



DISCIPLINARY PERSPECTIVES ON CREATIVITY IN HIGHER EDUCATION

CREATIVITY IN MEDICINE AND MEDICAL EDUCATION

October 2005

Norman Jackson, Higher Education Academy

Contributors: Dr Dominic Slowie, Medical School, Newcastle upon Tyne; Shee Lippell, University of Plymouth Business School; Jill Dales; Peter Campion, University of Hull; Sarah Gull; Amanda Howe, Institute of Health University of East Anglia; Gill McConnell, University of Edinburgh; Eva Doherty, Royal College of Surgeons in Ireland; Penny Morris, University of Leeds; Rafey Faruqi, Imperial College; Jane Metcalf, University Hospital of North Tees, School for Medical Education and Development, University of Newcastle; Anne Tynan, Royal Veterinary College; Jon Fuller, Barts and The London Queen Mary School for Medicine and Dentistry; John Spencer, University of Newcastle; Christine Bundy, University of Manchester; Trudie Roberts, University of Leeds; Sam Leinster, University of East Anglia; Taraneh Khalafpour, GP Trainer; Paul Thomas, GP and Thames Valley University; Carol Blow, GP and GP Examiner.

Purpose

The purpose of the Working Paper is to promote discussion about creativity in medicine and medical education. The intention is to develop a rich picture of the perceptions and insights of educators as to the way in which the idea of creativity is given meaning and operationalised in the field of medicine and medical education.

Introduction

The Higher Education Academy's Imaginative Curriculum project¹ is encouraging higher education teachers and disciplinary communities to consider the role of creativity in students' learning and their experiences of learning. Underlying this attempt to engage higher education are the assumptions that:

- Being creative is present in all disciplinary learning contexts, although we rarely use words like creativity to describe such things.
- We all need to be creative (inventive/adaptive) in a world that is constantly changing: a world that requires us also to change/adapt.
- Apart from those disciplines that explicitly recognise creativity as a central feature of their identity (like the performing arts and design), creativity is largely implicit in discussions about teaching and learning. However, teachers do value creativity, originality, flair and imagination in their students' learning. Indeed, some teachers believe that creativity is one of the hallmarks of excellence in learning and performance.

¹ <http://www.heacademy.ac.uk/creativity.htm>

Underlying our project is the desire to show that **creativity is an important part of being**: it is integral to being a biologist, lawyer, historian or, in this case, a medical practitioner. But being creative means different things in these different contexts for being.

To test this proposition an email survey was conducted, aimed at gaining insights from medical teachers and clinicians, many of whom are involved in medical education.

Questions used to prompt discussion:

Q1. How are medical practitioners creative? What is creative about being a medical practitioner? What sorts of things do medical practitioners do that are creative?

Q2. What is it about the subjects within the medical field that stimulates and encourages teachers and students to be creative?

Q3. How do teachers of medicine help/enable students to be creative? What forms of teaching encourage/enable students to be creative? What contexts/conditions for learning encourage/enable students to be creative?

Q4. How do teachers of medicine evaluate students' creativity? How do you assess/reward creativity in medical education? What criteria do you use to evaluate creativity?

Q5 What factors inhibit students' creativity in medical education?

Q6 How important a place do you feel creativity currently occupies in the medical curriculum? Do you feel it is adequately valued?

Participants' views are shown in italicized font. Quotes from other sources are in single quotation marks.

Creativity in Medicine and Medical Education

An interesting and distinctive feature of the survey was the number of respondents who associated creativity with the creative and performing arts: *'Many medical practitioners are creative outwith work, with high level skills in arts, music etc (not me!).'* This has not been a feature of creativity surveys in the other disciplinary fields so far undertaken.

Ultimately, a medical practitioner's creativity is motivated by and directed to improving the lives of people by solving or mediating patients' medical conditions and problems:

To help another individual to overcome suffering, pain or illness gives mp a feeling that, I believe, is not and cannot ever be experienced by any other group of individuals.

