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Towards a theory of the Ecology of Reflection: Reflective practice for experiential learning in higher education

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Keywords
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Introduction

A focus on reflection, as both an assessment strategy and a mechanism for understanding and learning from (potentially transformative) learning experiences, underpins higher-education curricula in a range of subjects and disciplines. Reflective practice is widely adopted across the field of experience-based learning subjects in higher education, including practicums, work-integrated learning, internships, service learning and community participation.

Whilst there is a large, broad and diverse base of literature on reflective practice in higher education, the discussion integrating the evidence for reflective practice with learning outcomes is theoretically limited. The contestable nature of reflection is made more problematic by the absence of such a theoretical framework (Harvey et al. 2010). Indeed, assertions have been made that empirical higher-education researchers lack clarity of "theoretical inference" (Hammersley 2010), or even avoid theory altogether (Anyon et al. 2009). This lack of theory raises questions as to the veracity of learning and teaching practices and the sustainability of learning outcomes that may result from the practice of reflection.

With a focus on, but not limited to, experiential learning, this paper adopts an ecological approach towards the development of a theory of reflection for learning. The research on reflection for

learning is applied to substantiate the underlying assumptions, concepts and tenets of an emergent theory before the theory is presented as an ecological model.

Background

The pedagogy of "reflection for learning" was the focus of a series of research projects undertaken at a large Australian metropolitan university. Undergraduate students of all disciplines were offered the opportunity to complete a new experiential-learning subject as part of their course of study. This subject included professional and community engagement and an explicit requirement that students engage in reflective practice. The term "learning through experience", used throughout this paper, denotes structured experiential-learning activities such as those offered by many universities; they are also referred to in the literature and in practice as work-integrated learning, work-based learning, cooperative education, collaborative learning, service learning, career-development learning, internships and practicums. The widespread practice of using reflection for learning in such experience-based activities assumes that reflective practice has positive outcomes for learning. The research project reported here sought to explore this assumption through the lens of practitioner-oriented action research. The practitioners were a multi-disciplinary research team who identified and negotiated the research questions that had been shaping their teaching practice. The research questions were:

i. How is the term "reflection" used and conceptualised in higher education?

ii. How does reflection develop (what skills or capabilities are required to develop the capacity to reflect)?

iii. What is the interaction between reflection and learning?

iv. Is reflection a catalyst for higher-order or deeper learning?

v. What are the contexts in which reflection for learning may be practised?

In addressing the first research question, a review of the literature identified that the use of reflection in higher education has been well documented, with widespread practitioner acceptance of its value for learning through experience (Coulson et al. 2010). Evidence for the efficacy of the relationship between reflective practice and learning outcomes has been offered primarily through anecdotal, practice-based evidence, student self-reporting and small case-based studies. Few longitudinal studies involving independent verification of the relationship between reflective practice and learning outcomes have been reported in the literature. Detailed discussion of the findings, including implications and models for identifying the roles of reflection, aligning reflection within the curriculum and scaffolding reflective skills, are offered elsewhere (Coulson et al. 2010; Coulson & Harvey 2013).

Of relevance to the research reported in this paper is the tendency amongst researchers in the field to write with the assumption that reflection "works", without providing evidence that this is so. Even the concept of reflection itself is not consistently defined or used. An analysis of different ways of conceptualising reflection provided by Rogers (2001) found that "no fewer than 15 different terms were used to describe the reflective process [and that] the term reflection is used as a noun, a verb, an adjective, a process and/or an outcome" (p.40). Reflection may be further differentiated by "levels" (for examples of different taxonomies, see Bain et al. 1999; Kreber & Castelden 2009; Larivee 2008) that range from a shallow or surface level of reporting to a deep critical or transformative level. They also differ by focus, source, perspectives or lens (Brookfield

1995). The deeper levels of reflection that may be achieved through critically reflective practice are presented in the literature as higher-order cognitive processes (Paris & Winograd 2003) requiring a high level of skill, the development of which relies on the "highest *extended abstract* level of learning" (King 2003, p.3). The deep levels of reflection warrant attention, as they are related to deeper student learning and, in turn, better learning outcomes (Nelson Laird et al. 2014). Not all learners are naturally reflective, but most can learn to reflect (Larrivee 2008; Moon 2004), while some disciplines and people are more critically reflective than others (Kreber & Castleden 2009; Kolb 1981).

