, and could include a variety of design disciplines.

Discursive design in the spatial design profession

This study shows small, but significant shifts in the biopics, in a discipline where traditional or conventional investigations primarily have solution or product driven outcomes, due to the professional focus of delivering buildings. This recommendation proposes ways of deepening the understanding by obtaining insight into users' unspoken needs and requirements, beyond the focus of static architectural design. In this way, familiar architectural processes can be extended to be more than an emphasis on design of building and buildings as objects, to refocus on the engagement with users, obtaining complex understandings, internalising and translating affective experiences, creating contextual meanings and adding value in intangible ways.

New research directions emerging

The speculative approach to the study brought to light three bigger questions for consideration. The time for critical discussion and much needed action on issues of transformation, representation and immersive learning in spatial design pedagogy, is now.

A relational spatial design pedagogy for transformative learning

Considering design development from a linear or sequential trajectory is short sighted and cannot sustain the nuances of transformative learning. A fluid and relational approach to spatial design can inform not only students' personal development, but also new directions for curricular design.

Representation and discourse

A more sophisticated language is required, both in discourse and in visual media / representational format, to make relational complexity and emerging concepts of time and space visible.

Immersive studio practices

The introduction of multi-modal explorations (both critical and creative) can enable more immersive practices in the design studio and reveal multiple intelligences. The collaborative nature of this type of design inquiry can potentially lead to new formats of studio culture.

epilogue

When I started this journey, three years ago, I had no idea where it would lead, what the actual questions would be, or how its development would unfold. Looking back, what would I change if I had to do it again? Nothing. This journey was truly an aleatory investigation. At the time of my initial research proposal presentation, I was captured by this approach. I found it difficult to articulate what I intended for the study. Yet this is exactly how the process unfolded. I knew that the journey would reveal itself, that the nature of the inquiry would become clear and that the focus would come into view. I was right. Over the last three years, I found my voice, my research voice.*

Little did I know that by shifting the focus from 'what' to 'how', that I would also be transformed. I often tell students that when you study design, you change; your life will never be the same again. How I have more insight into what that means today. I too, am not the same person anymore.

This study is only a start, and not the end, in this investigation. My hope is to open secret doors into the discourse of design pedagogy (or any discipline for that matter). I want to see what happens when the status quo in the spatial design studios of architecture and interior design is disrupted. If students can adapt to other ways of engagement. My own experiment at the outset proves to me that realization, at least, is possible and I will continue this endeavour for more connections, deeper understandings, better relations, meaningful associations, and overall, engaged learning.

*Aleatory is described as "... indeterminate applications of chance ... performers-users ... ever-changing scores ..." in *Architectures of chance* (Manolopoulou 2013:xxiii).

*let us continue
the conversation
over a cup of tea
or
barefoot under a tree
– this study has just begun*



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ADDENDUM A: Ethics approval letter and informed consent form



Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en
Inligtingtegnologie / Lefapha la Boetšenere,
Tikologo ya Kago le Theknološi ya Tshedimošo

Reference number: EBIT/77/2018

30 July 2018

Ms A Grobler
Department of Architecture
University of Pretoria
Pretoria
0028

Dear Ms Grobler

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Research Ethics Committee refers.

Approval is granted for the application with reference number that appears above.

1. This means that the research project entitled "Extending the concept of interiority into informal urban scenarios of (South) Africa: appropriation and meaning-making" has been approved as submitted. It is important to note what approval implies. This is expanded on in the points that follow.
2. This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Code of Ethics for Scholarly Activities of the University of Pretoria, or the Policy and Procedures for Responsible Research of the University of Pretoria. These documents are available on the website of the EBIT Research Ethics Committee.
3. If action is taken beyond the approved application, approval is withdrawn automatically.
4. According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of the EBIT Research Ethics Office.
5. The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof JJ Hanekom

Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

INFORMED CONSENT FORM - STUDENTS

(Form for research participant's permission)

1. Project information

1.1 Title of research project:

Extending the concept of interiority into informal urban scenarios of (South) Africa:
appropriation and meaning-making

1.2 Researcher details:

Anika Grobler, Department of Architecture, 012 420 2095, anika.grobler@up.ac.za

1.3 Research study description.

a) Project and objectives

The project investigates the way in which people occupy and transform spaces. It searches for a deeper understanding of the way we create meaning around us. It is focused on user(s) by describing and analyzing the dynamic and temporary aspects of living, the relationship and association with and between object and space, human behaviour, and social interaction.

[The project explores a deeper understanding of interiors and spatial design. It is focused on the dynamic, temporal and intangible aspects of interiors, as compared to the static and physical architectural. The objective is to follow a people-centred approach, by acknowledging social interactions, appropriation of space and the creation of meaning. The study explores alternative, but complementary methods to that of conventional architectural research and design inquiry. Other ways of critical design investigation include methods from the creative and visual arts.]

b) What will be required of participants?

Participants will be required to engage in studio activities integrated into existing design projects. This will entail observational analysis of situations and contexts (text and drawings) in the public urban environment (participant observations), but also of fictional scenarios; photographic studies; narrative writing; association and connotation investigations; and the making of critical 3D representations in an exploration to express meaning. Critical reflection is integral to the process. Here, students will be informants for participant observation where the researcher performs critical observation by means of memo writing, taking of photographs and video recording of the process.

c) Risks to participants

No foreseen risks are identified. The research activities are integrated with existing design projects in the modules, ONT 303 for undergraduate, RFP 713 / 723 / 733 / 740 for Honours and DPD 803 for MProf years.

2. Informed consent

2.1 I, _____ hereby voluntarily grant my permission for participation in the project as explained to me by the researcher, Anika Grobler.

2.2 The nature, objective, possible safety and health implications have been explained to me and I understand them.

2.3 I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially, unless I explicitly state otherwise for my name to be associated with creative work and myself to be identified in photographic and or video footage. I understand that I may withdraw at any stage. I am aware that the results of the investigation (visual and textual) may be used for the purposes of the PhD study and for publication and conferences.

2.4 I give permission for my name to be associated with creative work – textual or visual
YES _____ NO _____

2.5 I give permission for myself to be identified in photographic and or video footage
YES _____ NO _____

2.6 Upon signature of this form, the participant will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

ADDENDUM B: Plug-in workshop brief

plug[interiority]

a workshop exploring the dynamic meaning-making process of identities in the city

Broad aims

As 'plug-in', the workshop intends to serve as a tool to investigate and interrogate:

- Abstract/symbolic spatial expressions for representing dynamic conditions of living (in different contexts, programmes and typologies)
- Associations and meanings that are assigned through interaction and appropriation – interface and encounter at human scale
- A different creative inquiry approach: critical artefact exploration – not object focused, but people-process driven

Broad objectives

The main objective is to investigate the following by means of creative practice:

- Focus on the making and inhabiting of dynamic, fluid and temporal spaces
- Interrogating the intangible, emotive, relational and ephemeral conditions of/in spaces
- Identifying and revealing the dynamic conditions within everyday scenarios that are contextually loaded and located
- Assigning associations and meanings as informal interpretations of meaning-making
- Participation of students as observing informants, bringing the city into the studio
- Making of representations using 'second hand / prior use' objects and materials.

Workshop outcomes

Students are able to:

- Articulate by means of visual and textual means, intangible/ephemeral qualities of living
- Interrogate and interpret the social condition that appropriates and overlays the static manifestation of built form
- Design for human well-being (social, emotional, psychological) within complex, responsive scenarios/environments (social sustainability)

Keywords

- SUBJECT FOCUS: interiority, identity, meta-space, behavioural settings, social sustainability
- METHODOLOGY: critical artefact, process-based, provocation, visual arts, narrative

Situating the exploration

CONTEXT AND BACKGROUND

The workshop serves as a 'plug-in' exploration to expand the process of design inquiry as part of the studio project (within any context, typology and programme). It explores a deeper understanding of interiority, meaning-making and identity when considering the design of everyday spaces.

It questions the dominant model of spatial (interior) production or the traditional view of enclosure - object, user and space. Instead, the focus revolves around the dynamic, temporal and intangible conditions of interiors and interiority, shaped by social interactions.

...interiority is the abstract quality that enables the recognition and definition of an interior. It is a theoretical and immaterial set of coincidences and variables from which 'interior' is made possible... mobile and promiscuous...intimate with and contaminates every interior and every inside (McCarthy 2005:112).

This elusive and intangible phenomenon manifests itself everyday as people occupy, adapt and transform spaces for working, living and socialisation. Changing patterns are influencing ways in which people make and shape spaces to inhabit. Interesting behaviour-interface scenarios, influenced by both internal and external forces, are informally created. This is the spirit of the city. It relates to everyday rituals and narrates the performance/display of daily sequences of inhabitation, concerned with real-world conditions of living.

It is encountered at human scale, where tangible and intangible encounters are made visible through fluid and dynamic living conditions.

When a part of the city is designed as metaspace, it becomes an urban gallery – a fluid form of public space that evolves in time, generating different definitions of public space and different ways of participating in it (Bunschoten, 2004:59-60).

metaspace [*noun*] *a space transcending ordinary physical space* (Macmillan Dictionary).

With a sensitive awareness to unspoken needs and requirements of people, reflect on the experience, well-being, quality of life and emotional demands people make on its spaces. Consider that which is not obvious or explicit.

The storyline fell naturally into the construct of the triad: THE COMMONLY UNSEEN, THE COMMONLY UNHEARD and COMMONLY UNFELT (Bach, 1965:x).

- UNSEEN [insight/reflection/awareness/perception]
- UNHEARD [inspiration/recognition/intuition/receptivity]
- UNFELT [empathy/consciousness/expectation/apprehension]

Tacit [*adj*] *taken for granted, not said aloud, alluded to, allusive, assumed, hinted at, implicit, implied, inarticulate, indirect, inferred, intimated, silent, suggested, undeclared, understood, unexpressed, unsaid, unspoken, unstated unvoiced, wordless* (Roget's 21st Century Thesaurus)

Situating the methodology

CRITICAL [ARTEFACT] AS DESIGN PROCESS AND INQUIRY

The workshop explores alternative, but complementary methods to that of conventional architectural research and practice (drawings and models). Other ways of critical design investigation include methods from the creative arts and narrative inquiry (storytelling by means of descriptions and vignettes). In addition, the building of a critical artefact, using materials that are not normally associated with architectural/design studio practice, are deliberately used. Abstract/symbolic representations are intended as outcome in order to provoke and formulate new questions.

“Critical Design uses speculative design proposals to challenge narrow assumptions, preconceptions and givens about the role products [spaces] play in everyday life” (Dunne & Raby in Bowen 2010:3).

