8 Developing subject perspectives on creativity in higher education

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Importance of cultural domains

> creativity results from the interaction of a system composed of three elements: *a culture* that contains symbolic rules, *a person* who brings novelty into the symbolic domain, and a *field of experts* who recognize and validate the innovation. All three are necessary for a creative idea, product or discovery to take place.
>
> (Csikszentmihalyi, 1997: 6)

> creativity is any act, idea, or product that changes an existing domain into the new one. And the definition of a creative person is: someone whose thoughts or actions change a domain or establish a new one.
>
> (Csikszentmihalyi, 1997: 27–8)

The primary cultural domains in higher education are the disciplinary or subject fields (Becher, 1989) and Csikszentmihalyi's conceptions of creativity as being socially and culturally constructed within well defined domains underlie our attempt to explore whether:

- creativity is an important part of being a biologist, lawyer, historian or any other discipline-based practitioner.
- being creative means different things in different disciplinary contexts and the sites where creativity is accomplished; the means by which it is achieved and the results of creativity will also be different in different disciplines.
- creativity is largely unrecognised and undervalued in many (perhaps most?) subjects studied in UK higher education.

Underlying our 'adventure' into disciplinary thinking and practice is a belief that to extend our understanding of creativity in higher education we have to elaborate the meanings of creativity and the way it is operationalised in each disciplinary field.

Two approaches were used in parallel to explore these propositions. First, 18 QAA Subject benchmarking statements were analysed by Shaw (2005) using a simple evaluation tool (Appendix 8.1) to identify both overt and indirect

references to aspects of students' learning that might be associated with creative thinking and behaviours. Simultaneously, email surveys were conducted in four disciplinary fields (earth and environmental sciences, history, engineering and social work) with the help of HE Academy Subject Centres. Over 60 academics and field-based practitioners contributed to these surveys. The core questions used in the surveys are given below.

1 What does it mean to be creative in your subject?
2 What is it about your subject that stimulates/encourages teachers and students to be creative?
3 How do higher-education teachers in your field help/enable students to be creative?
4 How do teachers in your field recognise and assess creativity?
5 What are the barriers to creativity?
6 Is creativity valued in your disciplinary field?

Responses to these questions were compiled into a transcript and the key ideas were extracted and synthesised in a series of working papers (Jackson, 2005a, 2005b, 2005c; Jackson and Burgess, 2005), which were returned to participants for validation, critical comment and further development. This chapter summarises the findings of these approaches to gaining disciplinary perspective on the meanings of creativity.[1]

What does 'being creative' mean to academics?

Emerging from imaginative curriculum discussions and studies is a growing consensus amongst academics as to the key features of creativity (in any context). The ideas most often associated with creativity are:

- Being imaginative (*using imagination to think in ways that move us beyond the obvious, the known into the unknown, that see the world in different ways or from different perspectives, that take us outside the boxes we normally inhabit and lead to the generation of new ideas and novel interpretations).*
- Being original *(making a contribution that adds to what already exists).* For example, doing/producing/performing (inventing, innovating, transferring and adapting).
- Exploring for the purpose of discovery *(experimenting and taking risks, openness to new ideas and experiences typically linked to problem working).*
- *Using and combining thinking skills* (for example critical thinking to aid evaluation, synthesis and intuition to interpret and gain new insights and understandings).
- Communication – this is integral to the creative process *(for example, storytelling as a means of communicating meaning within the discipline).*

Our 'problem' is to understand what these things mean when they are operationalised in different subject contexts. Here are some examples of operationalisation. When academic teachers were asked the question, *'What does being creative mean when you design a course?'* (McGoldrick and Edwards, 2002; Oliver, 2002), responses included:

- Creativity as personal innovation – something that is new to individuals. This is often about the transfer and adaptation of ideas from one context to another.
- Creativity as working at and across the boundaries of acceptability in specific contexts: it involves exploring new territory and taking risks.
- Creativity as designs that promote the holistic idea of 'graduateness', that is, the capacity to connect and do things with what has been learnt and to utilise this knowledge to learn in other situations.
- Creativity as making sense out of complexity, that is, working with multiple, often conflicting factors, pressures, interests and constraints.
- Creativity as a process of narrative-making in order to present the 'real curriculum' in ways that conform to the regulatory expectations of how a curriculum should be framed.

In these few examples we can see representations of all the generic features of creativity – originality (working across the boundaries of acceptability; doing/producing new things; personal invention and innovation); use of imagination in designs to achieve a complex objective; exploration and risk-taking; making sense of complexity and story-telling. In contextualising and operationalising creativity in this way, we render the idea more accessible and meaningful to academics and students without devaluing it. On the contrary, creating meaning in this way allows us to celebrate the contribution made by creativity to professional achievement in teaching. The rest of this chapter will explore the extent to which such generic characteristics are exemplified, modified and extended in different disciplinary contexts.