The "wicked" (Rittel & Webber, 1973) and situational nature of reflection has become apparent, as it is "ill-defined" and "under-theorised" (Krause 2012, p.285). The learning, teaching and practice of reflection is situational, contextual and complex; that is, the setting (Rittel & Webber 1973), or ecology, for reflective practice varies. Furthermore, many approaches are possible, and there is a lack of clear causal pathways and solutions for learning, teaching and researching the efficacy of the relationship between reflective practice and learning outcomes.

Identifying the complexity associated with the term "reflection" led us to consider the further complexity associated with the coupling of reflection and experiential-learning outcomes. In such contexts the many interdependent and interrelated variables involved in teaching, learning and practising reflection are complicated by the fact that experiential learning often occurs in a context beyond the traditional classroom. In these cases, the *ecological* context of reflection is a further factor, and suggests the need for an ecological approach to theorising about reflection. For this, we adopt the term *ecology of reflection*.

Ecology is used in its broadest sense of an holistic, interconnected system such as those used in human ecology, social ecology and systems theory (e.g. Bronfenbrenner 1979; Buttel 1986; Hawley 1950; Lewin 1935), which examine the bidirectional interrelationship between humans and environments. An ecological approach acknowledges that experiential learning occurs across complex environments constituting interdependencies between the learner, the university and the host organisation, and often the people for whom services are provided. Likewise, the interrelationships of variables such as student experience, discipline-specific protocols and program of study add further complexity.

Building a theory of the ecology of reflection

The practice of reflection in higher education is "theory poor" (Tight 2004); that is, it is not generally grounded in a clear theoretical framework. Even though theories are a "highly abstract thought process" (Anfara & Mertz 2006, p.xv) they have a role in supporting an understanding of the "experienced world" (p.xv) that is especially relevant to the world of experienced–based learning. As Lewin famously stated, "Nothing is so practical as a good theory" (1945, p.129).

There exists an "urgent necessity for theory in educational research" (Ball 2006, p.9), and for the purposes of this paper we specifically focus on theory of reflection for learning. Theory has a role to play in making research both possible and reflexive (p.9) by providing a method, and acting as a tool, for reflexivity. The resulting knowledge, too, is reflexive (Ransome 2010). This asserts a reciprocity of need between theory and reflection – reflection is needed for theorising, and theory is needed for reflection.

While "there are very few accepted rules about what makes a theory: (Klein & Janning 1997, cited in Bell 2009, p.6), it can be considered a "process of research" (Glaser & Strauss 1967, p.6). Theory is not an esoteric discipline (McNiff & Whitehead 2011), and a rigorous process is

required to attain a valid outcome. Like the concept of reflection, theory has also been labelled a "wicked" issue (Trowler 2012). Acknowledging the integral association between empirical research and theory generation (Glaser & Strauss 1967), the requirements of logic and empirical relevance (Bell 2009, p.11) were used in this paper to develop a method and a process for theory development.

The key criteria that determined method and process were: both had to be compatible with an ecological perspective; support a collegial approach towards theorising; and have the flexibility to accommodate the participation of staff who would be teaching the new experienced-based subjects. A participatory action research methodology met these criteria. The ongoing iterative cycles of plan, act, observe and reflect (or evaluate) (after Kemmis, McTaggart & Nixon 2014) established a method for theory-building (Carlile & Christensen 2005; Eisenhardt 1989). The project team actively engaged in reflective practice while theorising reflection, thus enacting praxis (Kemmis & Smith 2008), or putting the emerging theory into practice.