In this four-hour workshop, the design process is set out to address the preconceptions and assumptions of the way spaces are used as a provocation through design inquiry. It focuses on the temporal and fluid constructions and intangible associations that people intuitively assign. The intention of Critical Artefacts as methodology is outlined (Bowen 2010:1-4):

- Inspired by critical design
- Challenge preconceptions, to provoke, not shock
- Attitude instead of a method
- A method to make issues (or matters of concern) visible
- Uses design to formulate questions
- Human-centred (“make it more human”)
- Address sensitive (“delicate”) issues
- Displayed in galleries/museums
- Not mass produced or sold

PROVOCATION [noun] *incitement, stimulus, challenge, dare, instigation, awaken, evoke, bestir, elicit, instigate, prompt* (Roget's 21st Century Thesaurus)

Because of the subject of the workshop, the term 'artefact' is further interrogated/questioned for its relevance and accuracy for describing a methodology where the outcome of product is secondary to the process of investigation.

Materials

A selection of materials that are unconventional, non-traditional and alternative to general architectural/design studio practice is used in the workshop. These are daily use items, objects and materials that have been discarded by the original owner as 'second hand or of prior use and not necessarily waste materials. Examples could include, but are not limited to:

Textiles offcuts (wool, cotton, felt) / thread, yarn / wool, cotton / felt, pleather / elastic, rubber / wire / clothing / candles / newspaper / screws, nails / mesh (steel/plastic) / glass / fishing gut / food dye / packaging tape / sporting equipment / kitchen accessories / automotive accessories / toys / shoes / packaging material / paint, pencils, crayons

SEQUENCE AND DETAILS OF ACTIVITIES (Total: 4 hours)

DESCRIPTION	DURATION
1. Briefing and background (setting the scene)	10 minutes
2. Problem statement - Description: 50-100 words describing the of matters/issues of concern (context, human-centred, experiential, programme) - Summary: 10 abstract nouns, adjectives and adverbs (no common/proper/concrete nouns)	15 minutes
3. Series of annotated vignettes capturing the temporal/intangible - Reflect on your observations on site/context and draw 5 vignettes to visually illustrate SITUATIONS / MOMENTS / SCENARIOS that consider matters/issues* above - Annotate ASSOCIATIONS / CONNOTATIONS and MEANING-MAKING as observed and/or understood	25 minutes (5 per vignette)
4. Peer to peer evaluation and input (rotate to the left to find a colleague to share with) - Share the selection and decision-making process - Provide written feedback notes to capture the discussion	25 minutes
5. Building of the CRITICAL [ARTEFACT] as provocation - An abstract/symbolic representation as a synthesis of the matters/issues above in 3d built form – giving presence to the intangible/temporal - Use of materials as described above	2 hours
6. Reflective essay - Critically reflect on the design process and expression of the workshop in 250-500 handwritten words - Consider how the focus on the social, temporal and fluid contributed to the degree of complexity in design (behavioural settings, meaning-making, appropriation and identity, beyond the static interior/architectural design) - Reflect on the use of alternative materials to the spatial expression possibilities and potential increased richness and complexity of spatial design.	20 minutes
7. Feedback and input - Peer evaluation (one colleague that was part of the process, one colleague that sees the work afresh) - Provide written feedback notes to capture the discussion	35 minutes
8. Ending and thank you Informal discussion – experience of workshop	10 minutes

*matters/issues could include, but are not limited to experiences, realities, delights, challenges, threats, opportunities...

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ADDENDUM C: Examples of data matrices

DATA MATRIX: BIOPICS SUMMARIES CONDENSED_observations

description	B1	B2	B3	B4
<i>Role of researcher</i>	Insider	Outsider, visitor	Intruder, stranger	Stranger, outsider
<i>Disruption</i>	Disruption gradual thinking in studio	Disruption NEW	Disruption NEW	Continuation of disruption
<i>Design project</i>	Agile workspace, CBD	Convenience store, neighbourhood	Energy efficient luminaire	Critical artefact, exhibition / installation
<i>Duration</i>	14 weeks	4 weeks	4 weeks	14 weeks
<i>Timing of workshop</i>	First quarter of project	Last quarter of project	First quarter of project	Mid project
<i>Collaboration</i>	Fluid interaction and feedback	Constructive criticism and feedback	Very limited interaction and feedback	No interaction (perceived)
<i>Initial response to workshop</i>	Uncertain and hesitant, but excited and eager	Hesitant, uncertain Had to confirm activities as speculative and exploratory for students to 'relax'	Anxiety and distress, white paper fear	Grappling, struggling, apprehensive Opened up later on
<i>Problem statement</i>	Emotional disruption Normative dissociation Deeper understanding Contextual meaning Eco-systemic approach	Cognitive disruption Attention, little absorption (limited normative dissociation) Human-environment needs Framing of problem Reflective practice	Difficulty to connect with workshop intent Challenge to identify issues of concern as wicked problems Meaning-making when consider self into the equation as user – reconstruct / imagine Prototyping anxiety and manufacturing	Personal relation / view to wicked problems -activist (cognitive empathy, attention) -member of community (emotional empathy – absorption)
<i>Keywords</i>	Appreciative inquiry – potential Abductive reasoning Express empathy – emotional / immersive of context	Appreciative inquiry – potential Contextual matters direct influence	Cognitive disruption Functionality (prototyping) vs emotive (atmosphere) Emphasis on intangible	Focusing the project Abductive reasoning Framing of the problem
<i>Vignettes</i>	Initial hesitation Relational conditions between people and place City (disconnected) People (fluid organism) Identify the spirit of the city	Hesitation at first Binary conditions (physical and emotional) Empath – human-centred	Cognitive disruption Unsure how / what to represent Majority of class challenge to find expression beyond object, shapes and associations	No vignettes
<i>Critical artefacts</i>	Cognitive disruption Creative disruption PROOCATION Process emphasis Abstract models (symbolic) Representing issues of concern Shift – no spatial mind-set as abstract model [known to group of students]	Cognitive disruption Creative disruption -disruption catalyst for workshop activities (material selection) Sensory engagement Symbolic representations ABSTRACT, EMOTIONVE Representation speculative (felt 'forced' to think differently) Reflection in action Process tricky	CREATIVE CATALYST (icebreaker / relief) Creative disruption Cognitive disruption Abstract representations "forced" to use 2 nd life materials Symbolism Action of making	Abstract associations made Process driven Rough and exploratory Cognitive disruption Creative disruption CHALLENGE OF REPRESENTATION of wicked problems Direct dialogue with the situation Not much engagement with 2 nd life materials Challenge – modal shift between connected / separate voices
<i>Peer feedback</i>	Shared freely Themes emerging (id formation, physical / social significance, meaning-making and interconnectedness)	Constructive criticism in pairs Emphasis on meaning-making and human-centred matters (vs pragmatic)	Limited interaction or collaboration (materials, meaning-making, process, end-user)	No peer collaboration, except at end of workshop (formal discussion) Self-reflection: representation, focus, abstraction, approach, invention vs convention

<i>Reflective essay</i>	Emotional and psychological disruption Immersed in workshop NORMATIVE DISSOCIATION PERSONAL ACCOUNTS OF CHANGE (half the class) Deeper understanding Abstract models Themes emerging	Cognitive and creative disruption Psychological disruption (to a degree – personal experience) Second life materials open up new possibilities / meanings SHIFT – HOW problems are expressed CONNECTEDNESS, UNDERSTANDING deeper Different awareness	Challenged preconceived ideas Outcome based replace by narrative focus Challenge – represent intangible with visual translations “forced” to think beyond static Process of investigation (surprised by outcome) =usual generic approach replaced with personal experience	Cognitive, creative and emotional disruption Immersed in project (causes flux in self) Normative dissociation (attention – activist; and member – absorption) SHIFT – perspective / approach Speculate and question Render visible the intangible Empathy, compassion
<i>Trajectory to completion</i>	Quarter of class deliberate integration of workshop considerations into project (beyond selection of client) Modal shifts – client, community, social, dynamic, materials, engagement with process Deeper understanding and insight of wicked problems Framing of problem Dialogue with the situation	Workshop too late (feedback) As result, limited integration Eye opener User-centred Meaning of things Problem framing – identification Abstraction and symbolism Feedback and critical reflection Value – meaning, another perspective, identify problems	No apparent link to workshop and final design development Besides creative use of materials for prototyping process	Impact not clear – except approach and attitude towards project Deeper insight and understanding of wicked problems Framing of problems Dialogue with the situation Challenge – representation of concepts and ideas ABSTRACTLY AS PROVOCATION
<i>Post feedback</i>	Students: Connected deeper Different perspective Overcame barriers Generate meaning in spaces Express and association Material and detailing Panel: User-centred focus Social, dynamic considerations Meaning-making (symbolism and association) Contextual integration Relationships (inter)	Realization of meaning of things Abstraction and symbolism Representation – sharing with others Emphasis not only on aesthetics Deeper understanding Thinking Materials Time management Process Intangibles Timing of workshop	Student work: Framing of problems Wicked problems Human-centred Emotive and affective qualities Studio coordinator: Lateral thinking Less predictable Process iterative and explorative Light as medium Human-centred Critical reflection of self and process Research as starting point ENJOYED THE WORKSHOP Future consideration 40% of the class INTIMIDATING NEW PROCESS Researcher as intruder	External examiner: Thinking to expand Theory over emphasis Introduce free and spontaneous investigation Alternative forms of representation Focus the project Viewer perspective Message? Student: Understanding of thinking process Production abilities Creative freedom
<i>Alignment with ethos of school</i>	Extending: Empathy – connection Framing and engaging with problems Deeper understanding – insight Meaning-making User perspective Agents of change – [citizenship]	Human-centred approach Meaning-making Framing of problems Deeper insight and understanding Use of materials Other ways of engaging – design process	Human-centred approach Meaning-making Social agency Lateral thinking Explorative, iterative process Research as starting point	Citizenship Empathy – cognitive and emotional Critical reflection Problem framing Agents of change