Subject benchmarking statements and creativity

A preliminary review of 18 subject benchmark statements (Table 8.1) revealed that only seven subjects (Art and Design; Medicine; Geography; Dance, Drama and Performance; Engineering; Nursing; Business and Management) make any explicit mention of 'creativity' per se as a desirable feature of curricula in their discipline. A further four benchmarking statements merely suggest that their students should either be creative or should demonstrate the use of certain skills creatively (Architecture; English; Languages and Related Studies; Social Work). The other seven statements that were evaluated (Accounting; Education; Maths; Earth and Environmental Sciences; Biosciences; History; Chemistry) make no specific reference either to creativity as a concept or to students being creative. Only five of the statements (Nursing; Business and Management; Dance, Drama and Performance; Engineering; Social Work) go further by making reference to

Table 8.1 Frequency of references made in subject benchmark statements to the 18 possible indicators of creativity identified in the evaluation tool

A&D	13	EES	7	Hist	6
Eng	9	Med	7	LRS	6
SocW	9	Bios	6	Math	5
Arch	8	B&M	6	Ed	4
DDP	8	Chem	6	Geog	4
Nurs	8	E	6	Acc	3

Key
Accountancy (Acc); Architecture (Arch); Art and Design (A&D); Biosciences (Bios); Business and Management (B&M); Chemistry (Chem); Dance, Drama and Performance (DDP); Earth and Environmental Science (EES); Education Studies (Ed); Engineering (Eng); English (E); Geography (Geog); History (Hist); Language and Related Studies (LRS); Maths, Stats and Operational Res (Math); Medicine (Med); Nursing (Nurs); Social Work (SocW).

creativity or creative outcomes in their benchmark assessment criteria for defining standards. Only one statement (Dance, Drama and Performance) treats creativity as an underlying principle of education and student development throughout the statement. If the benchmark statements represent the views of the field on what is valued in students' undergraduate learning, then it would appear that many subjects do not overtly see creativity as an idea that influences and shapes teaching, learning and assessment.

A second more detailed evaluation was undertaken to look for indirect evidence that the disciplinary community recognises and values creativity in students' learning and achievement using an analytical tool (Appendix 8.1) based on some of the indicators of students' creative engagements with higher-education learning (Jackson, 2003) namely,

- imagination and originality.
- thinking abilities (particularly combining analytical rational thinking with divergent and associative thinking).
- capacity to generate/evaluate ideas.
- activities that enable students to be creative.

The analytical tool contains 18 possible indicators of creativity and, whilst the presence of an indicator does not guarantee that students are engaged in creative practice, at least it indicates that such practices are encouraged. Each subject benchmark statement was read and passages that could be associated with the elements of the tool were extracted from the statement and included in Column 3 of the table. The column was left blank if there was no reference to an indicator within the benchmark statement. The frequency count of indicators for each of the subjects is shown in Table 8.1.

A number of benchmark statements both mention creativity (or creative skills) and provide a range of indicators which suggest that opportunities exist for creativity to be practised (A&D, Eng, Arch, DDP, Nurs, SocW). Other benchmarking statements mention creativity, but seem to provide fewer

opportunities for creative approaches to be practised (Med, Geog, LRS, E, B&M). Where a subject neither mentions creativity nor registers many indicators for its practice (Acc, Ed, Math, Hist, Chem, EES, Bios), then it would appear that the disciplinary community does not see creativity (or the way creativity is represented in the evaluation tool) as being important to undergraduate learning and learner development.

Divergent and convergent thinking is only specifically mentioned by two benchmark statements (Math, A&D) and similarly *Lateral thinking* only by two statements (Arch and Eng). *Taking risks and coping with failure* is only referred to by A&D. It is more encouraging that 11 subjects (Acc, EES, Eng, Hist, SocW, Med, Bios, Geog, A&D, Nurs, B&M, Ed) acknowledge the need to *operate in complex and ambiguous settings.* However this leaves four benchmarks (DDP, E, Chem, LRS) that do not mention any of the thinking abilities associated with a creative approach. Due to the general emptiness of this category, it is difficult to spot any emerging patterns within the different disciplines.

Indicators that students are expected to *generate and use their own ideas* are, if anything, more weakly represented in our benchmarks than the student thinking abilities described above. Only four benchmarks (DDP, A&D, B&M, LRS) specifically mention the need for *students to generate ideas*, only two (Arch, Ed) suggest that students should *reflect on ideas,* whereas three (Arch, Eng, A&D) see *review and evaluation of ideas* as relevant. The remaining 11 subject statements do not explicitly acknowledge the value of students' own ideas.

Imagination and originality: perhaps not surprisingly, since it is usually thought to be mainly within the ambit of postgraduate research awards, no subjects saw *development of new knowledge* as a relevant outcome for their students. Seven subjects (DDP, E, SocW, Math, A&D, Nurs, B&M) acknowledged *development of new practice* as pertinent. Only two subjects (Hist, E) suggested that *making new knowledge connections* was valuable. In this category *application of learning in new contexts* and *systematic process of enquiry* proved most popular with nine and 15 subjects registering respectively. Of note here is the failure of Acc and Ed to register at all in any of the five indicators in this category.

