

A Complexity Perspective on Ecologies for Learning & Creativity

Norman Jackson

This article is offered as a background paper to the #creativeHE collaborative inquiry 'Exploring Creative Ecologies'.

In the discussion Navid Tomlinson linked the ideas of creativity and complexity and tried to illustrate the idea of simple and more complex learning ecologies (Tomlinson 2016). *'If creativity is simply creating something new then it cannot be more or less creative, creativity is an absolute, instead I wish to talk about more and less complex creative outputs!'.....It seems to be there is a direct correlation between the complexity of our ecology and the complexity of our creative products.'*

The idea is implicit in the narratives of learning ecologies I offered in my book (Jackson 2016a) but I have not made it explicit so I will try to explore and illustrate it here.

Complexity of creative people

We might begin by recognising that people themselves embody different levels of complexity in their personalities, behaviours, cognitive and imaginary abilities and psychologies. The social psychologist Mihaly Csikszentmihalyi, author of *Creativity: Flow and the Psychology of Discovery and Invention*, studied the lives of 91 eminent creators, what he terms "big C" creatives who changed their domains, in search of what they might have in common. His conclusion was that these people are more complex than most people.

'I have devoted 30 years of research to how creative people live and work, to make more understandable the mysterious process by which they come up with new ideas and new things. Creative individuals are remarkable for their ability to adapt to almost any situation and to make do with whatever is at hand to reach their goals. If I had to express in one word what makes their personalities different from others, it's complexity. They show tendencies of thought and action that in most people are segregated. They contain contradictory extremes; instead of being an "individual," each of them is a "multitude.' (Csikszentmihalyi 1996).

Csikszentmihalyi believes that we all can become more creative by consciously becoming more complex (Rivero 2015). By "complexity" he meant having personalities of "contradictory extremes," such as being both extremely smart and naïve, or traditional and rebellious, or objective and passionate. There is little middle ground. Creatively complex people are nearly impossible to "peg" as this or that. Their capacity to tap into a fuller range of what life has to offer is what allows them a broader response to life's problems and questions, whether practical or artistic. This is in line with findings that openness to experience is an important part of creativity.

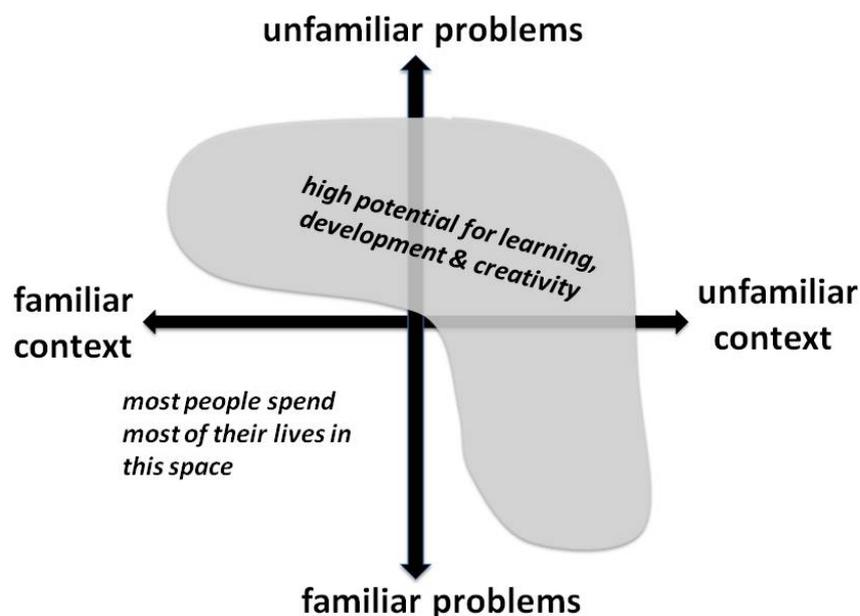
Complexity in situations, problems and opportunities

The human condition is to try to understand situations in order to make good decisions about how to act (or not to act). Some situations are easy to comprehend: they are familiar and we have dealt with them or something like them before and we are confident that we know what to do. Others are more difficult to understand and some are impossible to understand until we have engaged in them.

