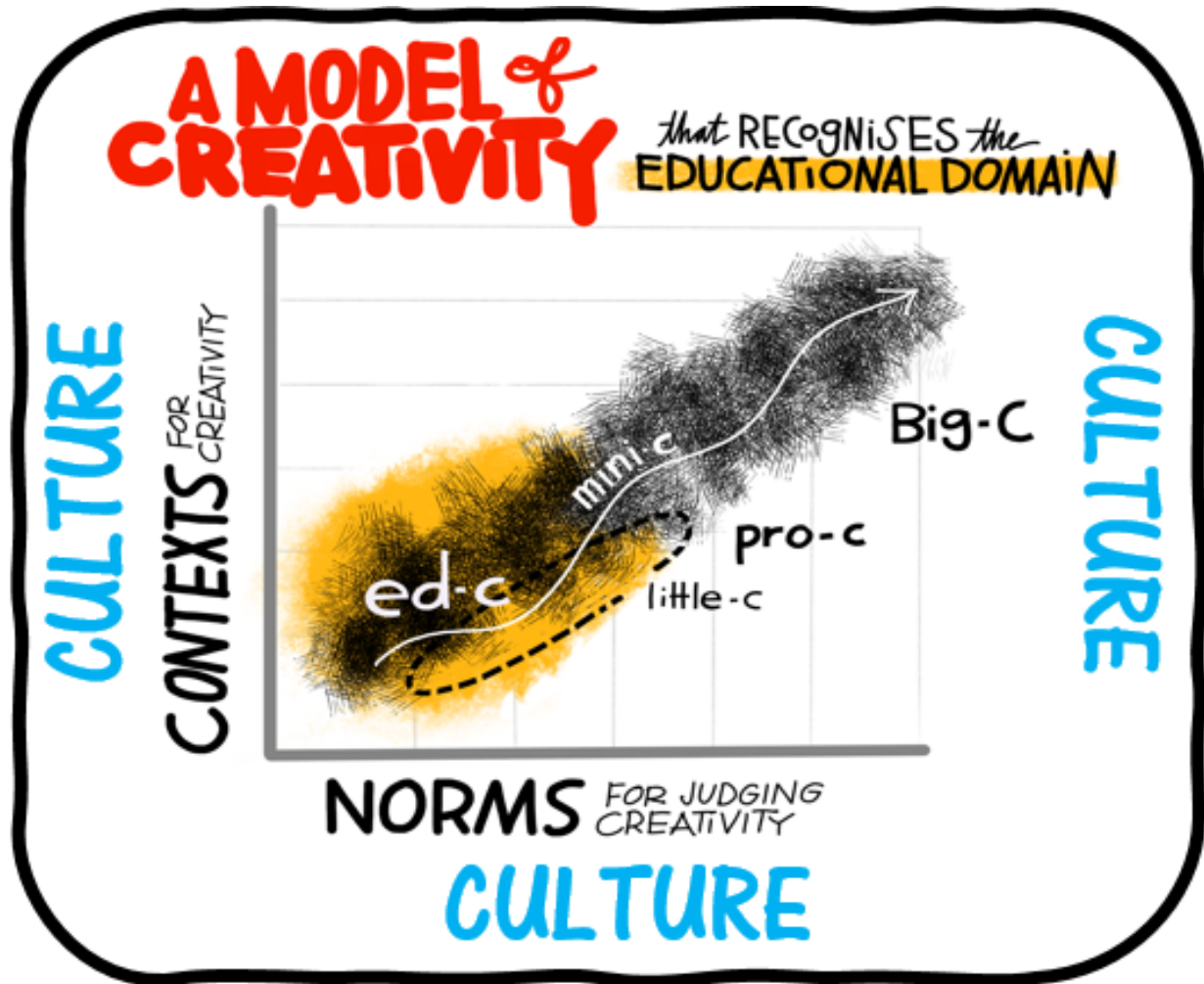


CAM 15 January 2020



**EXPLORING &
EXTENDING the
4C MODEL of
CREATIVITY**
RECOGNISING
the VALUE of **ed-c**

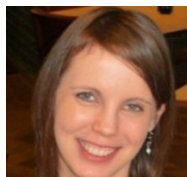
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Exploring and Extending the 4C Model of Creativity: Recognising the value of an ed-c contextual-cultural domain

Norman Jackson & Carly Lassig



Norman is Emeritus Professor of Higher Education at the University of Surrey, co-founder of Creative Academic and Editor of Creative Academic Magazine. His book, 'Developing Creativity in Higher Education: an imaginative curriculum' provides a foundation for his current work on creativity.



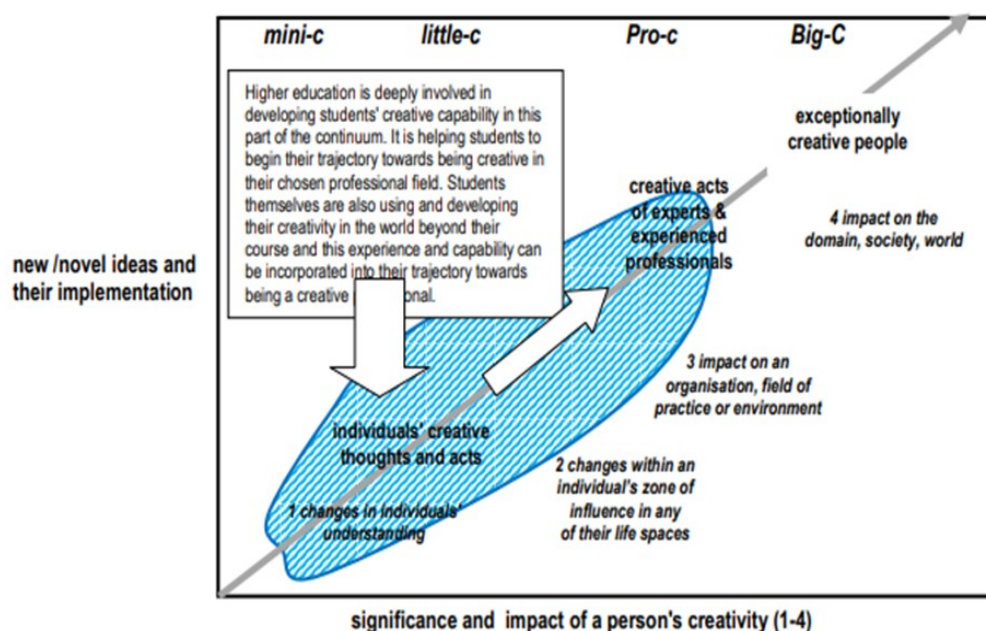
Carly is a Lecturer in the School of Early Childhood and Inclusive Education in the Faculty of Education at Queensland University of Technology. She has a passion for social justice, equity, and inclusion and through her doctoral research she developed a grounded theory for adolescents' creativity.

Background

The 4C model of creativity developed by James Kaufman and Ron Beghetto in 2009¹ provides a useful framework within which general concepts of creativity can be located. It helps to explain some of the complexity associated with the phenomenon of creativity. The value in their framework was to extend the ideas of everyday *personally meaningful* small-c creativity, and Big-C eminent *culturally meaningful* creativity to include "mini-c"—creativity that is inherent in the process of learning, and "Pro-c" creativity—relating to the creativity of experts working in a professional domain i.e. a domain where specialist knowledge and skill is needed to perform.

Their map of creativity as a phenomenon made a lot of sense to me [NJ] and I used it to create an illustration for conferences and talks given between 2010-14. The visual aid enabled me to explain the different contexts and significances of individuals' creativity (Figure 1) and show how different parts of the spectrum are relevant to education, work or other aspects of everyday life.

Figure 1 Representation of the 4C model of creativity¹ prepared for a conference presentation in November 2013²



Unbeknown to me, at the same time Carly was working on her doctoral study in Australia investigating the creativity of adolescents in which she drew on the 4C model and argued for its extension to include a fifth C to represent the domain of formal education.³

In May 2019 I attended the UK Creativity Researchers conference at the University of Central Lancashire and enjoyed a talk given by Thomas Colin, a doctoral researcher at the University of Plymouth. During the talk he showed a representation of a 2x3 grid for understanding creativity with 'context' and 'norm' as the labels for the two axes of the grid. I assumed his diagram was related to the 4C model of creativity. On the train home from the conference I redrew my 4C framework diagram to incorporate the dimensions of context and norms and shared it with Thomas to find out how I might give him credit for his idea. He subsequently sent me an article⁴ which explained the background to his diagram, but he assured me that he himself had not related his matrix to the 4C model, although he could see the value in doing so.

Simultaneously I was facilitating an on-line conversation in the #creativeHE Forum in our 'Lets Get Creative' festival. During the conversation I introduced the 4C model of creativity as a tool to help us interpret our own creative involvement in the festival⁴. In response to my post, one of the participants recommended that I look at Carly Lassig's PhD dissertation³. After reading Carly's work and appreciating the synergies in our ideas, I contacted Carly and this article is the result of our collaboration. We offer this exploration of the 4C model in order to stimulate further conversation about its use and value and argue that what we are calling a *contexts and norms framework* for creativity, could usefully be extended to include the educational (ed-c) domain proposed by Carly in her dissertation.

What is human creativity?

Before we go any further, we need to share our understandings of what creativity means. At the most fundamental level we agree with Lev Vygotsky when he says, "Any human act that gives rise to something new is referred to as a creative act, regardless of whether what is created is a physical object or some mental or emotional construct that lives within the person who created it and is known only to him."^{6 p7}

But there are many nuances on this theme resulting in over 100 published definitions or propositions as to what creativity means. There is no consensus-based definition of creativity, however, according to a standard definition, creativity is often perceived as the ability to produce something new/novel and appropriate/useful. Embedded in the standard definition used in psychological research⁷, are the ideas of *originality* and *effectiveness*. But there are two ambiguities in the standard definition³. Firstly, the definition leaves open the choice of the context and norms against which to measure originality and effectiveness. Secondly, it does not discuss the possible role of a subjective judge(s)^{3 p25} i.e. the person, persons or groups of people who evaluate and decide whether something is of value. In other words, the social/cultural environment within which people create is also the environment in which judgements are made about a creation. Creativity is a social construct and it is fairly meaningless without a social/cultural context.