But there is a recognition that people are inherently complex subjects and that creativity is required to understand them:

People are infinitely variable, so cannot be represented by an "equation" or a formula; society (and people) are complex systems, that demand creative thinking to even grasp what they are about.

Some medical practitioners say that they are not creative. They stress the importance of knowledge – many different sorts of knowledge and reasoning – in their clinical problem working and decision making:

I'm still wedded to the importance of the baseline knowledge, and an ability to apply this to an endless variety of situations in different ways but without 'creating' something new.

The something new is perhaps the solution to an individual's medical problem or condition. While many clinical situations are routine, clinicians are often confronted by problems they have never encountered before or combinations of problems whose diagnosis is not straightforward.

Creativity probably lies in the ways in which diverse types of specialist knowledge are harnessed and used in clinical decision making. Non-analytical forms of thinking such as intuition and imagination play an important role in the utilization of knowledge in problem working:

'imagination makes possible all our thinking about what is, what has been, and, perhaps most important, what might be.' Nigel Thomas

By drawing on their imagination daily to understand patients.....by responding to many different 'cues' when making diagnoses and thinking laterally or divergently rather than the converse.

In clinical practice, there is considerable 'Artistry' in: the process of clinical reasoning i.e. making a diagnosis (especially in the primary care setting...) in which situation the practitioner is often dealing with complexity and uncertainty and lots of background noise;

Clinical practitioners are creative in using their skills of observation and intuition to make diagnosis and in suggesting treatments that may go beyond science.

High level synthesis of multiple sources of data and input (people, tests, exam, choice of therapies - like a huge vocabulary or an endless palette).

Expert clinicians may not be able to explain how they use their stock of knowledge but it is in the process of problem working that everyday creativity is located. This view chimes with a recent synthesis of research on clinical reasoning (Norman. G 2005, 'Research in clinical reasoning: past history and current trends'. Medical Education: 39 418-427):

'Experts use multiple knowledge representations in solving a problem, and the kind of knowledge brought to bear is more critical of success than the process. For straight forward and frequently encountered problems, similarity-based reasoning is undoubtedly effective and efficient. At the other end, when problems are rare and complex, the expert is able to marshal extensive array of experimental and experiential knowledge, but one clearly unanswered question is how the expert switches from one to another; how does the expert recognise that the problem does not fit the mould?'

Problem Working and Creativity in the Medical Field

Clinicians (like GPs and hospital based doctors and consultants) draw on their creativity during the consultation process particularly when confronted with a complex non-routine problem. Often working within stringent time constraints they have to diagnose or find the problem(s), formulate and test a hypothesis about what is wrong with the patient, and develop a solution (strategy for dealing with the problem). They must listen carefully to the patient's story, facilitate further enquiry about the problem as perceived by the patient, through careful and empathetic questioning and reasoning, and gather factual information to inform their decisions through enquiry and examination. The outcome of such a process may lead to a decision about a specific treatment or management plan to further investigative testing or referral to more expert advice or sophisticated testing. Whatever the outcome, the clinician is engaging in an experiment aimed at resolving the patient's medical problem, albeit within a strong framework of procedural and scientific advice and ethical codes. If the experiment does not work the results inform a new course of action.

Creativity within the problem working process is bound up with thoughtful and empathetic communication and enquiry aimed at facilitating the construction of a narrative that combines the patient's story with the clinician's evaluative commentary from which hypotheses are created. Every patient is different and the clinician's creativity is used to create the best conditions for the patient to tell their story, and for the story to be understood by the patient and other clinicians involved in resolving the problem. The way the clinician engages with the patient depends on the patient's attitude and behaviour, their experiences prior to consultation, their knowledge and understanding of their medical problem, and how they respond to questioning:

The [GP] practitioner is often dealing with complexity and uncertainty and lots of background noise; interpreting the patient's narrative and helping them rewrite the narrative, as it were; and in the use of metaphor and analogy in trying to explain phenomena to patients.

