Imaginative Curriculum Study

Subject Perspectives on Creativity: a preliminary synthesis

Norman Jackson[1] and Malcolm Shaw[2]

Introduction

> 'Creativity cannot be understood by looking only at the people who appear to make it happen… creative ideas vanish unless there is a receptive audience to (appreciate), record and implement them. And without the assessment of outsiders, there is no reliable way to decide whether the claims of a self-styled creative person are valid. According to this view, 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.' (Csikszentmihayli 1997 p6).

> 'Creativity occurs when a person, using the symbols of a given domain such as music, engineering, business, or mathematics, has a new idea or sees a new pattern and when this novelty is selected by the appropriate field for inclusion into the relevant domain. The next generation will encounter that novelty as part of the domain they are exposed to, and if they are creative, they in turn will change it further.' ….When viewed in these terms '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.' (Csikszentmihayli 1997 p27-28).

These conceptions of creativity as being socially and culturally constructed underlie our attempt to examine the following propositions:

- that creativity is an important part of being a biologist, lawyer, historian or any other discipline based practitioner;
- that 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;
- that creativity is generally unrecognised and undervalued in undergraduate disciplinary learning in UK higher education;
- that in order to extend our understanding of creativity in higher education we have to elaborate the particular meanings of creativity and the way it is operationalised in each disciplinary field.

Two approaches were used in parallel to evaluate these propositions.

Firstly, eighteen QAA Subject benchmarking statements were examined using a simple evaluation tool (appendix 1) to identify both overt and indirect references to aspects of students' learning that might be associated with creative thinking and behaviours.

Secondly, an e-mail survey was conducted, with the help of HE Academy Subject Centres in four of these disciplines (earth and environmental sciences, history, engineering and social work). A total of fifty-five academics have contributed to the surveys so far (social work is still in progress). The core questions used in the survey are given below.

[1] Higher Education Academy Norman.Jackson@heacademy.ac.uk
[2] Leeds Metropolitan University M.Shaw@leedsmet.ac.uk

1 What does it mean to be creative in your discipline?
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 recognize 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 or categories of response were extracted and synthesized in a working paper (one for each subject). The working papers were returned to participants for validation, critical comment and further development. The working papers and the analysis of subject benchmark statements can be found at http://www.heacademy.ac.uk/creativity.htm.

What does *being creative* mean to academics?

At the highest level of abstraction there is a good degree of consensus as to what being creative means in any context. The results of many conversations in workshops, interviews and email surveys suggest that the most common ideas academics associate with creativity are:

- originality *(making a contribution that adds to what already exists)*
- being imaginative (*using imagination to think in certain ways that move us beyond the obvious and 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)*
- exploring for the purpose of discovery: *(experimenting and taking risks; openness to new ideas and experiences)*
- doing / producing new things *(invention)*
- doing / producing things no-one has ever done before *(innovation)*
- doing /producing things that have been done before but differently *(adaptation, transference).*
- communication – which is integral to the creative process.

Our problem was to try to understand what these things meant when they are operationalised and contextualized in different disciplinary thinking and practices. A relevant example of operationalisation and contextualization is provided by the studies of McGoldrick (2002) and Oliver (2002). When academic teachers were asked the question, *'what does being creative mean when you design a course?*' 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 – 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, i.e. 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 answers we can see representations of the generic features of creativity: originality (working across the boundaries of acceptability); use of imagination in designs to achieve an objective; personal invention and innovation; exploration and risk taking. But they also highlight some additional features like engaging with and making sense of complexity and story telling. In contextualizing and operationalising creativity in this way we render the idea more accessible and meaningful to

academics and students without devaluing it. This paper explores meanings of creativity in the contexts of different disciplines.

What do subject benchmarking statements say about creativity in disciplines?

A preliminary review of eighteen benchmark statements (Table 1) revealed that only five subject (English, Medicine, Geography, Nursing, Business and Management) make any explicit mention of 'creativity' *per se* as a desirable feature of curricula in their discipline. A further six benchmarking statements suggest that their students should either be creative or should demonstrate the use of certain skills creatively (Architecture; Art and Design; Dance, Drama and Performance; Engineering; Languages and Related Studies; Social Work). The other seven statements that were evaluated (Accounting, Education, Maths, Economics, Biosciences, Chemistry, Language & Religious Studies) 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 creativity or creative outcomes in their benchmark assessment criteria for defining standards.