Creativity as a phenomenon involving unique people interacting in unique ways with their unique contexts, situations and physical-social-cultural environments

The American philosopher, educator and social critic John Dewey developed an interactional model of creativity through which creativity emerged as a result of humans interacting with their environment. He believed that action and creativity are brought together through human experience. "*When we experience something, we act upon it, we do something with it; then we suffer or undergo the consequences. We do something to the thing and then it does something to us in return.*"^{8 p46}

Carl Rogers framed the way creativity manifests itself as a phenomenon through his concept of a creative process "*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 [their] life*"^{9- p350}. Like Dewey, he describes creativity as an ecological phenomenon - human beings having thoughts and feelings that are stimulated by their relationship and interactions with the material and socio-cultural world around them and these thoughts and feelings lead to actions and experiences in the world which they interpret and respond to in ways that cause new 'things' to emerge or happen.

Anthropologist Tim Ingold has much to say on the making of cultural artefacts that grow through a unique person interacting purposefully, skilfully and creatively with their environment.

"What people do with materials is to follow them, weaving their own lines of becoming into the texture of material flows comprising [their] lifeworld. Out of this, there emerge the kinds of things we call buildings, pies and paintings."^{10 p97}

"every practitioner has to improvise his or her own passage through the array of tasks the performance entails..... the wellsprings of creativity lie, not inside people's heads but in their attending upon a world in formation."^{11 p.124}

Support for these ways of thinking about creativity is provided through the recent publication of a socio-cultural manifesto for advancing creativity theory and research¹² which was endorsed by a group of 20 top creativity researchers. A selection of quotes from this short but authoritative statement about the nature of creativity, serve to reinforce the general flow of ideas about conceptions of creativity as we explore the 4C framework.

"Creativity is, at once a physical, social and material (physical and embodied) phenomenon. This multidimensionality is important because we create not as isolated minds but as embodied beings who participate in a socio-material world."^{12 p2}

"Creativity and culture are intertwined: the former uses the signs and tools made available by the latter to produce new cultural resources that go on to facilitate future creative acts. Language as a cultural artefact plays a particularly important role in the dynamic of creativity..... In the socio-cultural tradition, culture and mind are interdependent and continuously shape each other. Culture is neither external to the person nor static, but constitutive of the mind and of society by offering the symbolic resources required to perceive, think, remember, imagine, and, ultimately, create."^{12 p2}

“Creativity takes the form of action or activity, and all human action occurs in a given symbolic, social, institutional, and material context. As a result, creativity is constituted to a great extent by the situation and domain in which it is expressed rather than any universal or innate bio-psychological principles. This, among other things, makes creative acts unique - given that no two people and situations are completely alike - and also difficult to predict. At the same time, cultural patterns as well as individual regularities in creative expression do allow us to construct models that are transferable to different domains of creative action and to different contexts. Generalization should be made with great care, though, and in ways that recognize the situated nature of creative action.”^{12 p.2-3}

Education and creativity are cultural constructs. Culture is learned, not inherited. It derives from one's social environment ^{14 p.6} and creativity is action mediated by culture^{12 p.2} so we cannot extract (de-contextualise) creativity from its cultural home and expect to understand it. This is very important when using the contexts and norms framework as a cognitive tool we must appreciate that culture underlies everything (Figure 2).

But culture is also an individual, psychological construct as well as a social construct.¹⁴

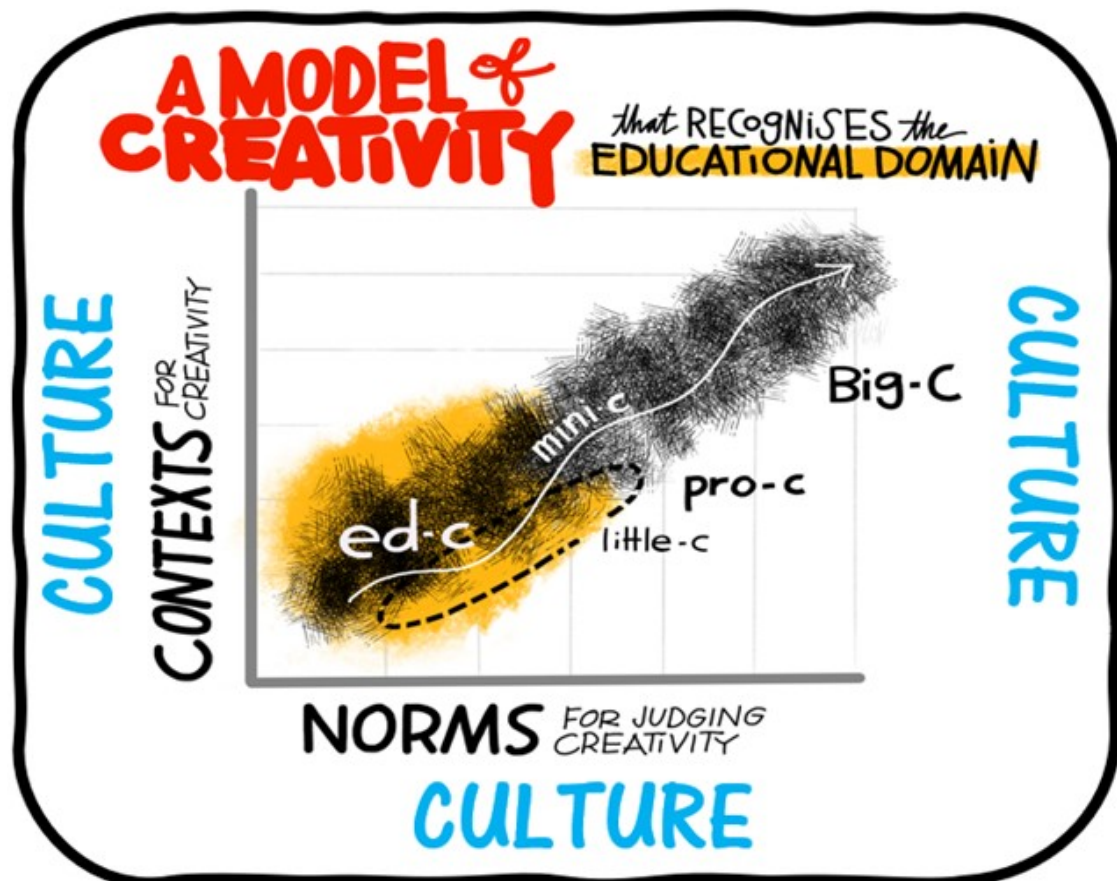
“culture exists in each and every one of us individually as much as it exists as a global, social construct. Individual differences in culture can be observed among people in the degree to which they adopt and engage in the attitudes, values, beliefs, and behaviours that, by consensus, constitute their culture. If you act in accordance with those values or behaviours, then that culture resides in you; if you do not share those values or behaviours, then you do not share that culture.”

“While the norms of any culture should be relevant to all the people within that culture, it is also true that those norms will be relevant in different degrees for different people. It is this interesting blend of culture in anthropology and sociology as a macro-concept and in psychology as an individual construct that makes understanding culture difficult but fascinating.”^{15 p.18}

What is clear from the literature is that culture underwrites the definitions, process and assessment of creativity¹⁶ and ‘people from different cultures or settings have distinct implicit and/or explicit conceptions of creativity’^{16 p.1}

‘Culture is a fuzzy set of basic assumptions and values, orientations to life, beliefs, policies, procedures [artefacts] and behavioural conventions that are shared by a group of people, and that influence (but do not determine) each member's behaviour and his/her interpretations of the ‘meaning’ of other people's behaviour.’ ^{13 p.3}

Figure 2 Our representation of the contexts and norms framework, drawn by Sita Magnuson, emphasising the way in which culture underpins everything and showing how ed-c sits alongside little-c as the essential environments for creativity during childhood, adolescence and early adult life for many people.



The 4C contexts & norms creativity framework

Our understanding of the 4C model¹ is that it seeks to develop a comprehensive and inclusive concept of creativity that can accommodate individual's creativity along and across the life span from the humblest to the most significant of scales and impacts. The model has four categories that relate to the manifestation of creativity but they are not uniform in character. Two of the categories might be viewed as meta-contexts within which particular contexts, situations and physical social-cultural environments are located.

Personal everyday life situations and contexts (little-c) *creativity can be present in any aspect of a person's life* A person's everyday life is a meta-context containing many different domains of activity and experience that hold potential for imagination and creative action alongside and integrated with thoughts, actions and experiences that would not be considered creative. Little-c actions or outcomes are considered creative by people in the relevant everyday context. For example, a new dinner recipe could be deemed creative by family members.

Professional/work situations and contexts (Pro-c) *creativity can be present in and through aspects of individual's work or areas of expertise.* The Pro-c meta-context contains a multitude of domains in which people practice and create. The word 'professional' might be a little misleading. More accurately this is a domain in which people have invested significant time and effort in developing themselves to the point where peers would consider them to be expert in their knowledge and performance. Thus, it does not have to be a professional work context for example serious hobbyists may have invested as much time and committed practice as someone who earns a living from their own expertise.

A third category of eminent creativity (Big-C) *is not a meta-context, rather it is the recognition of exceptional achievements or performances that impact on culture in any context or domain where expertise is required.* The eminent accomplishments of great inventors in artistic, scientific, technological or political fields inhabit this domain. Artists like Picasso, musicians like Mozart, scientists like Darwin, engineers like Brunel, writers like Shakespeare and leaders like Ghandi inhabit this category. Often the significance and value of an individual's accomplishments are only recognised after a considerable time has elapsed since their creativity was manifested. It typically takes two to three decades before someone receives a Nobel Prize for their ground-breaking work.

