Learning Experience Designs (LEDs) in an age of complexity: time to replace the lightbulb?

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Abstract

This paper describes reflective practice research of the actions taken over many years to address commonplace teaching issues faced in the higher education classroom. Three fundamentally different student learning experiences were ultimately created, each requiring the students to interact with self, knowledge and others in fundamentally different ways. The first learning experience, termed *informational learning*, focuses on knowledge acquisition, confidence building, social interaction and the development of the student sense of belonging. The second learning experience, termed *relational learning*, applies spatial and embodied cognition to develop metacognitive skills. The final learning experience, termed *transformational learning*, emphasises personal transformation brought about by dissonance work at the emotion laden 'edge'. Together the three phases highlight how practitioner Action Research can generate Living Theory through the understanding of the complex, multi-disciplinary ecology of the practice-theory dynamic. The paper challenges simplistic notions of teaching, highlighting how the natural, human and social sciences all contribute to the holistic understanding of the design of learning experiences. The findings have potential for wider application for module and curricula designs.

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INTRODUCTION

Since the distinguished American educational philosopher John Dewey suggested the need for a 'theory of experience' over eighty years ago (Dewey, 1938), theories concerning how humans learn have continued to develop and influence the increasingly sophisticated understanding of the design of experiences *of* and *for* learning. Whilst there are no absolute boundaries to the these significant changes, and with many less prominent undercurrents being influential (see Roberts, 2012), the orientations of the more dominant theories of learning are represented in an epigrammatic, chronological schema in Figure 1 below. The table highlights the continuous discovery of new knowledge that results in changes in conceptions about which aspects of learning and teaching are important in the design and delivery of educational experiences.

Insert Figure 1 here.

Figure 1 shows how the philosophical and epistemological beliefs about the human experiential dimensions involved in learning change over time. As new ideas about learning have emerged, older theories have typically been rejected, however zone E in Figure 1 suggests the emergence of a new 'ecological complexity' or 'revisionary postmodernism' (Sterling, 2003). Holistic, complex syncretisations of theories are alluded to by other authors (Fenwick, 2003; Davis & Sumara, 1997; Hughes & Lury, 2013). Learning is now more widely regarded as an interdependent function of cognition (mind/thinking), social and cultural interactions (with other people/communities), psychology (inner psyche/self), emotions (feelings), and environmental factors (space/place/other-than-human world) (Beard 2016). The design of learning experiences in higher education should ideally reflect this sophistication. This paper presents a glimpse of this ecological complexity (Zone E, Figure 1) reveals a sequence of three learning experience designs that are distinctive in terms of the different ways students interact with knowledge, self and others. The metaphor of LED (learning experience design) is used here to suggest the importance of embracing both new and older ideas (ecological complexity) about how humans learn: the LED bulb is a breakthrough that offers longer lasting bulbs (memory), brighter light (greater understanding), with more efficiency (teacher inputs) than incandescent bulbs.

METHODOLOGICAL CONSIDERATIONS

This practitioner research is a case study relating to the redesign of a specific Unit of learning at Master's level concerned with the study of the evolution of the environmental movement. This research presents a critical reflective account of a personal lived experience (van Manen, 2016) involving a longitudinal study of convoluted teaching transformation processes. A "distinctive 'educational' research methodology" (Whitehead, 2000, 94) of Action Research-Living Theory (Whitehead & McNiff, 2006) is adopted, whereby 'lived experience descriptions of remembered educational experiences' (Pithouse, et al., 2009, 50) are used to generate new thinking about the design of experiences *of* and *for* learning. Whilst the social sciences are regarded as 'currently the dominant form in educational research' (Whitehead & McNiff, 2006, 4), this study exposes a web of intricate relationships between everyday lived practice and the underpinning theories of learning derived from the natural, human and social sciences.

A substantial period of reflection to address my concerns about the effectiveness of my teaching and my need to get 'in touch with the inconsistencies between espoused pedagogical theories and what is actually done in the classroom (theory-in-use)' (Parra et al., 2015, 19). In

this study my data contains the experiential, the embodied, and the emotive qualities of my experience (Denzin & Lincoln, 2003). I do not present 'evidence of what works', rather my underlying question was and remains: '*How do I Improve What I am Doing?*' (Whitehead, 2000, 94). The research illustrates how my practical, creative and reflective processes of action continually 'alternate and interact with critical thinking' (Whitehead, 2000, 95).