The initial evaluation appeared to confirm the proposition that creativity as an idea that shapes teaching and learning is, as a general rule, not explicitly valued, recognised and elaborated by many disciplines. 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.

Some of the indicators of students' creative engagements with higher education learning (summarized by Jackson 2003) were used to develop an analytical tool using the categories of:

- imagination and originality
- thinking abilities (particularly combining analytical rational thinking with divergent and associative thinking)
- capacity to generate/evaluate ideas
- activities aimed at doing or producing something from the ideas generated.

Imagination and originality – might be demonstrated through the development of new knowledge, designs, products, practice(s) or performances, the making of new connections between existing knowledge, the transfer and application of learning into new contexts or through student engagement in the systematic processes of enquiry or research.

Thinking abilities – creativity is likely to flourish where the curriculum encourages students to engage in divergent as well as convergent thinking, where lateral thinking is clearly promoted, where students can operate in situations of complexity and ambiguity and where they are allowed and even encouraged to take risks in their thinking and actions in 'safe' supportive contexts that allow for failure and help them to cope with it. The ability to combine and synthesise ideas and knowledge are important features of creative thinking.

Generating and evaluating ideas – is an important feature of the creative process and the curriculum should encourage students to generate their own ideas through their thinking and interactions with others, to reflect on those ideas and to review and evaluate them in the light of the problems and contexts being considered.

Activities – that suggest that a curriculum is trying to support conditions for creativity might include:

- open ended problem solving – problem finding and defining; problems for which there are no single solutions
- projects and assignments that involve conceptualizing, planning, enquiry and production of independent work or artifacts
- experiential learning that put students in novel unpredictable and perhaps ambiguous situations.
- opportunities to develop and apply the skills of analysis, review, synthesis and evaluation in contexts of complexity (fieldwork being a good example of a complex context)

- encouragement to develop metacognitive capacities to be more self-aware, reflective and evaluative of oneself and the effects of actions such as personal development planning and the use of reflective portfolios
- opportunities that result in the co-creation of something and that require negotiation with others such as team or group based activities
- assessment that does not attempt to predict all the learning outcomes in advance that accommodated a variety of perspectives on what was to be assessed e.g. student negotiated, self and peer assessment.

From this list of some of the potential indicators of thinking and behaviour that might be associated with creativity in higher education learning a tool was developed to evaluate a sample of benchmark statements (example in appendix 1). Each 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 analytical tool contains eighteen possible indicators of creativity and, whilst it is by no means certain that the presence of an indicator is a guarantee of student practice of creativity within the curriculum, at least it indicates that the opportunity exists for such practice. The frequency count of indicators for each of the subjects is shown in Table 1.

Table 1 Frequency of references made in subject benchmark statements to the eighteen possible indicators of creativity identified in the evaluation tool.

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

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

A number of benchmark statements both mention creativity and provide a range of indicators that suggest that opportunities exist for creativity to be practised (A&D, Eng, Arch, DDP, Nurs). Other benchmarking statements mention creativity, but seem to provide few opportunities for creative approaches to be practised (Geog, LRS, E, B&M). Where a subject neither mentions creativity nor registers many indicators for its practice (Acc, Ed, Math, Hist, Chem) then it would appear that the disciplinary community does not see creativity (or the way creativity is represented in the evaluation tool) as an important element of its culture and practice.

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 eleven 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 characteristic of a creative approach. Due to the general emptiness of this category, it is difficult to spot any emerging patterns within the different classifications of disciplines.

Indicators that students are expected to *generate and use their own ideas* are, if anything, more weakly represented in our benchmarks than student thinking abilities 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 eleven 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 fifteen 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).

In summary:
- 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'.

So what do academics really think about creativity in their discipline?

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 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 marginalized in the face of the primary concerns of the discipline. In the belief that omission was by accident rather than design, a second strategy was developed to engage HE teachers and scholars 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 synthesized into a Working Paper (http://www.heacademy.ac.uk/creativity.htm). It is important to appreciate that these summaries represent the collective views of a small number of representatives in each discipline. 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 the wider disciplinary community.