Unfamiliarity and complexity

Situations can be categorised according to whether the context is familiar or unfamiliar and whether the problem (challenge or opportunity) is familiar or unfamiliar. John Stephenson (1998) developed a simple 2x2 matrix (Figure 1) to explain how we utilise our capability (including our creativity) within these conceptual spaces. Unfamiliarity, is one aspect of complexity.

Figure 1 Stephenson's conceptual framework for imagining the challenge and affordances of different conceptual spaces.



Much of our life is spent in familiar situations where we don't have to pay too much attention to what we are doing and we can reproduce our responses without really thinking deeply about our actions. Stephenson considered this space to be one in which we practised dependent capability and he related this to traditional teaching

approaches adopted in higher education. We can, if we choose, adopt and perform the routines we have learnt in these situations with little or no need to invent. Consequently, our ecologies for learning tend to be stable with little variation. Our personal creativity in this domain is not focused on mastering new contexts and difficult problems, rather we can choose to use our creativity to transform the ordinary into something which has extraordinary meaning for ourselves.

Moving to the other domains we can appreciate that if we are confronted with a problem, challenge or opportunity, or we enter a context (including a change of culture) that is unfamiliar, we have to develop new contextual understandings and / or invent and try out new practices and ways of behaving. Through this process we are creating new understandings and new ways of performing or producing. These are the situations in which

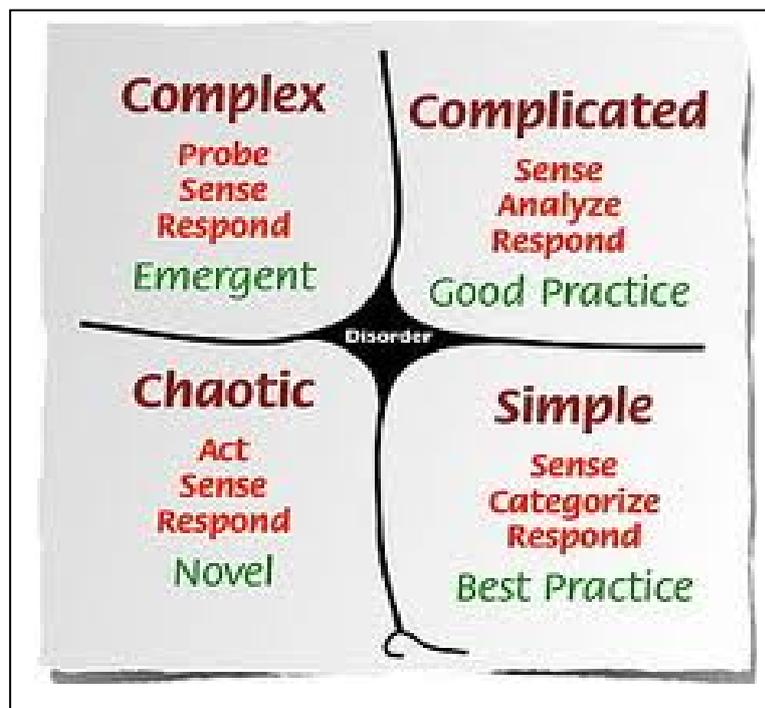
we develop (invent) new knowledge and capability. The challenges they present also demand or stimulate our creativity.

Levels of complexity

We might speculate that the increasing complexity of situations will demand increasingly complex learning ecologies to deal with them. We might also anticipate that highly complex situations and problems cannot be resolved by individuals but require teams of people working together over considerable periods of time.

We might visualise different levels of complexity in social situations using the Cynefin framework (Figure 2) developed by Snowden (Snowden 2000; Snowden and Boone 2007) and described by Callaghan (2009). The framework was originally developed to aid understanding of situations and how to deal with them in organisations, but the concept can also be used to evaluate personal situations. There are four domains within the framework.

Figure 2 The Cynefin tool to facilitate thinking about situations of differing complexity (Snowden 2000, Callaghan 2009).