Module action plans, teaching notes, and student qualitative and quantitative feedback underpinned a continuous reflective spiral. The short reflective narratives presented in this paper articulate the more significant changes that took place; they are interpretive and subjective, and always distorted to an extent by the personal processes of recollection. The original richness and messiness of the struggle for change is inevitably condensed through the brevity of this paper. Blakie et al. (2010) suggest that often a transformation of the self as a teacher is required before we can transform student learning. Such fundamental change involves working at the 'emotional edge' (Mälkki 2010, 2011), a term originally derived from the work of Berger (2004) as a zone of discomfort relating to the skirmishes between self and other, between knowing and not knowing, at the edge of letting go of old ways, and, simultaneously, at the edge of something new though essentially unknown (Beard & Mälkki, 2013; Mälkki & Green, 2014).

The call to action was triggered by the fact that many, though not all students struggled to grasp the topic complexity: student understanding tended to be overly simplistic, with knowledge acquisition accompanied by varying levels 'ambivalence' (Tomlinson, 2015), a propensity towards surface learning (Marton & Säljö, 1976) devoid of critical evaluation and scholarly passion (Beard et al., 2014). The change process was protracted: subsequent planning and implementation processes took place over fifteen years, from 1993 to 2008. Since 2008 the learning experience designs have been used in lecturer development programmes in several countries.

The Topic Being Studied

The United Kingdom environmental movement forms a part of what is said to be the largest social movement in the world (McCormick, 1989; Pepper, 1984). The module that forms the basis of this case study explores the creation, and development of this movement, and the module descriptor lists the indicative content as: 'analysis of the growth of environmental awareness and of the environmental movement in the UK and internationally; the background to the English legal system and European Union law; the background to the UK town and country planning system, and its relationship with recreation and conservation policies; chronological analysis of the development of environmental legislation, and its underlying socio-economic and political context; and the role of relevant national and international agencies, and other interest groups'. These topics have an inherent complexity as Stocking & Leonard (1990, 4) note, in that 'the environment story is one of the most complicated and pressing stories of our time', involving labyrinthine laws, grandstanding politicians, and a complex interplay of individuals and societies.

RESULTS: THREE DISTINCT PHASES OF DESIGN

The initial teaching problem concerned the creation of experiential approaches to learning that might result in greater student engagement and empowerment. The actions taken to solve this everyday classroom issue are described in short narratives. In seeking to 'go beyond the mere retelling and reconstruction of the experience' I then follow these with my understanding of the theoretical foundations.

Whilst Barnett (2000, 420) rightly argues that 'university knowledge, understood as a pure, objective reading of the world' should be abandoned, surface learning (Marton & Säljö, 1976) was deemed acceptable in phase one, when students were encouraged to focus on getting, storing and retrieving knowledge. The reasoning behind this was that peer relations were considered to be of greater concern at the start of the Unit, when students were required to develop positive learning habits towards collaborative working so as to acquire and develop new knowledge. The second and more difficult challenge was to develop specific pedagogic approaches that would support the deepening of understanding of relational complexity, and this became the practical trigger question for the design of phase two. The practical trigger question for the latter part of the Unit was the question: *So what?* and so a final phase concentrated on action, agency and personal social responsibility.

Phase 1: Beginning: Behavioural, humanistic and social constructivist approaches.

In the early stages of redesign my lectures and seminars became interactive 'lectorials' (Cavanagh, 2011) with increased multi-media content, reduced lecture inputs, and with students spending a considerable amount of time developing a base level of knowledge as prerequisite to later, more complex understandings beyond merely 'knowing'. The students worked in collaborative ways, searching for and sharing information, thus developing their understanding of copious facts about for example: organisations, key individuals, environmental laws, government departments and significant events. These basic facts, covering several hundred years, were fashioned by students into 'factsheets', electronic databases, and other formats. These were exchanged amongst fellow students and later shared and further developed by future students (intra & inter-cohort inheritance). Factsheets were put together on a variety of topics, ultimately becoming thematic booklets. An extensive library of booklets acted as base resources (e.g. a voluntary organisations e-booklet, a legal e-booklet, a protected and designated sites e-booklet); these compilations fostered early levels of critical analysis. These co-production and co-creation tasks to develop 'factual' documents and databases through collaborative peer interaction, whilst being a relatively simple to achieve, were seen as essential to the development of student confidence.