Seeing patients requires a degree of creativity in managing to learn from patients, not regard them as simple numbers or tasks.

The ability to give an understandable explanation to a patient about their condition also requires creativity as one needs to tailor the explanation in response to the patient's reaction.

If a clinician wants a patient/client to follow certain instructions, he/she needs to consider what words to use and how to express them. Clinical communication is often theatrical - there is always a certain tension between clinician and patient/client and both usually know that they will be acting out certain responses and reactions.

A doctor cannot begin to understand a person's medical problem(s) if they cannot communicate in ways that are meaningful and empathise with the patient. Communicating with patients in order to understand their conditions and see the world as they see it and communication to help them understand their own condition and how it might be improved are key foci for the clinicians' creativity:

Helping patients come to solutions for problems can be very creative, restating the problem they come with in the first place.

If a clinician wants a patient/client to follow certain instructions, he/she needs to consider what words to use and how to express them.

Working with human beings means students and tutors have to be able to be adaptable to the likes, dislikes, different personalities, beliefs and cultures of all with whom they come in contact. To be able to adapt involves a willingness to be creative.

In some specialities a specific creativity of insight into use of the doctor-patient relationship may be used to the best, most therapeutic effect - this includes a creative use of the interpersonal self, which is akin to taking on different roles to adapt to the needs of 'other'.

[Creativity is involved in] interpreting the patient's narrative and helping them rewrite the narrative, as it were; and in the use of metaphor and analogy in trying to explain phenomena to patients.

Clinical decision making, particularly with unusual conditions and difficult problems, requires both analytical and more intuitive thinking capacities. The way these are combined to solve a patient's problem is perhaps an important site for creative enterprise. While there are strongly convergent forces and much analytical reasoning within the process, there is also a need for imagination and divergent forms of thinking to ensure that all reasonable possibilities are explored. The clinician has to keep an open mind. Creativity is also bound up with the formulation and testing of hypotheses and the blending of scientific evidence, socially constructed knowledge (through conversations with patients and other clinicians) and perhaps intuitive knowledge derived from experience:

In clinical practice, there is considerable 'Artistry' in the process of clinical reasoning i.e. making a diagnosis (especially in the primary care setting).

Clinical practitioners are creative in using their skills of observation and intuition to make diagnosis and in suggesting treatments that may go beyond science.

There is a form of creativity in formulating a problem and making a diagnosis. The ability to give an understandable explanation to a patient about their condition also requires creativity as one needs to tailor the explanation in response to the patient's reaction. Developing new solutions to problems also requires a high level of creativity.

Making decisions in a clinical setting which require creative thinking; drawing on multiple sources and meanings, identifying priorities, different perspectives and levels of uncertainty.

Creativity may also be viewed from the perspective of technical or craft skills. For example, clinicians involved in surgical procedures:

Within the practice of medicine I would argue that surgeons are creative, especially those involved with microsurgery and reconstructive / cosmetic surgery.

I see my position as very creative (obstetrician/ gynaecologist /teacher/ etc) e.g. doing practical things which make a difference where the process may not be straightforward. e.g. complex surgery.

Sources of Stimulation

The primary sources of stimulation for creative thinking and action are the real world problems and challenges that social workers encounter every day of their lives. Examples of sources of inspiration/motivation:

There are so many uncertainties in all medical disciplines that creativity is encouraged.

Stimulation from people and their individual problems

- The interaction between patient and doctor
- It is the human contact that promotes discovery and creativity
- Human drama of illness, suffering, death, and recovery/survival
- Letting students have time with patients who have difficult issues to deal with and then spending time having them feed back to me can stimulate creativity for all of us
- The subjects are intimately concerned with humanity, existence and their meanings. This is also the mainstay of most art, so there is a natural connection
- People are infinitely variable, so they cannot be represented by an "equation" or a formula; society (and people) are complex systems, that demand creative thinking to even grasp what they are about.