A disciplined and systematic approach to theory-generation was required. This involved multiple action-research cycles and action-learning workshops through which the researchers articulated their values and assumptions, and described and explained each component of the theory being generated. These multi-disciplinary workshops and focus groups, made up of academics who were to teach the new experiential-learning subjects, were used to validate and test the developing theory against their critical feedback (adapted from McNiff & Whitehead 2011). The outcome was a five-stage theory-building process consisting of:

1. Declaring theoretical assumptions,

2. Substantiating assumptions with empirical evidence,

3. Conceptualising the basic ideas in the approach and determining their empirical relevance,

4. Identifying the principle tenets of the approach and

5. Mapping the ecology of the model.

Stage 1. Declaring Theoretical Assumptions

A first step in the process of theorising was a systematic inquiry (Wadsworth 2010) into the assumptions, or taken-for-granted truths, underlying our working epistemology of reflective practice for experiential learning. The declared assumptions were the result of an extensive literature review combined with team members' personal and professional practice, action learning and action research. As each assumption was articulated, it was collaboratively deconstructed to critically assess its legitimacy and role in the theory. It was "...imperative that assumptions are not just taken for granted but are tested for their validity, as in process reflection, and critically interrogated, as in premise reflection" (Kreber 2004, p.43). We were aiming to engage in an instrumental, communicative and emancipatory process (after Mezirow 1991) that would "either lead to validation or rejection of our assumptions" (Kreber 2004, p.44). The participatory action research approach supported this stage of theorising by providing a process for the analysis of our assumptions (Norton 2001).

As part of this stage, the relevant research, evidence, existing theories and conceptual frameworks were sourced and synthesised to provide substantiation for each assumption. This process, which has been labelled "enfolding literature" (Eisenhardt 1989), performs the role of building internal

validity and generalisability. Throughout this process, many of the team's assumptions were challenged; as a result, some were amended and revised and a number were found to be invalid or unsubstantiated. In addition, the sense of logical structure and progression of the list of assumptions was reviewed with an additional criterion of checking for redundancy and overlap. By the end of this phase of theorising there were 11 assumptions (from an original 17) (Table 1).

1	Reflection supports learning.
2	Reflection is a process.
3	Reflection may be engaged with at different levels, for different purposes and from different perspectives.
4	Not all reflection is critical.
5	Critical or deep reflection may lead to multiple learnings including transformative learning.
6	There is a relationship between critical reflection and the higher-order cognitive processes of self-regulation and metacognition.
7	Reflection may engage multiple ways of knowing.
8	There are many contexts and applications for reflection in learning and teaching.
9	Reflective thinking and practice may be taught.
10	Reflective skills may be developed through strategic interventions and scaffolding.
11	Reflection on experience provides a link to praxis.

Table 1. Assumptions underpinning a theory of an ecology of reflection

Stage 2. Substantiating Assumptions with Empirical Evidence

The evidence to support each of the final set of 11 assumptions was synthesised. Each assumption was now presented with a succinct outline of the seminal and foundational literature that supports it as a taken-for-granted truth when building a theory of reflection for learning.

1. Reflection supports learning.

Reflection is widely discussed in the literature for its contribution to learning (Caldicott 2010; Moon 2004). Indeed, a number of authors argue that reflection may be required to elicit the rich learning potential from an instance of experiential learning (Boud, Keogh & Walker 1985; Bringle & Hatcher 1999). If managed well, reflection will support students in bringing to the surface tacit

knowledge about their practice, thus adding to their work-based learning experience (Smith, Kielly-Coleman & Meijer 2010).

2. Reflection is a process.

It is well supported in the literature that reflection is a process (Coulson & Harvey 2013; Jay & Johnson 2001; Lucas & Fleming 2012; Moon 2004). Reflection may be aligned with the action-learning cycle (Kemmis, McTaggart & Nixon 2014), and is widely discussed and used by practitioners to support learning before, during and after experience (Correia & Bleicher 2008; McNamara & Field 2007; McRae 2015).

The literature tends to concentrate on the cognitive, intellectual and psychocritical processes of reflection, and does not often take into account learning from the emotions that may arise during experience. Experiential knowing involves the "whole person, visceral reactions and feelings as well as thoughts and words" (Rogers 1980 p.6). This level of knowing aligns with the concepts of whole-person learning (Yorks & Kasl 2002) and felt knowing or focusing (Walkerden 2005; Gendlin 1968). "Knowledge of how emotions contribute to the learning process remains very limited" (Rowe 2011, p.345); thus a holistic approach that recognises the role of "feelings, other ways of knowing (intuitive, somatic), and the role of relationship with others" (Taylor 2008, p.11) is needed.