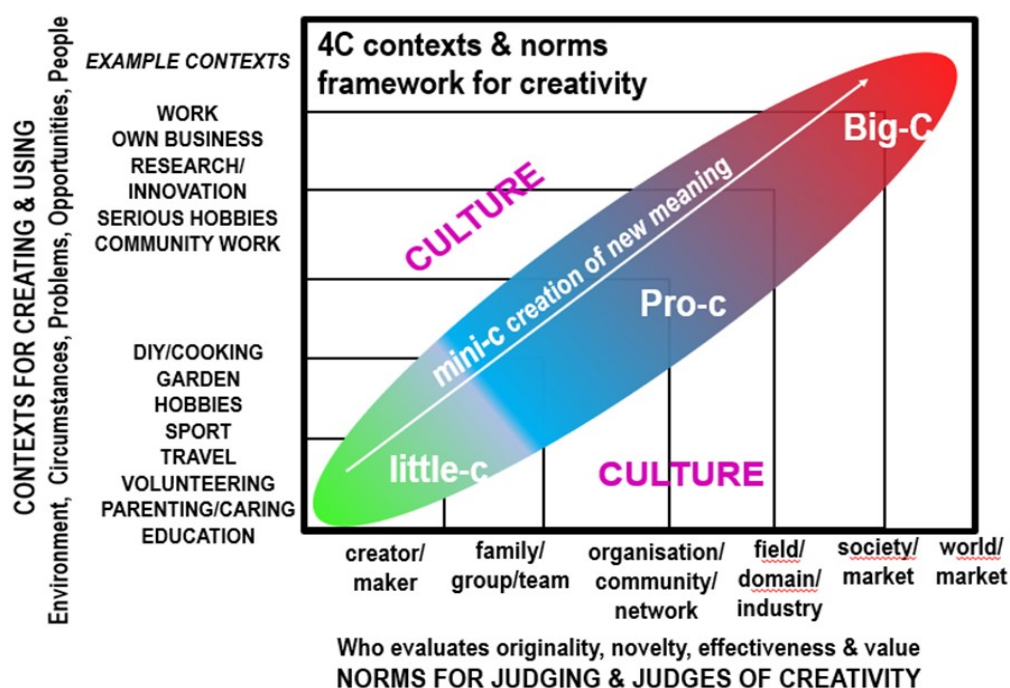
A fourth category (mini-c creativity) *refers to the cognitive and emotional process of constructing personal knowledge within a particular sociocultural context in order to develop/change understanding.* It is a mental process associated with activities and experiences in the three other categories of creativity described in the framework, and in all stages of human development and activity, from the imaginings of a child that transforms his everyday world into a magical and mysterious world of giants and monsters, to the most sophisticated conceptual thinking necessary for breakthrough science.

"mini-c creativity is not just for kids. Rather, it represents the initial, creative interpretations that all creators have and which later may manifest into recognizable (and in some instances, historically celebrated) creations"^{1 p4}

Viewing creativity as a phenomenon involving unique people interacting in unique ways with their unique contexts, situations and environments means that any frameworks within which creativity is considered need to acknowledge the contexts, and material and social-cultural world in which creativity emerges. This is the first motivation for our exploration of the 4C framework.

We believe we can usefully integrate the ideas of context, norms, values and subjective judges into the 4C framework to enhance its meaning and value as a cognitive tool. Figures 3 illustrates how these ideas might be combined and integrated.

Figure 3 4C contexts and norms framework showing the categories of creativity in the model with example contexts and the people who create, use and judge creations. Developed from Kaufman and Beghetto's 4C model of creativity¹



Exploring the contexts and norms framework (examples of little - c/mini-c phenomenon)

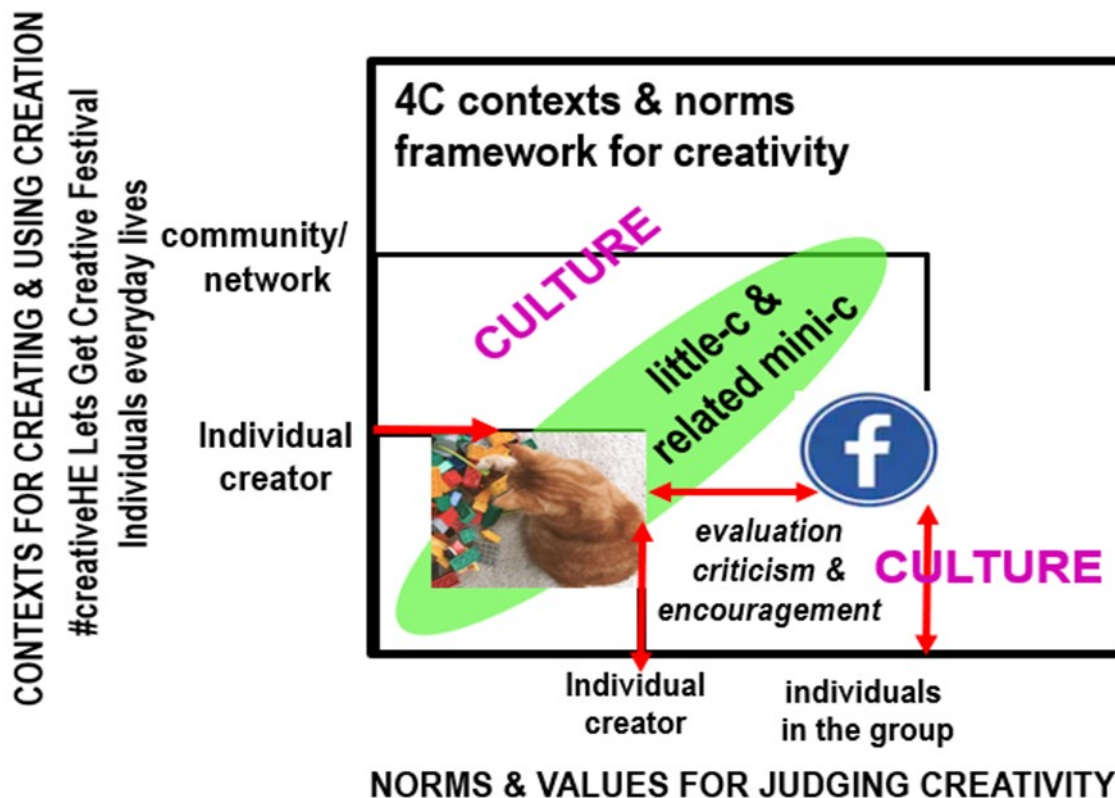
The May 2019 the UK-wide 'Let's Get Creative Festival' afforded the opportunity for the members of the #creativeHE facebook forum to use their creativity and share its effects with the other participants. The festival and forum created a context for individuals to try to use their creativity and share the outcomes and their understandings with others who in turn were able to evaluate and comment on the creative gifts using their own values to judge them. In this way the personal creativity of individuals was connected to the norms of a social group that shared to varying degrees, certain values and beliefs and were able to gently explore interesting aspects of little-c and attendant mini-c phenomenon.

Philosophically, the annual Let's Get Creative festival is founded on western cultural assumptions that engaging in creative activity is an essential part of being human with practical and psychological benefits in line with those advocated by David Schuldberg.

"Living creatively is an intrinsic part of everyday life. It is a core component of 'living a good life' which is not an outcome but a path that is constructed through ordinary activities and experiences. In this context creativity means coming up with solutions to life's problems and to making the most of opportunities that are both novel and useful to the inventive [resourceful] person. Sometimes these activities and effects are of practical significance and value and sometimes their meaning lies in the emotional and aesthetic" ^{17 p.55-6}.

We believed that the people who participated in the Lets Get Creative festival by producing and sharing something with the members of the group, also shared these cultural beliefs and values, although perhaps to varying degrees. We might use the 4C contexts and norms framework to model this set of conditions (Figure 4).

Figure 4 Using the 4C contexts and norms framework to illustrate the interactions between an individual participant sharing their little-c/mini-c creativity and the members of a forum



Clashing norms - what is/isn't creative?

While participants shared a context - membership of and participation in the #creativeHE forum and festival, and a set of broad cultural assumptions about creativity, what surfaced in the group was a tension between what some people believed was a valid manifestation of their own creativity for example, a photograph of their cat with interpretations of the meaning of what it was doing, and what other participants felt was an acceptable claim to creative self-expression. What we witnessed was a clash of personal norms relating to what it meant to be creative: a situation that is represented schematically using the 4C contexts and norms framework in Figure 5.

What followed was a conversation in which the facilitator defended the right of the individual to make a claim for their own creativity while the agent provocateur elaborated a more critical view of the creative value of the claim for creativity. What was interesting was the feedback given to the creator by other participants which aimed to encourage greater meaning making or more inventive use of the photographic artefact. The cat-

snapper responded to the critical feedback by creating captions and at the end of the process a synthesis collage. The lesson here perhaps is that interaction with a community 1) invites criticism and the testing of an individual's normative creative values against those of others. However, interaction 2) also invites the possibility of constructive feedback that can then stimulate responses that are deemed to be more creative by the community. In this way perhaps an individual's normative values are changed.

The cat snapper invited others to contribute captions and this resulted in several people suggesting alternative captions including several that were quite funny. In this way simple snaps of a cat engaged imaginations and stimulated metaphorical and symbolic interpretations of possible meanings which were aired and shared. Perhaps in this way interaction results in the sharing of meanings so that mini-c might be a property of a group process as well as an individual process.

The question of what is or isn't creative is a good one and it is one that continually exercised the #creativeHE forum. Carl Rogers talks about the need for an internal locus of evaluation.

"Perhaps the most fundamental condition of creativity is that the source or locus of evaluative judgment is internal. The value of his product is, for the creative person, established not by the praise and criticism of others, but by himself. Have I created something satisfying to me?... If to the person it has the "feel" of being "me in action," of being an actualization of potentialities in himself which heretofore have not existed and are now emerging into existence, then it is satisfying and creative, and no outside evaluation can change that fundamental fact." ^{9 p354}

When people declare their opinions, such as in a public on-line forum, it is clear that individuals differ in their sense of what is creative based on the beliefs and norms they hold. One way of mediating these differences is to develop criteria that can be shared and discussed in the context of individual contributions. Unfortunately, it is often very hard to even get participants to share the results of their creativity and even harder to get them to talk about it. This is one of the reasons that creativity is so elusive, subjective and contentious.

Personalising the 4C contexts and norms framework

The advent of social media means that the products of individuals' creative self-expression can be communicated to a wider, potentially global audience. One of the contributors to the May 2019 #creativeHE Let's Get Creative Festival was Chris Tomlinson a busy veterinary surgeon. Chris starts his day with a big bowl of porridge on the top of which he makes a pattern or a picture that means something to him, with fruit he has ready to hand¹⁸. On special days, like an anniversary or festival, he makes a picture that symbolises the meaning of the day, or it might be an incident or event drawn from his life that forms his subject for the day. Some examples are shown in Figure 5. His porridge pictures are personally meaningful cultural artefacts.

He began this practice to amuse and communicate important things to his young children. Impressed by his artistry, his daughter-in-law suggested he could share his personal creations with others by posting them on Instagram. She set up an account for him and since then he has made over 800 daily posts to share his porridge creations with over 300 followers on Instagram and many more on Facebook. In this way he actively participates in one of the more recently developed popular cultural practices of his family, friends and society more generally.

