

# Leveraging creativity to engage students in an agile ecology for learning

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## Abstract

This article explores the concept of an agile ecology for learning and its potential in leveraging creativity to engage students. Creativity is both seen as something that students bring with them from different part of their lives, across different formal and informal learning environments, but it is also seen as something that can be encouraged and developed through deliberate design of learning experiences and environments. The agile ecology for learning is fundamentally about blurring boundaries between informal and formal learning environments. A case study of a Closed Facebook group managed by students is used as a case study to illustrate the potential of using an agile ecology for learning as the underlying 'map' for learning design. If done well, we argue that this allows us to leverage creativity in students as both a tool of engagement and a crucial component in the development of a way of being for students whereby using their creativity in critically reflective ways becomes the norm.

## Keywords

Creativity, Agile ecology for learning, Student engagement, Adaptive expertise, Knowledge creation

## Introduction

The environments in which today's universities operate are what Ron Barnett (1999) has characterised as 'supercomplex', i.e. forever in a state flux and 'messy' with ever changing value systems, concepts and perspectives. This environment is characterised by fast changing and disruptive technologies, ubiquitous social and mobile media (i.e. pressure and a perceived need to always be connected), the digitization of everything, big data, corresponding changes to 'traditional' professions, and new and continuously evolving professions. It is an environment in which, we argue, universities need to be unafraid of the messiness and be proactive and courageous in generating 'feasible utopias' (Barnett, 2013). Bold steps need to be taken in thinking outside existing boxes and carefully imagining how creativity can be leveraged to engage students. It is also an environment in which creativity is increasingly a crucial element of the ability to navigate professional environments upon graduation.

In this article, we argue that the key to leveraging creativity is to recognise its relationship to prior learning and to environments beyond the formal higher education context. Furthermore, it entails valuing students' creativity (rather than simply recognising it) by drawing on it and integrating it into curriculum design in

conscious and deliberate ways. To do so effectively requires a better understanding of the (inter)relationship between creativity and student engagement – indeed, one that recognises the multiplicity and complexity of such relationships, as well as their implications for practice, policy and research. Especially the latter requires quite a radical structural rethinking of the ways in which universities currently operate, and it requires a significant blurring of boundaries.

In this article, we further develop our vision of an agile ecology for learning (Kek & Huijser, 2017) with a specific focus on leveraging creativity to increase student engagement. This vision is one that humanises university education through imaginative approaches to student learning, to teaching, to curriculum, to assessment, to professional learning, and to interdisciplinary approaches that go well beyond the institutional walls, and that include student development and support, curriculum sustainability, research and the scholarship of teaching and learning, and administration and leadership. Framing the interrelationship between creativity and student engagement within an agile ecology for learning requires us to conceptualise creativity and student engagement in a more holistic way, and one that moves away from institutional and disciplinary convention that often still shapes staff reality in important ways. In other words, it requires us to imagine a blurring of such conventional boundaries so that both staff and student creativity can be harnessed and indeed leveraged, and student-centeredness truly moves centre stage. Here, we outline the implications of such imaginative and creative approaches for practice, policy and research.

The design of a curriculum and the approach to learning that leverages students' creativity entails a blurring of boundaries between formal and informal spaces across micro-, meso-, exo-, and macro-systems of the university, and in this article we provide detail about what is included in each of those systems. We argue that an agile ecology for learning allows for the extension of the learning environment well beyond the university walls. Thus, the concept and framework of an agile ecology for learning is geared towards seeking, harnessing and leveraging connections within and between different systems in the overall ecosystem. This applies in particular to what students bring to the formal learning environments (e.g. creativity) from other parts of the agile ecology for learning, and the aim is thus to blur the boundaries between these different systems, both in a spatial and a temporal sense, in such a way that their connections become seamless. Our argument is that the more seamless or porous the ecology becomes, the more students' prior learning and creativity will be sought, harnessed and leveraged. As a result, synergistically activating students to be more engaged. As prior learning and creativity are being valued in this conceptualisation, they are also being developed in the process, so creativity itself, as a way of being, becomes the ultimate outcome of an agile ecology for learning.