3. Reflection may be engaged with at different levels, for different purposes and from different perspectives.

Multiple intellectual frameworks, taxonomies and models for the reflective process exist (for example, see Bain et al. 1999; Jay & Johnson 2001; Kember et al. 2000; Kreber & Castelden 2009; Larrivee 2008; Rarieya 2005). While they differ in how many levels they identify in the reflective process (ranging from three to five), they share a conceptualisation that reflective practice is a cognitive process that can range from a lower or shallow level through to a deep, even transformational level.

Three main purposes have been identified for reflective practice: academic learning, lifelong learning and skills development (Harvey et al. 2010). In a seminal work, Brookfield (1985) proposed four key lenses, or perspectives, for reflective practice: the perspectives of the self or autobiography; student (if a teacher) or teacher/supervisor (if a student); peers; and the literature. The underlying argument is that relying on one perspective limits learning. Drawing on multiple perspectives provides the reflective practitioner with a holistic or ecological understanding of the issue under reflection, and is analogous to the triangulation of data in the research process.

4. Not all reflection is critical.

Reflection may be engaged with at different levels, and not all reflection is undertaken at the deepest, or critical, level. A shallow level of reflection may be appropriate for certain learning outcomes that require the learner to describe, report or recall. Engaging with deeper and critical reflection can be related to whether the learner takes a deep or surface approach to learning (Leung & Kember 2003). A deep approach to learning is more closely associated with deep reflection, which can in turn enhance learning outcomes (Nelson Laird et al. 2014).

Influences on the level or depth of reflection include learner or teacher capacity and discipline approaches (Kolb 1981; Kreber & Castleden 2009). "Depth of reflection is characterised by

increasing ability to frame and reframe internal and external experience with openness and flexibility" (Moon 2004, p.100).

5. Critical or deep reflection may lead to multiple learnings including transformative learning.

Exploring and challenging personal values and ethical, political, social and moral assumptions, and "questioning of core beliefs that define how we presently interpret our practice" (Kreber & Castleden 2009, p.513) are features of critical reflection. Such practices could lead to transformative learning (Mezirow 1991; Boud 1994; Dirkz 2001), where one's values, beliefs and assumptions may be changed (or transformed). As Mezirow (2003, pp.58-59) writes, "[t]ransformative learning is learning that transforms problematic frames of reference – sets of fixed assumptions and expectations (habits of mind, meaning perspectives, mindsets) – to make them more inclusive, discriminating, open, reflective, and emotionally able to change". Transformative learning may arise through the acquisition of emancipatory knowledge, "the self-awareness that frees us from constraints (and) is a product of critical reflection and critical self-reflection" (Cranton 2002, p.64).

6. There is a relationship between critical reflection and the higher order cognitive processes of self-regulation and metacognition.

The capacity for reflection implicates a range of higher-order cognitive processes associated with self-regulatory frameworks of learning and the term "metacognition" (Paris & Winograd 2003). Reflection is an essential element of the process of self-regulation (Grant, Franklin & Langford 2002), and comprises the third phase in Zimmerman's (2002) self-regulation process.

The relationship between self-regulation, metacognition and reflection is perhaps best described as reciprocal and complementary, in that reflective capacity supports self-regulation inasmuch as a great deal of self-regulation is needed to support the higher levels of critical reflection described earlier. Desautel (2009) goes some way to explaining this synergistic relationship in acknowledging that self-reflection aids the construction of metacognitive knowledge by "making formerly unconscious, intangible, or reflexive processes or events explicit" (Desautel 2009, p.2001). To the extent that experiential learning necessitates an increase in metacognitive knowledge and awareness, the capacity for reflection would appear to be critical to the sustained regulation and use of this knowledge.

7. Reflection may engage multiple ways of knowing.

Reflection may lead to multiple ways of knowing; these may include transformative (or emanicipatory) learning. Reflection has been credited with contributing to academic learning, skills development and lifelong learning in the higher-education sector (Harvey et al. 2010). Reflection is applied to academic learning through identification and assessment of intended learning outcomes and development of praxis. Reflection contributes to the development of higher-order skills including critically reflective thinking and expression, metacognition and professional competence. Reflection also contributes to lifelong learning skills and attributes that include graduate capabilities, professional practice, career-development learning and transformative learning. When creative modes of reflective practice, such as arts-based practice, music and dance, are offered to students, more affective and somatic ways of knowing may be engaged (Harvey et al. 2012).