In the *simple* domain things have a simple cause and effect - you do X and you are very likely to get Y. The environment is familiar and understood. You will probably have had many similar experiences that can be directly related to the situation. You know that 'what you do' is likely to have a particular result. And if you do the same thing in a similar situation the same result will happen. At the other extreme is the *chaotic* domain where there is no perceivable relationship between cause and effect. If this situation happens in your

life, you feel totally out of control and overwhelmed. In these situations your natural response is to act, sense what happens and then act again until you get yourself into a more understandable and comfortable situation. Between these two extremes there are two other types of situation.

Complicated situations are not single events but involve a stream of interconnected situations (many of which may be simple) linked to achieving a goal (like solving a difficult problem or bringing about a significant innovation or corporate performance). They can be difficult to understand: their cause-and-effect relationships might not be obvious but you have to put some effort into working out the relationships by gathering information about the situation and analysing it to see the patterns and look for possible explanations of what is

happening. Engaging in these sorts of challenges is the way you become more expert in achieving difficult things and a lot of professional work is like this.

Complex situations are the most difficult to understand. They are not single events but involve multiple streams of variably connected situations linked to achieving a significant change in the pattern of beliefs and behaviours (culture) in a society or organisation. In such situations the cause-and-effect relationships are so intertwined that things only make sense in hindsight and sometimes well after the events have taken place. In the complex space, it's all about the inter-connectivity of people and their evolving behaviours and patterns of participation that are being encouraged or nurtured through the actions of key agents. The results of action will be unique to the particular situation and cannot be directly repeated. In these situations relationships are not straightforward and things are unpredictable in detail. People involved may not know the cause of the change that they have been involved in or ascribe the source of change to something that is quite removed from the trigger for change. The sort of factors being dealt with in the complex space are things like culture, trust and leadership, and the way you make progress in understanding what is happening is to sense the patterns of change and respond accordingly.

Levels of complexity in learning ecologies

In developing capability for dealing effectively with situations we are developing the ability to comprehend and appraise situations, and perform appropriately and effectively in situations of different levels of complexity. The idea of learning ecologies has been proposed to help explain the relationships of people to their environment / contexts /resources, their problems and perceived affordances and the pattern of interactions and outcomes, as people pursue learning and achievement goals (Jackson 2016).

We might make use of the Cynefin tool to evaluate the situations, problems and opportunities our ecologies for learning and creativity are engaging with.

Simple learning ecologies for simple situations, problems and achievements

In the simple conceptual space - things have a simple cause and effect - you do X and you are very likely to get Y. In my book Jackson (2016) I recount the story of Nadia

we have a music block and sometimes we go in there at lunchtime because it's warm and no teachers kick you out especially if you've got someone actually playing an instrument. One of my friends, Ellie she's amazing at playing the piano. She is grade seven. She was playing the piano. I was sitting there feeling slightly bored, because I couldn't play the piano and even if I could she was hogging it. So I thought, "Well I might as well do something with this time," and so I went and I sat next to her, and when she finished the piece I was like, "Can you teach me something on the piano?" Just because I wanted to be able to play the piano just so I could come home [and play it], because we've got a piano just sitting there. Even if I just sat there and played a scale over and over again, at least I had something to play.....because I had done the flute before I know what scales are. So she taught me the C major scale, which is just going from C to C. So yes I learned that and then I came home and I wasn't really in the mood to do any [home]work...I came into the sitting room and just sat down at the piano and I started practicing the scale. I saw my sister's [piano] book just sitting there on its own, looking all lonely. So I was like, "Well if that's got any instructions, I might as well see if I can do anything else because I know where C is now on the keyboard. Even if I just press that over and over again, maybe there is a song for that." I read the book and I just started teaching myself how to play the piano, just for fun, which is probably the weirdest thing I've ever done, especially for fun.