DATA MATRIX: BIOPICS SUMMARIES CONDENSED_with literature

description	B1 UP	B2 UJ	B3 GDC	B4 SAIC
DATA	Insider	Outsider, visitor	Intruder, stranger	Stranger, outsider
Disruption	Disruption gradual thinking in studio	Disruption NEW	Disruption NEW	Continuation of disruption
Design project	Agile workspace, CBD	Convenience store, neighbourhood	Energy efficient luminaire	Critical artefact, exhibition / installation
Duration	14 weeks	4 weeks	4 weeks	14 weeks
Timing of workshop	First quarter of project	Last quarter of project	First quarter of project	Mid project
Collaboration	Fluid interaction and feedback	Constructive criticism and feedback	Very limited interaction and feedback	No interaction (perceived)
Initial response to workshop	Uncertain and hesitant, but excited and eager	Hesitant, uncertain Had to confirm activities as speculative and exploratory for students to 'relax'	Anxiety and distress, white paper fear	Grappling, struggling, apprehensive Opened up later on
[Problem statement] <i>Disruption Provocation</i> <i>Empathy 4 phases</i> <i>Routes to empathy</i> <i>Levels of mindreading (awareness)</i> <i>Dissociation Shifts between personas</i> <i>Contextual meaning</i> <i>Wicked problems</i> <i>Modal shifts</i> <i>Perspective</i> <i>Ways of knowing</i>	EMOTIONAL DISRUPTION EMPATHY – affective resonance 1-discovery (contact, explore) & 2-immersion (absorb, expand understanding) Routes to empathy -mirror (project own BIAS) -reconstructive (imagination of what can be) – Abductive reasoning Low and high level awareness Normative dissociation (continuum) Deeper understanding CONTEXTUAL MEANING Eco-systemic approach Wicked problems Modal shifts Perspective Shifts between personas Connected-separate knowing	COGNITIVE DISRUPTION EMPATHY - attention, little absorption COGNITIVE EMPATHY (reasoning) 1-discovery (explore) & 2-immersion (limited / pragmatic) Routes to empathy -mirror (personal BIAS) -reconstructive (pragmatic imagination, constructive process) Mostly low level awareness Limited normative dissociation Human-environment needs FRAMING OF PROBLEM REFLECTIVE PRACTICE PERSPECTIVE taking Connected-separate knowing	Difficulty to connect with workshop intent Challenge to identify issues of concern as wicked problems COGNITIVE EMPATHY (reasoning) 1-discovery (explore) Routes to empathy -mirror (own experience, perception bias) -reconstructive BIAS – commission (egocentric – designer's view) Meaning-making when consider self into the equation as user – reconstruct / imagine- Normative dissociation Prototyping anxiety and manufacturing ASKING CRITICAL QUESTIONS Ways of thinking and questioning Perspective taking Separate knowing [?]	Personal relation / view to wicked problems – levels of modal shifts Reflective practice EMPATHY -activist (COGNITIVE EMPATHY, attention) -member of community (EMOTIONAL EMPATHY – absorption / affective resonance 1-discovery (contact explore) & 2-immersion (expand understanding, absorb) Routes to empathy -mirror (project own biases) – activist - BIAS – own perspective, view -reconstructive (high level) – member - BIAS – commission (egocentric – architects view) and omission (ignorance of other opinions, views other than your own, inclusive of full picture) Continuum – normative dissociation Provocation Connected-separate knowing

[Keywords] <i>Appreciative inquiry</i> <i>Abductive reasoning</i> <i>Contextual meaning</i> <i>Disruption</i> <i>Empathy</i>	Appreciative inquiry – potential Abductive reasoning EMPATHY – affective resonance (emotional / immersive) CONTEXTUAL MEANING	Appreciative inquiry – potential Contextual matters direct influence – CONTEXTUAL MEANING	Cognitive disruption Functionality (prototyping) vs emotive (atmosphere) – juxtaposition DIALOGUE WITH THE SITUATION Emphasis on intangible	Focusing – PROJECT FRAMING Abductive reasoning Dialogue with the situation
[Vignettes] <i>Reflective practice</i> <i>Co-development of problem-solution</i> <i>Dialogue with the situation</i> <i>Modal shifts</i> <i>Ways of knowing</i> <i>Disruption</i> <i>Shifts between personas</i> <i>Empathy</i> <i>Attention, absorption</i> <i>Representation</i>	Initial hesitation Reflective practice Co-development of problem-solution Dialogue with the situation (context, people, self) Relational conditions between people and place City (disconnected) People (fluid organism) Connected knowing Identify the spirit of the city Expanding empathetic horizon (attention and absorption) Representation spontaneous	Hesitation at first Binary conditions (physical and emotional) Expanding the empathetic horizon – human-centred (ATTENTION and absorption) Dialogue with the situation Modal shifts Shift between personas Representation exploratory	Cognitive disruption Unsure how / what to represent Majority of class challenge to find expression beyond object, shapes and associations Representation challenge	No vignettes
[Critical artefacts] <i>Provocation</i> <i>Discursive design</i> <i>Disruption</i> <i>Contextual meaning</i> <i>Wicked problems</i> <i>Co-development of problem-solution</i> <i>Reflection-in-action</i> <i>Perspectives</i> <i>Dialogue with the situation</i> <i>Solution-led goal analysis</i> <i>Contextual relativism</i> <i>Exploratory learning</i> <i>Ways of knowing</i> <i>Process driven / action</i>	Cognitive disruption Creative disruption PROVOCATION – materials and symbolism Contextual meaning Contextual relativism Process of making (driven) Discursive design Abstract models (symbolic) Representing issues of concern/ wicked problems Co-development of problem-solution Abstract model known to students	Cognitive disruption Creative disruption -disruption catalyst for workshop activities (material selection) Sensory engagement Symbolic representations Abstract, emotive DISCURSIVE DESIGN Representation speculative (felt 'forced' to think differently) Reflection in action Co-development of problem-solution Process tricky	CREATIVE CATALYST (icebreaker / relief) Creative disruption Cognitive disruption Abstract representations DISCURSIVE DESIGN "forced" to use 2nd life materials Symbolism Action of making Exploratory learning Perspectives Dialogue with the situation	Abstract associations made DISCURSIVE DESIGN Process driven Rough and exploratory Cognitive disruption Creative disruption CHALLENGE OF REPRESENTATION of wicked problems Direct dialogue with the situation Not much engagement with 2nd life materials Challenge – modal shift between SOLUTION-LED GOAL ANALYSIS connected / separate voices

<i>[Peer feedback]</i> Reflection-on-action Self-reflection Cognitive – ethical development Empathy – insight	Shared freely Themes emerging (id formation, physical / social significance, meaning-making and interconnectedness) Reflection-on-action Multiplicity > Contextual relativism Deeper understanding / insight	Constructive criticism in pairs Emphasis on meaning-making and human-centred matters (vs pragmatic) Reflection-on-action Multiplicity > Contextual relativism Deeper understanding / insight	Limited interaction or collaboration (materials, meaning-making, process, end-user) Multiplicity > < Contextual relativism	No peer collaboration, except at end of workshop (formal discussion) Self-reflection: representation, focus, abstraction, approach, invention vs convention Reflection-on-action Multiplicity > Contextual relativism Deeper understanding / insight
<i>[Reflective essay]</i> Disruption Discursive design Dissociation Empathy Cognitive – ethical development Experiential learning Ways of knowing Transformative learning SHIFT	Emotional and psychological disruption Immersed in workshop NORMATIVE DISSOCIATION PERSONAL ACCOUNTS OF CHANGE (half the class) Deeper understanding Discursive design - Abstract models Themes emerging Multiplicity > Contextual relativism > Commitment SHIFT – perspective – user (HCD) Contextual meaning Experiential learning -experience into knowledge Separate > Connected knowing Transformative learning <u>Frames of reference</u> -habits of mind (assumptions) Challenge to shift (very personal, own judgements) -point of view (appropriation)	Cognitive and creative disruption Psychological disruption (to a degree – personal experience) Second life materials open up new possibilities / meanings SHIFT – HOW problems are expressed CONNECTEDNESS UNDERSTANDING deeper Different awareness Double loop learning -Modification of goals / decisions Separate > < Connected knowing Transformative learning <u>Frames of reference</u> -habits of mind (assumptions) Assumed role of user in personal capacity (pragmatics) -point of view (appropriation) Able to adopt user perspective	Challenged preconceived ideas SHIFT – Outcome based replace by narrative focus Challenge – represent intangible with visual translations “forced” to think beyond static Process of investigation (surprised by outcome) =usual generic approach replaced with personal experience Double loop learning -Modification of goals / decisions Separate > [] knowing Transformative learning <u>Frames of reference</u> -habits of mind (assumptions) Personal judgements / opinions about use of light, quality of light Designer’s view strong, challenge to shift -point of view (appropriation) Able to shift view	Cognitive, creative and emotional disruption Immersed in project (causes flux in self) Normative dissociation (attention – activist; and member – absorption) SHIFT – perspective / approach Speculate and question Representation – render visible the intangible Empathy, compassion Experiential learning -experience into knowledge Separate > Connected knowing Transformative learning <u>Frames of reference</u> -habits of mind (assumptions) Own views, preconceived ideas challenge to shift (personal opinions, judgements) (omissions, commissions) -point of view (appropriation) Can take other’s point of view,

	Able to shift view = Normative dissociation		= Normative dissociation	however, translation into discursive design challenge Limited normative dissociation Attachment too great, or too disconnected
[Trajectory to completion] Modal shifts Wicked problems Framing Dialogue with the situation User centred Reflective practice Perspective Provocation Discursive design Empathy 4 phases Routes to empathy Levels of mindreading (awareness) Process driven Representation	Quarter of class deliberate integration of workshop considerations into project (beyond selection of client) Routes to empathy: from mirror to reconstructive (see below) MODAL SHIFTS – client, community, social, dynamic, materials, engagement with process Deeper understanding and insight of wicked problems Framing of problem Dialogue with the situation Empathy 3-Connection (emotional level reflect, create understanding -affective: understand feelings -cognitive: understand meanings 4-Detachment (Knowledge) Insights, increase understanding Routes to empathy -from mirror to reconstructive = modal shift -reconstructive -enactment / imagination -replicate experience -constructive process Result in deeper understanding of wicked problems Simulation theorists mindreading	Workshop too late (feedback) As result, limited integration Eye opener User-centred Meaning of things Problem framing – identification Abstraction and symbolism Feedback and critical reflection Value – meaning, (another) perspective taking (Mirror) (identify) problems framing (Mirror) Empathy 3-Connection (emotional level reflect, create understanding -affective: understand feelings -cognitive: understand meanings 4-Detachment (Knowledge) Insights, increase understanding -NOT REALLY REQUIRED – NOT FULL EMOTIONAL CONNECTION Routes to empathy -mirror -observation of functional pragmatism (own BIAS - self, judgements, expectations -modify empathy -reconstructive -imagination -replicate experience -immerse self (normative dissociation) -constructive process	No apparent link to workshop and final design development Besides creative use of materials for prototyping process Empathy 3-Connection (create understanding) -limited affective empathy (feelings) -cognitive: understand meanings 4-Detachment (Knowledge) Insights, increase understanding -NOT REALLY REQUIRED – NOT FULL EMOTIONAL CONNECTION Routes to empathy NOT VISIBLE (manufacturing focus)	Impact not clear – except approach and attitude towards project Deeper insight and understanding of wicked problems Framing of problems Dialogue with the situation (reconstructive route – imagination) Challenge – representation of concepts and ideas ABSTRACTLY AS PROVOCATION Empathy 3-Connection (emotional level reflect, create understanding -MEMBER: affective: understand feelings -Activist: cognitive: not true internalisation / engagement to understand meanings through representation / interpretation 4-Detachment [not in affective resonance] (Knowledge) Insights, increase understanding [compromised?] Routes to empathy -mirror – framing of problems -observation / immersion, discovery (bias - self, judgements, expectations -modify empathy – BIAS -reconstructive – dialogue with the situation -enactment / imagination -replicate experience