In phase one peer interactions, outlined in Figure 2 below, became quite diverse. Other peer interactional dynamics were introduced later within phases two and three. Peer interaction has increased in popularity over the past 20 years, with 'growing evidence from the literature' supporting its effectiveness (Rowe, 2014, 24). Peer interactions were developed to increase confidence and to support the student psychological need to ‘belong’ (Baumeister et al., 1995). The application of peer pressure, the use of incentives and disincentives, the creation of positive interdependence with students by sharing materials and working towards a common goal, and individual accountability whereby students all contribute to a final outcome are all said to be typical of behavioural and humanistic designs (Bentham, 2002). The emphasis on 'student partnerships', and 'co-production' bestow 'educational value and the development of pedagogically valuable experiences' are also said to be typical of social constructivist orientations (McCulloch, 2009, cited in Tomlinson, 2015, 587).

Insert Figure 2 here.

The second practical design challenge was to move towards a more substantive critical analysis and synthesis at a higher cognitive level (Bloom, 1956) whereby students could grasp the complex inter-relationships of, for example, laws, events, government departments, policies, voluntary bodies and special designated sites, a second phase experience evolved.

Phase 2: Middle phase. Embodied cognition and abstract thought through spatial and relational complexity.

In this second phase the understanding of the topic had to move to a higher (spatial metaphor) level of complexity. Cell (1984, 62) notes that 'when we interpret, we see connections between things, pulling them together into a meaningful pattern'. He continues by commenting on 'our way of seeing things in terms of spatial and temporal relations, what things cause other things to happen, the kinds of purposes that give shape and meaning to our human life.' I sketched out a draft map of some inter-relationships I wanted the students to appreciate, however my mantra 'let the students to the work' gave rise to the creative and practical idea to design an experience whereby the students would collaborate to create such a relational map, and in this way the understanding would become more visible (Ritchhart et al., 2011).

To aid this phase of understanding small groups of students were allocated different research topics to work together on, so as to focus on particular parts of the evolutionary story, such as the emergence and role of (1) the categorization and evolving campaign tactics of the voluntary sector, (2) the evolution of legislation, (3) the influence key events in the UK (such as the Plague, World Wars, Mass Tresspass, voting rights for women), (4) government departments, and (5) site designations for protecting nature or landscape beauty (e.g. National Parks/Sites of Special Scientific Interest). Each topic was colour coded. The appreciation of the connectedness of these topics began as each group began as their own research findings spilled over into the research areas of other groups. In order to further develop a deeper understanding of the relational complexity, I designed a schematic processing experience applied it half way through phase 2.

Initially 'schema' involved the construction of simple topic time lines to allow students to illustrate their own research: higher cognition and communicative competence was enhanced by walking (bodily), and talking (verbal) their findings. This was supported by the use of credit card sized, colour-coded laminated sets of cards with key facts on them such as a law (blue), a voluntary organization (yellow), or significant event (orange), each containing a date. Blank cards were also provided for the students to supplement their time line. Time lines were discussed by one group at a time; other groups listened, watched, reflected on and interacted with their peer groups. Student conversations added 'flesh' to the skeletal format that the cards represented. As the groups placed their cards on a large floor space it became clear that a temporal and spatial match was required as several time lines gave rise to a complex schema. Multiple routes through the cards were described as students walked through and around several of the time lines, giving rise to a collective three dimensional interpretative process that exemplified the interrelated nature of their findings in the dimensions of time, space, and depth (factual to propositional). Thus students became aware of the complex, fluid evolution of the environmental movement: the dissolution of uncomplicated truths from phase one, as uncritically evaluated realities, had commenced.

The resultant colour schema became a symbolic representation, not dissimilar to, but considerably more complex than the visually impressive London Underground map (Schwetman, 2014). As each group walked through time and space abstract reasoning and distinct narratives emerged which were voice recorded and posted online. This facilitated individual navigation of the complexity, enabling the individual development of ideas in preparation for written assignment about the evolution of environmental movements. Observation notes noted that students became more engaged in this cognitive, corporeal and affective experience.

Equipped with this new higher order cognition students became comfortable with ambiguity and fluidity (Davis & Sumara, 1997), referred to by Barnett (2000) as an 'epistemology for uncertainty'. Each student conception gradually became further enmeshed in the understanding of others: the 'collective knowledge and individual understanding are dynamically co-emergent phenomena' (Davis & Sumara, 1997, 119). Student peer conversations surfaced multiple layers of interpretation, including chronological, spatial-relational, multi-dimensional, micro-macro, practical-conceptual, and other analytical patterns. This co-production approach also created a subtle peer pressure.