The approach in this article is thus to develop a conceptual framework in the first part, in the form of the idea of an agile ecology for learning. This is part of the 'agenda-setting' aim of this special journal issue, and it aims to develop a conceptual framework around building a better understanding of the (inter)relationship between creativity and student engagement. The agile ecology for learning is thus conceptualised and used to make meaningful connections between purpose, process and product, as it relates to leveraging creativity and student engagement. It

is also closely aligned to Csikszentmihalyi's (2014) systems model of creativity, which is based on the following fundamental idea:

We cannot study creativity by isolating individuals and their works from the social and historical milieu in which their actions are carried out. This is because what we call creative is never the result of individual action alone; it is the product of three main shaping forces: a set of social institutions, or *field*, that selects from the variations produced by individuals those that are worth preserving; a stable cultural *domain* that will preserve and transmit the selected new ideas or forms to the following generations; and finally the *individual*, who brings about some change in the domain, a change that the field will consider to be creative. (Csikszentmihalyi, 2014, p. 47, original emphases)

Thus, in this systems model of creativity, the notion of creativity is seen to operate across an ecology of learning, but importantly, it is what the *field* will consider to be creative that has a large potential impact on *individual* student (or staff) engagement. In turn, as part of the system, the *field*, along with the *domain*, can be mapped across the micro-, meso-, exo-, and macro-systems of the agile ecology for learning. Doing this creates the potential to reconceptualise the *field* in particular (i.e. institutional and disciplinary convention), and thereby allows for a more holistic conceptualisation of creativity and student engagement, whereby for example the boundary between students and staff is considerably blurred.

The conceptual framework will be the foundation for a case study in the second part of the article. The case study focuses on a students-as-partners in learning and teaching' pilot project, which was trialled in a regional Australian university in 2016. The pilot project involved the selection and training of two experienced students to be student leaders of a Closed Facebook 'students-only' community. This community was expected to provide peer support in both a learning and an overall student journey sense. The selected students-as-partners were expected to provide advice and to channel student questions towards people in the university who could provide answers, but since it was designed as a 'students-only' group, they were also encouraged to draw on their own creativity to develop a social media community in the way in which they imagined it to work. Thus, they could draw on their prior learning, as well as on the informal environments in an overall 'agile ecology for learning'. The students who created the Facebook environment and community were asked to provide their reflections of the Closed Facebook learning environment. For this article, further analysis of the reflective data was conducted. The reflective data illuminated how creativity was used in the process and the potential of doing this in other areas of their formal learning environment. The combination of drawing on creativity that students bring with them, and designing environments in which that creativity can thrive and be developed further, is the key focus of this article, both conceptually and with regards to the case study that follows the conceptual discussion.

## **Creativity: Process, product and outcome**

The quest to define creativity has long been recognised and accepted as challenging, confusing, and as in lacking consensus (Ford & Harris III, 1992; Parkhurst, 1999). However, Runco and Jaeger (2012) insist that there is a standard definition for creativity. They concede that the standard or commonly known definition of creativity is composed of two criteria: originality and effectiveness. However, this definition was constructed in the 1990s predating the possibility of online literature searches. They suggest that the earlier discussions of the standard definition have been ignored but are relevant in a today's supercomplex world (Barnett, 1999, 2000a, 2000b) including in university contexts. We agree with their conclusion that Stein's (1953) definition of creativity is the most relevant as it is unambiguous, and we have therefore adopted it for this article.

Echoing Csikszentmihalyi's (2014) systems model of creativity to some extent, Stein (1953, p. 311-312) defined and described creativity as follows:

*The creative work is a novel work that is accepted as tenable or useful or satisfying by a group in some point in time... By "novel" I mean that the creative product did not exist previously in precisely the same form... The extent to which a work is novel depends on the extent to which it deviates from the traditional or the status quo. This may well depend on the nature of the problem that is attacked, the fund of knowledge or experience that exists in the field at the time, and the characteristics of the creative individual and those of the individuals with whom he [or she] is communicating... arises from a reintegration of already existing materials or knowledge, but when completed it contains elements that are new... Often, in studying creativity, we tend to restrict ourselves to a study of the genius because the "distance" between what he [or she] has done and what has existed is quite marked... In speaking of creativity, therefore, it is necessary to distinguish between internal and external frames of reference.*

In Stein's definition, in addition to the standard notions of originality (novelty) and effectiveness, or of value (accepted as tenable or useful or satisfying), we propose that creativity is not just a construct made up of two distinct elements, but rather that it is a process, product and outcome. Seen in this way, creativity is (1) a process, as there is always some form of social discourse and judgement involved; (2) a product built on existing knowledge or materials rendering the product 'new'; and (3) an outcome of the interplay or interactions between the individual/s and environment, whereby individuals are empowered to develop a way-of-being on the way to becoming an adaptive expert (Kek & Huijser, 2017).