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 felt creativity was important, it was not really valued in the discipline beyond the rhetorical level. This view 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;
- the historian's awareness of the approaches offered by other human science disciplines and their applicability to the study of the past;
- the analysis of the information from the past, including critical evaluation of sources in a comparative context;
- her empathy and imaginative representation of the past, which is an essential component of the historical process;
- the 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).

Originality

Originality can be represented as *creating something new and useful to the discipline*. It is different to personal invention, adaptation and innovation, which are about things that an individual does that are new to him. For example, 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.

> '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.

> 'I would describe creativity in terms of novel approaches to historical questions and sources.'

Making use of imagination

> *'Imagination is more important than knowledge. For while knowledge defines all we currently know and understand, imagination points to all we might yet discover and create.' Albert Einstein.*

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 sustains motivation throughout a work project, 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.’

‘Historical imagination, in the positive sense of the imagination 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.’

‘The imagination to think of new approaches which reveal new sources of historical evidence or perspectives on the past; the capacity to devise new interpretations of existing information; the ability to think laterally and define new explanations which could plausibly ‘fill the gaps’ in existing understanding; the critical facilities to develop new approaches to validate existing accounts and evidence of the past; fluency of language and creativity of expression to convey historical arguments and evidence effectively to others and excite considered debate.’

‘The possibility for thinking imaginatively in our subjects is enormous. We are not so constrained as in the more analytically grounded sciences.’ This comment from an earth and environmental scientist suggests that academics in some disciplines believe they have more opportunity for using imagination than in other disciplines.

‘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.

The imaginations of academics and non-academic practitioners are stimulated by the concerns, interests, experiences and subjects 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.

‘In social work, creativity means finding imaginative new ways of working with people who are referred or who come for help..’ ……‘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.’

‘Inspiration for creativity in the design of new products or processes can come from any source in the physical environment.’ ‘In the world of creating buildings the possibilities are pretty endless. And the chance to influence an urban landscape can be incredibly inspiring.’ ‘possibly a curiosity about how discoveries or topics in almost any other discipline might be integrated into the engineering inventory, theory and vocabulary.’ Engineering.

Finding and thinking about complex problems

The great engine of academic creativity (the disciplinary mother of invention) is intellectual curiosity that is fired by imagination – 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 visualized, 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.’ …. ‘It is often said that engineers are problem solvers. I would prefer to say they are problem creators.’

Complex problems are complex because they contain many parts or elements. The dynamics of these problems is such that they might not be amenable to reductionist and linear 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.
>
> In the earth and environmental sciences problem working is focused on understanding and explaining complex (physical, chemical and biological) systems that have to be visualised and understood holistically. The ability to imagine how a geological or environmental system works and evolves over time is central to being an earth or environmental scientist.

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. The solution of such problems is useful to individuals or society.

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 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 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, where the problem (or need) is inspired by the academic’s own interests and perceptions of need. This type of *explorativity* characterizes research and scholarship and the solution of abstract problems which may not have any immediate application i.e. the outcomes of problem working are more useful to 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.’

Willingness to explore

Academics recognize that being creative requires exploration, experimentation and risk taking although the latter may be anathema in some disciplines.

> ‘Historical imagination, in the positive sense of the imagination absolutely necessary to grasp the *‘other’ times and places under exploration….*
>
> Challenging the status quo – **‘**Creativity can, of course, have negative connotations, in terms of departing from the objective or the given past. However, counterfactual history is also a positive type of creativity, as long as its intention is to spur thinking in others.’ History

> ‘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 recognize 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.

> ‘In social work, creativity means finding imaginative new ways of working with people who are referred or who come for help.’

Although there are certainly situations where risk taking and experimentation is kept to a minimum. For the engineer, creativity has to be implemented within such constraints.

> ‘It is also the case that 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

Example of creativity in social work problem working

The core *problem working process* of the social worker is concerned with understanding and resolving or mediating the problems of her clients. The process is often messy and iterative but for simplicity it might be represented as two stages each of which requires both competency and creativity that combine to produce professional capability. The initial problem working process is to work out what a client’s problems are then the focus shifts to securing the support and resources to resolve or mediate the problem.