Nadia's learning project grew out of the circumstances of her life. It wasn't planned, and she didn't have a distal goal. Her proximal goal was simply to learn a tune, emerged through social interaction with her friend and she saw affordance in the situation and then realised the opportunity through her actions. Her personal learning ecology comprises the *contexts* of school and home, the material *resources* of two piano's, one at school and one at home, a book of music at home, a significant *relationship* with her friend who provided the inspiration and essential knowledge/skill resource (her expertise). Learning occurred when Nadia recognised the potential in the situation to achieve something worthwhile and she created a *process* to make use of the resources that were readily to hand. She set aside the time to practice and master the musical notation and used the book of piano music that had been sitting on the piano ever since her sister gave up playing the piano. Nadia's creative achievement was to play a simple tune. Her learning ecology was simple as she might have predicted at the start that if she did the things she did she would be able to play a tune. She might have persisted and created a more complicated learning ecology but she did not continue to learn the piano - she lacked the distal goal that would have encouraged her to persist.



Complicated learning ecologies for complicated situations, problems & achievements

In the *Complicated* conceptual space situations are not single events but involve a stream of interconnected situations (many of which may be simple) linked to achieving a goal (like solving a difficult problem or as in the next example, learning a difficult dance). Paul, who was interested in Morris dancing (a form of English folk dance) wanted to develop his expertise and master a particular dance.

I have taken it upon myself to develop an expert understanding of the Morris dancing and related folk music tradition.... I've committed myself to this journey and for me its about getting to mastery, not the rate in which I get to mastery. I purposefully put myself in positions to learn more.....I have been focused on learning a jig called "I'll go and enlist for a sailor". Some of the steps were eluding me. Over this last weekend I attended the Marlboro Morris Ale and was fortunate enough to meet John Dexter, who could teach me the jig. I was shown the steps in detail by a master of the dance, much of the mystery of the steps were demonstrated, they are no longer a mystery. All my reading of the dance, and watching videos had prepared me well for this master / apprentice type session. I was ready to learn and the correct situation presented itself as I was on my learning journey, often it is important to hold the faith that the right learning is available at the right time. The Morris Ale became a part of my learning ecology.

Paul had a distal goal - to develop his knowledge and expertise in a field that he was interested in. He also set himself a proximal goal to 'master' a particular dance. Paul makes the point that in order to learn you have to put yourself into an environment (*context and situations*) in which you are more likely to find the *resources* and *opportunities* you need to

learn. He saw the *affordance* for developing himself in the Morris dancing event. By reading about the dance and watching videos (*resources*) he prepared himself so that he was ready to learn. His most important opportunity for learning came about when he put himself into a situation where Morris dancers came together to perform and share their tradition. By building a *new relationship* with an expert he was able to gain



access to the help he needed to enable him to complete his learning project. This example illustrates the importance in personal learning ecologies of particular spaces, places and times (contexts) in which specific social practices occur and the resources and relationships for learning are more likely to be available. It also illustrates the importance of creating a learning process that will increase the chance of accessing resources and relationships necessary for learning. His learning ecology was complicated because it involved a number of connected situations over a period of time. Although he might have been determined to master the particular dance he could not have predicted exactly how it would be achieved. It was only afterward that he could reconstruct his learning trajectory and appreciate his creative outcome - being able to perform a dance that he had not invented but was able to replicate for himself with others.

Complex learning ecologies for complex situations, problems & achievements

A few projects in our life that extend over long time scales are likely to be visualised, formed and enacted in the complex conceptual domain.. they will contain ecologies that are in themselves dealing with complicated situations but overall, the project and the packages of ecologies are best envisaged as inhabiting the complex domain.

Complex ecologies to tackle complex problems and produce complex achievements necessarily involve complex inputs and relationships. Complexity may be reflected in such things as the scale and scope of our learning ecology, the amount and level of knowledge and skill we need to develop the number and quality of relationships we need to form, the number of people who are directly involved who influence and co-create the ecology, the long time scale over which the ecology is developed and its connectivity to other learning ecologies, the scale and nature of resources that are need to support it.

Complex situations and problems are the most difficult to understand. They are not single events but involve multiple streams of variably connected situations linked to achieving significant goals over an extended time scale. Complex change will subsume all other types of change within it. Cause-and-effect relationships are difficult to recognise and things are unpredictable in detail. Often the outcomes only make sense in hindsight and sometimes well after the events have taken place. The results of action will be unique to the particular situation and cannot be directly repeated. Complex learning ecologies will involve more people and relationships than simple and complicated ecologies.