Stimulation from the subject and practice in the subject

- The need to incorporate new advances into teaching
- The quest for cutting edge knowledge
- So many uncertainties in all medical disciplines that creativity is encouraged
- Those requiring dexterity, such as outlined in surgery above, would stimulate creativity
- Clinicians seem to thrive on working with the unknown and uncertain
- Problem solving aspect of clinical work involves creative thinking
- There are always discoveries to be made
- Medical research - all doctors are researchers with current clinical cases
- Being given a challenge

- Having to find out for oneself rather than being told "the answer"
- Problem solving, questioning evidence - is there a better way?
- The area of overlap between the subjective and the objective
- The impact of emotion on health.

Resourcefulness and entrepreneurialism stimulated by the system/organisations within which practitioners work

- Radical changes in the nature of health care have also required clinicians to adapt and invent new forms of delivery and to work in creative ways with increasingly complex and sometimes constraining systems and protocols.
- Primary care also involves running a business and this provides another potential site for individual and group creativity.
- A clinician's creativity may also be involved in securing expert opinions or the best or the most rapid treatment. Resourcefulness in acquiring scarce resources is another important focus for creativity. Developing and maintaining good working relationships with people in other organizations is crucial as is the ability to communicate, persuade, negotiate and make complex and timely connections so that expertise and resources are brought to bear on the particular issue.
- Developing practice within a department towards making "best" use of limited resources.

Forms of Teaching and Contexts/Conditions that Encourage/Enable Students to be Creative

Some respondents are not sure that medical education does provide opportunities and experiences that encourage and enable students to be creative. Those that do identify a range of teaching and learning methods through which students' creativity can be promoted. The methods tend to be those that result in active engaged learning – students doing things to learn often collaboratively. These are methods that encourage open-ended exploration through problem-working and story-telling. They sometimes/often combine techniques, for example creative thinking/problem-working with problem-based learning or engagement with realistic scenarios. They require forms of teaching that are facilitative rather than based on transmission.

General principles

- Student-centred learning in any form - nurturant/hands off parenting
- Any form of teaching that encourages the student to question accepted wisdom and to see beyond the obvious
- Encourage independent thought rather than prescriptive learning; be accepting and non-judgemental to encourage independent thinking
- Encourage self-expression; listen to students' 'stories' and experiences, fears and aspirations and allow them to develop and grow when appropriate or possible; value their opinions and perspectives
- Allow teacher/learner the time and space to be creative – yet paradoxically creativity often emerges when under pressure
- Teach students to cope with uncertainty and that there are often no right answers
- Teacher must provide good role model: '*I guess teachers have to show by example plus give examples of how they are creative in their response to solving problems, plus how they draw on other resources*'
- Whenever students are being taught by a clinical teacher who understands the processes, they will encourage/enable creative approach in the study
- Create contexts that both are blame-free and value experimentation; contexts which do not repress creativity are those which are free from perceptual expectations, emotional blocks, cultural blocks, environmental blocks, intellectual blocks, expressive blocks
- Encourage the contextualizing of information and putting things into practice.

Humanities in the curriculum

- Increase inclusion of humanities in curricula
- Introduce students to the arts and humanities as part of core curriculum and enable them to develop and study the skills of the writer and artist whilst at the same time helping them make connections with the skills of the clinician
- Introduction of the arts into medical education ie. arts and humanities discipline groups, interdisciplinary education eg. arts therapy, theatre, etc.

Case studies and scenarios

- Devise scenarios for virtual patients and simulated patients to be used in PBL and clinical skills teaching; devise scenarios for resource sessions in basic sciences, and public health
- Generate scenarios for ethics discussions
- Devise projects for SSCs (student-selected components in the medical course, now a requirement from the GMC).

Experiential learning

- PATIENT contact probably the most potential
- Crisis situations, where there is a staff shortage and many patients/clients waiting, seem to be fertile ground for creative thinking
- Vacation projects, which students generally enjoy.