Social workers’ draw on their creativity during the consultation process particularly when confronted with complex non-routine problems and situations. Social workers are required to develop trusting relationships while maintaining objectivity so that judgements can be made about how to deal with the problems. They have to find and understand the problem(s), formulate and test hypotheses about what is wrong and why it is wrong, and develop solutions (possible strategies for dealing with the problems). They must listen carefully to their client’s story, facilitate further enquiry through sympathetic questioning and reasoning, and gather factual information to inform their decisions through broader enquiry. The information gathered informs decisions/judgements about possible strategies which are then used to engage service providers and other sources of support with the objective of securing the best support for their client and perhaps the client’s family.

Creativity within the initial problem working process is bound up with thoughtful and empathetic communication and enquiry aimed at facilitating the construction of a narrative that combines the client’s story with the social worker’s evaluative commentary from which hypotheses are created and ultimately judgements are made. The way the social worker engages with her client depends on her attitude and behaviour, her experiences and how she feels about them and how she responds to what emerges through conversation.

Creativity is also bound up with the formulation and testing of hypotheses about the problems and their possible solutions, the blending of scientific evidence, socially constructed knowledge (through conversations with clients and others with knowledge of the client) and intuitive knowledge derived.

Working with and understanding complexity

Regardless of whether 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.

> ‘Social workers are necessarily creative in responding to new scenarios for which formulaic responses are invariably inadequate.’

Imagination/creativity is important to interpretation particularly in circumstances where the evidence base does not permit an interpretation 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 a new, 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.’

> ‘The complexity of the world earth and environmental scientists 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.’

> ‘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.’

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 disciplines like earth science and history mental models have to be constructed in order to understand how something worked or happened in the past. 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 design would function under certain conditions in the future.

Newton et al (1998 p48-50) described understanding for history teachers in terms of the reconstruction of events.

> ‘Understanding is a mental reconstruction of events which includes, for instance, origins, developments and plausible reasons for their occurrence significant consequences, the ethos and values prevailing at the time.’ ‘Broader understandings in history came from the synthesis of accounts of specific events into a larger picture.’

> ‘In encountering the past the creativity of the historian is directed to understanding unfamiliar structures, contexts, cultures and belief systems. Imagining what the past was like – how, why and when people did certain things, is central to being a historian. Historical imagination is essential to grasping the ‘other’ times and places under exploration and to conveying both that difference and

a personal understanding of it. ‘The ability to see a situation from a perspective that is not present-minded’ is perhaps an essential ingredient of the historian’s creativity and imagination.’

Thinking outside the disciplinary box

While problems might be rooted in 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 sciences.
>
> Creativity in history is seen as ‘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.’
>
> ‘Engineers *transfer ideas* and things from one context to another. They *adapt* products produced for one market so that they can be used in another market.’ ‘Possibly a curiosity about how discoveries or topics in almost any other discipline might be integrated into the engineering inventory, theory and vocabulary.

Synthesis

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.

> The responses of history teachers in this survey highlights the importance to the historian of an imagination that is able to assimilate and synthesise complex but often fragmentary historically relevant knowledge from different sources and combine this with intuitive and empathetic ways of thinking that are in tune with the historical situation and moment to grow new understandings.
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> ‘Pushing analysis into synthesis, broader approaches to constraints and links to analogous systems are all involved here.’ ‘Assimilation of information, abstract concepts and detailed facts to provide creative solutions to problems!!!!’ Engineering
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> Sense making in many aspects of geoscience education or applied practice 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 synthesize 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 an important dimension 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.'

The earth and environmental scientist makes creative use of imagery (observational or manipulated imagery like that derived through Geographic Information Systems or Satellite Imagery), chemical, physical, numerical, graphical data, and blends and integrates different sorts of information within a narrative.

> 'A measure of our success in science is the body of knowledge shared world-wide by scientists--independent of culture, language, economics, or even time. 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. The mathematical sciences - math and physics, […] have long held prestige as the most scientific of the sciences precisely because they are the least ambiguous, most rigorous of all of the sciences. Yet 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.'

The social worker cannot begin to understand and resolve a person's problem(s) and if she cannot communicate in ways that are meaningful and empathise with her 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.'……'They (social workers) also have to find ways of communicating with those whose ability to do so is impaired for some reason using pictures, music, sound and movement may all have a place.'