Embodied and embedded cognition underpins the practical design of phase two and the 'walk-the-talk' learning design (as it became known) facilitated the exchange of information by using graphical schema as an 'extra-discursive' mode of learning (Burr, 2003, 197). Lakoff & Johnson (1999) argue that spatial relations are at heart of our conceptual systems, and that concepts and reason are embodied (see also Gallager, 2005: Lakoff & Johnson, 1999; Woods-Daudelin, 1996; Sheets-Johnstone, 2009). Sensory and motor systems were put to work in service of abstract reasoning (Pinker, 1989); the landscape of spatial-relational 'data' is understood and navigated by storied interpretations involving knowledge creation through a complex mix of interaction (social), talking (oration/linguistic), walking (motor/corporeal), visual schematics (spatial-relational) and abstract reasoning (higher cognition). Such external spatial schema, as Gattis (2001) suggests, support three components of abstract cognition: to structure memory, to structure communication and to structure reasoning.

According to recent neurosocience research by Dolins and Mitchell (2010), the brain area known as the hippocampus plays a key role in this associative, sequential and relational memory. Fortin et al., (2002) argue that any interpretation of a large corpus of data (phase two) tends to place a heavy relational processing load on the hippocampus as the part of the brain responsible for cognitive mapping capacity. In spatial-temporal mapping private, mental conceptualisations are made visible to others so they can be shared, critically examined, and revised. Tversky (2001, 108) argues that 'visualisations have become increasingly important in organising large databases enabling efficient search through them'. Sheets-Johnstone (2009) suggests that phylogenetically and ontogenetically the origins of human thinking lie in movement, and so our brains are wired up for learning in this way.

Ecological epistemology is a useful term to describe phase two design. Coined by Hughes and Lury (2013, 797) the term acknowledges 'the ongoing and dynamic interrelationship of processes and objects, being and things, figures and grounds'.

Phase 3: Ending. Transformation, perspective change, and agency.

With the deeper understanding developed in phase two the students were then required to not only consider how things are, but how they could be, and how they might change (Hughes and Lury, 2013). In this phase there was an expectation that students' would again modify their assumptions and expectations about what they knew (Mezirow, 2000), as the sense of self, in terms of identity, values and belief systems, is opened up for critical scrutiny through an interplay of feelings (affect), thinking (cognitive/epistemological self) and wider life-self (ontological) dimensions (Beard et al., 2014). Instrumental neutrality and emotional ambivalence towards intellectual engagement was lessened as the emotional conditions influence changes in perceptions and beliefs. The self in phase three is 'challenged and ultimately, reconstructed' (Beard & Mälkki, 2013, 30).

In phase three the way students 'interact with knowledge is more emotionally charged' (Blackie et al. 2010, 641). The (re)construction of the student critical voice played a key role

in the 'interactional negotiation of identities and relationships among students and teachers' (Yanuzzi & Martin, 2014, 709). There is evidence that negative emotions inherent in the intellectual struggle can act as 'activating emotions' (Beard et al., 2014), that can give rise to longer term positive emotions. Emotions are also 'intricately linked to social relationships' (Beard et al., 2014) and so high levels of emotion in phase three, particularly anxiety, are scaffolded by the strong peer relationships and the sense of belonging developed in phases one and two. Indeed Mezirow (2000) contends that educators should seek clarification and emphasis on the role played by emotions in transformation as it can be a threatening experience when students move from the relative comfort of simplistic knowledge to the new unsettled feelings emerging about not knowing.

In phase three outward facing complex questions generated a new focus, towards agency and the student sense of their *being* in the world. Emerging issues further problematized the understanding of the environmental movement, necessitating further interrogation of meta-narratives, core constructs, and silenced voices (Ellsworth, 1992). These problems included the trivialisation of nature by the media, campaigning tactics, rioting and violence, power and dominance, gender, rights to vote, industrial revolution(s), private versus public rights, the origins of law, social justice, class and the elite establishment, colonialism, first nation peoples, intra-and inter-generational equity, global economics and other complex issues that have a tendency to create and bring into view strong emotional reactions as different belief positions were adopted and debated among students. In phase three not knowing is commonplace; emotional dissonance is created through challenging questions, occasional conflict, and a loosening of false beliefs and old views. Student emotions are further intensified by concerns about their assignment, as more complex issues continuously emerge.

Critical reflexivity, higher-order understanding and deeper interaction with the subject moved myself and the students towards higher levels of emotional engagement located at the 'emotional edge' (Mälkki, 2010). The edge is thus a site of intrinsic struggle, anxiety, and discomfort, where one's sense of identity is challenged (Illeris, 2007). Emotional dissonance creates ideal conditions for perspective transformation (Mezirow, 2000) when ‘work on transformative learning grants to the teacher the role of dissonance engineer’ (Brookfield, 2009, 217), and so a key role at this stage is the facilitation of safe and supportive relationships (Brookfied, 1994) alongside my provocative role.