We posit that creativity as a process, product and outcome is possible if creativity is enabled and fostered through interconnections that are created with the specific intent to bridge different environments or ecologies of a university. These types of interconnections will enable different types of knowledge, or liquid knowledge (Kek & Huijser, 2017), to flow from one ecology or environment to another through increasingly porous or seamless membranes/borders and across increasingly solid bridges, thereby facilitating the creative exchange of ideas. In an academic or formal institution of learning, the boundaries and systems tend to be rather fixed and rigid, creating structural barriers in university environments for students and academic and

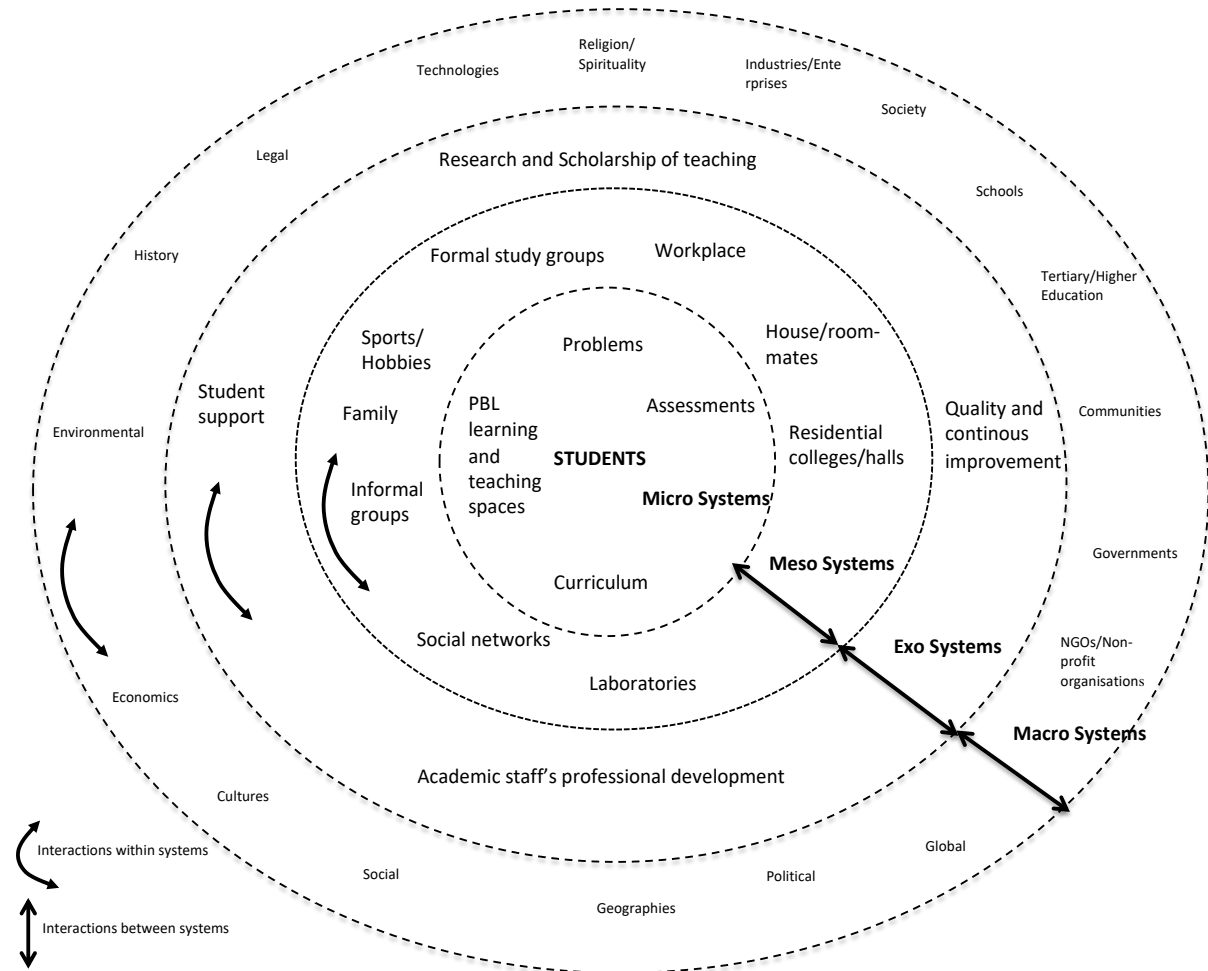
professional staff, rather than creating environments that allow them to engage in interactions or learning that would be much closer to those found in the world beyond the academy. The distances and walls between 'formal and informal' need to become eroded to pave the way for a more liquefied or flexible ecology, which in turn allows for agile or adaptive pedagogy, curriculum and practices (Kek & Huijser, 2017), which are a prerequisite in fostering and advancing creativity. Only when there is agility in university ecologies can liquid knowledge flow in social interactions, generate creative products, and develop adaptive experts as an outcome. Such a notion of adaptive experts is predicated on the leveraging of creativity, and therefore deliberately departs from an overly instrumentalist conceptualisation of preconceived graduate attributes (Barrie, 2007; Barrie, 2012; Green, Hammer & Star, 2009). Understanding and making more explicit the interrelationships between creativity and student engagement contributes a more holistic lens to apply to the learning process.