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 telling seems to be an important part 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.'

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

'The particular area of social work that I was involved in, residential child care, held great potential for creativity. 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. 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.'

Resourcefulness

In social work (and other disciplines that are focused on helping people e.g. medicine and education) resolving or mediating a client's problem will depend to a large extent on the social worker's ability to harness resources (financial, material, professional expertise). Resourcefulness in acquiring scarce resources which help people and improve their conditions and circumstances is another important focus for creativity and is the central concern of the second stage of social work problem working.

'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 Workers often have to build bridges between organisations (such as Health, or Education, or Housing) who are more routinely set in narrow service frameworks, with set roles and responsibilities. Beyond the performance of prescribed tasks, the relationship between service user and practitioner is a creative dynamic, and should be cherished as such.'

Heuristic framework for recognizing sites for creativity in disciplines

There are many sites and opportunities for creativity in disciplinary thinking and practice and these can be connected within disciplinary frameworks and contexts for problem working. While the nature of the problems and the way they are visualized and addressed varies from discipline to discipline; finding, formulating and working with problems and communicating their solution is the key focus for creative thinking and action in all disciplinary contexts. Academics 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. Forming and telling stories seems to be an important dimension of learning and human creativity (McDrury and Alterio 2002). These studies suggest that story telling is an important part of the creative process in all the disciplines studied. It is a means through which problems are formulated, elaborated, theorized, understood and eventually communicated.

Figure 1 provides a heuristic framework that might be applied to most problem working contexts in which potential sites for creativity might be located. Imagination is represented as the way an

academic uniquely combines different forms of thinking to find, formulate, explore and resolve the sorts of problems that are meaningful to him in his disciplinary practice. 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. Academics' use their imaginations to:

- Generate ideas and possibilities (find problems / find approaches to problems/ find potential solutions to problems).
- Invent ways of exploring problems, complex situations and systems (e.g. thinking holistically, being resourceful, inventing new or adapting existing methodologies).
- Interpret and find novel solutions (fill in the gaps, synthesise, find patterns and connections, sense making that is not constrained by that which can be observed or proved, construct and tell stories that explain the problem).
- Facilitate communication to different audiences– explaining/representing/persuading/story telling.

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, 2004).

Figure 1 Heuristic representations of the use of imagination in disciplinary problem working contexts.

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 to be enacted over and over again.