The strongest indicators in the *activities* category are *skills*, with all subjects registering and *personal/interpersonal development/personal development planning and reflection,* with all but Math registering. At the other end of the scale, *negotiated and experiential learning* was least subscribed, with only three subjects (DDP, Med, SocW). Whereas most subjects recognised problem-solving, only five (Chem, Eng, Math, A&D, Nurs) specifically distinguished *open-ended problem solving* as relevant. More problematic is *project/assignment work*, with seven subjects (Acc, E, Med, Math, Geog, B&M, Ed) not registering. It seems likely that the potential overlap of this indicator with *systematic process of enquiry* and with *skills* may account for its apparent omission in some benchmarks. Finally, *negotiated, self and peer assessment* is recognised by eight subjects (Arch, EES, DDP, SocW, Med, Bios, A&D, LRS).

Preliminary conclusions

- Students' creative-thinking abilities are generally not addressed by subjects except for some acknowledgement of the need to operate in complex and ambiguous settings.
- Students' idea-generating capacities are least well covered, with only a small number of subjects registering any indicator.
- Student imagination and originality is poorly recognised, with the exception of 'systematic process of enquiry/research', which is well covered.
- The greatest attention is given to activities that have the potential for nurturing students' creativity. Most disciplines value 'project/ assignment work', 'personal/interpersonal development, skills/personal development planning and reflection', but tend to neglect 'open-ended problem solving', 'negotiated and experiential learning' and 'negotiated, self and peer assessment'.

Academics' views on creativity in disciplines

The benchmarking statements suggest that creativity (or the thinking and behaviours that might be associated with being creative) is not something that the members of subject benchmarking groups were overly concerned with. There are a number of possible explanations for this. Benchmarking groups may have considered the idea of creativity, but it was either rejected as an explicit concept for undergraduate learning or it was considered to be implicit in the concepts for learning that are made explicit. Alternatively, the idea may have just been omitted by accident from many of the benchmarking discussions: or have been marginalised in the face of the primary concerns of the discipline. Or, as one Chair of a benchmarking group claimed, 'creativity was not part of the QAA criteria'. But it's hard to believe that a group of intelligent and caring professionals would omit something that they thought was important simply because the guidance was deficient. In the belief that omission was by accident rather than intentional, a second strategy was developed to engage HE teachers and a small number of non-academic practitioners in selected subjects more directly. Four subjects were chosen for the pilot study: Earth and Environmental Sciences, History, Engineering and Social Work. For each discipline, academics' views were gathered by email questionnaire and synthesised into a Working Paper (Jackson, 2005a, 2005b, 2005c; Jackson and Burgess, 2005). It is important to appreciate that these summaries represent the collective views of a small number of representatives in each field. No individual holds the range of perspectives offered and it remains to be seen whether the perspectives as a whole have currency when they are exposed to wider debate in the disciplinary community. The exercise must be viewed as an initial step in articulating the meanings of creativity in disciplines and the intention is to promote further discussion and expression within the community, rather than to claim definitive representation.

Acceptance that creativity is necessary to disciplinary learning and practice

From the responses, it is clear that most academics believe that creativity is necessary to being a practitioner in their discipline. But many academics felt that, although they as individuals believe that creativity is important, it was not really valued in their discipline beyond the rhetorical level – a view that is consistent with the evaluation of the benchmarking statements.

Sites for creativity

Sites for creative thinking and action appear to be available in most aspects of disciplinary practice. For example, in History the potential for creativity exists in the:

- processes of knowledge-gathering, since the sources are numerous and generally disparate
- historian's awareness of the approaches offered by other human science disciplines and their applicability to the study of the past.
- analysis of the information from the past, including critical evaluation of sources in a comparative context.
- empathy and imaginative representation of the past, which is an essential component of the historical process.
- process of writing and presentation of output, a vital part of communication in the discipline.

These sites can be connected through the idea of disciplinary problem working (see below, page 00).

Being original

Originality can be represented as *creating something new for and useful to the discipline*.

> The ability to form or formulate something that no one else has done before, and that feels as if it has the proper relations of the parts to the whole.
>
> (Earth and Environmental Science)

It is connected to invention and innovation where these add something to the discipline. In history, originality is seen as the *invention* of: new approaches to historical problems; new techniques to gather and analyse data; new approaches to validate existing accounts and evidence of the past; new/alternative interpretations explanations and insights of events; re-interpretations of the evidence; new forms of history; new forms of communication and new forms of historical understanding providing insights into how the past has shaped the present. A key focus for originality in the discipline is advancing understanding.

Originality in the context of students' learning might be represented as a student producing work that is very different to everyone else's work, denoting that they had thought about something in a very different way to the other students (Edwards *et al*., Chapter 6 of this book, use the quality of newness as a way of explaining originality in students learning).

Making use of imagination

The use of imagination (the faculty or action of producing ideas, especially mental images of what is not present or has not been experienced) takes on particular meaning in the disciplinary context. Imagination as a thinking process acts as a source of personal inspiration, it stimulates curiosity and sustains motivation, it generates ideas from which creative solutions are selected and facilitates interpretations in situations which cannot be understood by facts or observations alone. The knowledge and intellectual cultures and concerns of the domain provide the essential context for imagination when an academic is engaged in disciplinary thinking and practice.