8. There are many contexts and applications for reflection in learning and teaching.

Context and application may influence the focus for reflection. McAlpine et al. (1999) identify three general foci for reflecting on learning and teaching:

1. Practical reflection: improving actions in a particular context;
2. Strategic reflection: attention to generalised knowledge or approaches (to teaching) that are applicable across contexts; and
3. Epistemic reflection: represents a cognitive awareness of one's reflective processes as well as how they may impede the reflection on and enactment of plans (p.110).

As a practice, reflection is applicable to most subjects and disciplines, as shown by 32 different disciplines reporting the use of reflective journals in the literature (Moon 2004). The application of reflection to learning through experiential learning may be structured within an action-learning cycle (Revans 1980):

i. Planning for the experience – reflection *for* action;

ii. Being in the experience – reflection *in* action;

iii. Reviewing the experience – reflection *on* action; and

iv. Learning from the experience – reflection *on* action.

The application for reflection needs to consider the learner and their capacity to reflect, which is determined by the four Cs: cognition, communication, context and conditions (see the section of this paper on the learner ecology).

9. Reflective thinking and practice may be taught.

Given that most learners can learn to reflect (Larrivee 2008; Moon 2004), teachers have a role to play in scaffolding the practice and documentation of reflection through effective teaching strategies. Teachers need to know their students and identify their current level of understanding and capacity for reflective practice in order to facilitate the incremental development of students' reflective skills. There are many questions that a teacher needs to ask to guide them in their role; for example, "What do I know about the reflective capacity of this student cohort and individual students?" and "What prior exposure have they had to reflection?" (For a list of questions, see Coulson & Harvey 2013, p.406.)

10. Reflective skills may be developed through strategic interventions and scaffolding.

The gap between students' current and desired skill in reflective practice in their learning context can be seen as analogous to their zone of proximal development (Vygotsky 1978); therefore, students can be scaffolded to develop a higher level of reflective skill.

Many tools, strategies and resources may be used to scaffold the development and practice of reflection for learning through experience at each of four stages:

i. Learning to reflect;

ii. Reflection *for* action;

iii. Reflection *in* action; and

iv. Reflection *on* action.

A spectrum of strategies for scaffolding student reflective capacity exists. The choice of an appropriate strategy depends on which of the four stages students inhabit at a given time, and range from establishing a shared understanding of the role of reflection and introducing reflective tools through to providing debriefing (see Coulson & Harvey 2013 for a detailed discussion of the strategies).

11. Reflection on experience provides a link to praxis.

Reflective practice is an effective strategy in bridging the learning of theory with its authentic application beyond the classroom, achieving praxis. Praxis refers to the synergetic nexus between theory and practice, between "thought and action" (Zuber-Skerritt 2001, p.16). "Reflection helps students make stronger connections between theoretical perspectives and practice [praxis]...reflection...can assist students in making sense of their service-learning experience" (Correia & Bleicher 2008, p.41). During experiential learning, praxis can involve "practical reasoning about what it is wise and proper to do" in that experiential situation (Kemmis & Smith 2008, p.16).

Stage 3. Conceptualising the Basic Ideas in the Approach and Determining Their Theoretical Relevance

As each of the theoretical assumptions was declared and the literature enfolded, the key theoretical concepts – "terms and their related meanings that are the building blocks in theoretical arguments" (Cheal 2005, p.4) – that were the foundation of the theory were synchronously considered. The aim was to raise the theoretical level by "sharpening construct definitions" (Eisenhardt 1989, p.533), thereby "developing construct measures and...construct validity" (p.542). Clarity around the definition of each concept supports a shared understanding of the resulting theory.

First, we defined the key concepts of relevance to our research and our developing theory as: reflection, reflective learning, critical reflection, critically reflective practice, critical thinking and metacognition. The literature around each concept was enfolded, that is, examined and re-examined through multiple iterations of the action-research cycle. This involved the research team's deep reflection on each concept, over time, to arrive at an empirically informed consensus about an agreed definition. Table 2 provides a definition for each concept that is considered representative of the available literature.