These propositions underpin the reason why creativity can be unfolded by developing an agile ecology for learning. An agile ecology for learning is a concept and framework that humanises university education through imaginative approaches to advancing creativity and learning more broadly. A key element is that it entails a blurring of boundaries between formal and informal learning spaces across micro-, meso-, exo-, and macro-systems. We argue that an agile ecology for learning allows for the extension of the learning environment well beyond the university walls. Indeed, it is here that Csikszentmihalyi's (2014) systems model of creativity becomes most relevant in relation to an agile ecology for learning, as noted above, because it allows for the blurring of boundaries between different systems, and in the process allows us to firstly leverage creativity expressed beyond the university walls, and secondly blur the boundaries of the *field* itself (i.e. institutional and disciplinary convention). Importantly, this relies on a collaborative approach by both students and staff by necessity, as traditional hierarchies (i.e. teacher and student) would harden such boundaries, rather than blur them, which would impede creativity, rather than capitalise on it. It is therefore important to consider that roles have to be re-thought, which makes it a potentially highly rewarding enterprise, but also rather risky. Thus, an agile ecology for learning explicitly leverages the affordances of these different learning spaces, rather than erecting walls around them. Thus, the concept and framework of an agile ecology for learning is geared towards seeking, harnessing and leveraging connections within and between different systems in the overall university ecosystem. Our argument is that the more seamless the ecology becomes, the more students' prior learning and creativity will be utilised in the process, the more engaged and creative students will be, and as a result the products or artefacts generated are creative. The ultimate outcome is students who are facilitated to become adaptive experts.

### **An agile ecology for creativity (and learning): Purpose and potential**

The concept of an agile ecology for learning was initially developed as a learning environment specifically focused on Problem-based Learning (PBL) as the main learning approach or philosophy (Kek & Huijser, 2017). However, in the process of developing this ecology, it dawned on us that the concept could be applied in a broader sense to all learning environments. One of the key realisations was that it is not just a map of what is, but also an overview of what could be, or perhaps should

be, which involves deliberate design of, for example creativity, into the learning process, which is what we focus on this article. It is the through the creation of such an environment, one that nurtures and sustains creativity, that a love of learning is enabled to flow, breaking through the tendency to 'learn-for-the-test' and nurturing one of excitement for learning for its own sake.



**Figure 1.** Agile ecology for learning, Source: Kek and Huijser (2017)

Creativity is connected in this way to the idea of developing a 'way-of-being' or indwelling, or indeed a way-of-becoming. Thus, creativity is leveraged across the different systems in the overall ecology: the micro-, meso-, exo-, and macro-systems. Leveraging in this context means not only drawing on existing creativity from different systems in the ecology, but also developing creativity which can in turn be leveraged across the range of different systems in the ecology as appropriate. Thus, a way-of-being and/or a way-of-becoming is the salient ingredient for developing an 'outcome', which is adaptive expertise. In addition, from this idea of an ecology of and for learning, a systems perspective of creativity emerges

(Csikszentmihalyi, 2014), which is a powerful idea in the complex and rapidly changing learning space, as noted.