> Perhaps there is something unique in the way imagination is utilised when the imagination can access the domain specific knowledge and skills of an engineer. Perhaps there is also something significant about creativity in the way engineers are inspired to imagine by the technical problems they encounter and the economic constraints within which they work.
>
> (Engineering)

> Historical imagination, in the positive sense of the imagination is absolutely necessary to grasp the 'other' times and places under exploration, and the ability to convey both that difference and a personal understanding of it.
>
> (History)

> I believe most of the social sciences encourage/require creative thought – or at least imaginative thought; the ability to literally think outside the box. . ..in both understanding and responding to constantly changing dynamics in whatever contexts people work.
>
> (Social Work)

There are suggestions that either the use of imagination is more acceptable in some disciplines (such as the soft sciences and humanities) and/or the nature of discipline inquiry positively encourages its use.

> The possibility for thinking imaginatively in our subjects is enormous. We are not so constrained as in the more analytically grounded sciences.
>
> (History)

The imaginations of academics and non-academic practitioners are stimulated by the concerns, interests, experiences, problems, people and things they

encounter in the disciplinary world they have chosen to make their own. For example:

> There are lots of contexts/situations within the disciplinary territory that excite interest and stimulate and capture the imaginations of teachers and students. The scale of what we work with from the nano- to the galactic from observations of how things happen as they happen to what happened 2.5 billion years ago. The awesome nature we can observe around us – volcanoes, hurricanes, earthquakes. The effects of what we do on our planet on our fellow human beings. Why we are here and how we got here.
>
> (Earth Science)

> Creativity means finding imaginative new ways of working with people who are referred or who come for help.
>
> (Social Work)

> It is the potential for infinite variety in working with human beings that can stimulate creativity. This can be sharpened by close encounters with poverty, and with emotional deprivation and abuse.
>
> (Social Work)

> Inspiration for creativity in the design of new products or processes can come from any source in the physical environment.
>
> (Engineering)

> In the world of creating buildings the possibilities are pretty endless. And the chance to influence an urban landscape can be incredibly inspiring.
>
> (Engineering)

Finding and thinking about complex problems

The great engine of academic creativity is intellectual curiosity – the desire to find out, understand, explain, prove or disprove something or simply to imagine something different. Curiosity leads academics to find/create problems that can only be visualised, formulated and worked upon by people who are immersed in the knowledge, thinking/reasoning and practice skills of the domain.

> Engineers find problems that could only be imagined and conceptualised by an engineer with their knowledge and technical background.
>
> (Engineering)

> It is often said that engineers are problem solvers. I would prefer to say they are problem creators.
>
> (Engineering)

Complex problems are complex because they contain many interconnected and interfering parts or complex processes or human interactions. The dynamics of these problems are such that they are not amenable to reductionist and linear ways of thinking but must be envisaged as a whole.

> Engineers have to apply systems thinking to complex problems in order to think of the problem holistically – how the components of the system interact and relate to each other. They must balance costs, benefits, safety, quality, reliability appearance and environmental impact. Balancing so many variables in finding solutions may be a distinctive feature of engineering problem working and an important driver for creativity.
>
> (Engineering)

> Problem working is focused on understanding and explaining complex (physical, chemical and biological) systems that have to be visualised and understood holistically.
>
> (Earth or Environmental Science)

Intellectual curiosity is stimulated by problems that are of two basic types. The first type of disciplinary problem working is concerned with resolving or mediating an issue or improving a condition or situation. In Engineering the problem might be framed in terms of the need to *design* or *invent* new processes and *adapt* existing processes and products so that they are better and/or more cost-effective (and therefore more useful and valuable to society) than anything currently available. In Earth and Environmental Sciences the problem might be framed around discovering and evaluating new mineral deposits or perhaps stopping a mine from polluting the environment. The social worker is primarily concerned with understanding and resolving or mediating the problems of his/her clients and improving their situations and life chances.

The second type of problem originates when academics go in search of intellectually exciting and challenging possibilities or opportunities for problem working. The problem is inspired by academics' own interests and perceptions of need or possibility. This type of *exploration* characterises research and scholarship and the solution of abstract problems, which may not have any immediate application. The outcomes of this type of problem working are more useful to advancing understanding in the discipline.

> Creativity arises when one identifies an aspect of history or a subject previously uncovered, and sets out to portray it in one form or another. It also comes about during the portrayal process, as one considers the best mode of representation.
>
> (History)

Willingness to explore in order to discover

Academics recognise that being creative requires exploration, experimentation and taking risks. Although there are certainly situations where risk-taking and experimentation are kept to a minimum.

> It seems absolutely essential that in order to maintain creativity, we have to periodically move out of our own masses of fixed ideas into the unknown. In the earth sciences, we have the opportunity to do this simply by exploring our planet, and now, other planets. We must recognise that stimulus and surprises are important. We as individuals should try to break down the barriers that our own frameworks erect and allow ourselves to be open to surprises.
>
> (Earth and Environmental Science)

> During their work they may need to improvise what is seen as part of a solution but on the whole they need to be ultra conservative because people, money and resources are at stake and the engineer is employed to secure results and not to experiment or take risks.
>
> (Engineering)

Making sense of complexity

Regardless of the context for problem working, academics in all disciplines believe that creativity is something that is used in working with problems that are challenging, new, unpredictable and/or emergent. There is little need for creativity in routine, well-understood problem working situations.