Co-created curriculum

- Allow students to develop their own creativity by working on projects within areas of personal interest. Students are often allowed to design these parts themselves if they wish
- A student-selected component where students choose their own project, conflating an area of humanities with medicine
- Student Selected Components (SSCs), many of which are clinical and all are clinically relevant.

Problem Based Learning

- Problem solving exercises/projects
- PBL encourages creativity through "brainstorming" and through requiring whiteboard work (diagrams, spider diagrams, mind-maps etc); working with simulated patients demands thinking through a range of possibilities in communicating - our method expects a "now try something else" approach (the Calgary-Cambridge model).
- Provide problems, encourage brainstorming without initial judgement, encourage critical thinking, encourage a holistic approach, reward lateral thinking.

Group working

- Non-tutor led groups encourage students to develop roles within the group, learning styles, sharing of knowledge and skills
- We run a project which is run MBA style, ie the students are in teams and submit a team project and each student then receives a team mark. The projects are designed around cases and they have to research various aspects of the case (medical, societal, ethical. professional etc), write a press release, find websites.

Space and permission to experiment and grow new knowledge

- Give structure and safety for experimentation
- Learning is essentially how to construct moment-by-moment relationships and problem solving nurtured essentially by safe structures and an acknowledgment that this is new knowledge that has to be created in the moment - there are no right answers so feel free to create your own.

Story telling/ drama/role play/self-observation/ role modelling

- Use of role play/drama, storytelling, reflection, encouraging creative presentations - posters etc
- Use of role play/reflection/contextualisation and practical application of theory

- Seeing senior doctors being creative in approach helps (gives permission/role modeling)
- Encourage self-expression
- Role modeling.

Encouraging reflection

- Reflection - ideally within a group to begin with then through the use of a learning portfolio; although written reflection does 'exclude' the internal reflectors
- Encourage students to draw on their own personal experience, particularly those which have 'touched' them
- Encourage self-evaluation.

Evaluation of Students' Creativity

Medical educators and practitioners hold a variety of views that might be characterized as:

1. A belief that creativity is not generally assessed, or if it is, it is implicit in criteria that are not explicit in their elaboration of creativity. This view shades into the view that creativity must be integral to other things which are assessed, like criticality.
2. Beliefs that creativity is assessed in some parts of the course – student selected components, presentations, other forms of communication, PDP/portfolios, projects and essays, all mentioned as sites in which creativity is assessed, although perhaps not always explicitly defined.
3. Beliefs that creativity is recognized and rewarded informally, eg through praise:

SSCs are assessed by verbal or written reports which can be graded "excellent" if they go beyond the routine expected level of activity and show creativity; clinical and especially communication skills (we teach and assess both together) can be informally rewarded for creativity (by praise from tutors) but our assessment system doesn't allow scope for discretion - it tends to work as a "threshold" assessment, good enough or not.

Interestingly, no responses suggested that there is a relationship between levels of academic achievement and creativity, i.e. higher levels of achievement are generally associated with evidence of creativity.

Factors that inhibit students' creativity

Factors can be categorized into:

Cultural factors

- General culture of not valuing anything other than the 'scientific' paradigm
- Fear of failure and criticism, fear that it is not Hard Science
- Undervaluing creativity, overvaluing rationality
- Difficulty of bringing clinicians and artists together when the disciplines are structured so differently and have such different values.

Teacher/teaching related factors

- The course
- The fact that the curriculum is overloaded
- Over-emphasis on factual learning. The volume of "facts" to learn takes a lot of time and devalues other ways of learning
- Too much didactic teaching
- The very necessary requirement to achieve and conform to defined professional standards.

- Inappropriate methods of delivery
- Teachers' perfectionism and fear of mistakes
- Too much work.