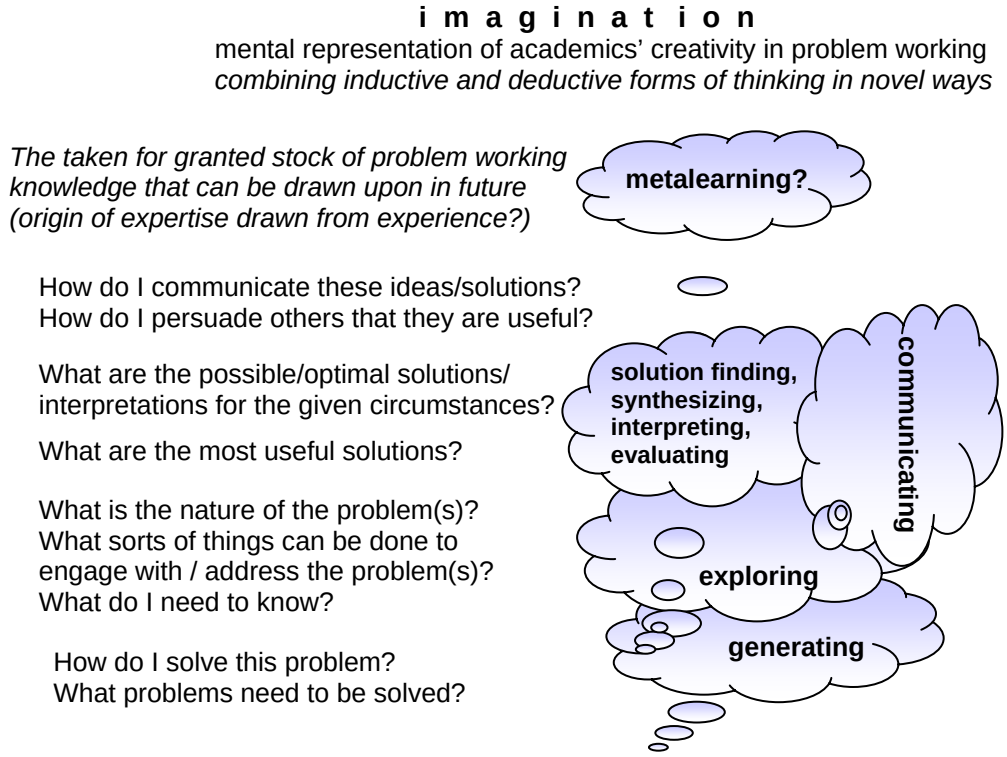
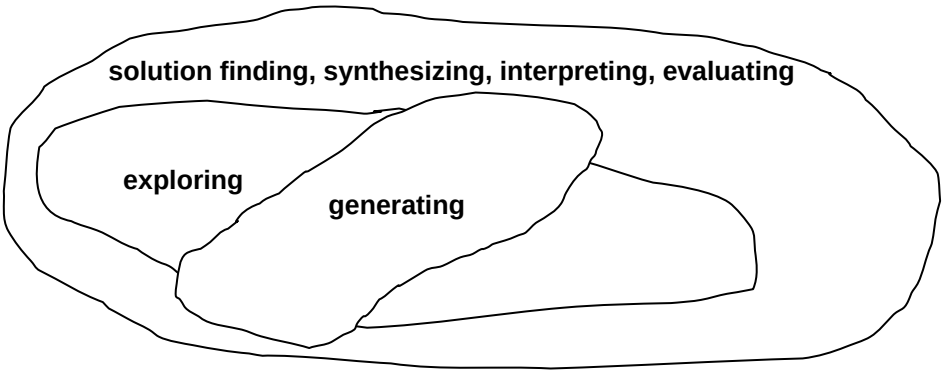


Figure 2 provides a more integrated less linear conception of the generation-exploration-synthesis-solution finding cycle such as might be associated in a clinical problem working for example where a social worker is engaged in consultation with a client. In which generative and explorative thinking, hypothesizing and solution finding are more or less happening simultaneously.

Figure 2



Across the four disciplines studied three types of problem working scenarios can be recognized:

- contexts where there are few constraints on how and when a problem will be solved
- design briefs or work expectations that impose limits and constraints on how and when a problem will be resolved
- problem working in real time in which a client's problems need to be identified and possible solutions grown with the client.

The nature of problem working in disciplines and the ways in which creativity is used would seem to be important territory for future research.

Tentative conclusions

Finding conclusions this type of study is also a creative process. Some tentative conclusions for further testing are given below.

There seems to be general acceptance that creativity exists in the disciplinary context. At the level of individual responses there is a great diversity in the level of elaboration of what creativity means but for some contributors it is an important part of their identity.

When set against the collective views of academics' on creativity in each discipline, subject benchmarking statements give only a very partial and incomplete view of the extent to which creativity features in disciplinary thinking and practice. There are at least three possible reasons for this.

Firstly, and in mitigation, we might recognize that benchmarking statements are framed in terms of students' learning (more specifically what it is to be creative in the discipline in the context 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 i.e. we are dealing with different contexts and levels of creativity. But if higher education is a preparation for disciplinary practice (both academic and professional) then there should be a relationship between the two levels and contexts.

Secondly, also in mitigation, we should recognize 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 statements when they are formally reviewed.

Thirdly, many academics report that creativity while recognized in their discipline is not really valued beyond the rhetorical level. So the absence of limited recognition of creativity in benchmarking statements is simply reflecting an absence of recognition and value within 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'.

While being creative means particular things in disciplines general patterns of meanings can be discerned which can be evaluated through further study.

Originality can be represented as *creating something new and useful to the discipline*. It is different to personal invention, adaptation and innovation which are still creative but are new to the individual rather than the discipline. But if the definition of a creative person is: *'someone whose thoughts or actions change a domain, or establish a new one'* (Csikszentmihayli 1997 p27-28), then only those people who make an original contribution to the discipline can be considered as creative. We favour a more inclusive notion of creativity that embraces personal creativity used in problem working but the outcome would not change the domain.