> There is so much ambiguity and paradox in the complex systems that we are studying that their recognition stimulates our curiosity. Many of the problems we work with have no single solution: the possibility space of different solutions stimulates creative thinking.
>
> (Earth and Environmental Science)

> Given the many layers and how these layers interact and impact individuals and families, there are far too many factors, converging in far too complex a way, to simply apply a rational, left-brained approach to considering an individual or family's situation and providing an 'informed' response.
>
> (Social Work)

Imagination is important to interpretation particularly in circumstances where the evidence base does not permit interpretations that are based solely on factual evidence.

> Most of us like to feel that we can get pretty close to what happened and 'creativity' reminds us just how much we fill in the gaps in the evidence base for ourselves. We might do this based on contextual knowledge, comparable case

> studies, the use of interdisciplinary tools or whatever, but at the end of the day we have 'created' elements of 'the past'. It's important to recognise this creativity because it forces us to consider that the picture of the past we put together, whilst based on evidence and contextual 'established' knowledge, is nonetheless rooted in interpretation. So we don't so much recreate History but create it, and this is a difference between the 'Past' and 'History'. The past happened, but history is what we create from what we know of the past.
>
> (History)

> The complexity of the world we study means that it is open to interpretation. Curiosity that drives the search for understanding is stimulated by the possibility space afforded by interpretations of what is encountered.
>
> (Earth and Environmental Science)

> Engineers have to solve problems, often on the basis of limited and possibly contradictory information. In situations of incomplete data imaginative use of pattern recognition and predictions based on similar situations must play a part in the thinking process.
>
> (Engineering)

Imagination is essential for the construction of mental models, representations of reality that people use to understand specific phenomena, the basis of reasoning in all disciplines. For example, in Social Work imagination might be directed towards understanding the complex set of relationships and environmental conditions that have shaped a client's view of and attitudes to the world. In Engineering, mental modelling might be focused on how a construction would function under extreme weather conditions in the future. In disciplines like Earth Science and History, mental models have to be constructed in order to understand how something worked or happened in the past.

Thinking outside the disciplinary box

While problems might be rooted in a particular discipline, ideas, ways of thinking or methodologies from other disciplines are often involved in creative acts. The blending and intelligent use of these different sources of knowledge and methodologies to solve particular problems is potentially another source of creativity.

> The complexity of systems requires practitioners to think inter-disciplinary: the discipline is pre-disposed to borrowing/adapting/using ideas, constructs and methodologies from other subjects.
>
> (Earth and Environmental Science)

> Utilising insights/concepts/theories/ methodologies from another context or discipline in order to approach and analyse a particular issue from a new

> perspective. Other 'disciplines' might include philosophy, anthropology, cultural studies, literature and art.
>
> (History)

> A curiosity about how discoveries or topics in almost any other discipline might be integrated into the engineering inventory, theory and vocabulary.
>
> (Engineering)

Synthesis, making connections and seeing relationships

Because working with complex problems (systems) often involves working with multiple and incomplete data sets, the capacity to synthesise, make connections and see new patterns and relationships seems to be particularly important in sense-making (interpreting) and working towards better understandings and possible solutions to difficult problems.

> Pushing analysis into synthesis, broader approaches to constraints and links to analogous systems are all involved here.
>
> (Engineering)

Sense-making in many aspects of Earth and Environmental Science involves piecing together lots of disparate pieces of information to construct a coherent and believable story and/or to see emergent patterns of relationships. Capacities to synthesise complex and incomplete data sets in order to see and understand the whole requires both inductive and deductive thinking.

Communication

The communication of ideas, knowledge and deeper understandings are important dimensions of creativity. Communication may be part of the creative process and/or diffusion of the results of creativity. Disciplinary practitioners are creative in the way in which they communicate with each other and with people outside their disciplines.

> Technology does change and with it the technical language changes. Quite unconsciously the engineering community will coin new terms and exploit metaphor and analogy. Sometimes, such linguistic innovations shift to other professions or even the public. Linguistic creativity is thus a trait amongst engineers.
>
> (Engineering)

> I would claim that the communication of science is a feat comparable to the ability of humans to transmit aesthetics through paintings or music that are from different centuries and cultures. . .. we must hold up to the rest of the scientific world the tremendous success of earth scientists in communicating through different cultures and languages the concepts of space, time, stratigraphy and process, when we often have not even seen the same rocks or experienced the same phenomena. Thus, the scientific product –

> though very different in expression from the artistic product – resembles the arts because it accomplishes communication between human beings across generational and cultural gaps.
>
> (Earth and Environmental Science)

The social worker cannot begin to understand and resolve a client's problems if he/she cannot communicate in ways that are meaningful and empathise with the client.