Graduates with adaptive expertise would leverage their creativity in applying such expertise and making judgments about its use in different contexts, including professional contexts. This echoes Barnett's "being-for-uncertainty" (2004, p. 258), which embraces a kind of disposition that includes elements such as resilience, courage, humility, receptiveness and criticality – and of course creativity. This is quite a departure from simply concentrating on functional attributes such as communication skills or discipline knowledge, but allows instead for a focus on long-term sustainability, rather than exclusively on short-term economic gains, both on the individual and societal levels. Savin-Baden (2008) warns in this respect that "higher education has increasingly become colonized by an enterprising culture", and that "these colonizing forms of enterprise in higher education reflect the market forces and the quick stance of commerce and industry. Higher education that only supplies 'training' is unlikely to equip students to work in an uncertain world" (p. 141). The key outcome idea in relation to the agile ecology for learning is that students will ultimately share a similar way-of-being that will enable them to live and work in a world of unknowns. Being comfortable and confident in their use of creativity to address problems and to work on solutions, and not just to existing problems but also to imagined future problems, will be a vital attribute in future proofing themselves. Being comfortable with creativity can also lead to a state of flow (Csikszentmihalyi, 1990; Bonaiuto, Mao, Roberts, Psalti, Ariccio, Ganucci Cancellieri & Csikszentmihalyi, 2016) where students become immersed in learning, which then minimises risk and fear of failure. An element of achievable challenge, as aligned to understandings of the Zone of Proximal Development (inherent within the concept of creativity, where anticipated outcomes are not defined) encourages students to search for more, both within and external to their current level of knowledge and skills.

Thus, the idea of an agile ecology for learning has as its key outcome a way-of-being that allows students and graduates who find themselves in situations where they do not have the relevant or necessary knowledge or skills, to not be fearful of the challenges but to be able to draw on their indwelling - knowledge, skills, creativity and dispositions – and their way-of-being as a matter of course, which would thus allow them to be productive citizens in an uncertain world (Barnett, 2004). This would also allow us to get away from a situation where "gaining a degree is more about marginal advantage in the job market than about personal transformation" (Savin-Baden, 2008, p.144). Thus, learning environments informed by an in-depth understanding of an agile ecology for learning will allow for a whole lot more with a focus on the latter.

Barnett (2000a) states that the development of 'a way of being' is crucial to universities in the 21<sup>st</sup> century, which he characterises as a "radically unknowable world" (Barnett, 1999, p. 43). Barnett (2004) conceived of the term supercomplexity to denote a world in which "the interactions between elements are unclear, uncertain and unpredictable" (p. 249). Indeed, supercomplexity characterizes a world that is not just "radically unknowable" but also "indescribable" (Barnett, 2004, p. 252). Hence, his argument is that this condition of uncertainty demands curricula and pedagogy that must be founded on the principle that the learning process is both

high-risk and transformatory in character, wherein students and teachers themselves are engaged as persons with “openness, mutual disclosure, personal risks and disturbance” (Barnett, 2004, pp. 257-258). Such curricula and pedagogy engage students in developing three dimensions of knowing, acting and being, of which being is the most significant (Barnett & Coate, 2004); that is, being truly and actively engaged in the learning process and with others. Barnett and Coate (2004) add that such active engagement can only occur when the students are afforded spaces in the curriculum in which deep, reflective learning can take place. The Facebook group in the case study we discuss in this article was designed as one such space. Crucially, it was deliberately designed as a relatively ‘empty shell’ so that students needed to draw on both their prior knowledge about such spaces, across different systems of the ecology, and on their creativity, to make this space a meaningful learning space. Therefore, teachers, who are explicitly associated with the formal learning environment, deliberately removed themselves from this space.

The idea of creating learning spaces where students have the freedom to define these spaces for themselves are of course not new. However, an agile ecology for learning creates an opportunity to do this much more consistently and across a complete formal curriculum, so that attributes, including creativity, can be leveraged and developed simultaneously and in agile ways. When done thoughtfully, comprehensively, and consistently, the outcomes promise to be cohorts who are flexible, agile and creative enough to be able to engage productively with ‘radically unknowable’ contexts. In short, the long-term expectation is that they will become adaptive experts who know how to leverage their creativity in critically reflective ways as they progressed through their studies while still a student, and when they graduate from their studies when they move on to the world beyond university.

Adaptive experts are more likely to go beyond routine competencies with variations, rather than in terms of speed and accuracy of solving familiar problems (Hatano & Inagaki, 1984). They apply their conceptual schemas in a more adaptive manner due to their understanding of why their procedures work; they also modify known procedures, or even invent new procedures by responding in a flexible manner to contextual variations (Hatano & Inagaki, 1984), making them more flexible, innovative, and creative, and thereby ultimately more agile. This is precisely what we want in 21<sup>st</sup> century learners – to be adaptive, flexible, and creative as they traverse from the university to a supercomplex world in which uncertainties are the norm. However, for this outcome to be achieved, it requires an educational landscape that allows them to actively explore, experiment and reflect (Hatano & Inagaki, 1984; Hatano & Oura, 2003), which would eventually lead them to continually adapt to change (Hatano & Oura, 2003). An agile ecology for learning allows the conceptualisation of how to leverage creativity in a consistent manner across an entire curriculum, rather than in a piecemeal fashion or in isolated pockets. Naturally, this is not an easy task, and requires a monumental shift in attitudes in the short term, but we argue that such a shift is ultimately inevitable, and indeed desirable. By not focusing on a way-of-being which would prepare students for future learning (Bransford & Schwartz, 1999), and by not changing the pedagogy and curriculum, we run the risk of educating pseudo-experts at best - students whose expertise does not mirror the expertise needed for real world, thinking inside or outside the academic disciplines and knowledges, and students who lack what Sternberg (2003) calls successful intelligence.