Imagination seems to be central to being an effective historian, earth and environmental scientist, engineer or social worker. People working in a disciplinary setting imagine things that only they can imagine when their knowledge, understanding and skills are engaged and stimulated by the things that matter to them in the disciplinary world they inhabit. Imagination provides inspiration, sustain motivation, generate ideas and possibilities, and facilitate hypothesis making and interpretation of situations which cannot be understood by facts alone: including the many situations where data are fragmentary and incomplete. There is a perception amongst some academics that some subjects perhaps have more opportunity to make use of imagination. An alternative or supplementary explanation would be that it is the problem working contexts and constraints that influence the extent to which imagination can be utilized.

Acknowledgements

We are very grateful to the 60 people who contributed to the surveys they are named in each of the working papers. We also appreciate greatly the help we have received from Subject Centre colleagues – Helen King, Hilary Burgess, Paul Hyland, Alan Booth and Sarah Williamson. Thank you for believing that exploring what academics understand by creativity is a worthwhile thing to do. The paper was presented at the Creativity in Higher Education Symposium on June 29th at the 2005 Higher Education Academy Annual Conference.

Please address comments to Norman.Jackson@heacademy.ac.uk

References

Csikszentmihayli, M. (1997) *Creativity. Flow and the psychology of discovery and invention*. New York: Harper Collins.

Jackson, N. J. (2003) Nurturing creativity through an imaginative curriculum. *Educational*

Developments. SEDA Issue 4.2 July 2003 p8-12 reprinted in the HERDSA journal in Australia. An updated version Creativity in higher education is available at: http://heacademy.ac.uk/creativity.htm.
McGoldrick, C. (2002) Creativity and curriculum design: what do academics think? *Commissioned Imaginative Curriculum Research Study* http://www.heacademy.ac.uk/resources.asp?process=full_record&section=generic&id=60
Newton, D P; Newton, L D; and Oberski, I. (1998) Learning and conceptions of understanding in history and science: lecturers and new graduates compared. *Studies in Higher Education*. v 23, 1, 43-57.
Oliver, M. (2002) Creativity and curriculum design: what do academics think? *Commissioned Imaginative Curriculum Research Study*. LTSN June 2002 http://www.ltsn.ac.uk/genericcentre

Appendix 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/.

Benchmark subject: HISTORY

Categories for creativity:	**Indicators of creativity:**	**Specific indicators explicitly identified:**
1. Student thinking abilities	Divergent and convergent thinking	
	Lateral thinking	
	Operating in complex & ambiguous settings	*interpretation of complex, ambiguous, conflicting and incomplete material capacity to consider and solve complex problems*
	Taking risks and coping with 'failure'	
2. Student ideas	Generation of ideas	
	Reflection on ideas	
	Review and evaluation of ideas	
3. Student imagination and originality	Development of new knowledge	
	Development of new practice(s)	
	Making of new knowledge connections	*empathy and imaginative insight*
	Transfer and application of learning in new contexts	
	Engages in systematic process of enquiry	*skills of the researcher…..to set tasks and solve problems*
4. Student activities with potential to promote creativity	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*
	Personal/interpersonal skills for teamwork/pdp/reflection	*ability to work with others and have respect for others views* *reflect critically on the nature of their discipline*
	Skills: analysis, review, synthesis, evaluation	*gather, sift, select, organise and synthesise large quantities of evidence*
	Negotiated and experiential learning	
	Negotiated, self & peer assessment	

APPENDIX 2

Creativity in history – summary statement from working paper

The central concern of the discipline of history is to understand how people existed, acted and thought in the past and the societies and cultures they inhabited. The objective of the intellectual and emotional enterprise is to create imaginary worlds (mental models of worlds) that never actually existed based on interpretations of factual evidence and intuition. Because the past has no objective material reality, any interaction with it can only be a creative and imaginative one.

In encountering the past the creativity of the historian is directed to understanding unfamiliar structures, contexts, cultures and belief systems. Imagining what the past was like – how, why and when people did certain things, is central to being a historian. Historical imagination, is essential to grasping the 'other' times and places under exploration and to conveying both that difference and a personal understanding of it. 'The ability to see a situation from a perspective that is not present-minded' is perhaps an essential ingredient of the historian's creativity and imagination.