Concept	Definition
Reflection	Reflection is a deliberate and conscientious process that employs a person's cognitive, emotional and somatic capacities to mindfully contemplate on past, present or future (intended or planned) actions in order to learn, better understand and potentially improve future actions.
Reflective learning	Reflective learning in the academic context is "likely to involve a conscious and stated purpose for reflection, with an outcome specified in terms of learning, action or clarification. It may be preceded by a description of the purpose and/or the subject matter of the reflection. The process and outcome

	of reflective work are most likely to be in a represented (e.g. written) form, to be seen by others and to be assessed. All of these factors can influence its nature and quality" (Moon 2004, p.83).
Critical reflection	The term "critical reflection" has the "most consensus in the literature as a level of reflection examining ethical, social, and political consequences of one's practice" (Larrivee 2008, p.343).
Critically reflective practice	"Seeing how we think and work through different lenses is the core process of reflective practice. What turns this into *critical* reflection is a consistent focus on unearthing and scrutinizing two kinds of assumptions: (1) those that mask the ways in which the variable of power affects and often distorts educational interactions; (2) those that seem congenial but actually work against our own best interests (hegemonic assumptions)" (Brookfield 1995, p.xii)
Critical thinking	"[Critical thinking is related to] an individual cognitive skill with three distinct characteristics: 1. An attitude of being or state of mind to thoughtfully consider the problems and subjects that come within a range of one's experiences; 2. Knowledge of the methods of logical enquiry and reasoning; and 3. Some skill in applying these methods" (Lloyd & Bahr 2010, p.1).
Metacognition	Metacognition is a term widely used to refer to higher order or "executive" processes that involve active control of cognitive processes during learning, such as planning, monitoring, comprehension and evaluation (including reflection) (Livingstone 1997). It comprises both metacognitive knowledge and metacognitive experiences or regulation (Flavell 1979, 1987). Metacognitive knowledge comprises understanding of how one learns, the nature of the task, which strategies to use and when to apply them. Metacognitive experience, or regulation, involves the actual use of strategies and experiences while using these strategies; it helps learners oversee and regulate their application of strategies, or perhaps alter the course of their learning – for example, when they realise that they have made an error.

Table 2. Definitions of key concepts in reflection

Stage 4. Identifying the Principle Tenets of the Approach

Collegial reflection on the research questions, in conjunction with the revised assumptions and the defined concepts, provided the basic elements for a new meta-theory. Three basic tenets, or propositions (Trowler 2012), of the theory of the ecology of reflection emerged:

i. The purpose of reflection needs to be defined and contextualised for each application;

ii. The ecology of reflection affects the learning and practice of reflection; and
iii. A 'fit' between the individual and the reflective practice is required for effective reflection.

Learners and teachers may differ in how they define, contextualise and ultimately practise reflection. Reflection needs a clear context and definition if it is to be effectively used to support learning (Bringle & Hatcher 1999). Ideally the reflective practice needs to be contextualised, or tailored, to suit the experiential-learning context.

To contextualise the reflective practice, teachers and learners first need to know the ecologies in which reflection will be practised. Three principle components for a basic model were identified as: the learner, the learning context and the experiential learning context (Figure 1). The nexus between the three ecologies is reflective practice. Elements of each ecology, which may have an impact on reflective practice, are identified in the next section.

While cognitive, text-based reflective practice is commonly used, this may not always offer the best fit with the individual learner's preferred learning style. A goodness of fit between the learner and the mode of, and approach to, reflective practice refers to attaining an equilibrium between a learner's reflective capacity and the "demands" or "opportunities" (Partridge 2003, p.681) of the experiential-learning context.

These three tenets, built on declared theoretical assumptions and concepts, provided the foundation for the development of a theoretical model. A scholarly approach was then used to critically analyse each of these components. Driving this analysis was the research, the evidence, existing theories and practice.