Discussion

This research concerns the lived experience of continuous reflective practice and the innovative design ideas created to address a range of everyday practical problems associated with teaching and learning. The three phases described in this paper reveal a snapshot of Sterling’s (2001) ecological complexity, or revisionary postmodernism, in that the five epistemological and ontological orientations towards human learning (Figure 1) are variably emphasized. 'Corporeal, relational, enactive, and situational modalities' (van Manen, 2016, xiv), are shown in this research to be interdependently connected, granting my ' experience its particular quality (central idea or dominant theme)' (van Manen, 2016, 37). As practitioner research it challenges simplistic notions of student learning that diminish the status of teaching. The phases of experience design offer potential for generic application, not only because each phase highlights innovative design features, but also because there exists a clear progression, as an overarching shape and flow, in the way students interact with knowledge. The design facilitates the movement from *informational*, to *relational*, and on to *transformational* approaches to learning. As such the phases can be seen as progressing *levels of learning,* with each phase antecedent to those that follow (see Figure 3). Underlying my

approach is the facilitation of holistic approaches to education, to embrace not only learning to know, but learning to act (conative/agency), learning to feel (affective), learning to sense, observe, and to belong and 'be' (Beard & Wilson, 2013).

The focus of my enquiry was ‘not so much on the components of experience but, rather, on the relations that bind these elements together in action’ (Davis & Sumara, 1997, 108). The linear format of discourse and text makes these relations difficult to fully articulate through didactic styles. In writing this paper the problem of languaging experience (see Sheets-Johnstone, 2009) is similarly problematic, as noted by Kull (2008, 184), when researching solitude for his PhD: he dropped his pen in frustration, declaring ‘there is no dance between word and world. What I see begs a sensuous tango, but my words march static and stiff in lines across the page’.

Insert Figure 3 here.

Barnett (2007, 9) argues that the wider purpose of higher education is the development of the ontological self, rather than the epistemological self, and that the 'ontological self should be brought in to view and engaged with'. The shift from an epistemological, knowledge based approach, to an ontological and therefore potentially transformative approach is pedagogically difficult and challenging. Davis & Sumara (1997, 110) eloquently describe the essence of ecological complexity (Sterling, 2001) that this paper has attempted to expose in terms of how it underpins the student learning experience design processes:

> What happens if we reject the pervasive knowledge-as-object (as "third thing") metaphor and adopt, instead, an understanding of knowledge-as-action - or, better yet, knowledge-as-(inter) action? Or, to frame it differently, what if we were to reject the self-evident axiom that cognition is located within cognitive agents who are cast as isolated from one another and distinct from the world, and insist instead that all cognition exists in the interstices of a complex ecology of organismic relationality? (Davis & Sumara,1997, 110).

Hughes and Lury (2013, 797) view knowledge as an 'event', as ephemeral in form: 'we think the term ecology is helpful insofar as it enables us to acknowledge the ongoing and dynamic interrelation of processes and objects, beings and things, figures and grounds'.

Concluding comments

Through the application of Action Research-Living Theory (Whitehead & McNiff, 2006), this paper presents short reflective narratives of a teaching change process that culminated in the design of three fundamentally different phases or experiences *of* and *for* learning in terms of the way the students interact with people and knowledge. The first phase of design, termed *informational learning*, focused on basic knowledge acquisition, confidence building, social interaction and the development of the student sense of belonging. The second phase design, termed *relational learning*, applied spatial and embodied cognition to develop metacognitive skills. The final phase of design, termed *transformational learning*, emphasised personal transformation, brought about by challenging questions, and the creation of dissonance by working at the emotion laden 'edge' (Berger, 2004).

Multi-disciplinary theories concerning human learning are holistic in approach and tend to embrace ideas from the natural, human and social sciences. By applying thinking from across these sciences this practitioner research makes a contribution to the understanding the rich ecology of a practice-theory interplay that underpins learning experience design (LED) in higher education. In 2005 the author gained National Teaching Fellow status in the UK. The application, thirteen years ago, contained the following comment: 'and the need, in future, for me to play a part in bringing a greater sense of comprehensiveness to the student learning experience'.

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Figure 1: A brief and simplified history of dominant theories of cognition.