Integrative learning, which is what an agile ecology for learning further allows for, is learning in preparation for future learning (Bransford et al., 2006), preparing to apply adaptive expertise (Hatano & Inagaki, 1984; Hatano & Oura, 2003) which in turn is about responding flexibly to contextual variations, and maximising transfer of learning in the work place (Bransford & Schwartz, 1999). This requires above all creativity, and it requires a confidence to leverage such creativity. Furthermore, the 21st century themes referred to above, when fully integrated, often requires interdisciplinary applications, which is important because “we know that we must draw on multiple knowledge domains to find solutions for many of today’s problems” (Partnership for 21st Century Learning, 2007, p. 9). The emphasis on solutions and multiple knowledge domains again point to the necessity of blurring boundaries and the creative capacity to explore solutions by combining elements from multiple domains, and from across different systems in the agile ecology for learning. Thus, these boundaries are both physical and mental ones.

A range of active learning approaches (e.g. enquiry-based learning, problem-based learning, flipped classroom approaches) that leverage different systems in the agile ecology for learning serve as a curricular and pedagogical vehicle to facilitate the development of a particular way-of-being among students whereby critical reflection and creativity are the norm. The aim of these learning approaches is so that students can learn and develop adaptive expertise while in their current studies and beyond the micro-context of the university as lifelong learners.

We argue that for students to develop a way-of-being and becoming adaptive experts, university teachers must enable collaborative knowledge building in an agile ecology for learning. This does not just involve the mere sharing of information, but rather a continuous dialogue with students, functioning all the time on a metacognitive level, challenging and encouraging self-directed learning, inquiry, reflection and critical reasoning, modelling dialogue, providing scaffolds and then fading out of the picture, and using silences when appropriate to let students be independent from the teachers. Within this approach, an agile ecology for learning becomes important as it allows us to deliberately and consciously ‘design in’ learning spaces that are informal, where the teacher has faded out, and that leverage prior learning, creativity and the building of learning communities.

The Closed Facebook group in the case study that follows is but one example of such a space, and thus only an example and a beginning. There is however a myriad of agile spaces, both online and offline, that could be created, some of which may be purely student-centered, such as the Closed Facebook group in our example, while others may involve a stronger teacher presence, or co-constructed spaces, depending on the projected outcomes. Within this context, teachers need to be collaborative themselves and reach out beyond the university walls to involve others from different systems in the agile ecology for learning, for example employers. The potential linkages are boundless, which constitutes the fundamental benefits, and it reflects the realities of a supercomplex world. Leveraging creativity in meaningful ways develops students’ confidence in looking for novel solutions, at the same time as it develops their ability to apply their creativity in critically reflective ways. In short it simultaneously engages and challenges students, which ultimately becomes their way-of-being and thus the norm.

## **Students-as-partners: An instrumental case study of a closed Facebook group**

An instrumental case study was used to test the conceptual framework or serve as a proof of concept. The instrumental case study was selected as a method to gain a general understanding of how creativity might be facilitated or processed (Creswell, 2012) in an agile ecology for learning at a regional university in Australia. The case used was a students-as-partners project in higher education (Healey, Flint, & Harrington, 2014) initiative at a regional Australian University. The students-as-partners project was initially established to enhance student engagement, and to envelop students' voices in the university ecology of learning, to serve as a bridge between the formal curricular elements of the learning environment on the one hand, and informal, co-curricular environments on the other (Kek, Kimmins, Lawrence, & Abawi, 2017).

