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 at 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 1896:115).

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 & Weinsten 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

Mezirow (1991)		Cognitive						[modes]	Affective	
		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.