	- FROM low level (perceptions, emotions) TO -high level (beliefs, desires, hopes, intention)	Simulation theorists mindreading -low level challenged (perceptions, emotions) -increase in high level (beliefs, desires, hopes, intention)		-constructive process -BIAS: omission (ignorance of one over another), commission (egocentric architects voice) Simulation theorists mindreading -low level challenged (perceptions, emotions) -high level complexity> ambiguity> (beliefs, desires, hopes, intention)
<i>[Post feedback]</i> <i>Empathy</i> 4 phases Routes to empathy Levels of mindreading (awareness) <i>Perspective</i> User-centred Contextual meaning Framing Wicked problems Reflective practice <i>Process-driven</i> <i>Representation</i> <i>Discursive design</i> SHIFT	Students: Connected deeper – 3-connection 4-detachment for insight and knowledge Different perspective Overcame barriers Generate meaning in spaces Express and association Material and detailing Panel: User-centred focus Social, dynamic considerations Meaning-making (symbolism and association) Contextual integration Relationships (inter) Trajectory: Routes to empathy -from mirror to reconstructive = modal shift Reconstructive – BIAS: omission (ignorance due to own bias / judgements)	Realization of meaning of things Abstraction and symbolism Representation – sharing with others Emphasis not only on aesthetics Deeper understanding – 4-detachment Pragmatics and meaning-making Routes to empathy -mirror (user-centred) -reconstructive -imagination, constructive process) Thinking Materials Time management Process Intangibles Timing of workshop	Student work: Framing of problems Wicked problems Human-centred Emotive and affective qualities – 3-connection 4-detachment not needed (no emotional connection) Routes to empathy -mirror (user-centred) Studio coordinator: Lateral thinking Less predictable Process iterative and explorative Light as medium Human-centred Critical reflection of self and process Routes to empathy -reconstructive -imagination, constructive process Research as starting point ENJOYED THE WORKSHOP Future consideration 40% of the class	External examiner: Thinking to expand Theory over emphasis Introduce free and spontaneous investigation Alternative forms of representation Focus the project Viewer perspective Message? Routes to empathy -mirror – observation, immersion: own BIAS judgements -modify empathy – BIAS -reconstructive Replicate experience, constructive process = co-development of problem-solution Dialogue with the situation -BIAS: omission (ignorance of one over another), commission (egocentric architects voice) Simulation theorists mindreading -low level challenged (perceptions, emotions) -high level complexity> ambiguity> (beliefs, desires, hopes, intention) Student: Understanding of thinking process Production abilities

			INTIMIDATING NEW PROCESS Researcher as intruder	Creative freedom
<i>[Alignment with ethos of school]</i> Empathy Framing Perspective Human-centred Reflective practice Process-driven	Extending: Empathy – connection Deeper understanding - insight Framing and engaging with problems User perspective Meaning-making Agents of change – [citizenship]	Extending: Human-centred approach Framing of problems Meaning-making Deeper insight and understanding Use of materials Other ways of engaging – design process	Extending: Human-centred approach Meaning-making Social agency Lateral thinking Explorative, iterative process Research as starting point	Extending: Citizenship Empathy – cognitive and emotional Critical reflection Problem framing Agents of change

ADDENDUM D: EXAMPLES OF BIOPIC NARRATIVES

work in full
4/3/20

biopic journeys

✓ empathetic routes

	b1 UP	b2 UJ	b3 GDC	b4 SAIC
[Problem statement]	EMPATHY – affective resonance 1-discovery (contact, explore) 2-immersion (absorb, expand understanding) Routes to empathy -mirror (project own BIAS, judgement and experience) -reconstructive (imagining what can be) Levels of mindreading [awareness] - CONTEXTUAL -Low level awareness (personal perception and emotions) - High level awareness (propositional attitudes) SPATIAL separate	EMPATHY - attention, little absorption COGNITIVE EMPATHY (reasoning) 1-discovery (explore) & 2-immersion (limited / pragmatic) Routes to empathy -mirror (personal BIAS) -reconstructive (pragmatic imagination, constructive process, not really identifying what can be, pointing out problems currently experienced) Levels of mindreading [awareness] - CONTEXTUAL Mostly low level awareness SPATIAL commercial	COGNITIVE EMPATHY (reasoning) – attention (little absorption) 1-discovery (explore) 2-immersion (limited / pragmatic) Routes to empathy -mirror (own experience, perception bias) -reconstructive BIAS – commission (egocentric – designer's view) Levels of mindreading [awareness] - PRAGMATIC, MANUFACTURING Mostly low level awareness USE OBJECT.	EMPATHY -activist (COGNITIVE EMPATHY, attention) -member of community (EMOTIONAL EMPATHY – absorption / affective resonance) 1-discovery (contact, explore) 2-immersion (expand understanding, absorb) Routes to empathy -mirror (project own biases) -activist -BIAS – own perspective -reconstructive (high level) -member of community -BIAS -commission, egocentric (architects view) -omission (ignorance of other opinions, views other than your own, inclusive of full picture) Level of mindreading exhibit social issues object high level level of mindreading
[Keywords]	EMPATHY – affective resonance (emotional / immersive) Empathetic response related to wicked problems	Human-centred Cognitive empathy – (objective – observation, personal experience (immersive))	Human-centred Cognitive empathy – (objective – observation)	Human-centred Cognitive empathy – (objective – observation) Emotional empathy – (subjective – immersion)
[Vignettes]	Expanding empathetic horizon (attention and absorption) Routes to empathy -Mirror: -experience (absorption and IMAGINATION) Reconstruct: -observation (attention and REPRESENTATION) vignette = thinking + making Relation. Discovering understanding & shift in mode	Hesitation at first Binary conditions (physical and emotional) Expanding the empathetic horizon – human-centred (ATTENTION and absorption) Empathy central to vignettes interpretation -physical/emotional, relational, id/connections. Routes to empathy -Mirror: -experience (absorption and IMAGINATION) Reconstruct: -observation (attention, REPRESENTATION)	Expanding the empathetic horizon – (attention, observation) Routes to empathy -mirror -observation of functional pragmatism (own BIAS - self, judgements, expectations)	No vignettes Problem in translation & representational fair ideas theoretical philosophical to spatial objects / installing of provocation

— time —

empathetic routes

	b1 UP	b2 UJ	b3 GDC	b4 SAIC
[Problem statement]	EMPATHY – affective resonance 1-discovery (contact, explore) 2-immersion (absorb, expand understanding) <u>Routes to empathy</u> -mirror (project own BIAS, judgement and experience) -reconstructive (imagining what can be) <u>Levels of mindreading</u> <u>[awareness]</u> - CONTEXTUAL -Low level awareness (personal perception and emotions) - High level awareness (propositional attitudes)	EMPATHY - attention, little absorption COGNITIVE EMPATHY (reasoning) 1-discovery (explore) & 2-immersion (limited / pragmatic) <u>Routes to empathy</u> -mirror (personal BIAS) -reconstructive (pragmatic imagination, constructive process, not really identifying what can be, pointing out problems currently experienced) <u>Levels of mindreading</u> <u>[awareness]</u> - CONTEXTUAL Mostly low level awareness	COGNITIVE EMPATHY (reasoning) – attention (little absorption) 1-discovery (explore) 2-immersion (limited / pragmatic) <u>Routes to empathy</u> -mirror (own experience, perception bias) -reconstructive BIAS – commission (egocentric – designer's view) <u>Levels of mindreading</u> <u>[awareness]</u> – PRAGMATIC, MANUFACTURING Mostly low level awareness	EMPATHY -activist (COGNITIVE EMPATHY, attention) -member of community (EMOTIONAL EMPATHY – absorption / affective resonance 1-discovery (contact, explore) 2-immersion (expand understanding, absorb) <u>Routes to empathy</u> -mirror (project own biases) -activist -BIAS – own perspective -reconstructive (high level) -member of community -BIAS -commission, egocentric (architects view) -omission (ignorance of other opinions, views other than your own, inclusive of full picture)
[Keywords]	EMPATHY – affective resonance (emotional / immersive) Empathetic response related to wicked problems	Human-centred Cognitive empathy – (objective – observation, - personal experience (immersive)	Human-centred Cognitive empathy – (objective – observation)	Human-centred Cognitive empathy – (objective – observation) Emotional empathy – (subjective – immersion)
[Vignettes]	Expanding empathetic horizon (attention and absorption) <u>Routes to empathy</u> Mirror: -experience (absorption and IMAGINATION) Reconstruct: -observation (attention and REPRESENTATION)	Hesitation at first Binary conditions (physical and emotional) Expanding the empathetic horizon – human-centred (ATTENTION and absorption) Empathy central to vignettes interpretation -physical/emotional, relational, id/connections <u>Routes to empathy</u> Mirror: -experience (absorption and IMAGINATION) Reconstruct: -observation (attention, REPRESENTATION)	Expanding the empathetic horizon – (attention, observation) <u>Routes to empathy</u> -mirror -observation of functional pragmatism (own BIAS - self, judgements, expectations)	No vignettes

[Critical artefacts]	Expanding empathetic horizon Affective and cognitive empathy Commenting on: issues / themes emerging -see 'Dissociation' and 'Shift' columns	Expanding empathetic horizon Affective and cognitive empathy THEMES: -materials -think (understanding) -human-centred -process	Expanding empathetic horizon Affective and cognitive empathy Empathy <u>3-Connection</u> (emotional reflect) -affective: understand relational conditions -cognitive: understand meanings generated through interface and experience Routes to empathy <u>-from mirror to reconstructive</u> = modal shift <u>-reconstructive</u> -enactment / imagination -replicate experience -constructive process <u>Simulation theorists</u> <u>mindreading</u> - FROM low level (perceptions, emotions) TO -high level (beliefs, desires, hopes, intention) – not always clearly articulated <u>How problems are expressed</u> Human-centred -normative dissociation	EMPATHY - attention, little absorption COGNITIVE EMPATHY (reasoning) – activist -absorption, immersion EMOTIONAL EMPATHY -member of community 1-discovery (explore) & 2-immersion (limited / pragmatic) 3-connect <u>Routes to empathy</u> -mirror (personal BIAS – perceptions, judgements) -reconstructive (pragmatic imagination, constructive process, BIAS commission (egocentric, omission – one-sided view))
[Peer feedback]	Deeper understanding / insight into living scenarios in the city (economic, social, environmental, political) Meaningful place of connection = emotional, physical and mental Personal experience changes the context from physical to emotional (memory and emotive connections)	Deeper understanding / insight Personal connection Cognitive (observation) and emotional (immersive) empathy	Empathy -user centred Limited interaction = question nature of empathy for each other in the process of the workshop (?)	Deeper understanding / insight ALTHOUGH – feels as if students are going in circles with arguments, motivations <u>Empathy</u> Cognitive (observation - activist) and emotional (immersive – member of society) <u>Self-reflection</u> Routes to empathy -recontextualisation – commission – 'get out of architect's mindset – egocentric (challenge of preconceived ideas)