### *The Closed Facebook informal learning ecology*

While a full account of the students-as-partners project has been reported elsewhere (Kek et al., 2017), here we provide a summary of the set-up. The project was part of a National Transforming Practice Initiative funded by the Australian Government's Office of Learning and Teaching. It was additionally funded and supported by the University of Southern Queensland's Office of the Pro Vice Chancellor as a project. This project was about the establishment of a Closed Facebook space which deliberately resided outside of the students' curricular, formal learning environment. The co-curricular, informal learning space was conceived to support first-year students from the Education discipline in developing academic learning skills. The project was considered a students-as-partners initiative because it was co-designed by two students and four academic staff, and the co-curricular, informal learning space was facilitated by the two student partners. There were no academic teaching staff of the course present which was intentional. The co-curricular, informal learning space was implemented in the second semester of the academic year 2016. All students studying the course EDC 1400 Foundations of Curriculum and Pedagogy were invited to join. These students were also informed that the project had the University's ethics approval to conduct it as a research project. Student participation was voluntary, making the students self-selective.

A participatory action research methodology was deployed to evaluate the project where data from the student partners, academic staff and student participants were collected. The data collected was then grouped into three different participant roles to illuminate their respective perspectives: student participants, student partners and academic staff. The different perspectives can be seen in Table 1.

Student Participants	Student Partners	Academics
<ol style="list-style-type: none"> <li>1. Valued sharing concerns with peers (not alone)</li> <li>2. Non-threatening support</li> <li>3. Built agency</li> <li>4. Someone that listened</li> <li>5. Welcomed by online learners in particular</li> <li>6. Academics unaware of certain concerns raised</li> <li>7. Welcomed study and organisational tips from student partners</li> </ol>	<ol style="list-style-type: none"> <li>1. Facilitated other student's learning</li> <li>2. Built personal leadership capability</li> <li>3. Made a difference</li> <li>4. Shared knowledge and experience</li> <li>5. Possibly best to provide support in first semester</li> <li>6. Best for support to not be attached to a course but broadly</li> <li>7. Help for one helped other students</li> <li>8. Shared facilitation worked well</li> <li>9. True partnership with academics</li> </ol>	<ol style="list-style-type: none"> <li>1. Supported transition thinking from student into 'pre-service professional'</li> <li>2. Learned from student partners</li> <li>3. Timing for support might depend partly on discipline</li> <li>4. Developed student partners ability to self-reflect</li> <li>5. Student partners show empathy</li> <li>6. Emphasis needed to be on experience not course content</li> <li>7. True partnership</li> </ol>

**Table 1:** Reflection data, Source: Kek et al (2017)

### *Analysis of the case study*

An analysis of the reflection data revealed that the Closed Facebook site had provided a safe space for students where they could question, in a largely informal and student-defined space, the practices in the formal, curricular environment – classroom interactions, lectures and tutorials, thus serving as a linking mechanism between these formal and informal learning spaces. It was also an environment where students were sharing technical and personal knowledge with each other as reflected by the student participants: “Welcomed study and organisational tips from student partners” (reflection data 7). This was strongly echoed by the student partners when they commented that “help for one helped other students” (reflection data 7).

Academic staff involved reported that the knowledge sharing and building were a result of the just-in-time support provided by the student partners and that the student partners had served as an ‘engagement bridge’ to knowledge sharing and learning. While the student partners served in this role, they reported having developed invaluable personal leadership skills. In their reflections they reported being able to change students’ expectations about their studies (and in this way becoming change agents) and developed an understanding of key team skills, for example that whilst they might be inactive in some interactions, there were other members in the informal learning space who were able to help and guide the students and who often took the initiative to do so. In other words, they began to recognise their role as facilitators in a student-focused community of practice (Wenger, McDermott, & Snyder, 2002). The self-determined and self-regulated nature of this learning adds to the creativity of the learning space.

Thus, the student partners and student participants, as evidenced by their reflections on their participation in the project, were becoming more like adaptive experts as they moved through their learning journeys, as they adapted what they learned in the formal curriculum to more informal spaces and vice versa, again showing a blurring of boundaries between these spaces. However, this occurred very much at their own pace and according to their own rules. Importantly, this occurred in an informal learning space, albeit connected to the formal learning environment. In this space, the development of adaptive expertise occurred without assessment as the immediate lever, which is one of the key characteristics of informal learning spaces. In this sense, it was very much a self-determined and self-regulated learning space, where control of how to adapt their learning (and by extension their expertise), was in students' hands. While some might argue that there was an indirect link to assessment in the sense that the Closed Facebook was connected to the formal and curricular learning environment of a course, the learning and development of creativity associated with becoming an adaptive expert (Hatano & Inagaki, 1984) and/or successful intelligence (Sternberg, 2003) that occurred in the Closed Facebook site happened more by osmosis rather than as a direct result of specific assessment items and their requirements.