Figure 5 Some examples of Chris' porridge art

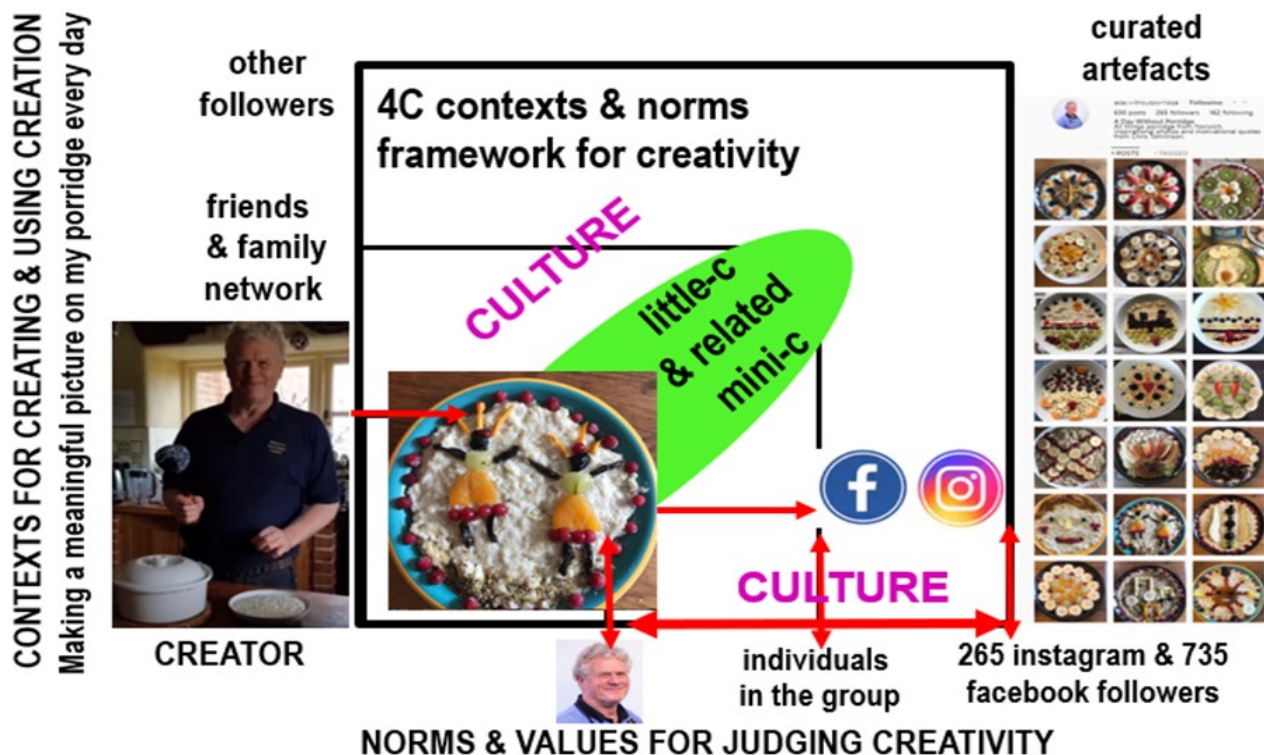
According to Chris, *'creativity is expressing something about yourself in your daily life.. so it's not doing something that everybody else does in the same way as everyone else does it, but doing something which shows something of your personality.'*¹⁸ In making his designs he uses the materials in his cupboard, fridge and freezer, he draws on recent or soon to be events in his life to provide the subjects for his imagination and he weaves these things into a design or picture that means something to him and the people who know him. In this way his mini-c and little-c are working together to make something that is not just an expression of himself for himself, but a gift for others which he is able to share with them at the instant of making because he has access to a number of technologies - mobile phone camera, wifi, internet and social media platforms.



*'It's kind of fun to be feeding pictures of my porridge to people on Facebook and Instagram, "This is my porridge for today." You get the feedback from people and it tells you it brings a smile on people's faces and they enjoy seeing what I have done with my porridge, it's like a little feature in their life.'*¹⁸

We can use the 4C contexts and norms framework to illustrate some of the features of his creative process (Figure 6) in doing this we personalise the abstract framework. Chris has undertaken to start every day by engaging his mind and body to make something that is both original and meaningful in the context of his everyday life. Because it's part of a daily routine - eating breakfast, he is not 'eating into' his busy life. His making is fairly spontaneous, he has an idea imagines an image that he is able to execute. The materials that are available to him in his home environment also shape the image as he works. There is a video clip of his practice <https://www.youtube.com/watch?v=ytFtrgZT9qU&t=546s> that has in the last 12 months been watched 650 times.

Figure 6 Using the 4C contexts and norms framework to visualise an individual's little-c creative practice and their environmental and social-cultural interactions facilitated by social media.



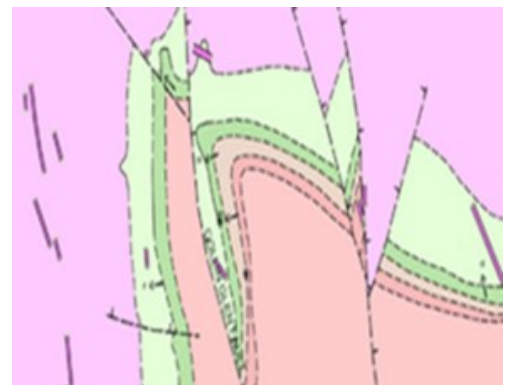
Because his images have been curated on Instagram we can see that no two images are the same, taken together they provide a substantial body of porridge art while documenting significant events in his life. After he has made his creation he photographs it, adds some captions to help convey the meanings he attributes to the artefact and posts the image on Instagram and facebook where his followers indicate whether they like it or not and offer their comments and reactions. In this way his followers evaluate his gift and the feedback they give tells him that what he is doing is valued by others. In this way his artistic enterprise becomes a conversation and this motivates him to continue and do more. From this simple example we can see how social media enables an individual to share/ gift the results of their creativity in real time with a large number of people and gain feedback that encourages them to sustain their creative enterprise.

This example of little-c / mini-c creativity also reveals another dimension of creativity phenomenon, namely the production of a 'body of work' over time. In this case the use of social media enables people to access the body of work at any time now or in the future. Furthermore, the body of work itself creates a new context within which the creative enterprise and any new creation can be judged.

Exploring the contexts and norms framework: Example of Pro-c/mini-c phenomenon

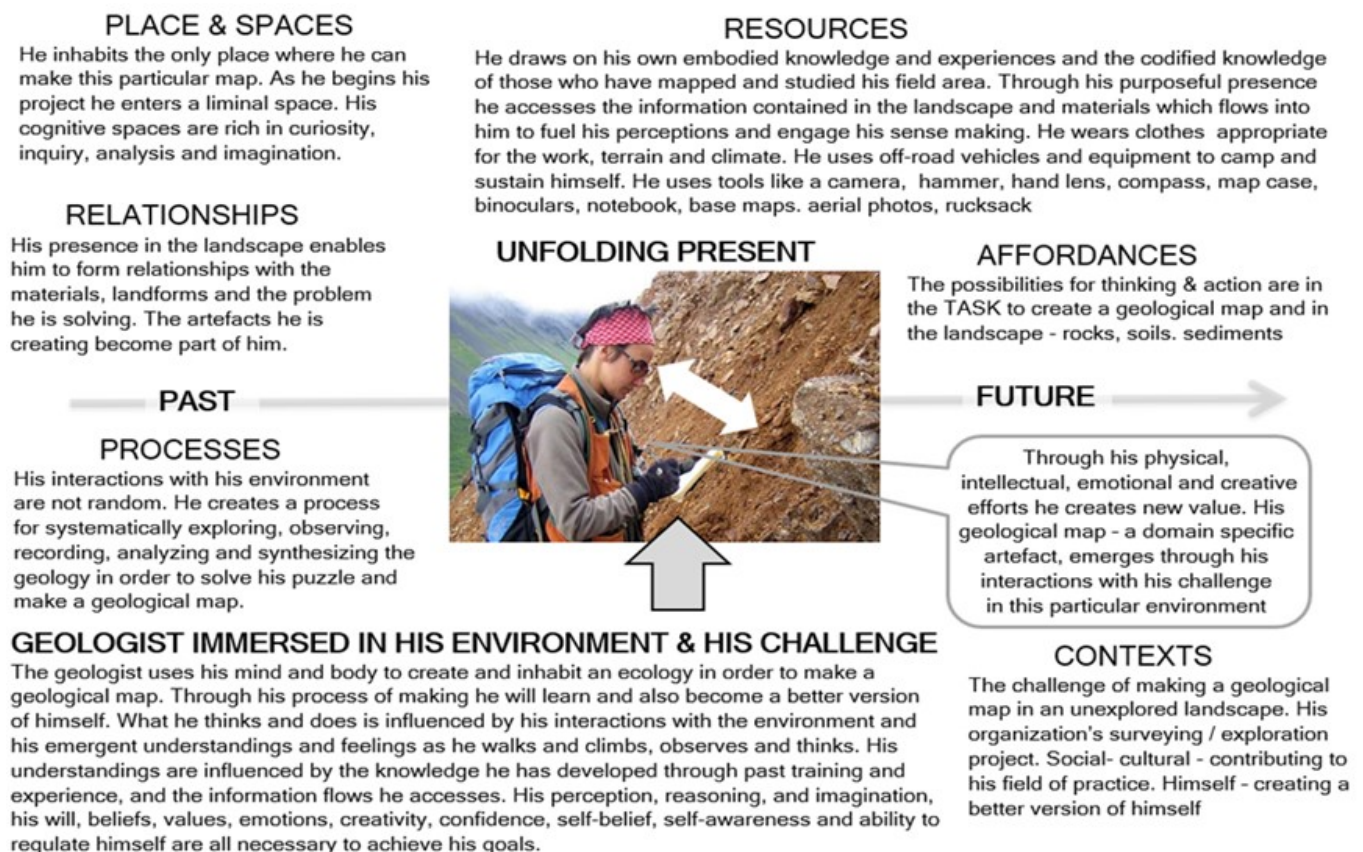
We can use the same approach, to that described above, to represent the creativity of people who are expert in their field i.e. the Pro-c domain of creativity in the 4C contexts and norms framework.

In a recent book chapter¹⁹ I [NJ] describe a geologist making a geological map that contains a symbolic visual representation of the rocks, structures, material resources and geological history of an area. We can view the geological map as a new/original, useful and meaningful, domain specific artefact brought into existence through the skilful/ expert practices and cognitive processes of the geologist.



In order to make the map the geologist develops an *ecology of practice*¹⁵ (Figure 7). A geologist's ecology of practice comprises themselves, their mind and body and all they can bring to the situation as they relate to and interact with their unique physical environment - the only place in the whole world where this particular map can be made. They have learnt how to create an ecology of practice through the education, training and practical experience they have learnt how to create an ecology of practice through the education, training and practical experience they have undertaken in the cultural domain of geology. This has equipped them with the knowledge and skills to engage with, observe and interpret their physical environment using the signs and tools developed and made available through their cultural domain in order to produce new cultural resources - a geological map and report.