Assessment

- The assessment-driven curriculum
- The assessment process drives a perspective of learning as acquisition of "facts" independent of teacher and learner. These are reproduced in MCQs, etc. Similarly, practical tests and OSCEs all encourage conformity rather than creativity
- Being driven by exams to learn a syllabus
- Creativity unrecognized in summative assessment, so students disregard it.

Student related factors

- Students' (and teachers') perfectionism and fear of mistakes
- Fear of patients/people
- Too much work
- Fear of failure
- Some very factual tasks
- Having to survive financially
- Being young in their career, ie not able to be in a real relationship with patients and be confident and experimental
- Time pressures
- High hurdles for student to pass (there is a balance, if there is no assessment they spend no time on it)
- Overbearing or derogatory teachers.

Institutional or systemic factors

- Inappropriate environments for teaching
- National and professional guidelines, such as NICE, DoH, Royal College, etc. produce recommendations for practice with levels of evidence. Much of this may be critiqued in terms of absolute truth, but nevertheless needs to be adhered to unless you want to get criticised by colleagues, professional bodies etc. for unusual practice.

Importance of Creativity in Undergraduate Medical Education

Although many of the people responding to the survey value creativity themselves, there is a sense that they believe it is inadequately valued in medical education and a number signal that there is scope for more explicit recognition of what we already do to promote learner creativity. There is a sense that creativity is important in clinical practice and that it is perhaps becoming more important as clinical practice and the system within which clinicians work become more and more complex.

'We could value it more and acknowledge how much we already value it.'

'I think it is becoming more important as the structure of the NHS changes. For example, referral from private secondary care has had to change because of shortages of funding. The GP now has to be more creative in managing the patient.'

PART 2 PARTICIPANTS' RESPONSES

Q1. How are basic science and clinical practitioners creative? What is creative about being a practitioner? What sorts of things do practitioners do that are creative?

I think that we are conservative in many things and object to change. Often (daily) we have change forced upon us by gov'n/management etc and feel frustrated by this as often these changes will harm the care we give to patients, not enhance it. However within our own working lives I believe there is an enormous amount of creativity (not just on expenses forms!). We regularly adapt our working practices to improve our services for example. Seeing patients requires a degree of creativity in managing to learn from patients not regard them as simple numbers or tasks. New medical education requires enormous creativity to meet prescribed curricular but teach in interesting ways! Many medical practitioners are creative outside work, with high level skills in arts, music etc (not me!).

I can't comment about basic scientists, since I am a clinician, except that within their research I am aware of considerable creativity in finding novel methods to investigate phenomena, and perhaps also novel interpretations of results. In clinical practice, there is considerable 'Artistry' in: the process of clinical reasoning i.e. making a diagnosis (especially in the primary care setting - I would say of this of course. Since I am a GP! - in which situation the practitioner is often dealing with complexity and uncertainty and lots of background noise; interpreting the patient's narrative and helping them rewrite the narrative, as it were; and in the use of metaphor and analogy in trying to explain phenomena to patients.

Creativity also comes into clinical research, of course. Increasingly in medical education new ways of delivering and assessing material are being explored, in both basic and clinical areas, in which creativity plays a significant part e.g. increasing inclusion of humanities in curricula (see below).

Helping patients come to solutions for problems can be very creative, restating the problem they come with in the first place, managing organisations and solving organisational problems.

There is a form of creativity in formulating a problem and making a diagnosis. The ability to give an understandable explanation to a patient about their condition also requires creativity as one needs to tailor the explanation in response to the patient's reaction. Developing new solutions to problems also requires a high level of creativity.

Strong link with music, many of my colleagues are accomplished musicians. Link with fine arts too as well as writing. Within the practice of medicine I would argue that surgeons are creative especially those involved with microsurgery and reconstructive/cosmetic surgery. Those who make big scientific leaps in research are also creative especially those who cross boundaries. Neuroscience is one that comes to mind.