In my final background paper for #creativeHE I describe the learning ecology through which I developed the idea of learning ecologies to the point where I codified my thinking in a book. Although there were a sequence of learning ecologies they were connected by a common purpose - to explore the idea and development new knowledge and when viewed as a whole it comprised a complex learning ecology out of which emerged a creative product - the book (Jackson 2016b). Bringing the book into existence was consistent with the concepts of creativity proposed by (Dellas and Gaier's 1970, and Rogers (1961)

Creativity is the desire and ability to use imagination, insight, intellect, feeling and emotion to move an idea from one state to an alternative, previously unexplored state (Dellas and Gaier's 1970)

[creativity is] the emergence in action of a novel relational product growing out of the uniqueness of the individual on the one hand, and the materials, events, people, or circumstances of his life (Rogers 1961).

Combining the complexity of individuals with the complexity of situations

Every organism exists in an environment: the organism shapes its environment and the environment shapes the organism. So it helps to think of an indivisible totality of 'organism plus environment' - best seen as an ongoing process of growth and development (Ingold 2000). The philosopher Gregory Bateson (1971) talks about our need to think with ecological complexity to solve the worlds complex problems. I think we need to apply the same type of ecological thinking to the way we learn, develop and create.

The idea is based on a belief that it does not make sense to talk about the environment in which we are learning without reference to ourselves as the organism that is perceiving and interacting with the environment we inhabit in order to learn, develop, perform and achieve. Gregory Bateson talks about thinking with ecological complexity to solve the worlds complex problems. I think we need to apply the same type of ecological thinking to the way we learn, develop and create.

Applying the idea of ecology to learning, personal development and achievement, including our creative achievements, is an attempt to view a person their purposes, ambitions, goals, interests, needs and circumstances, and their unique set of personal qualities, capabilities, beliefs and values, and their relationships with the social, physical and virtual world they inhabit, as inseparable and interdependent. It is not just about an environment, or about us as beings with capacity and agency to learn. It's about us sensing, perceiving, inhabiting and performing in our environment and responding to whatever emerges.

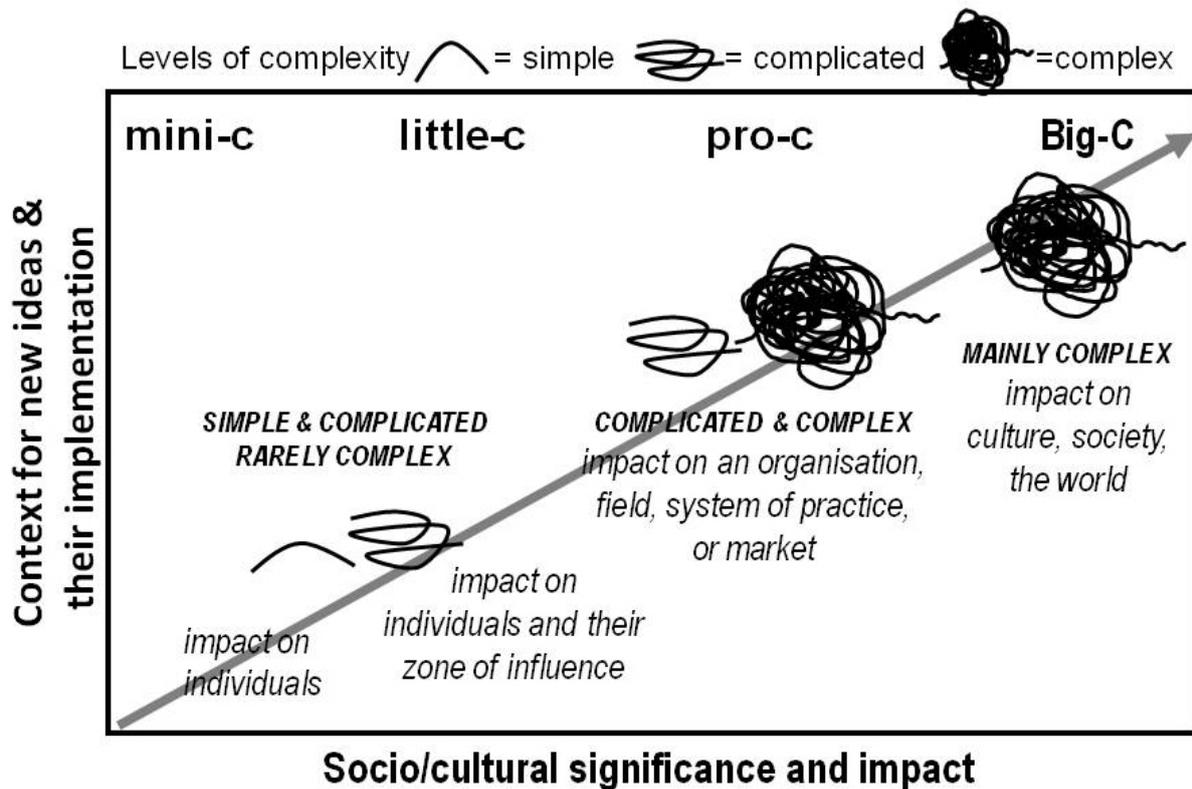
The ideas outlined in this article suggest that we cannot separate the complexity of the person from the complexity of the situations the person is inhabiting. Perhaps it's this combination of complexity within which acts of creativity flourish.