Figure 7 A field geologist's ecology of practice for making a geological map¹⁹



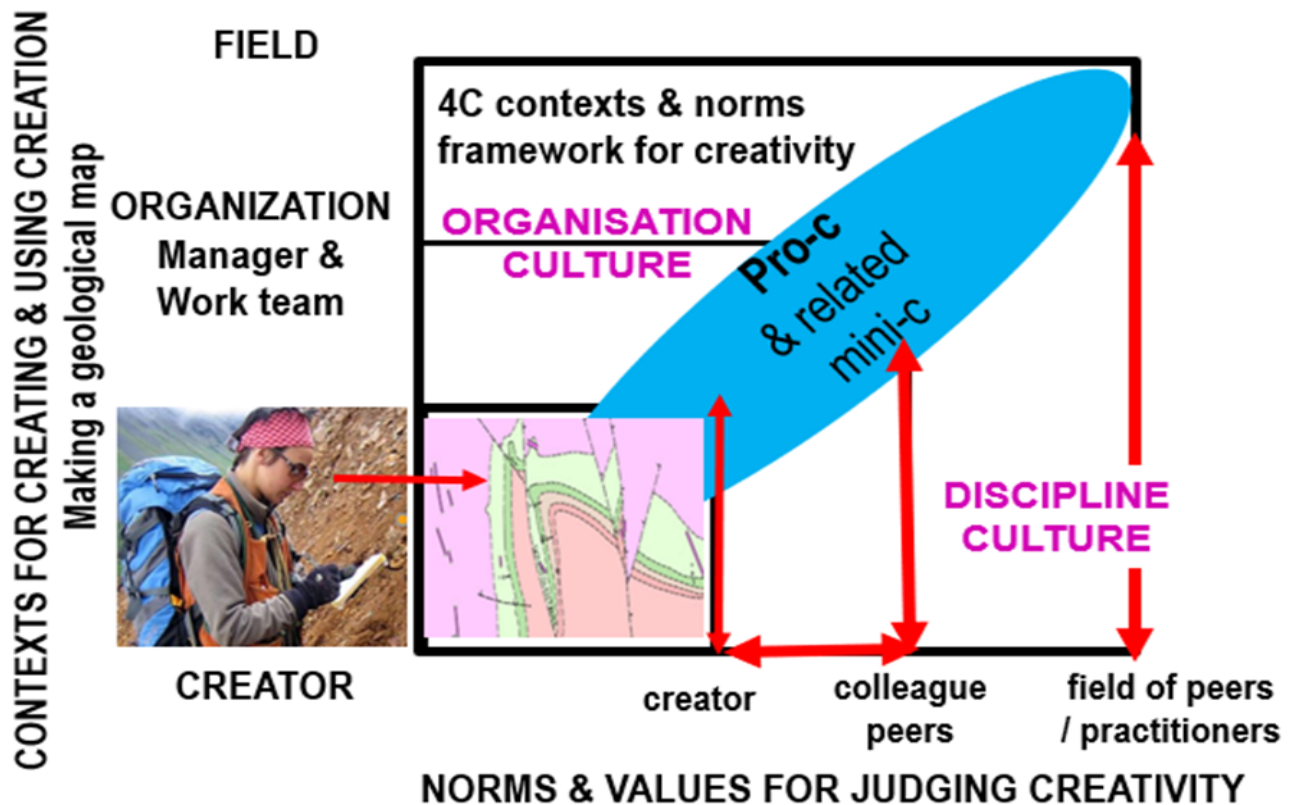
Their ecology of practice includes their work activities and the methodologies and the processes they employ using specific tools and technologies. Before they enter the field environment they will conduct research into what is already known. They gather the resources they need, such as aerial or satellite photographs and topographic maps, and use these to make preliminary assessments of the geology. When they enter the field environment, they will physically cover the ground, gathering and processing lots of information through skilful actions like locating the position of a rock outcrop on a topographic map or aerial photograph, measuring the dip and strike of bedding or other structures in rocks, breaking rocks and examining fresh surfaces with a hand lens and perhaps testing them with dilute hydrochloric acid, photographing and sketching outcrops and annotating their sketches with observations and interpretations. In these actions they are searching for geological evidence that they can interpret and to which they can give meaning; meanings that have been learnt through years of study and practical experiences in a range of environments.

"Creativity and culture are intertwined: the former uses the signs and tools made available by the latter to produce new cultural resources that go on to facilitate future creative acts"^{12p2}

Making a geological map is like solving a giant jigsaw puzzle where most of the pieces are missing (there may be no rock at the surface to physically to examine). They use tools such as a hammer, compass, clinometer, camera, notebook, base maps, and aerial photographs to help to locate themselves in the landscape, sample the rocks, observe, measure and record information that is important and relevant to their map making. The physical and emotional experience of making a geological map, and the accompanying mental processes of perceiving, imagining, reasoning and reflecting enable them to build a picture of the geology and develop working hypotheses. Such concepts and theories influence future actions that enable them to test and evaluate their ideas and search for more pieces of their geological puzzle. In this way, ideas about the geology are tested, advanced or abandoned as they create new meaning.

Through their practice ecology the geologist blends at every step their scientific and experiential knowledge, imagination, and skill as they improvise their actions through the landscape to create their map. This domain specific artefact ‘emerges through action’. The geologist’s creativity does not happen by chance, it emerges because the creator - indivisible with their environment - weaves together particular pieces of information, ideas and material things to create new meaning. Like any other artefact once the map and report are produced they can be evaluated by other knowledgeable practitioners such as the geologist’s colleagues, managers and perhaps an editor (Figure 8). And once the map is published it can be used and evaluated by other geologists in the field (Figure 8).

Figure 8 Using the 4C contexts and norms framework to visualise an individual’s Pro-c / mini-c creative practice and their environmental & social-cultural interactions.



Including other cultural domains in the contexts and norms framework

The appeal of the 4C framework is its simplicity which permits customisation for particular domains of activity. However, we might ask whether these are the only generic contextual-cultural categories worthy of inclusion in a generic framework. Here we outline the reasons why we believe there is a case for including an educational domain ‘ed-c’ in the generic framework.

Ed-c - creativity in education

In my study [CL] of adolescent creativity in the school environment⁵ I developed a grounded theory to explain adolescent creativity as a process of perceiving novelty and then pursuing it, in order to be different from others or create something that is different from the norm. I also argued that within the 4Cs model of creativity, the creativity of adolescents would typically be classified as mini-c or little-c creativity.

Mini-c is directly involved in learning as it is association with “the creative, transformative process involved in developing personal knowledge and insights”^{20 p.74}. It is distinguished from all other forms of creativity because the judgment of creativity is made solely by the creator; mini-c outcomes are not novel or meaningful to other people²⁰. Tasks and activities that involve mini-c can occur at any developmental level, and therefore do not necessarily require high levels of knowledge or skill. Depending on whether the learning is related to formal education or personal interest, mini-c manifestations of creativity can be either intrinsically or extrinsically motivated.

Little-c refers to creativity used for engaging in and managing everyday activities or interests, and adapting to change^{20,21,22}. It is a form of interpersonal creativity where other people, in addition to the creator, judge the creativity of the outcome. Higher levels of ability, knowledge, or skill were necessary for progressing beyond mini-c to little-c. Little-c tasks were sometimes worked on by adolescents over an extended period, when they had the time, opportunity, and autonomy. Ongoing, recursive brainstorming and evaluating of ideas was often evident before they achieved insight; however, other times the tasks were more intuitive and spontaneous. In the absence of time constraints, incubation was a commonly utilised strategy for dealing with challenges during the little-c process.

scope of participating adolescents’ creative experiences because it does not explain creativity for educational purposes, including learning and achievement. Just as Big-C and little-c do not sufficiently encapsulate the creativity of people who are expert in their field requiring the recognition of a Pro-c contextual domain, little-c and mini-c were inadequate to account for adolescents’ creativity in the educational contextual domain. This led me to propose an ed-c contextual domain for adolescent creativity that is enacted and manifested within the environmental conditions and cultural constraints of formal education. ^{3:280-1}

Ed-c refers to perceiving and pursuing novelty for learning or achievement in formal educational environments such as schools, colleges and universities. Ed-c outcomes differ from outcomes typically presented by peers. Requirements and constraints of a particular educational environment, e.g. limitations posed by task demands, assessment criteria, or teachers’ instructions and behaviours influence individuals’ creative processes and products. Ed-c, like little-c, is a form of interpersonal creativity, so the outcome must be creative to someone else, not just the creator. For adolescents in formal educational environments, the judges of creativity are usually teachers, external examiners of formal assessments, or fellow adolescents in peer-assessed tasks.

Ed-c refers to perceiving and pursuing novelty for learning or achievement in formal educational environments such as schools, colleges and universities.

Although adolescents could be intrinsically motivated in educational tasks, ed-c and related mini-c usually involved extrinsic motivation and was often focused on creative task achievement (e.g., achieving a good grade for assignments). Completion of the creative process and production of a creative outcome was paramount for most ed-c tasks, particularly educational assessment tasks. Ed-c outcomes often affected future creativity in similar educational tasks, and sometimes creators’ emotions. There was an intention to affect the audience assessing the work, as students were usually aiming to receive positive reactions or recognition.

Ed-c can also be distinguished in terms of the optimal context for this category of creativity. Sufficient levels of intellectual ability, knowledge, and skills related to the specific task were required. Supportive environmental conditions included stimuli and structure to guide the adolescents towards meeting task demands, as well as cognitive and affective support from teachers, parents, other experts or mentors, or like-minded peers. Given that ed-c was often related to school work, curriculum constraints, time constraints, and pressure were most likely to be inhibiting factors; however, these did not necessarily prevent creativity.

My research points to a 3Cs model of adolescent creativity. While there are some overlaps between the categories of mini-c, little-c, and ed-c, there are also clear differences. A comparison of the 3Cs of adolescent creativity is presented in Table 1.