All medical practitioners (mp) are creative in their work because they constantly need to make decisions when dealing only with indeterminate knowledge. From this work they (eventually) contribute to determinate knowledge. Some mp are also academics and involved in biological and clinical research. Many mp are educators and teachers. All these individuals contribute to the formation of knowledge - local, regional, national and global. Additionally all mp are involved in creating better systems of care for patients.

Clinical situations involving patients and/or clients demand a creative approach to situations and communication about situations. If a clinician wants a patient/client to follow certain instructions, he/she needs to consider what words to use and how to express them. Clinical communication is often theatrical - there is always a certain tension between clinician and patient/client and both usually know that they will be acting out certain responses and reactions. This is also the case within clinical teams and when clinicians are working with students.

General practitioners are creative with projects that are under their direct control, such as new clinics, companies or projects. Some are creative with IT.

Medical practitioners are creative in a number of ways:

- *Through their communications with patients and their relatives*
- *In communication with other members of their interdisciplinary team*
- *Determining referral pathways*
- *Teaching / coaching*
- *Their own further education which may be unique to them*
- *Diagnosis, choice of diagnostic tools and the way they are used.*

Medicine is an art and was taught as one up until about 100 years ago. Clinical practitioners are creative in using their skills of observation and intuition to make diagnosis and in suggesting treatments that may go beyond science. A practitioner, like a writer, has to be 'someone on whom nothing is lost' (Henry James) and in this way mirrors the creativity of the artist.

- *Hypothesis generation*
- *Diagnosis*
- *PBL*
- *Thinking 'outside the box' in patient care - with nurses this seems to translate to ways of providing care tailored to the needs of the individual patient.*
- *Going against the rules*
- *Sourcing resources*
- *Making innovative use of scarce resources*
- *Systemic thinking in teams*
- *Running a 'mini-business' ie. GP.*

Perhaps creativity needs greater definition, and activity must vary between practitioners. However, I see my position as very creative (obstetrician/ gynaecologist /teacher/ etc). Examples include:

Doing practical things which make a difference where the process may not be straightforward. e.g complex surgery

Making decisions in a clinical setting which require creative thinking; drawing on multiple sources and meanings, identifying priorities, different perspectives and levels of uncertainty

Developing practice within a department towards making "best" use of limited resources

Developing teaching provision in a reflexive manner, responding to changes, observation, feedback and new opportunities:

- *Writing*
- *Thinking up new ideas (these last two are often linked)*
- *Producing/presenting work*
- *Generating discussion*
- *Anything which involves mental struggle.*

By drawing on their imagination daily to understand patients, and when not doing so usually indicating fatigue or more seriously 'burn-out'; by responding to many different 'cues' when making diagnoses and thinking laterally or divergently rather than the converse.

- *creative with research - new ideas, new collaborations, new applications of existing techniques/knowledge, recurrent rethinking of possible causes etc*
- *creative with people / relationships (clinicians)- always having to reconsider how, who, why, where, when in diagnosis and rx, also in some specialities a specific creativity of insight into use of the doctor-patient relationship to the best, most therapeutic effect - this includes a creative use of the interpersonal self, which is akin to taking on different roles to adapt to the needs of others*
- *creative in use of scarce resources*

- also some are personally creative in the artistic sense (many examples in the literature).

In basic science, there is ample evidence of creativity - the ability to form a hypothesis about the unknown is certainly creative. In both science and clinical practice, creativity often involves problem solving and lateral thinking, whatever the scale. Examples range from using a hypodermic needle to pin the fractured leg of a hamster, to creating Dolly the sheep, to art inspired by science. Drivers for creativity include pure curiosity, self-expression, the desire to find solutions (whether to a practical or an emotional problem), and, particularly in the medical/veterinary field, society's demand for improved treatments and patient care. Funding can steer the direction of creativity in science, but so can both self-exploration and altruism.

What is it about the subjects within the medical/clinical field that stimulates and encourages teachers and students to be creative?