[Reflective essay]	Expanding empathetic horizon -deeper understanding (Themes emerging) Empathy <u>3-Connection</u> (emotional level reflect, create understanding -affective: understand feelings -cognitive: understand meanings Routes to empathy -from mirror to <u>reconstructive</u> = modal shift -reconstructive -enactment / imagination -replicate experience -constructive process <u>Simulation theorists mindreading</u> - FROM low level (perceptions, emotions) TO -high level (beliefs, desires, hopes, intention)	Understanding deeper - different awareness Expanding empathetic horizon (Themes emerging) Empathy <u>3-Connection</u> (limited emotional level reflect) -affective: understand feelings of customers -cognitive: understand meanings generated through interface and experience Routes to empathy -from mirror to <u>reconstructive</u> = modal shift -reconstructive -enactment / imagination -replicate experience -constructive process <u>Simulation theorists mindreading</u> - FROM low level (perceptions, emotions) TO -high level (beliefs, desires, hopes, intention) – not always clearly articulated <u>How problems are expressed</u> Human-centred -normative dissociation -appropriation -identity formation (users and designer)	Understanding deeper - different awareness, insight Expanding empathetic horizon (Themes emerging) Empathy <u>3-Connection</u> (limited emotional level reflect) -affective: understand feelings of use and interface -cognitive: understand meanings generated through interface – appropriation, control and choice, inclusion Routes to empathy -from mirror to <u>reconstructive</u> = modal shift -reconstructive -enactment / imagination -replicate experience -constructive process CONTEXTUAL MEANING understanding through critical artefacts <u>Simulation theorists mindreading</u> - FROM low level (perceptions, emotions) TO -high level (beliefs, desires, hopes, intention), visible in abstraction in critical artefacts, not articulated in text <u>How problems are expressed</u> Human-centred -normative dissociation -appropriation -identity formation (users and designer)	Understanding deeper - different awareness Expanding empathetic horizon Empathy <u>1-discovery</u> (cognitive) (explore – investigating) -some students were 'trapped' in this phase) <u>2-immersion</u> (C & E) (limited / pragmatic) -Activists (detached) (absorbed) -Member of community (were 'swallowed' into the issues emotionally – lost perspective) <u>3-connection</u> (emotional level reflect continuum) -affective: understand feelings of customers -cognitive: understand meanings generated through direct experience and imagination Routes to empathy -from mirror to <u>reconstructive</u> = modal shift -reconstructive -enactment / imagination -replicate experience -constructive process BIAS – commission (egocentric), omission (exclusion) <u>Simulation theorists mindreading</u> - FROM low level (perceptions, emotions) TO -high level (beliefs, desires, hopes, intention) – not always clearly articulated

[Trajectory to completion]	Routes to empathy: from mirror to reconstructive (see below) Phases of empathy <u>3-Connection</u> (emotional level reflect, create understanding) -affective: understand feelings -cognitive: understand meanings <u>4-Detachment</u> (Knowledge) Insights, increase understanding -students who integrated into exam presentation -faded for the rest of class Routes to empathy <u>-from mirror to reconstructive</u> = modal shift <u>-reconstructive</u> -enactment / imagination -replicate experience -constructive process <u>Simulation theorists mindreading</u> - FROM low level (perceptions, emotions) TO -high level (beliefs, desires, hopes, intention) EXPANDED EMPATHETIC HORIZON	Empathy <u>3-Connection</u> (emotional level reflect, create understanding) -affective: understand feelings -cognitive: understand meanings <u>4-Detachment</u> (Knowledge) Insights, increase understanding -NOT REALLY REQUIRED – NOT FULL EMOTIONAL CONNECTION Routes to empathy <u>-mirror</u> -observation of functional pragmatism (own BIAS - self, judgements, expectations -modify empathy <u>-reconstructive</u> -imagination -replicate experience – immerse self (normative dissociation) -constructive process Simulation theorists mindreading -low level challenged (perceptions, emotions) -increase in high level (beliefs, desires, hopes, intention)	Empathy <u>3-Connection</u> (create understanding) -limited affective empathy (feelings) -cognitive: understand meanings <u>4-Detachment</u> (Knowledge) Insights, increase understanding -NOT REALLY RELEVANT – NO FULL EMOTIONAL CONNECTION Routes to empathy NOT VISIBLE (manufacturing focus)	<u>Empathy phases</u> <u>3-Connection</u> (emotional level reflect, create understanding) -MEMBER: affective: understand feelings -Activist: cognitive: not true internalisation / engagement to understand meanings through [representation / interpretation] <u>4-Detachment [not in affective resonance]</u> (Knowledge) Insights, increase understanding [compromised?] <u>Routes to empathy</u> <u>-mirror</u> – [framing of problems] -observation / immersion, discovery (bias - self, judgements, expectations -modify empathy – BIAS <u>-reconstructive</u> – [dialogue with the situation] -enactment / imagination -replicate experience -constructive process -BIAS: omission (ignorance of one over another), commission (egocentric architects voice) <u>Simulation theorists mindreading</u> -low level challenged (perceptions, emotions) -high level complexity> ambiguity> (beliefs, desires, hopes, intention)
[Post feedback]	<u>Students:</u> Connected deeper – 3-connection 4-detachment for insight and knowledge <u>Trajectory:</u> Routes to empathy <u>-from mirror to reconstructive</u> = modal shift Reconstructive – BIAS: omission (ignorance due to own bias / judgements)	<u>Phases of empathy</u> 3-connection Deeper understanding, insight 4-detachment Pragmatics and meaning-making (not fully absorbed – detachment possible, also too late in project to fully attach / immerse) <u>Routes to empathy</u> <u>-mirror</u> (user-centred) <u>-reconstructive</u> -imagination, constructive process – meaning-making)	Emotive and affective qualities – 3-connection with issues 4-detachment not needed (no emotional connection) Routes to empathy <u>-mirror</u> (user-centred observation) Pragmatics – functional use, user-object interface Routes to empathy <u>-reconstructive</u> -imagination, constructive process	<u>Empathy</u> -attention – stays within observation (cognitive empathy) – detached as (ACTIVIST – new word proposed – CHAMPION or ADVOCATE) <u>Routes to empathy</u> <u>-mirror</u> – observation, immersion: own BIAS judgements -modify empathy – BIAS <u>-reconstructive</u> Replicate experience, constructive process [= co-development of problem-solution] Dialogue with the situation -BIAS: omission (ignorance of one over another), commission (egocentric architects voice) <u>Simulation theorists mindreading</u> -low level challenged (perceptions, emotions) -high level complexity> ambiguity> (beliefs, desires, hopes, intention)

[Alignment with ethos of school]	<u>Extending:</u> Empathy – connection, relation, association -expanding empathetic horizon Deeper understanding and insight	Deeper understanding and insight	Affective empathy (emotional) – connection to deeper understanding and insight	Empathy – cognitive and emotional (expanding empathetic horizon) Human-centred design focus

challenge : shift

	b1 UP	b2 UJ	b3 GDC	b4 SAIC
[Problem statement]	Emotional response to real-life context (not usually the case) Extending understanding of site for purpose of virtual project building (past MARCH student design proposal)	Real-life project – pertinent customer requirements identified in framing	<u>Challenge</u> Difficulty to connect with workshop intent Challenge to identify issues of concern / wicked problems Unfamiliar nature of workshop approach -student non-responsive at the start	<u>CHALLENGE</u> PROVOCATION -not solving problems REPRESENTATION <u>Topics emerging:</u> -liminality and transience -power and control -territoriality and presence <u>Themes emerging:</u> -empathy -meaning-making -social agency -urban condition IDENTITY / BELONGING
[Keywords]	Focus on essence of embodied experience	Potential identified (vs problems in problems statement)	<u>Challenge</u> of capturing essence with keywords overshadows shifts	From social processes to meaning-making
[Vignettes]	Represent binary condition in the city: -CITY: disconnected from its people [trapped condition] -PEOPLE: life = connections = spirit [vital mind-set] (appropriating ill-supported Infrastructure)	Thinking in a different mode to text THEMES -meaning-making (id and value) -memory and interaction -associations – human-centred	Challenge to generate vignettes	[None]
[Critical artefacts]	PROVOCATIVE REPRESENTATION (themes emerging) -authenticity -real-life conditions / scenarios -judgements / mind sets to change -importance of process (over product) -small change (bottom up) -self-correction, self-reflection -impermanence of things	Abstraction as aim DISRUPTION – MAKING (catalyst for workshop trajectory) Free, spontaneous vs anxiety, uncertainty at start Different process to normal familiar studio practice WAY OF THINKING perspective, reflective, critical	HUGE SHIFT IN THINKING AND ENGAGING -connection to making process -second life materials elicit spontaneous responses -no judgement -free expression <u>Themes emerging from MAKING:</u> -Process -Making and materials -Human-centredness	Exploratory process – no aim of creating a product -process driven PROVOCATION <u>CHALLENGE</u> Modal shift

[Peer feedback]	Themes emerging (id formation, physical / social significance, meaning-making and interconnectedness, social identities)	Only half class documented comments (seems as if not a normal occurrence)	Limited student feedback (written and interaction) -notes only for 3 students	Verbal comments only Ideas well framed ALTHOUGH – feels as if students are going in circles with arguments, motivations <u>CHALLENGE</u> <u>Self-reflection</u> -visual translation of ideas -making intangible concepts / issues visible <u>Themes emerging</u> -think of issue (framing / focus) -approach (suggesting / pointing out -process (sequence) -translation (representation, interpretation)
[Reflective essay]	PERSONAL ACCOUNTS OF CHANGE (half the class noted a shift in some way) - perspective of user - contextual meaning -immersion -enable what already there -bottom-up approach -vision / potential unlocked -agency - HCD Quarter of class deliberate integration of workshop into exam work SHIFT in cognitive, creative and ethical development M > CR TIME: makes things visible (Kirsten) Methodology – intentions shifted Added new meanings Unravel abstract process Challenge self – depth and complexity	SHIFT – HOW problems are expressed CONNECTEDNESS ABSTRACT APPROACH TO CREATIVE INQUIRY Importance of human / social interaction SPATIAL DESIGN NOT RESTRICTED TO FOUR WALLS, RATHER SOLVING AN ISSUE TO BREAK DOWN COMPLEXITY -understanding TESTING – SPECULATIVE INQUIRY	<u>CHALLENGE</u> -PRECONCEIVED IDEAS -represent intangible with visual translations SHIFT -outcome based replace by narrative focus -goal orientated at first -then created without goal or product in mind Became ENGAGE / CONNECT <u>Themes emerging</u> -human-centred approach -meaning-making -social agency -fluid, temporary, flexibility conditions <u>SHIFT FROM PROBLEM STATEMENT =</u> ¾ disconnected voice at start TO 99% connected voice at end INCREASED ENGAGEMENT AND CONNECTEDNESS [critical artefact making catalyst]	SHIFT <u>Challenge</u> -perspective and approach -speculate and to question