Table 1 Core features of each of the categories in the 3C’s of adolescent creativity

	<u>mini-c</u>	little-c	ed-c
Form of creativity	Intrapersonal creativity that is part of formal or informal learning and other life experiences	Interpersonal, everyday creativity that is novel and valuable to someone other than the creator	Interpersonal creativity for learning and achievement in formal education
Example judge of creativity	Creator (student)	Family, friends	Teacher, IB external examiner

The outcomes of each of the 3Cs of adolescent creativity must meet the criteria of being novel as well as appropriate to the relevant judge of creativity. These criteria distinguish outcomes that are not the norm from typical work by adolescents. Outcomes are not creative if they do not involve the imagination of learners to produce something that is new to them and what is produced is merely copied from other people’s work or repetitions of previous work. Mini-c processes or outcomes need only be novel to the individual adolescent; ed-c and little-c must be creative to the intended audience in a particular context.

The 3Cs of adolescent creativity are displayed in various situations and environments (Table 2).

Table 2 Environments of the 3C’s of adolescent creativity

	School environment		Non-school environments		
	Curriculum	Extracurricular activities	Formal extracurricular activities	Hobbies or personal interests	Everyday life
mini-c	✓	✓	✓	✓	✓
little-c		✓		✓	✓
ed-c	✓	✓	✓		

Mini-c can be demonstrated in a range of activities and tasks inside and outside school. Little-c is evident in school extracurricular activities that do not entail formal learning or assessment, and in everyday life and personal interests external to school. Ed-c is exhibited in educational tasks in school, extracurricular activities with a formal structure of evaluating progress, ability, or achievement (e.g., debating), or other formal extracurricular activities outside school (e.g., private music lessons). Ed-c is always created within the constraints and culture of a formal educational environment; this is not necessarily the case with mini-c and little-c. **5C contexts and norms framework for creativity**

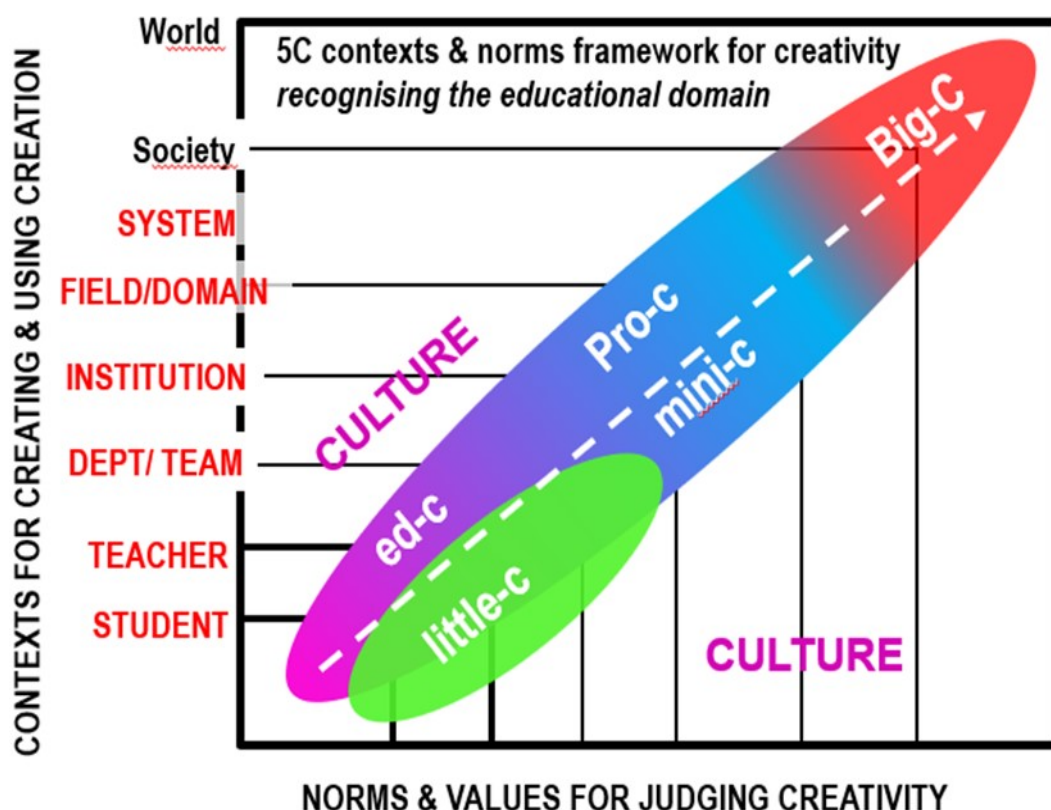
We [NJ & CL] believe that there are compelling arguments for recognising ed-c as an important contextual and cultural domain within which a person learns to use, apply and develop their creativity. Firstly, education, at least in the developed world, is something that every person experiences for between 10 or 11 years and many people experience for up to 15 or 16 years. Secondly, it's a generic domain in which people have to conform to and behave within strong cultural norms, values and rules that impose strong constraints on the use of imagination and creativity. Indeed, education's preoccupation with such things as 'one right answer', 'the correct way of doing something' and 'only valuing and measuring what can be predicted', may well inhibit or stifle creativity in many aspects of education. Education in fact, is a domain in which learners' natural tendency to creativity in a way they might experience in their everyday lives, is often severely restricted or curtailed.

Educational commentators like Sir Ken Robinson, say that education kills a young person's creativity, but another and more positive way of appreciating what education does, is to see it as an environment in which people learn to use their creativity in a way that is consistent with the requirements of the subject and the pedagogical task. This is the third and most important reason for why education should be seen as a significant and distinctive context for creativity. Through education people are introduced to disciplinary cultural ways of thinking and behaving and they begin to appreciate the domain specifics of creativity which they may later pursue in their careers. In education, learners develop the foundational academic knowledge and skills to make use of such knowledge that is essential for creativity in any knowledge work. They also learn what is valued in different subject and problem solving contexts, and in certain pedagogical environments they may also experience the creation of new value. Understanding both of these concepts is essential for the evaluation of creativity in a disciplinary learning environment.²³ The creation of new value - bringing something new into existence, or the extension of existing value by developing something that already exists *"involves learners interpreting the relevance of a particular idea to their local context and then doing the integration work to make it fit. This adaptation to local fit is not written on the surface of the concept or idea but involves envisioning the potential value of the idea to what is being learned and how it could operate in the local context in a way that realises a locally envisioned outcome."*^{24 p131-32}

Education is a domain of practice in which the practice is dedicated to enabling others to learn. Through appropriate pedagogical practices teachers as the key influencers in the system, are able to encourage, support and facilitate learners' creativity and creative development. Alternatively, their pedagogical practices can inhibit learners' creative development. Creative development takes place alongside the intellectual academic

development of the learner within the cultural traditions and constraints of specific disciplines, institutions & systems. In other words, development is 'pragmatic' serving the needs and of priorities of education. Unfortunately, in many subjects in secondary and tertiary education, these needs and priorities all too often pay little attention to the creative development of individuals.

Figure 9 A 5C contexts and norms framework for creativity incorporating the ed-c domain



If the argument is accepted that the disciplinary foundations of creativity are laid down in secondary and tertiary education then we can also argue that ed-c is the stepping-stone to Pro-c creativity in a way that little-c never can be. Such reasoning allows us to argue that education provides a significant generic context within which creativity is used, developed, recognised and valued and for many people it lays the foundations for future creativity in their chosen professional/work domain. Figure 8 shows how an ed-c contextual domain can be incorporated into the contexts and norms framework and how ed-c provides the foundations for discipline-based Pro-c creativity.

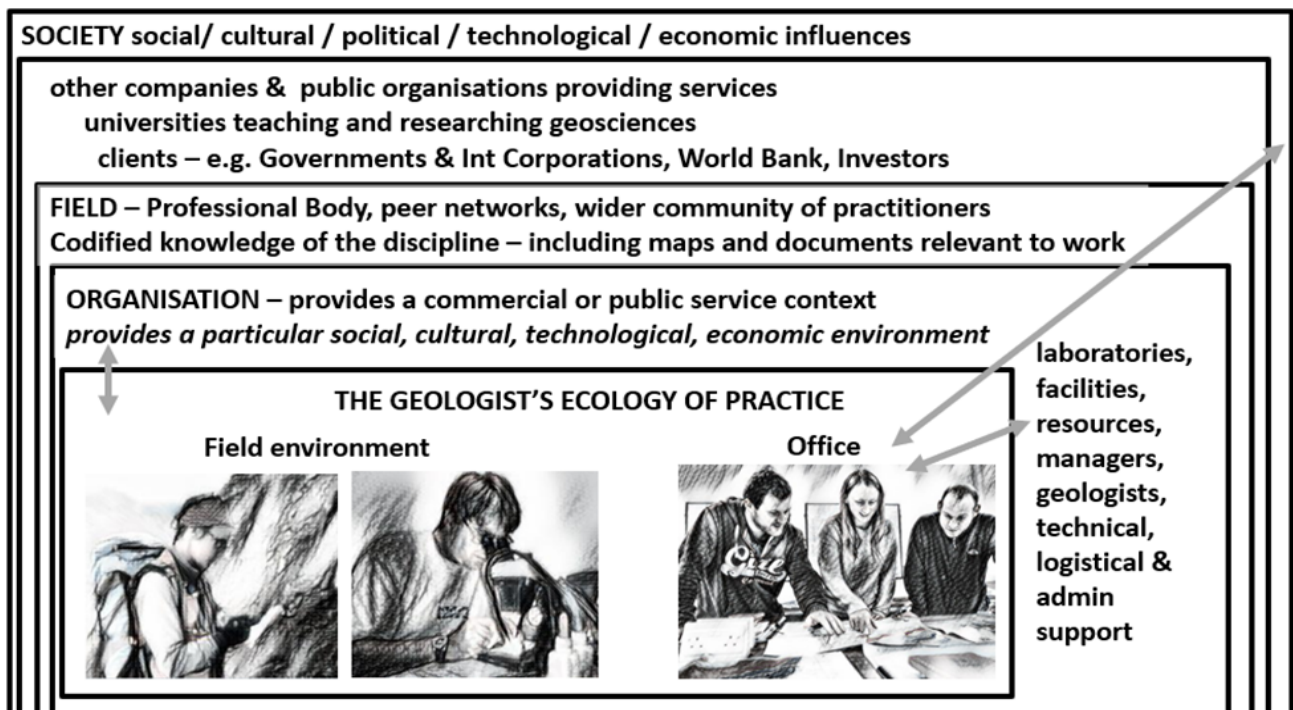
Customising the 5C model for the Higher Education context of encouraging and enabling learners to use, develop and recognise their own creativity

One of the important features of the contexts, norms and values framework is the way it maps out the ecosystems within which people create. This is because (as we have shown in previous illustrations) an individual's creativity is not simply a cognitive process, rather, it is a function of their whole body and mind involvement in and interactions with the ecosocial system of which they are a part.