### **Towards an agile ecology for learning**

The data from the reflections have illuminated how knowledge – technical and personal – is liquid, flowing in and from curricular, formal and co-curricular, and informal learning spaces that are connected in the overall learning ecology. Liquid knowledge would not be flowing if the ecologies were bounded rather than porous. In fact liquid knowledge would instead be 'solid' and bounded, as it often is in a context where boundaries, including disciplinary boundaries, are rigidly imposed. The consequential result of the interconnection or the engagement bridge between the different parts of a learning ecology would be greater than the sum of learning in one particular 'bounded' part of that ecology, for example the formal university environment in isolation. The question this raises of course is how boundaries between the different systems in the ecology can be loosened and weakened to become more porous and this feed off each other in more agile ways.

The Closed Facebook site in this case study is but one small example of how this can be achieved, as it consciously and deliberately interconnected an 'informal' space to a 'formal' space, so that the two could feed off each other in unpredictable but productive ways. An important by-product of this blurring of boundaries by design is that it personalises learning by drawing on and valuing 'external' knowledge that students bring with them into the formal learning environments, or in straightforward Vygotskian terms, it draws on prior knowledge and in particular recognises the concept of the zone of proximal development (Vygotsky, 1978).

Barnett (2017) conceptualises the learning experience in an agile ecology for learning as learning ventures, where the interplay between the individual and the learning ecology they engage with will take on significant tensions, particularly since that learning ecology is made up of different systems that can at any time complement each other but also pose tensions. That is, a learning experience where

knowledge will always be contested and debated before agreement or consensus are reached. In the process it draws on, and recognises, different systems in the ecology which thus by necessity need to be reconciled at specific points in time or in particular contexts.

As such an agile ecology for learning, by interconnecting formal and informal learning opportunities, encourages a learning experience where creativity could be generated as a process, product and outcome derived from the learning experience itself. This is a result made possible by the interconnections with diverse systems in the ecology, including but not confined to, the formal university context itself, and wherever liquid knowledge/s are constantly being tested and verified. Ironically, this recognises the idea, which is central to the philosophy behind universities, that knowledge is never final, but instead needs to be engaged with, built upon, challenged, accepted, and discarded at various points in time, and for this to happen in productive ways, boundaries need to be flexible and porous, as for creativity to thrive it requires boundless possibilities. An agile ecology for learning is thus ideally suited if the objective is to both draw on existing creativity (and by extension prior knowledge) that students bring to encourage and develop that creativity further. While the Closed Facebook we have discussed in this article is of course a very small example of stimulating creativity as process through the deliberate design of formal and informal learning environments, it is nevertheless an example that can be built upon and expanded to develop an increasingly complex and robust ecology for learning that is agile enough to be fit for purpose in a sustainable manner, precisely because it is never finalised.

Creativity is a process, rather than a 'thing', and it functions as the currency for debates and verification of liquid knowledge. Creativity is a product, albeit an ever-changing product, as it is employed to confront, prod and rework liquid knowledge in a continuous process that ultimately creates new knowledge, however fleetingly, until the process repeats itself in continuous cycles that are never quite the same. In the process, existing knowledge and information are extended and build upon, and physical and mental artefacts and ideas are produced. Creativity is an outcome when the individual/person or participant in the learning venture, particularly the student, develops a way-of-being, and a way of becoming an adaptive expert. This way-of-being works to overturn feelings of alienation (Mann, 2005) that can emerge for isolated, disempowered students and converts them through trust relationships (Bryson & Hand, 2007).

## **Conclusion**

The main findings of the students-only Closed Facebook project showed that the learning ecology have provided a safe space 'outside/inside' the formal learning environment, where students were able to ask and share knowledge, and where they could explicitly draw on their prior learning and creativity and thus leverage this across informal and formal learning spaces, i.e. from different parts of the agile ecology for learning, which normally tend to be much more discreet and separate spaces. The student engagement suggests the need for more blurring of boundaries between formal and informal learning spaces, so that the creativity students bring

from other parts of the ecology can be leveraged to further fuel existing student engagement. However, we have argued in this article that the benefits of employing an agile ecology for learning as a blueprint or map to design learning experiences extends well beyond students being engaged, as it ultimately has the potential to develop a way-of-being for students that allows them to leverage their creativity in critically reflective ways. This way-of-being stands them in good stead to address the wide range of challenges, many of which are yet unknown, in this ever supercomplex world.

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