I**magination** may be directed to: the approaches used to engage with historical problems or the use of sources and techniques to produce new interpretations, or significantly qualify existing interpretations. Imagination is essential to grasp the 'other' times and places under exploration; to convey both that difference and a personal understanding of it; and to devising ways of communicating findings effectively to diverse audiences. It is also necessary to teach history in an engaging way. In history, creativity might be conceived 'as imaginative flare in historical interpretation.'

'Fostering imagination and empathy is, in itself, a creative process, while the outcomes of that process contribute to creativity….. There is no better incentive to being creative than following Maitland's advice and forcing oneself 'inside societies'.

Novelty – *creating something new and useful to the discipline* – is seen in terms of 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, new forms of communication, re-interpretations of the evidence, new forms of history. New forms of historical understanding provide insights into how the past has shaped the present.

'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.'

Connectivity and synthesis – Another manifestation of creativity in the practice of the historian is the ability to connect, differentiate, and draw parallels across historical topics that are interesting and useful so that the detail is located within a bigger picture.

Transferability – Creativity in the discipline is seen as 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.

Challenging the status quo – 'Creativity can, of course, have negative connotations, in terms of departing from the objective or the given past. However, counterfactual history is also a positive type of creativity, as long as its intention is to spur thinking in others.'

Historians grapple with complex social systems of the past which have to be viewed holistically in order to be understood but interpretations have to be developed on the basis of incomplete evidence. Creativity is involved in making sense of disparate and fragmentary evidence. Creativity is manifested in: thinking 'outside the box'; thinking laterally and speculatively as a way of moving

beyond the more obvious; questioning conventions and orthodoxy; defining new explanations which could plausibly 'fill the gaps' in existing understanding; fluency of language and creativity of expression to convey historical arguments and evidence effectively to others and excite considered debate.

Creativity exists in all aspects of disciplinary study. It is necessary in:

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

'Creativity can take place at both the research stage and the writing stage. Historians need to be theoretically, methodologically and historiographically reflexive throughout both of these phases of their research and history-writing. This might be, for example, through the creative selection and combination of the types of sources in use, or through an explicit awareness of the limits and possibilities of historical discourse and therefore the ways in which it can be, and has been, subverted, re-imagined, stretched to its limits etc.'

The outcomes of historical study are not limited by the existence of materially correct or provable answers to questions. They are partly dependent upon freedom in the crafting of questions; explorations are as valid as answers and historical selectivity is not a precise science. The creative historian is able to apply concepts and ideas to an historical source, event or process to produce insightful and alternative observations and interpretations and to compare, connect, differentiate, and draw parallels across historical topics that are interesting and useful – in extending understanding. '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. This combines divergent and convergent ways of thinking.

'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 a new, 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.'

The complexity of past worlds that historians' study means that they are open to interpretation. The **intellectual curiosity** that drives historians to think and search for understanding is stimulated by the rich possibility space afforded by different interpretations of the past. All this begs the question, is creativity essential to the development of historical understanding?

An interview-based study of Australian higher education history teachers (Newton et al 1998 p48-50) described understanding for history teachers in terms of the reconstruction of events.

'Understanding is a mental reconstruction of events which includes, for instance, origins, developments and plausible reasons for their occurrence significant consequences, the ethos and values prevailing at the time.'

‘One is trying to stimulate the imagination because it’s an imaginative thing to understand the past.’

Broader understandings in history came from the synthesis of accounts of specific events into a larger picture.

In the same study history students described the evidence for their understanding in terms of ‘awareness of a coherent, plausible mental structure representing an event or situation (e.g. relationships within the new knowledge, an empathy with the people in the situation) and of the consequent feelings (e.g. conviction, pleasure).

‘It’s when I can summon up an image or an atmosphere of the time in my mind, rather than, quite often I’ve forgotten lots of dates and lots of names. .’

The responses of history teachers in this survey highlights the importance to the historian of an imagination that is able to assimilate and synthesise complex but often fragmentary historically relevant knowledge from different sources and combine this with intuitive and empathetic ways of thinking that are in tune with the historical situation and moment to grow new understandings. To do this the historian must inhabit the mental and emotional world that she has constructed. The act of inhabiting and gaining insights from such mental worlds is inherently creative.