All organisms inhabit an ecosystem - *the complex set of interactions among the residents, resources and habitats of an area for the purpose of living*²¹. Each organism within an ecosystem develops a unique ecology for living and reproduction. However, human organisms differ from other organisms in the extent to which we make our own ecosystems and develop our own ecologies not simply to sustain ourselves but to make our lives more interesting, productive and meaningful.²⁵

Biological concepts of ecosystem in the natural world can be applied to human ecosystems which are part natural and part social constructions. For example, if we take the example of the geologist making a geological map which we described earlier, the ecosocial system they work within is shown in Figure 10. Ecosocial systems have a hierarchy of organisational levels and form a nested structure. They are open with each level of organisation able to influence other layers of organisation. When it comes to creativity its production and manifestation is at the practice level (ecology of practice) but its social-cultural evaluation and recognition is at higher organisational levels.

Figure 10 The geologist's ecosocial/cultural system^{19, 26}



Teachers also work in an ecosystem comprising different levels of organisation. For example, a university is a specialised ecosocial system for the purposes of education and research nested within a tertiary education system within a society and global field of educational practices and practitioners.²⁶

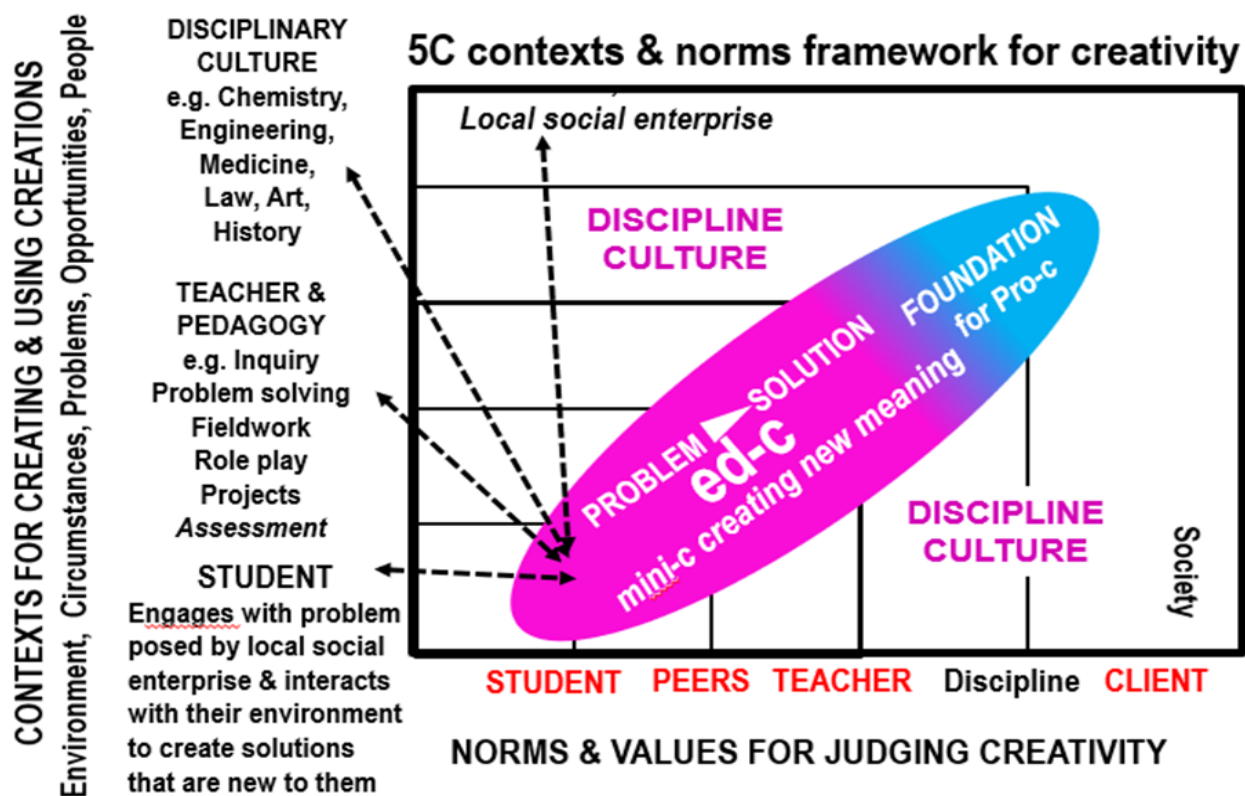
A university contains many people with specialist knowledge and skills, many organisational parts and functions, and many interactions between the people and the parts/functions. It is adaptive because information flowing from activity at all levels of the system enables it to respond, develop and accomplish the things the people and entities in it set out to achieve. A higher education ecosystem comprises different levels of organisation extending from individual actors fulfilling different roles and pursuing different goals (learners, teachers, administrators, support workers, leaders and managers), through organised teams and networks of people, departments, schools, faculties, whole institutions and other organisations.²⁶

The 5C framework allows us to map key features of the educational ecosystem and interactions within it with a view to emphasising key influences on creativity (Figure 11). For a university ecosystem we might emphasise : 1) the learners immersed engaged in a module on a programme of study within a specific disciplinary context in which creativity has meaning and tangible expression in the thinking and performances of learners and the artefacts they make 2) the pedagogies and tasks used by teachers to enable learners to use and develop their creativity and to reflect on their understandings of what creativity means in the contexts in which it was applied and 3) the means by which learning and creativity are evaluated/assessed/judged by teachers, learners and their peers and others.

Figure 11 has in fact been customised to illustrate how it can be used to understand the emergence of creativity within a particular educational scenario. An engineering student studying on a module that involves tackling problems for the local business community, is tasked with helping a social enterprise solve a problem. Through discussion he explores the problem with his client. He conducts research and imagines possible solutions which he discusses with his client. The conversation helps him refine his problem and solution and design a possible solution which he discusses with his client. The feedback he received enabled him to refine his solution and then present it to his classmates and teacher. His peers are encouraged by the teacher to provide him with constructive feedback and suggestions for improvement. They are also encouraged to evaluate the originality and value of his ideas using criteria the class has agreed and the teacher also judges his performance and provides him with feedback. Through the ecology he created to work with this set of circumstances the student learnt how to create new value for their client and had a rich experience to reflect on the ways in which he used his creativity.

Creating new value “involves learners interpreting the relevance of a particular idea to their local context and then doing the integration work to make it fit. This adaptation to local fit is not written on the surface of the concept or idea but involves envisioning the potential value of the idea to what is being learned and how it could operate in the local context in a way that realises a locally envisioned outcome.”^{20 p131-32}

Figure 11 Mapping key features of the ecosystem that are relevant to individuals’ and groups’ creativity.

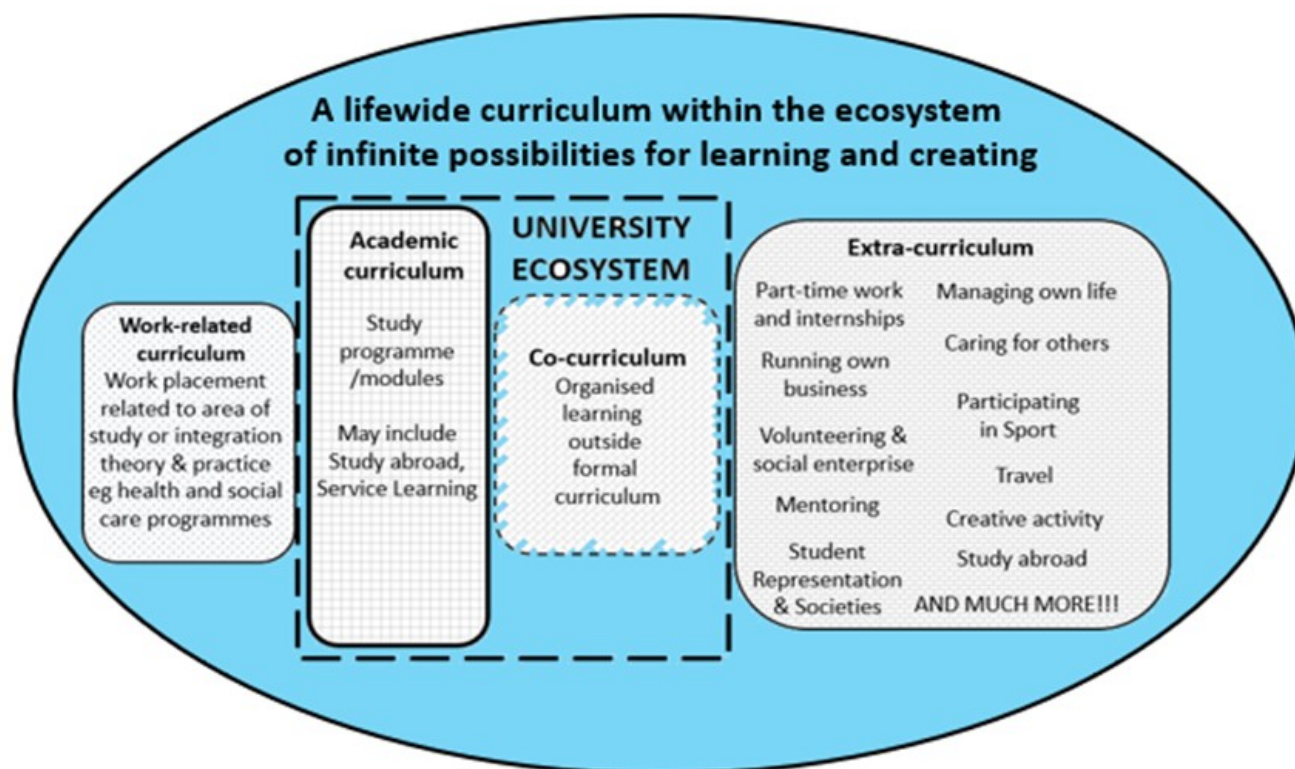


A lifewide concept of education

The range and scope of opportunities for learners to use, develop and gain recognition for their creativity depends on the way an institution defines what counts as learning and experiences that have educational value. In many institutions the concept of learning and education is limited to the academic curriculum while some institution’s extend learning and education to the co- and extra-curriculum. A lifewide curriculum²³ (Figure 12) embraces every possible curriculum space and affords the best opportunity for students’ creative development, since the intrinsic motivations that drive creativity and the contexts that provide the opportunity and challenge, are more likely to be present in the spaces that individuals either choose to inhabit or are forced into by circumstance².