> Teaching kids how to play and have fun offered plentiful creative opportunities, as did learning how to structure the more difficult times of the day. For instance, meal times were often hairy, and I made a habit of finding riddles or trivia questions to ask at the table to keep the boys amused. Certain activities were in themselves creative (e.g. arts and crafts), and I often felt in a 'creative zone' when using humour, negotiating a sanction, or just planning a shift. I enjoyed those shifts best when I felt a good, strong creative energy, and I think the kids responded best to that energy as well.
>
> (Social Work)

Story-telling

Disciplinary cultures are largely based on writing using the language, symbols and images that have been developed to facilitate communication of knowledge and understanding. Story-writing and story-telling seem to be important parts of academics' creativity.

> Story-telling is fundamentally about making sense of worlds past, present and future. It is profound curiosity that these worlds invoke that is the primary source of creative inspiration for many earth and environmental scientists. Story-telling is a way of theorising about the way the world works.
>
> (Earth and Environmental Science)

> Authority depends not upon the discovery of 'facts' but upon the construction of convincing and persuasive argument; and all argument is creative. The process of creating stories to explain the past is one of generating possible interpretations and testing these through the evidential record.
>
> (History)

When working with problems that society is interested in, practitioners must communicate with people outside their discipline.

> The selling of ideas and novel solutions to clients must also be part of the creative process of an engineer. In presenting a unique idea or novel solution to a technical problem the creative engineer must convince other people of its value and its technical and economic feasibility.
>
> (Engineering)

The social worker's creativity is used to create the best conditions for his/her clients to tell their stories, and for those stories to be understood by others who can help resolve the problems. The social worker is a creator and illustrator of stories. They help clients tell their stories in ways that reveal their situations and problems in order for them to be understood/diagnosed and addressed. The social worker captures these stories in forms that are appropriate and necessary to present a client's case and argue for support on their behalf. Social workers have to imagine the situations of the people they are helping in order to understand their problems and needs.

> Working with people requires a degree of spontaneity, flexibility and freshness in order to be effective, and I think creativity underlies these things. It's about being responsive to the person and situation (and yourself, to some degree) in the moment. Working with children and young people offered what I found to be a rich context for creatively solving problems, structuring time, or looking at situations.
>
> (Social Work)

Resourcefulness

In Social Work (and other disciplines that are focused on helping people) resolving or mediating a client's problem will depend to a large extent on the social worker's ability to access and acquire resources (financial, material, professional expertise).

> At the most mundane level such things as getting money for a homeless family out of the benefits office at 4.15 p.m. on a Friday afternoon counts as pretty creative in my book! At a broader level, social workers work with few resources, often in hostile situations, with few hard and fast boundaries (except the law, social policy and procedures). All of this calls for creativity of a kind.
>
> (Social Work)

Interpretations

These pilot surveys suggest that there is general acceptance that creativity is widely recognised in disciplinary contexts. All participants identified things that they associate with being creative in the discipline, although there was considerable variation in the level of detail and elaboration of responses.

When set against the collective views of academics on creativity in each discipline, subject benchmarking statements give an incomplete and misleading view of the extent to which creativity features in disciplinary thinking and practice. There are at least three possible reasons for this. First, and in mitigation, we might recognise that benchmarking statements are framed in terms of undergraduate learning, whereas the responses of academics in the study reported here are framed around their views of creativity in both academic and professional

disciplinary practice; we may be dealing with different contexts and levels of creativity. But if one of the purposes of higher education is to prepare learners for professional practice in the field, then there should be a relationship between the two levels and contexts. Second, also in mitigation, we should recognise that the benchmarking statements represent the initial step in formulating a discipline view of what is important in students' higher-education learning. Given the general absence of discussion about creativity in disciplines, it is not surprising that most benchmarking groups paid only cursory attention to its role in students' learning. The richer perspectives on creativity in the disciplines now being surfaced through these surveys can be used to evaluate and develop the benchmark statements when they are formally reviewed. Third, many academics report that creativity, while recognised in their discipline, is not really valued beyond the rhetorical level. So the limited recognition of creativity in benchmarking statements might simply reflect ambivalence to creativity in the disciplinary culture.

What is encouraging is that statements are generally supportive of active and engaged forms of learning within which students' creativity can be developed and demonstrated. Most disciplines value project/assignment work, personal/interpersonal development, skills/personal development planning and reflection, but tend to neglect open-ended problem solving, negotiated and experiential learning and negotiated, self- and peer-assessment.

Representations of creativity in disciplines

While being creative means particular things in disciplines, the following general patterns of meanings can be distinguished.

Originality – at the highest level of achievement, originality can be represented as *creating something new which is useful, recognised and incorporated into the culture if the discipline*. Originality is manifested in individual and collective acts of invention, innovation and adaptation that change the domain, and it is consistent with the definition of a creative person offered by Csikszentmihalyi (1997: 27): *'someone whose thoughts or actions change a domain, or establish a new one.'* But the concept of originality can't only apply to someone who changes a domain. Acts of personal invention or innovation that bring about localised cultural change, but which do not affect the domain as a whole, must also be viewed as creative. An example might be a new approach to teaching that is developed and adopted in a department, and then perhaps exported to other departments within and outside of the institution.