[Trajectory to completion]	Process – reverted back to conventional approach and attitude to the design process Richness faded as a result Complexity of interpretation became superficial and predictable Technical requirements of modules overshadowed the insights and depth of understanding Empathetic horizon expanded, but not explored to the fullest	MEANING-MAKING -to consumer -to process of making -abstraction (meaning without literal objects) PEER ASSESSMENT -incorporated into final design FOCUS Meaning (something of value) vs aesthetic (Nadene)	Majority of students -no apparent link to workshop and final design development Besides creative use of materials for prototyping process Except students who challenged the aim and purpose of the luminaire – addressing wicked problems	CHALLENGES TO OVERCOME (EXTERNAL COMMENTS) -own criticality required -not engaged enough -lack theoretical support -to develop further -determine focus -theory suffocating creativity -determine perspective (point of view) and message -explore media appropriate to represent issues IMPORTANT NOTE Challenging issues in project scope, interpretation, and representation prove maintain to be a challenge throughout – students manage to address some matters, but own intentions are not seen in the same light as the externals
[Post feedback]	Overcame barriers Generate meaning in spaces Express and association Material and detailing - associations	Emphasis not only on aesthetics -but also meaning-making Half the class provided post feedback	Research as starting point ENJOYED THE WORKSHOP However, major disruption / provocation to familiar, conventional studio practice Future consideration 40% of the class <u>FOCUS</u> -from task lamps, to atmospheric lighting -from light as object, so light becoming spatial	CHALLENGES TO OVERCOME (EXTERNAL COMMENTS) -own criticality required -not engaged enough -lack theoretical support -to develop further -determine focus -theory suffocating creativity -determine perspective (point of view) and message -explore media appropriate to represent issues INTENT FOR SHIFT NOT TRULY OBTAINED – contradictory views by students and external <u>Student feedback</u> Understanding of thinking process Production abilities Creative freedom
[Alignment with ethos of school]	Meaning-making Agents of change – [citizenship] <u>INSIGHT</u> Need to reach Commitment position 7 (Perry) Active experimentation (Kolb) Activist (Honey & Mumford) <u>FOR CITIZENSHIP FORMATION</u>	Meaning-making	Meaning-making Social agency Research as starting point	Citizenship Agents of change

ADDENDUM E: Biopics background and context

Below is a description in the four biopics investigations, which includes an outline of the following: the design brief of the active studio project, the role of the researcher, the workshop situation within the studio accommodation and the impact of the workshop on the completed design project. In addition, the impact moments identified in each biopic investigation are presented according to the qualitative data analysis and threshold concepts identified. Lastly, the relation of the disruptive activities and transformative focus of the workshop is considered in relation to the ethos of the school.

Consider **Addendum E** in conjunction with *PART 1 – Detailed biopics overview* (pages 131-142) and *Table 6-1* (page 131) in *Chapter 6 Biopic Investigations*.

Biopic 1: public university_b1

Design brief of active studio project: corporate office in CBD

The design brief for b1 is a corporate office design project, which considers agile workplace principles. The context is situated in the Pretoria CBD and a virtual building (an architectural project from a past MProf student) is used as the site. The brief requires students to identify a client informed by the mapping and contextual documentation and analysis of the context. This process is informed by a walk-about in the city between 4pm and 6pm on a winter's day. This immersive embodied experience provides a first-hand encounter of the realities of the city, as it shuts down at night. The two-hour walk-about stretches into the evening, as it is already dark returning to the starting point.

The design project is contextualised by the development of an urban block vision and framework by the interdisciplinary student teams (interior, landscape and architecture). Students spent two weeks familiarising themselves with the context, obtaining an intimate understanding of the unwritten and intangible scenarios, conditions and experiences they encounter. They formulate a grounded insight of the challenges of the bigger design concerns, framed by their personal points of reference. The urban block vision or framework the group adopts, outlines five points of importance as background to the design project: 1) connectivity to and of the city, 2) community engagement, 3) meaningful urban places, 4) greening the city, and 5) social inclusivity.

The brief requires students to interpret the corporate identity and culture of the selected client into a contemporary agile workplace design, taking into account the urban framework, to enable social interaction and meaningful relationships. The students' immersive experiences guide the selection of clients, as the companies proposed are all connected to larger urban issues in some way, being local start-ups, NGO's or community initiatives of corporates. These selections are informed by the students' direct perception when identifying the potential of the city, its people, their experiences and the realities of living in an interconnected network of urban flux. This is particularly noteworthy, as visualisation and imagination are required to make connections to the virtual building in the context.

Role of the researcher

As studio coordinator of the group, the researcher is directly involved in the studio and as a result, the students trust the focus and purpose of the workshop, regardless of its unfamiliar approach and activities. They embrace the disruption (emotional, cognitive and creative) and engage freely, although they might not always have been comfortable with the process. Because they are familiar with abstraction in design, due to other projects during the previous semester, they allow the process to unfold and to delve deeper into the design inquiry. They are participants not only contributing in the workshop as design research, but also participating in order to further their personal development. As such, the researcher performed her normal activities in the studio as an insider. Student interaction is a fluid process, as they feel at ease to connect with their peers. This studio atmosphere makes a positive impact on engagement and connection between students and the workshop activities. This is a familiar place where no judgements are passed, and as a result, students feel comfortable to express and share freely.

Studio accommodation and workshop situation

During the time of the workshop, the Boukunde building was renovated and the department temporarily re-located to the Groenkloof campus. The studio environment was situated within 'shed-like' structures, with large open volumes, good natural light and roller-shutter doors that open to the expansive gardens of the campus grounds. The interior arrangement of the studio allows each student adequate dedicated workspace. On the cold winter's morning, heaters ensured a warm studio and an informal coffee station for a hot drink before the activities began. During the morning, the roller shutter doors were opened and students moved freely between inside and outside and created their own workspace within the familiarity of their everyday studio setup.

Impact on completed design project

The impact of the workshop on the studio projects has limited effect. Most students consider the selection of a client in relation to the workshop activities and do not consider the concepts and approach in more depth. Some students follow a user-centred approach and focus on the social, dynamic conditions of living over static design expressions. Meaning-making in design also receives attention in selected projects where specific materials and personal relations to details are considered. In instances where the workshop approach is lost, students revert to a conventional spatial design approach. As a result, the richness fades and complexity and interpretation become more superficial and predictable. However, students show an awareness and concern for others on deeper levels, but the presentations show little evidence of its exploration and development, beyond the identification and selection of client. A good contextual understanding becomes visible, but it is not translated into a larger contextual meaning-making. Their own bias remains evident, demonstrating the difficulty to shift points of view and perspectives in the context of the larger design project.

The students that demonstrate an immersion in the project, which is derived from the workshop investigation, are able to form a connected inquiry. It seems that they are able to emotionally detach

from the process, resulting in deeper insights due to an objective understanding. Shifting between various personas and different ways of working assist the journey of transformation. Students are able to make conscious decisions to benefit the lives of people in other ways, through intangible means and on deeper levels.

Impact moments

The impact moments and threshold concepts are instances in the workshop and design project where small, but noticeable transformations are observed.

Table A: *b_1 consolidated impact moments*

Impact moments	Threshold concepts	Related literature
Sq_1 disruption : dissociation		
Emotional confrontation in the city – (prior experience)	Emotional disruption	Worldviews Ontological perspective
Imagination of self as city dweller – (problem statement)	Perspective taking , empathy Shifts between personas	Wicked problems Normative dissociation
Distilling essence and focus project – (keywords)	Contextual awareness Appreciative inquiry(potential)	Contextual meaning Abductive reasoning, framing
Zoom into micro scale encounters – Fluid scenarios (vignettes)	Intimate interactions , interpretation of conditions and situations Deep engagements	Spatial agency, modal shifts Expanding empathetic horizon Normative dissociation
Ways of engagement (process – ‘how’)	Emotional-cognitive shifts	Modal shifts Dialogue with the situation
Sq_2 human-centred approach and empathy		
Symbolism and abstraction (representation)	Transferral of understanding Metaphor	Discursive design Contextual meaning
Association and connotation (material use)	Meaning-making and message Transference of new meanings	Disruption (not solving problems) Connected / engaged learning
Process and approach Second life materials (critical artefacts)	Provocation Social commentary Design association and meaning	Wicked problems Dialogue with the situation Discursive design
Modal shifts (design actions)	Transactional encounters	Perspectives
Personal experience (small scale observations)	Making sense, insight Affective-cognitive shifts	Transformative learning
Sq_3 transformative engagement and other design agendas		
Walkabout in the city (prior experience)	Emotional attachment Connected immersion	Connected knowing Normative dissociation Disruption
Identifying potential (problem statement)	Imagining self as urban dweller Positive engagement	Normative dissociation Abductive reasoning Appreciative inquiry
Distilling the essence of the project (keywords)	Reframe design intentions	Framing Dialogue with the situation
Perspective shifts	Modal shifts Reaching beyond symptoms	Normative dissociation Wicked problems
Thinking and making abstractly (critical artefacts)	Symbolism Meaning-making	Discursive design Wicked problems Dialogue with the situation
Deep engagement with process (process driven)	Connected learning Contextual immersion	Contextual meaning Citizenship; discursive design Discursive design
Sharing with peers (bias, judgements)	Challenge personal perspectives World views	Points of view Habits of mind

Post studio project		
Emotional detachment	Perspective shifts	Normative dissociation
Objective stance after immersion	Human-centred design	Frames of reference
Imagine self as user	Empathy	Expanding empathetic horizon
	Design awareness	
Association and connotations	Meaning-making	Contextual meaning
Dialogue with self, process and challenging matters	Engaged learning	Wicked problems
	Connected knowing	Transformative learning
Commitment to issues	Agency	Design citizenship
Challenge bias	Judgement	World view

b1_threshold concepts

In biopic one, threshold concepts relate to broader societal issues and challenges that are contextually bound and experienced. No direct reference to workplace design or agile office design considerations feature anywhere in the workshop engagement. Instead, students are immersed in the city and reliving their embodied experiences. Could this be why only a number of them actively expanded the refocused approach in the design project? Nevertheless, threshold concepts reveal noteworthy findings, albeit mostly in the context of the workshop.

Transformative (shift perception, values, attitudes)

- Contextual meaning; connected knowing

Irreversible (concepts change)

- Perspectives; spatial agency
- ‘feel’ and ‘act’ to introduce to ethos of school

Integrative (not previously known, new information or meanings)

- Workshop ‘forces’ students to confront issues; worldviews; perspectives

Troublesome (reveal previous preconceptions)

- Contextual meaning – emotional disruption

Bounded (reconstruct worldviews)

- Refocus design agendas; citizenship designers

Relation to ethos of school

Considering the ‘think’, ‘feel’ and ‘do’ triad (Fisher & Clarke 2012) of engagement promoted by the department, the workshop shows that most students struggle to sustain ‘feel’ into the design projects. Those that made connected links benefitted most from the activities. Students express the value of engaged learning, although it is mostly contained in the context of the workshop. This attitude aligns with the department’s newly established Unit for Urban Citizenship. The unit introduces engaged learning and participatory design research projects, where students are encouraged to become design citizens and activists for design making positive change. Normative dissociation also proves useful, as students are adopting and respecting different opinions and perspectives, to reveal new design agendas.