<table>
<tr><td>Time

Periods</td><td></td><td>1900-1940s</td><td>1950s</td><td>1960s</td><td>1970s</td><td>1980s</td><td>1990s</td><td>2000</td></tr>
<tr><td rowspan="5">HUMAN LEARNING

THEORIES

B.C.H.S.E.</td><td>B</td><td colspan="7">BEHAVIOURAL (ethology, animal focus). Stimulus-response. Early roots of transmission approaches. Programmed instruction. Conditioning.

OBSERVABLE BEHAVIOUR FOCUS.</td></tr>
<tr><td></td><td>C</td><td colspan="6">COGNITIVE. (Computational focus on the understanding of the functioning of the brain. Cognition).

THINKING (INTERNAL) PROCESSES FOCUS.</td></tr>
<tr><td></td><td></td><td>H</td><td colspan="5">HUMANIST (Empathetic/nurturing. Affective).

Early roots of student-centred, transactional approaches.

FEELING/SENSING FOCUS.</td></tr>
<tr><td></td><td></td><td></td><td>S</td><td colspan="4">SOCIAL CONSTRUCTION of knowledge (social constructivist, active, interactive).

BELONGING/INTERACTING/DOING/THINKING FOCUS.</td></tr>
<tr><td></td><td colspan="5">BELONGING, BEING, SENSING, DOING, KNOWING AND FEELING

MULTI-DISCIPLINARY AND HOLISTIC E

Embracing rather than rejecting preceding theories of learning.</td><td colspan="2">ECOLOGICAL COMPLEXITY

Transformational approach. 'Revisionary postmodernism'.</td></tr>
</table>

Figure 2: Social interaction in phases 1, 2 & 3.

Dominant in Phase 1 Peer support	For creating knowledge, and feelings, doing, being and belonging. For the development of the process skills for learning, achieving a common goal, and positive learning habits.
Dominant in Phase 1 Peer pressure	Exposure and Visibility: not contributing, missing factsheets, poor or missing VLE materials, inability to complete the walk-the-talk activity, with little contribution to this pseudo 'viva' experience.
Dominant in Phase 1 Peer collaboration, co-production & competition	Enquiry based. Cooperative booklet production, key facts. Inter and intra cohort benefits. Walking the territory together. Collectively creating and critiquing multiple/alternative narratives. Performance, levels of contribution, tutor interjections and comments.
P1 Peer Inheritance	Between cohorts: inheritance of materials, databases, viva voice recordings. Databases passed onto other HE institutions also via UK Higher Education Academy websites.
Dominant in Phase 2 & 3 Peer reflection/reflexivity	Continuous learning, fluid, not easy to grasp, increasing complexity and potential for the reconstruction/transformation of self.
Dominant in Phase 2 & 3 Peer freedom/liberation	Freedom to express views and values, and freedom to struggle, tutor-less at times. Peer control of learning spaces/places, resources. Conversations relating to agency and citizenship. Comfortable to experience a range of emotional dynamics.
Dominant in Phase 1, 2 & 3 Peer collaboration associated with assessment	Critically reflective & reflexive dialogue, increasing focus on the final assessment.

Figure 3: Learning Experience Design (LED): Three Distinct Phases.

Ecological Complexity (Zone E, Figure 1.)		
PHASE 1 **Beginnings** **PRIMARY FOCUS ON** **Peer interactions and belonging.** **HAVING** **INFORMATIONAL LEARNING**	**PHASE 2** **Middle** **PRIMARY FOCUS ON** **Embodied and embedded cognition. Spatial cognition.** **DOING** **RELATIONAL LEARNING**	**PHASE 3** **Ending** **PRIMARY FOCUS ON** **Transformation Ontological Self** **BEING** **TRANSFORMATIONAL LEARNING**
Epistemological self Focus on 'Facts'. Not knowing. Confusion. Basic Knowledge Surface Learning as acceptable Getting & Knowing Facts Co-production and co-creation of knowledge. Initiating peer/social relations/interactions. Positive interdependence. Individual accountability, Interpersonal-social skill development.	Spatial Schema. Spatial-Relational Understanding Critical Depth and Complexity Exploring spatial and temporal relationships of facts. Walking (movement), talking (oration), mapping (schema). Corporeal Increased Level of understanding Higher cognition becomes visible to others.	Affective/Feelings. Broad range of affect states. Working at the 'edge'. No definitive answer Confusion. Dissonance. Challenges to self: Values, beliefs and identity. Agency. Action.

Adapted from Beard et al., 2014