Imagination – 'seeing and developing new meanings of the world' (Thomas, 1999) lies at the heart of the creative academic enterprise and imagination is central to this ability. People working in a disciplinary setting imagine things that only they can imagine when their knowledge, understanding, interests and skills are engaged and stimulated by the things that matter to them in the disciplinary world they inhabit.

> Imagination – the mental capacity for experiencing, constructing, or manipulating 'mental imagery' (quasi-perceptual experience) is regarded as being

> responsible for fantasy, inventiveness, idiosyncrasy, and creative, original, and insightful thought in general, and, sometimes, for a much wider range of mental activities dealing with the non-actual, such as supposing, pretending, *seeing as*, thinking of possibilities, and even being mistaken.
>
> (Dictionary of Philosophy of the Mind)

Imagination is a capacity and a way of being that is central to the construction of new perceptual worlds that can only be imagined, not experienced.

> Imagination is what makes our sensory experience meaningful, enabling us to interpret and make sense of it, whether from a conventional perspective or from a fresh, original, individual one. It is what makes perception more than the mere physical stimulation of sense organs. It also produces mental imagery, visual and otherwise, which is what makes it possible for us to think outside the confines of our present perceptual reality, to consider memories of the past and possibilities for the future, and to weigh alternatives against one another. Thus, imagination makes possible all our thinking about what is, what has been, and, perhaps most important, what might be.
>
> Nigel J.T. Thomas)

The core enterprise of the academy is to develop new knowledge and re-interpret existing knowledge. Much of our knowledge about the world has been created through direct observation, experience and careful measurement and recording of what we can observe and experience. But there are many things that we cannot experience, and to understand it in the way we have come to understand it we also have to *explore and see it* through our imaginations. Academics use their imaginations to:

- generate ideas and possibilities (e.g. to find problems).
- invent ways of exploring problems, complex situations and systems (e.g. thinking holistically, being resourceful, inventing new or adapting existing methodologies).
- combine ideas and things in novel ways.
- interpret and find novel solutions to problems and challenges (fill in the gaps, synthesize, find patterns and connections, hypothesise and theorise, engage in sense-making that is not constrained by that which can be observed or proved.
- construct and tell stories that explain and change the way people see the world.

Problem working – there are many sites and opportunities for creativity in disciplinary thinking and practice and these can be connected within different notions of problem working. While the nature of the problems and the way they are visualised and addressed varies from discipline to discipline, finding, formulating, exploring, interpreting and finding solutions to complex concrete or abstract problems is the key focus for creative thinking and action in all disciplinary contexts. Academics

Representation A

Mental representation of academics' creativity in problem working
combining inductive and deductive forms of thinking in novel ways

The taken for granted stock of problem working knowledge that can be drawn upon in future (origin of expertise drawn from experience?).

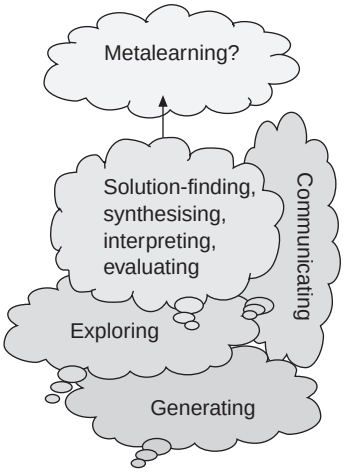
How do I communicate these ideas/solutions?
How do I persuade others that they are useful?

What are the possible/optimal solutions/ interpretations for the given circumstances?

What are the most useful solutions?

What is the nature of the problem(s)?
What sort of things can be done to engage with/address the problem(s)?
What do I need to know?

How do I solve this problem?
What problems need to be solved?



Representation B

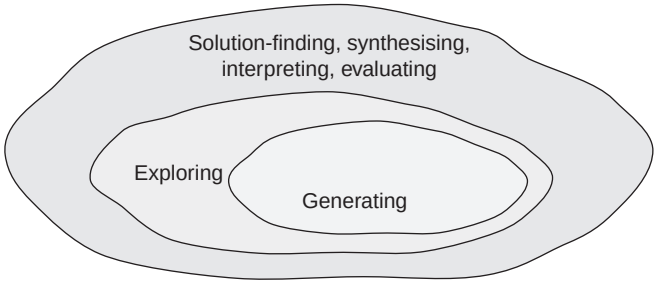


Figure 8.1 Representations of creative processes in disciplinary problem working contexts.

Note
(A) represents a problem working scenario that evolves more or less linearly over time. This form is typical of a major research project. Many problem working situations might require the cycle of generation–exploration–synthesis–solution finding cycle to be enacted over and over again. **(B)** represents a more integrated representation of the generation–exploration– synthesis-solution–finding cycle such as might be associated in problem working situations involving clients or patients.

believe that creativity is something that is used in working with problems that are challenging, new, unpredictable and/or emergent. There is little need for creativity in routine, well-understood problem working situations. Story-writing and story-telling, which enable complexity to be understood and communicated, are important parts of the creative process in all the disciplines studied. Figure 8.1 provides a visual representation of the way in which creativity might be involved in problem working in subject domains.