Combining the complexity of situations/problems and affordances with Kaufman and Beghetto's 4C model of creativity

Some people believe that they are just not creative: a belief that stems from comparing themselves with people they perceive as being highly creative (ie 'compared to her/him I am

not creative'). Individuals' creative development will be hindered unless they believe that they have potential to be creative in their ways and circumstances. One approach is use the 'scale and significance' diagram to explain the nature, scope and influence of individuals' creativity.

Figure 3 The 4C model of creativity proposed by Kaufman and Beghetto (2000) combined with a complexity perspective (Snowdon 2000).



Kaufman and Beghetto (2000) suggest that human creativity can be categorised into 'Big-C' creativity that brings about significant change in a domain; 'pro-c' creativity associated with the creative acts of experts or people who have mastered a field, including but not only people involved in professional activity; 'little-c' creativity - the everyday creative acts of individuals who are not particularly expert in a situation and 'mini-c' the novel and personally meaningful interpretation of experiences, actions and events made by individuals. Central to the definition of mini-c creativity is the dynamic, interpretative process of constructing personal knowledge and understanding within a particular socio-cultural context. Because all creativity must involve new thoughts and changes in understanding it must also be present in little-c, pro-c and Big-C creations.

Both mini-c and little-c forms of creativity are relevant to higher education learning and curriculum designs, teaching and learning strategies could usefully encourage and facilitate these. One might speculate that participation in these forms of creativity are pre-requisite for pro-c and Big-C creativity in later life: if we want creative professionals then we should be encouraging our students to be creative. It is however important to note that 'everyday creativity can extend from mini-c to little-c through pro-c. It is only Big-C that remains eminent creativity (ibid:6) beyond the reach of most of us. From an educational perspective it

might be reasoned that by encouraging and empowering students to use, develop and make claims for mini-c and little-c forms of creativity, we are better preparing them not only for using these forms of creativity in later life but for engaging in more expert-based forms of creativity that emerges through sustained engagement with a particular domain or field of activity.

Figure 3 attempts to integrate a complexity perspective into the 4C model of creativity. We might speculate that little-c creativity involves relatively simple and complicated situations and problems pro-c creativity involves complicated and complex situations and Big-C creativity would be mainly concerned with situations and problems that are complex but would also subsume simple and complicated situations within complexity.

QUESTIONS

- 1) Is the idea that learning ecologies and the creative achievements that emerge from them have different levels of complexity useful?
- 2) In what other ways might complexity be recognised in a learning ecology?
- 3) Are there other tools we might use to appreciate the complexity of situations?
- 4) Is the idea integrating a complexity perspective into the 4C model of creativity useful?
- 5) What other questions might we ask about learning ecologies, creativity and complexity?

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