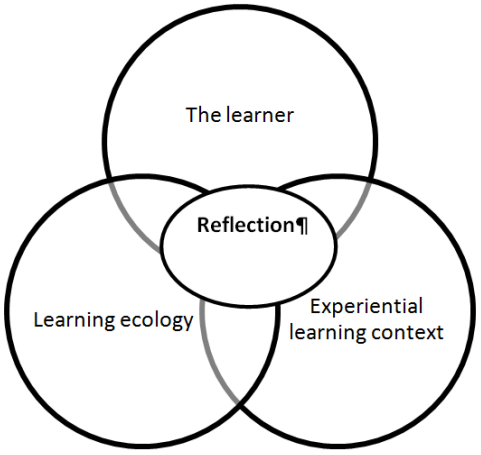

Figure 1. Three components of an ecology of reflection for learning through experience

Stage 5. Mapping the Ecology of the Model

One characteristic of theory is that it should help "locate social processes in wider structure, because it is these which lend predictability to the social world" (Trowler 2012, p.274). Generating the theory of the ecology of reflection located three significant ecologies:

- The learner ecology
- The learning ecology
- The experiential-learning ecology.

These three were examined to identify the key elements of, and their interrelationship within and across, the ecologies. The elements that contribute to each ecology are proposed in our model of the ecology of reflection. Consistent within and across these ecologies is the proposition that strategies for scaffolding reflection in any context or ecology are to be viewed as developmental. These strategies range from *developing* (for those new to reflection), to *developmental* (for deepening an existing reflective capacity), and through to *developed* (for when learners are assessed as possessing the required level of reflective capacity for the learning context).

The learner ecology

The important considerations for the ecology of the learner, termed the four "Cs", in no particular order, are:

- *Cognitive* capacity that includes self-awareness, critical thinking, metacognition, self-regulation and motivation – the higher-order cognitive skills linked to critical reflection;
- *Communicative* skill, language fluency and preferred and available communication media. Introducing creative approaches to documenting reflection, as proposed by Harvey et al. (2016), may better accommodate learners' diverse communication capacities and preferences than relying solely on a text-based reflective journal;
- *Contextual* element, which includes self-awareness during interactions with others, values, beliefs and assumptions, culture, language, approach to learning and ways of knowing;
- *Conditions* under which learning is to take place. Factors such as age, life stage or course, socio-economic status, geographic access, health or disability status, culture, race, personal circumstances such as carer responsibilities, internal or external environments, family experience of higher education, human or non-human resources all influence the type, depth and perspective of reflective practice.

The learning ecology

The four "Ps" of the learning ecology help determine what type, depth and perspective of reflective practice is required:

- *Predisposition* for reflection includes the approach and reflective capacity of the learner, teacher and host supervisor, and the capacity within the cohort and across the discipline.

Teacher capacity to reflect, for instance, has been found to vary between individuals and across disciplines (Kreber & Castleden 2009), which influences the type and depth of reflection taught and the perspective from which a teacher is able to teach reflection. As with learners, not all teachers are innately reflective, and may themselves need scaffolding to be able to teach reflection effectively (Coulson & Harvey 2013);

- *Program context* includes the discipline, program and unit of study, stage or year, resources and assessment strategy, as well as the developmental stage of the program level and cohort. Assessment of reflections, while problematic, offers some benefits for student learning. A guide to creating a placement profile to assist in determining an appropriate assessment strategy was outlined by Mackaway et al. (2011, p.11). The guide uses a continuum or gradient of 14 dichotomous elements, an example of which is 'Student in later stages of degree program (through to) Student in early stages of degree/program' (p. 11);

- *Planned (intended) learning outcomes* may incorporate one or more of academic learning, skills development, professional practice, graduate capabilities, praxis, accreditation, lifelong learning and the wild card of unplanned outcomes. Using learner reflections to assess learning outcomes is contentious and contestable and yet is of value (Mackaway et al. 2011). The risks of assessing reflections will, we contend, need to be considered within each specific ecological context;

- *Participation or experiential context* is sufficiently complex that a separate model was created to cover the ecology of participation.