Figure 8.1 provides a representation of creativity within the disciplinary field that is directed to problem working. Imagination is represented as the way academics combine different forms of thinking to find, formulate, explore and resolve the sorts of problems that are meaningful to them in their disciplinary settings. Imagination is grown from disciplinary understandings, stimulated by issues and events that are encountered and inspired by the things that inspire people in that disciplinary world. Imaginations might also be shaped by ideas and ways of thinking and behaving imported from other disciplines. Ultimately, the experience and learning gained from being creative by working with a problem in this way enters an individual's stock of metacognitive knowledge which can then be drawn upon to invent new problem working and learning strategies as the need emerges. The term metalearning has been used to represent this type of creativity (Jackson, 2004a).

Appendix 8.1

Example of the analytical tool used to evaluate subject benchmark statements for indications of support for creativity in students' learning. The complete set of analyses can be found at: http://www.heacademy.ac.uk/creativity.htm.

Indictors of Creativity in the History Subject Benchmark Statement

Categories for creativity	*Indicators of creativity*	*Specific indicators explicitly identified*
	Divergent and convergent thinking Lateral thinking	
1 Student thinking abilities	Operating in complex and ambiguous settings.	Interpretation of complex, ambiguous, conflicting and incomplete material. Capacity to consider and solve complex problems.
	Taking risks and coping with 'failure'. Generation of ideas.	
2 Student ideas	Reflection on ideas.	
	Review and evaluation of ideas. Development of new knowledge. Development of new practice(s).	

Categories for creativity	*Indicators of creativity*	*Specific indicators explicitly identified*
3 Student imagination and originality	Making of new knowledge connections. Transfer and application of learning in new contexts.	Empathy and imaginative insight.
	Engages in systematic process of enquiry.	Skills of the researcher – to set tasks and solve problems.
	Open-ended problem solving Project/assignment work to plan/design/develop.	Ability to formulate questions and provide answers using valid and relevant evidence and argument.
4 Student activities with potential to promote creativity	Personal/interpersonal skills for teamwork/pdp/reflection.	Ability to work with others and have respect for their views. Reflect critically on the nature of their discipline.
	Skills: analysis, review, synthesis, evaluation Negotiated and experiential learning. Negotiated, self and peer assessment.	Gather, sift, select, organise and synthesise large quantities of evidence.

Notes

1 The working papers and analysis of subject benchmark statements can be found at: www.heacademy.ac.uk/2762.htm.

2 www.calstatela.edu/faculty/nthomas/.

Higher education overview. Academic research.Â Education competencies: Creativity. This competency is one in a set of complete functional and behavioral qualities that, when fully realized, can help lead to professional success. View all competencies . Overview.Â Generates many new and unique ideas. Develops innovative ideas and methods of doing things. Consistently generates and employs original ideas for himself or herself and for others, tackling both simple and complex problems. Tries old solutions to problems, but will search for new methods when challenged. Use these strategies to develop creativity in yourself, in your students, and in your colleagues and staff members. Our strategies are based on the investment theory, a psychological theory of creativity, but any one strategy is consistent with many other theories.Â Foster creativity by buying low and selling high in the world of ideasâ€”defy the crowd. Creativity is as much an attitude toward life as a matter of ability. We routinely witness creativity in young children, but it is hard to find in older children and adults because their creative potential has been suppressed by a society that encourages intellectual conformity. We begin to suppress children's natural creativity when we expect them to color within the lines in their coloring books. Chapter 7: Developing the Cambridge learner attributes throughCambridge Global Perspectives and Enterprise.Â The ability and inclination to be creative is essential to living a fulfilled and successful life, and it is valued in higher education and the workplace.Â A study on creativity and innovation in education in European member states (Craft, 2005, p.21) found that teachers preferred their learners to be â€˜conformingâ€™ or â€˜considerateâ€™ to â€˜risk takingâ€™ and â€˜playfulâ€™ (Ferrari, Cachia & Punie, 2009, p.21).Â It highlights that effective teachers have a deep knowledge of their subject as well as an understanding of how students think about subject content at different developmental stages (pedagogical knowledge). â€œCreativity in Higher Educationâ€, a project initiated by the EUA and cofunded by the Socrates Programme of the European Commission, was designed as an exploratory activity to enhance understanding of the concept.Â classroom (62% educators strongly felt that they should be creative regardless of the subjects they teach). l The important role of the educator in the process of fostering creativity (a significantly higher number of respondents, 35% versus 21%, held that educators, rather than parents were primarily responsible for this activity). l The importance of proper tools and training (41% educators believe. Many experts in psychology and education argue that creativity skills are psychological skills needed for success in school and in the future workforce. As such, schools have a duty to teach them and value them.Â As Alane Jordan Starko points out in the book Creativity in the Classroom, the strategies that support creativityâ€”solving problems, exploring multiple options, and learning inquiryâ€”also support depth of understanding. Robert Sternberg has argued that creativity can predict college success above and beyond just what we get from standardized test scores: In one study of students taking the GRE, higher scores correlated with higher creativity.Â Creativity requires a safe environment in which to play, exercise autonomy, and take risks.