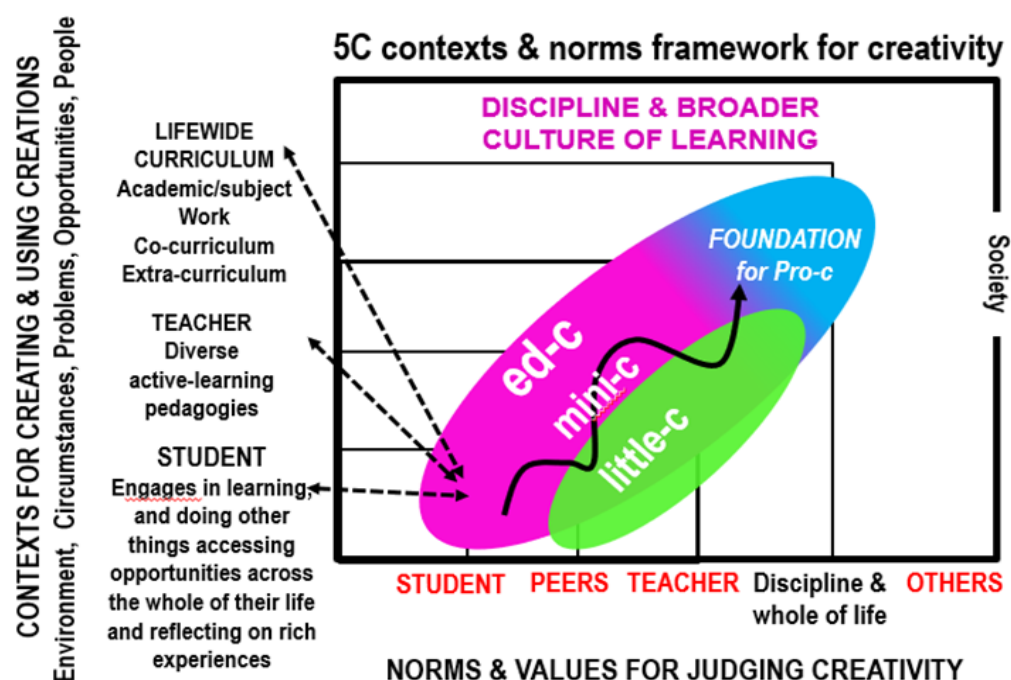
A lifewide curriculum honours informal, accidental, by-product learning in learner determined situations as well as formal learning in teacher determined situations. It embraces learning in the physical/emotional social spaces that characterise the work/practice environment and it honours formal and informal learning in all other environments that learners choose to be in because of their interests and passions, needs [and circumstances]. Because of this a lifewide curriculum is likely to provide a better framework for encouraging, supporting, recognising and valuing learners' creativity and self-expression, than a curriculum that is solely based on academic or academic and professional practice experiences.²

Figure 12 A lifewide curriculum situated within the global ecosystem of infinite possibilities for learning, developing and achieving²³



Adopting a lifewide curriculum enables an educational institution to engage learners in creative enterprise and learn from their experiences in the disciplinary meanings, contexts and opportunities for creativity (ed-c with associated mini-c) and in the many other contexts and opportunities for learning, action and creation that pervade students' lives while they are studying at university (little-c with associated mini-c) Figure 13.

Figure 13 Using the contexts and norms framework to show how a lifewide curriculum embraces all the opportunities a student has to use and develop their creativity.



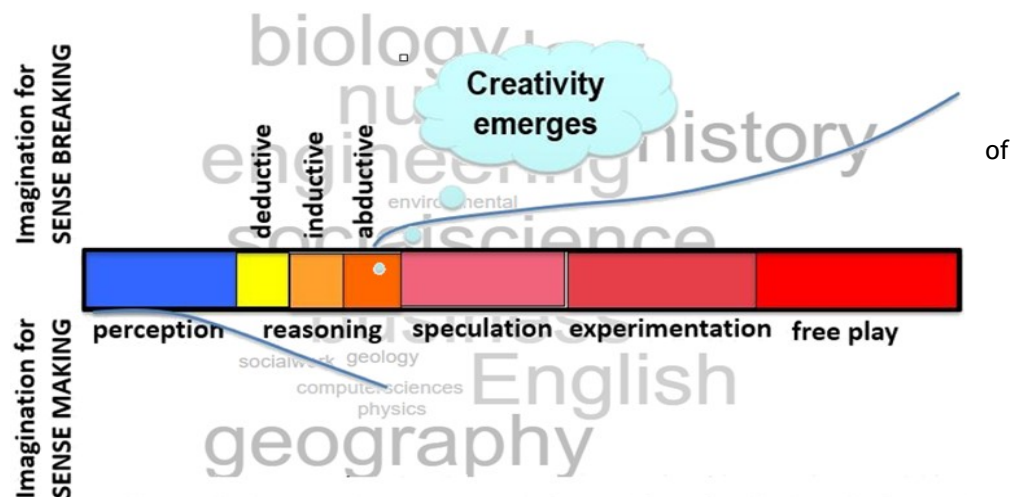
Final thoughts

Over a decade ago I [NJ] analysed the problem of creativity in higher education²⁸ and concluded that it is not seen as chronic, in the sense that most teachers and decision makers believe that there is a significant issue that needs to be addressed. The problem is not that creativity is absent but that it is omnipresent subsumed within analytic ways of thinking that dominate the academic intellectual territory. By 2020 this perception is shifting with the threat of AI and automation taking over many knowledge worker roles that higher has traditionally prepared their learners for.

There is a gradual recognition that the key meta-skill (disposition and capability) for surviving and flourishing in the world 40 years from now has to be our ability to think with sufficient imagination and complexity to be able to understand the situations and contexts and projects we are involved in, and adapt to innovate in such situations.

Such thinking is deeply ecological in the sense that it involves us being immersed in and being able to access and process the information flows from the dynamic environment of which we are a part. Figure 14 provides a neat way of synthesizing the complex interplay between our perceptions, imagination and reasoning as we access and try to make sense of these information flows and do something productive with such information. It is in these mental processes that are stimulated through our interactions with our environment and the people and materials in it, that our creativity lies. Our creativity is essential for survival and flourishing in the non-routine cognitive domain of knowledge work. Higher education, has, and will always have an important role to play in developing the cognition necessary to think with complexity, but it also must pay attention to the learning opportunities (affordances) that enable learners to create, and experience creating, new value.

Figure 14 The cognitive continuum showing how creativity involves the complete spectrum of cognition based on the work Pendleton-Julian and Brown^{28 p68-9}



Undergoing in order to be creative in a Pro-c domain begins in the ed-c educational domain

The recent conversation in the #creativeHE forum prompted by the proposition, 'You can't teach creativity but you can learn it' offered many perspectives each of which seemed to hinge on the interpretation of what it meant to teach and what roles teachers and learners performed in the educational domain. Chris Wilson got to the heart of the matter when he said, *'If transactional perspectives of 'knowledge transfer' underpin conceptions of 'teaching' then perhaps creativity cannot be taught. If teaching is conceived as a more general process of supporting others in developing new insights and understanding, then of course creativity can be taught. Creativity is, after all, domain-based.'*^{30 p23} I would like to expand on this a little.

Being creative in any field requires the development and mastery of domain specific knowledge, skills and values, combined with the will to be creative and other essential dispositions such as the will to inquire and persevere. In order to become an engineer, lawyer, scientist, historian or practitioner in any other discipline, a learner has to serve an apprenticeship through which they 'undergo' and learn to think and act like the practitioner they want to become.²² In order to come to know what being creative means in their disciplinary field, learners must be able to experience what being creativity means and learn what it means to add or create new value. They must 'perceive and pursue novelty for learning or achievement'.³

As John Dewey first explained in his interactional model of creativity⁸, such 'undergoing' is a necessary foundation for further creative (or any other significant) action in the world: in some disciplinary contexts it provides the essential platform for creative action at the Pro-c level of expertise since it is at this level that the foundational knowledge and skills necessary to perform in a field of practice are developed. This is the level at which learners, learn how to create ecologies for learning and practice. For example, the geologist making a geological map in the Pro-c domain, learns how to create an ecology of practice to perform this task in the ed-c domain. We argue that recognising an ed-c contextual domain will help draw attention to the important role of education in developing human creative potential.

If we take the example of the field geologist making a geological map in the Pro-c domain (described earlier), to perform this role he developed, through a higher education, a substantial body of domain-specific knowledge and skills so as to perceive (observe, recognise, interpret and understand) the rocks, structures, or landscapes that will form the material environment of his work. His university programme provided him with opportunities for cognitive and practical development (like an apprenticeship) through classroom and real world immersive experiences^{19 p179-80}. His cognitive apprenticeship³¹ enabled him to develop the propositional knowledge and ability to perceive, imagine and reason and, to some extent, to act like a practitioner, while the practical apprenticeship enabled him to think and practise competently in the different environments and problem solving situations in which geologists work. While a cognitive apprenticeship can be served in a classroom, a practical apprenticeship must be served in the authentic environments in which practitioners perform their role alongside more experienced practitioners.^{19 p179-80}

In higher education, cognitive and practical apprenticeships are facilitated by teachers employing the signature pedagogies of their discipline. Signature pedagogies, 'are types of teaching that organize the fundamental ways of educating future practitioners, and are used to transfer skills of how to think, to perform and to act with integrity in their professional work'^{32 p.52}. Through signature learning experiences, the novice geologist develops the knowledge, skills and perceptual awareness needed to make a geological map. Placed in an unfamiliar field environment, they learn how to interpret and assess geological problems, decide what to do and act using appropriate tools and methodologies, mindful of the results of their actions and adjusting where necessary^{33 p.18}.

Figure 15 Geology students' signature learning experiences relating to 'making a geological map'



Making a geological map involves novice geologists using tools like a compass/clinometer, geological hammer and hand lens to take measurements, collect, describe and identify rock samples and record their observations in a notebook and on a base map. Through a signature experience, learners make use of the knowledge and skills they have acquired through lectures and reading, and develop new knowledge and skills in an experiential and embodied sense while in the company of peers and experienced teacher practitioners in the field. As they develop (undergo) they learn what it means to be creative in the context of their work as a geologist. Creativity³⁴ is not taught as such, what is taught, demonstrated and learned through what Baker calls 'guided participation' and the experience of 'being' a geologist, is what it means to be creative when immersed in the authentic task of making a geological map in an authentic real world environment.

Education is so much more than the transmission of knowledge. At its best it is about enabling human beings to flourish to develop their potential, to undergo and become the person they want to be in every sense of what that means. That is why we argue that recognising an ed-c contextual-cultural domain would help draw attention to and acknowledge the important role of education in developing the creative potential of people.

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