Biopic 2: comprehensive university_b2

Design brief of running studio project: convenience store in suburb

The brief for the active studio project for b2 focuses on the design of a neighbourhood convenience store in a suburban area and students are required to propose a familiar site as context. The client is a national brand and the project encourages student-client interaction, simulating a 'real-life' project from client briefing to interim meetings and design presentations. The standard programmatic requirements for conventional convenience stores are complimented by the inclusion of a local aspect inspired by the immediate context. The purpose is to inform the design conceptualisation of the new interior image and spatial articulation of the brand. Costing and budgeting are added realities to consider in the project.

Role of the researcher

Although the researcher was received with excitement during the introductory lecture two weeks prior to the workshop, students still experience her as an outsider or visitor to the studio. The unfamiliar perspective and ways of working introduced in the workshop, adds to this experience. Regardless of these emotions and feelings, students embraced the activities and fully participated, whether they felt comfortable or not. The researcher was a silent observer on the day and did not interfere in the activities, unless there were questions. Students responded spontaneously towards a request to provide post workshop feedback and they shared honest experiences and opinions. The strong peer interaction alleviated the perceived pressure of the researcher's presence. Regardless, they participated with rigour and enthusiasm.

Studio accommodation and workshop situation

The workshop took place in the interior programme's model building workshop, a shared space between the different years of study. On the day of the workshop, three desk clusters are appropriated for the duration of the session, and as students arrive, spontaneous groups are formed. No interaction is observed outside the groups, except during the selection of second life materials from the communal tables.

Impact on completed design project

Post workshop feedback reveals a logistical issue regarding the relation between the design project of the convenience store and the workshop. The timing of the workshop three weeks into the project (duration of project four weeks) is not ideal. As a result, it did not provide adequate time for students to immerse themselves in another way of thinking and engaging as part of the larger design process. For the 'plug-in' addition to have more effect, implementation within the first week of concept development is more suited. Nonetheless, some students report that the workshop made a difference in some way.

Impact moments

The impact moments and threshold concepts below show instances in the workshop and design project, where small but noticeable transformations occur. Some students made specific reference to aspects they felt made a difference in their work, especially to connect to the users' needs more directly.

Table B: b_2 consolidated impact moments

Impact moments	Threshold concepts	Related literature
Sq_1 disruption : dissociation		
Imagine self as customer (problem statement)	Cognitive disruption Emotional activator	Normative dissociation
Contextual exploration and imagination (keywords)	Contextual observation	Contextual meaning
Thinking in images (vignettes) – catalyst	Representation of relational conditions Dialogue with the situation	Modal shifts Expanding empathetic horizon Engaged learning
Disruption – cognitive, affective, creative	Shifts between personas Imagination and observation	Dialogue with the situation Engaged learning
Sq_2 human-centred approach and empathy		
Materials potential (second life objects)	Association and symbolism Representations and message	Discursive design provocation
Adopt view of customer Shift perspective	Expanded empathetic horizon Connected knowing	Normative dissociation Engaged learning Modal shifts
Reflection and interaction (peers and process)	Modal shifts Meaning-making	Contextual meaning Transformative learning
Process and approach Not solving problems	Disruption Abstraction	Discursive design Message and meaning
Personal experiences (feedback)	Immersive / imagined experiences Constructive criticism in pairs	Connected knowing Share, grow, transform
Sq_3 transformative engagement and other design agendas		
Disruption – cognitive, affective (problems statement)	Adopting customer perspective and experience	Expanding empathetic horizon Perspective change Normative dissociation
Articulating the essence of project (keywords)	Framing the project	Framing Appreciative inquiry
Modes of engagement Design actions (vignettes and critical artefacts)	Exploratory learning Abstraction Association with materials	Discursive design Modal shifts Dialogue with the situation (vs solution led goal analysis)
Discover depth and complexity	Affective, cognitive relations equilibrium	Separate – connected knowing balance
Post studio project		
Immersed engagement with process	New perspectives Other ways of inquiry	Dialogue with the situation Modal shifts
Stages in the process	Break down complexity	Phase model Dialogue with the situation
Adopt view of customers	Absorb in the situation Attentive imagined observation	Normative dissociation Expanded empathetic horizon

Materials and associations	Symbolism and connotations Meaning-making	Discursive design Message, representation
Articulate design issues (cognitive, emotional)	Reflective practice Active experimentation	Problem framing Critical reflection

b2_threshold concepts

Threshold concepts emerging from b2 do not provide a full scope for intervention, due to the late timing of the workshop. As a result, the *bounded* concepts cannot be identified beyond students' design awareness and intent. However, students do display a deeper understanding of design complexities in general.

Transformative (shift perception, values attitudes)

- Customer focused; expand empathetic horizon
- Critical reflection and peer interaction

Irreversible (concepts change)

- Perspectives; choice and agency

Integrative (not previously known, new information or meanings)

- Emotional and experiential conditions related to convenience store design
- Abstract meaning-making

Troublesome (reveal previous preconceptions)

- Immersive, imagined experiences
- Programmatic contextual knowing / meaning

Bounded (reconstruct worldviews)

- Awareness of preconceived ideas ('acting on' not yet visible due to late timing of the workshop)

Relation to ethos of school

The convenience store is an example of a project that connects to the city. This connection offers students opportunities to extend innovative thinking and ideas regarding human-environment needs. The familiar process of design inquiry students are used to, are disrupted with the workshop that opens another door to ways of engagement in the studio. Students are exposed to 'connected' actions that are immersive, interactive and hands-on. Because of this, students find their own interpretations and understandings into deeper insights into relational, emotional, pragmatic, contextual and social conditions. The ethos of the school is extended to also consider the intangible and behavioural aspects related to spatial design, through other ways to enable engaged learning.

Biopic 3: private design college_b3

Design brief of running studio project: luminaire design, open-ended use

The studio project brief of b3 is an energy efficient luminaire for a self-defined domestic interior. It dovetails with the requirements for the 2019 *PPC Imaginarium Awards*, emphasising innovative concepts and prototypes using PPC concrete. Students are challenged to “think laterally” and to question what light is, how it shapes spatial environments and express meaning, mood and atmosphere. The project objectives are to work with perception and deception, experiment with the unknown and with light as a medium. It has strong structural aims and focuses on material and technical concerns, in conjunction with prototyping, in the design process.

Role of the researcher

The researcher is experienced as an outsider, an intruder. The students are sceptical about the workshop process, facilitated by someone they do not know or trust. They question the intent of the activities and its alignment with their own studio leader’s expectations. They are furthermore concerned with who will be involved in grading the projects and to what degree the stranger who introduced strange and intimidating ideas into the projects will be involved. As a result, students keep their distance and choose not to interact with the researcher. They do however participate with intent and purpose.

Afterwards, the studio master and researcher discussed the potential difference in students’ experiences of the workshop should the studio master have facilitated the activities himself – someone they know and trust. Perhaps in this way, they would have been sensitised to another way of design inquiry quicker and with less anxiety. When a stranger presents something unfamiliar, they are outside their comfort zone. If they can challenge themselves beyond the discomfort of the disruption, they can increase their personal growth by embracing other design skills, to supplement the familiar conventional design process.

Studio accommodation and workshop situation

The studios at the school are shared between interdisciplinary groups of students of the same year, at different times during the week. Workspaces have a group cluster format where each student has a self-assigned workspace to support group interaction. The workshop takes place between 8h00 and 12h00 in summer time, during load shedding, which makes arriving on time challenging for students traveling long distances. Everyone needs time to settle down after arriving, after which the social conditions in the studio are relaxed. The degree of participation of students is noteworthy, with the majority actively immersed in the process. However, there are some showing disinterested for most of the workshop and as a result, do not produce enough to write for a critical reflection.

The studio coordinator reported afterwards that the researcher was perceived as an outsider, an intruder, someone the students did not really trust. This was due to the unfamiliar activities and focus of the workshop, outside the norm of the students’ familiar studio process. Students perceived it as foreign and questioned the relevance, importance within the context of their luminaire design project.

Impact on completed design project

The interim critique midway through the design project reveals no relation to the workshop, besides exploration of alternative materials for prototypes. The designs are mostly shape driven and students investigate energy efficient lighting technologies. Feedback from the studio master reports that students enjoyed the workshop, as it fostered stronger iterative and critical reflective practices compared to the past two years. Students are more critical of their own processes. They focus on how the prototypes can be done, indicating their emphasis on process. In addition, they have a stronger research focus. Ideas are less predictable and more manufacturing ready. The focus is not only on user-object interface, but also on user-environment interface. Students consider how light becomes spatial, how people use light in space and its effect on an environment.

The impact of the workshop on the final luminaire prototypes indicate a variety of responses, ranging from conventional luminaire designs, to luminaires with spatial and atmospheric effects and human-object interface designs. The initial richness and complexity expressed in the workshop mostly relates to social matters, equity and inclusivity. This fades during prototyping for the design presentation and is replaced by an emphasis on manufacturing, material choices and detailing. Students refocus their attention to product as outcome, which overshadow the deeper explorations they uncovered in the workshop. The anxiety and pressure of making is compared to the unsettling disruption students experienced at the start of the workshop session. Only a quarter of the class complete prototypes, which address complex societal issues and integrate the workshop attitude and approach from their own accord. Concepts address health, physical and emotional wellbeing of people of all ages.

The transition from workshop to final prototype is therefore not easy. It takes time for thinking and actions to transform from initial indecisiveness and scepticism, where students are suspicious to make something without a result in mind, to engaged interaction. Students show awareness of personal intent versus intuition. However, reacting on that in the context of the luminaire prototyping remains a challenge.

Impact moments

The impact moments and threshold concepts show small but significant transformations, where the initial anxiety is replaced by an appreciation of learning new skills and ways of doing.