The experiential-learning ecology

Four key elements of the experiential-learning ecology require consideration when identifying reflective capacity and approach. The *type of placement* (for example work-integrated learning, internship, practicum or service learning) will require the identification of the approach to reflective practice that offers the best fit for that context. *Placement conditions* such as duration and location of placement and whether the placement is compulsory or elective, continuous or intermittent, together with the level of institutional support offered, will all influence reflective practice. The mode and approach to reflective practice will also be influenced by the *academic-learning conditions*. These include, but are not limited to, the scaffolding offered as the learners prepare for their experiential learning, access to teachers during placement and the external requirements of professional standards and accreditation bodies. The *host-organisation conditions* are another element of this experiential-learning ecology. Organisational culture and values, degree of learner control over their experience, involvement of the host supervisor and depth and appropriateness of the experience will all affect learners' reflective practice.

These three ecologies and their elements may be likened to dynamic systems (Lewis 2005) in that they are in non-linear, interconnected relationship and 'operate through reciprocal, recursive, and multiple causal processes (which are) characterized by the emergence of wholes out of interacting parts' (p.169). The dynamic nature of the ecology of reflection will be developed in a future paper.

Summary and Conclusion

The theory of the ecology of reflection, developed and evaluated from a multi-disciplinary perspective and through iterative cycles within a participatory action research framework, invites further application. The theory contributes a convenient summary of various bodies of knowledge in the field, thus offering a heuristic approach to the complex, diverse and widely-reported subject of reflection for learning.

To achieve this, 11 evidence-based assumptions underpinning the theory have been declared. In summary, we state our belief that reflection is a process that supports learning. As learners engage with reflective practice they may do so at different levels ranging from shallow reporting to a deeper and critical level. Critical reflection, in turn, is related to both metacognition and transformative learning. Reflective practice is diverse in the modes of practice available and in the endless contexts and applications possible. A fundamental pedagogical assumption is that reflective practice can be taught and, therefore, learnt. Reflective practice's contribution to experiential learning is as an enabler of praxis.

The key concepts of this theory – reflection, reflective learning, critical reflection, critically reflective practice, critical thinking, and metacognition – were defined to promote a shared understanding of reflective practice. Next, three tenets of the theory of the ecology of reflection were established: the purpose of reflection needs to be defined and contextualised for each application; the ecology of reflection affects the learning and practice of reflection; and a fit between the individual and the reflective practice is required for effective reflection.

Building on these tenets, this paper introduced three significant ecologies that make up the theoretical model: the learner, the learning ecology and the experiential-learning ecology. The four "Cs" of the learner ecology are identified as Cognitive, Communicative, Contextual and Conditions. The four "Ps" of the learning ecology are termed as Predisposition, Program, Planned (learning outcomes) and Participation (or experiential context). This experiential ecology requires consideration of four key elements: the type of placement and the conditions of the placement, the academic learning and the host organisation. While the many components of the theory have been discussed as separate entities throughout this paper, it is imperative to keep in mind that they are interrelated and interdependent components of a complex and interesting ecology.

As this is an emerging, dynamic theory, we invite colleagues to join us in validating and further developing the theory through application and research. The theory's validity needs to be further tested as colleagues from different disciplines (Carlile & Christensen 2005) examine reflection for experiential learning through their own perspectives or lenses, which will test the theory's internal validity, and through their own ecologies or contexts, which will test the theory's external validity.

We encourage colleagues to evaluate the theory using the criteria recommended by Eisenhardt (1989) – parsimony, logic, coherence and a grounding in the evidence – or the canons of evaluation of theory proposed by Glaser and Strauss (1967, p.5): logical consistency, clarity, parsimony, density, scope, integration fit and workability.

By theorising about reflection for experiential learning we have aimed to "talk about the need to explain [reflective] practice and specify what [reflective] practice is for and whose interests it should serve" (McNiff & Whitehead 2011, p.72). By reflecting on the relationship between reflective practice and experiential learning, we are aiming to make sense of the empirical world. This is our "interpretation of reality" (Garner 2007, p.xiii).

If the process of trying to understand our theory results in a "shift in one's mental structure" so that the reader can "discover a different way of thinking" (Anfara & Mertz 2006, p.xiv), our work is done in that moment, and

> [theories] thus become instruments, not answers to enigmas, in which we can rest. We don't lie back upon them, we move forward, and, on occasion, make nature over again by their aid (James 1907, p.46).

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