Table C: b3_consolidated impact moments

Impact moments	Threshold concepts	Related literature
Sq_1 disruption : dissociation		
Cognitive disruption (problem statement)	Contextualising luminaire in larger design discourse	Contextual meaning Normative dissociation
Distilling essence of focus project (keywords) – cognitive disruption	Default to the familiar Barriers to engagement / development	Dialogue with the situation Framing the project Developmental psychology
Creative and relational upset (vignettes)	Barriers to engagement Formal, shape driven	Attention based normative dissociation Mirror own bias, judgements (empathy)
Ways of engagement (process – 'how')	Disruptive practice Unfamiliar studio engagement	Disruption Barriers to engagement / development
Influence of design project brief	Dichotomy between product-driven focus and scenario-based inquiry	Transformative learning Modal shifts; perspectives Normative dissociation
Sq_2 human-centred approach and empathy		
Second life materials provocation	Meaning-making, symbolism	Discursive design Creative disruption
Free exploration (process driven)	Contextual awareness Co-development of problem-solution	Wicked problems Contextual meaning
Absorbed in process	Empathy Engaged learning	Expanding empathetic horizon Transformative learning
Relational conditions	Interrelationships	Connected knowing Normative dissociation
Focus on intangibles (peer interaction)	Dialogue (situation, process, peers) Empathy	Meaning-making Transformative learning
Sq_3 transformative engagement and other design agendas		
Focus on process (not product)	Cognitive disruption Narrative focus	Discursive design Message and representation
Anxiety and apprehension (problem statement)	Cognitive disruption Critical reflection	Points of view; bias Separate-connected knowing
Framing the issues (keywords)	Dialogue with the situation Reflective practice	Normative dissociation Framing; dialogue with the situation
Relational conditions (vignettes)	Situational awareness Empathy	Modal shift, human-centred focus Contextual meaning
Use of second life materials (critical artefacts)	Creative disruption Association and connotation	Modal shift; Meaning-making Discursive design
Connected engagement to workshop Perspectives	Socially inclusive Spatial agency	Engaged learning Citizenship
Post studio design project		
Prototyping (luminaire)	Explorative learning Modification of goals	Co-development of problem-solution Connected knowing
Abstraction and symbolism	Different views / perspectives Modal shifts	Normative dissociation Discursive design
Intimidating new process	Reflective practice Points of view	Modes of engagement Dialogue with the situation, Iteration
Deeper meanings in manufacturing	Meaning-making Complex design issues	Contextual meaning Situational awareness

b3_threshold concepts

Due to the nature of the design project brief, the bounded threshold concept remains hesitant at this stage. The emphasis on a product as outcome stifled an immersive and connected engagement. A quarter of students follow through on the workshop approach by integrating the design attitude into the prototype and final design proposal.

Transformative (shift perception, values attitudes)

- Situational awareness
- Reflective practice

Irreversible (concepts change)

- Dialogue with self, situation, challenges, process

Integrative (not previously known, new information or meanings)

- Perspectives
- Meaning-making through engaged learning

Troublesome (reveal previous preconceptions)

- Modes of engagement; process-driven
- Disruptive practice

Bounded (reconstruct worldviews)

- [Spatial agency; citizenship]

Relation to ethos of school

The school's emphasis on user centred design is complemented by the unusual workshop activities which introduces emotive, intangible and affective aspects. By shifting modes of engagement, students become comfortable to pursue iterative and explorative processes that address other design agendas, albeit in their own small ways. The 'process of making' becomes the context in this project. This is made possible through manufacturing, testing, reflecting, contextual consequences, and material and technical research. The workshop highlights the realities of living and its effect on lighting considerations, which increases the understanding of users in an environment. Students are challenged to explore design scenarios that are responsive, and some move beyond predictable and superficial reactions. They address complex design matters in order to make change through design.

Biopic 4: independent school of art and design_b4

Design brief of running studio project: artefact for exhibition setting

The *Critical Artefacts Seminar-Studio* is an interdisciplinary studio that combines senior undergraduate and [post] graduate students. It deals with body-space spatial concerns, object-space relationships, and the "ideas of temporality, gesture, identity, ownership and the social shaping of technology" (Project brief 2019). The studio's intent is to search for sophisticated tools to translate concerns as an artefact that critically engages the audience on a matter, instead of finding solutions. Pluralistic research methods are encouraged, combining empirical investigations and speculative explorations as biopic investigations (Critical Artefacts Seminar-Studio Course Material 2019).

The project requires students to define a matter of concern, giving commentary on the desire for, consumption of and relationship with material things. The project scope includes a project statement, a conceptual framework poster to visually communicate the matter and a critical artefact that abstractly makes the concerns visible in the public domain, for public and academic critique. This falls within the domain of discursive design (Tharp &Tharp 2018). The project stipulates the selection of one of the specified categories for the critical artefacts:

- 1) self-sufficient environments; 2) disobedient objects; 3) disruptive interactions; 4) cannibalistic machines; and 5) reflective conduits (Critical Artefacts Seminar-Studio Course Material 2019).

Role of the researcher

The researcher experienced feeling like an outsider or intruder during the workshop. Students continued with their work independently as part of the larger studio project. However, when the researcher engaged with students one-on-one, the issues of concern they identified as well as the difficulty they experienced to translate ideas into the project artefacts, were expressed. The interactions were constructive, although students remained aloof and apprehensive. Students responded politely and in detail, although with various levels of hesitation, as experienced by the researcher. Only one student integrated an aspect discussed during the course of the workshop at the presentation at the end of the evening. The rest of the students were reluctant or did not seem to consider these aspects in the presentation. It is presumed that the students were already on a path of investigation and did not 'trust' or allow an outsider to give another opinion. As with b2, the researcher speculates on students' perception of the validity of other opinions offered by an outsider. The reliance on the trusted opinion of their own studio master seems to be the only one that really 'counts', as was evident in the honest and spontaneous feedback in the reflective essays.

Workshop situation and studio accommodation

The researcher visited the school in March 2019 as an invited facilitator, to conduct the workshop as part of the critical artefacts project during the mid-term presentation. The workshop takes place during normal studio hours, 6pm to 9pm, however, the activities continued until 10pm during a very cold winters evening. On arrival, coats are neatly hooked; scarves and beanies removed and hot water is ready for a cup of coffee or tea. The studio setting is spread over two floors where each student has an individual workspace, away from their peers. Activities are performed independently, with peer interaction limited to the critical reflection at the end of the evening. Through observation, it is noted that students immersed themselves in the process, focusing on complex societal issues they identified.

The workshop is intended to refine the development of projects. During the course of the evening, the researcher spends time with students individually to determine the focus of each project and to reflect on their thinking and process to date. The workshop activities unfold differently to that of the other three biopics, due to the project's disruptive nature. Students firstly reflect on the issues identified in their work and focus on finding ways to make these visible in an abstract way, without solving the issues. As part of the preparation for the workshop, they complete a critical self-reflection, listing keywords and

document specific difficulties they are experiencing at that moment. These data sets are used as the problem statement, keywords and first critical reflection to correlate with the other three biopic investigations, and for consistency in the data. The initial posters presented at midterm, outline the matters of concern and extend the scope of data set. No vignettes are created, only selected diagrams. Only a couple of students choose to engage in the making of critical artefacts and only two integrate second life materials to explore abstract and symbolic exploration as part of the workshop. Students present their process development and conceptual posters at the end of the evening where everyone gives input and feedback.

Impact on completed design project

Due to the close alignment of the workshop to the studio design project, the impact of the workshop is limited. Students find themselves already within a 'disruptive' situation and the workshop activities become an extension. It is noteworthy that the students do not easily find an 'exit' from the disruption, even if an outsider's opinion is presented as an alternative and objective voice to deepen their understanding. The external examiner observes the same by noting issues related to critical reflection, critical theory, visual representation, project focus and design engagement.

Impact moments

Impact moments and threshold concepts are highlighted as a personal challenge; however, some find an expanded creative expression through the critical inquiry.

Table D: b4_consolidated impact moments

Impact moments	Threshold concepts	Related literature
Sq_1 disruption : dissociation		
Cognitive disruption (project statement)	Personal bias – commission (egocentric), omission (ignorance)	Worldviews Ontological perspective
Emotional confrontation (project statement)	Connected – separate knowing Perspectives	Procedural knowing Wicked problems Normative dissociation
Distilling essence and focus project (keywords)	Provocation Disruptive practice	Contextual meaning Framing; wicked problems
Perspective taking and bias (point of view)	Frame of reference Identity of designer	Modal shifts Empathetic – cognitive, affective
Ways of engagement (one dimensional – no vignettes)	Modal shifts Emotional-cognitive shifts	Modal shifts Dialogue with the situation
Sq_2 human-centred approach and empathy		
Making visible abstract or intangible concepts	Associations and connotations Symbolism	Discursive design Meaning-making
Connected-separate learning (challenge)	Emotional immersion Cognitive detachment	Expanding empathetic horizon Normative dissociation
Perspective shifts (challenge)	Modal shifts	Worldviews Frames of reference
Ways of engagement Design activities	Modal shifts Connected learning	Engaged learning Dialogue with the situation

Disruptive focus	Time and connection	Connected-separate knowing
Duration	Empathy	Contextual meaning
		Situational awareness
Sq_3 transformative engagement and other design agendas		
Project as provocation (disturbing <i>status quo</i>)	Cognitive, affective, creative disruption Design intent	New design agendas Citizenship
Articulating project focus (problems statement and keywords)	Reframing design intentions	Framing Situational awareness
Perspective shifts	Dialogue with the situation	Modal shifts
Assuming role of the user	Reaching into complex matters	Perspectives
Thinking and making abstractly	Symbolism	Discursive design
Not solving problems	Abstraction	Meaning-making
Interpretation and representation	Theory entanglement	Ways of engagement
What is the message	Emotional attachment	Perspectives
Deep engagement (member or activist)	Connected-separate learning Personal bias; Empathy	Procedural knowing Frames of reference
Post studio design project		
Emotional attachment (connected, ignorant of other views) member > activist	Perspectives Subjective immersion Situational awareness	Normative dissociation Modal shifts Contextual meaning Dialogue with the situation
Cognitive detachment (separate, egocentric views) activist > advocate / champion	Perspectives Designer bias and judgement Routes to empathy	Normative dissociation Modal shifts Expanding empathetic horizon Solution-led goal analysis
Critical and creative inquiry	Design commitment on behalf of others Reflective practice	Citizenship; Agency Worldview; Frame of reference
Engaged design actions (think, feel, act, do, share)	Various design activities Ways of engagement	Modal shifts Abstraction; Discursive design
Theoretical engagement vs Abstract representation	Design discourse Design practice	Research through design Transformative learning

b4_ threshold concepts

Threshold concepts in b4 relate to the disruptive emphasis of the project and the workshop. This upsetting scenario becomes the catalyst for a change in thinking and design engagement. The shift in perception relates directly to the critical reflection of students' own values and worldviews. Considerations that become *irreversible* show their commitment to design engagement and to making an impact through design. Shifts in personas transition between 'connected' and 'separate' learning modalities. This remains a challenge until the end of the design project. The *troublesome* experiences of the disruptive practice have the largest influence on the way students ask questions and reflect on the larger design project intentions. All students realise their responsibility and express commitment to making positive social and societal change, by refocusing their design lenses toward people.

Transformative (shift perception, values attitudes)

- Frames of reference
- Worldviews, ontological change

Irreversible (concepts change)

- Spatial agency
- New design agendas

Integrative (not previously known, new information or meanings)

- Connected-separate knowing
- Expanding empathetic horizon

Troublesome (reveal previous preconceptions)

- Disruptive practice – ways of design engagement
- Discursive design; abstraction without solving problems

Bounded (reconstruct worldviews)

- Citizen designers
- Holistic learning

Relation to ethos of school

Within the school's ethos of 'provocative making, thinking and sharing', the transition in design engagement that proves the most challenging is the shift in design agendas – from problem solving to revealing issues. The students are hesitant to engage actively in the 'making' part of the process and as a result, the representation loses potential complexity and richness. It seems that students battle with 'what to do with the idea of provocation' and 'how to handle the disruption'. Although they are eager and committed to the approach, attitude and process, they are finding their individual ways of engagement.