For teachers it is partly to avoid terminal boredom in teaching the same things every year. However as the goalposts move to creating 'fit for purpose' practitioners then we must be more creative in how we teach. Also, many more are doing formal teaching qualifications and learning the theories behind education and the evidence, and thus adapt teaching practice in the light of new knowledge. Within the many fields of medicine, evidence and discoveries are published every day and in order to incorporate this we must be creative.

If the artistry used by experts in clinical reasoning is indeed what you mean by 'creativity', then it is inherent in what is at the very heart of clinical education & training - i.e. the interaction between patient and doctor. In theory we can encourage students to be creative by reflecting about each patient (and other) encounters either through writing or discussion.

My view is that overall medical study (subjects) inhibits creativity (some exceptions!). It is the human contact and quest for cutting edge knowledge that promotes discovery and creativity.

I find that letting students have time with patients who have difficult issues to deal with and then spending time having them feed back to me can stimulate creativity for all of us (not all the time and not with every student). This is particularly so when the student engages with the patient and takes a special interest in them.

There are so many uncertainties in all medical disciplines that creativity is encouraged.

The disease focus and individual learning style inhibits innovation that is systemic or collaborative. By contrast provokes focused creativity.

I can see that those requiring dexterity such as outlined in surgery above, would stimulate creativity. Other than that it is difficult to link other subjects.

The medical/clinical field seems to involve much more uncertainty than the lay person might think. Clinicians seem to thrive on working with the unknown and uncertain. Even if a surgeon has carried out endless operations over many years, there are always discoveries to be made. During one operation that I observed, the leading surgeon sent a student running to get a camera, as he wanted to photograph a particular growth that they had found. The surgeon's excitement had quite an impact on the students as well as me. Creativeness is always linked to discovery and this is the key to creativeness in this field.

The subjects are intimately concerned with humanity, existence and their meanings. This is also the mainstay of most art, so there is a natural connection.

Working with human beings means students and tutors have to be able to be adaptable to the likes,

dislikes, different personalities, beliefs and cultures of all with whom they come in contact. To be able to adapt involves a willingness to be creative. Interpersonal communication is fundamental to good practice and to being an efficient, effective and compassionate practitioner - language is creative - we don't all share the same one. To maintain our ability to communicate with others, we need to be able to adapt, and be creative with what we know and share. What we say or do may also result in the creative process of new knowledge, thoughts, behaviours and attitudes.

Human drama of illness, suffering, death, and recovery/survival.

Interpersonal nature of clinical interactions. Family feel of health institutions (built around the drama) invokes deepest personal dynamics.

Problem solving aspect of clinical work involves creative thinking.

Medical research does also - all doctors are researchers with current clinical cases.

People are infinitely variable, so cannot be represented by an "equation" or a formula; society (and people) are complex systems that demand creative thinking to even grasp what they are about.

- Being given a challenge. For students in a crowded curriculum this needs to be somehow reinforced by assessment.*
- Finding out for oneself rather than being told "the answer"*
- Having permission to do things differently (which includes permission to take some risk)*
- Feeling your own ideas are valued, or at least tolerated*
- Getting "out of the box" to try out or see new things: art shows, performance art, cinema, books*
- Developing the discipline to write*
- Having some time and space (occasionally) to think for oneself*
- Going for a run.*

The 'human element' - be it from a patient's story or a fictional account, stories where things have not gone well, tend to provoke ideas about alternative ways of doing things including an awareness of culture, when done interestingly and not dogmatically they can be inspiring.

High level synthesis of multiple sources of data and input (people, tests, exams, choice of therapies - like a huge vocabulary or an endless palette). The ultimate driver is the need of the 'other' to call out our abilities and knowledge. There are probably complex cognitive links which 'cross over' different areas of the brain and are therefore opened up to other creative routes but it is also about being deeply au fait with the human condition.

Problem solving, questioning evidence - is there a better way? The area of overlap between the subjective and the objective; the impact of emotion on health.

There is a universal fascination with medicine. Everyone, at some time or other, will come into contact with doctors or will suffer illnesses no matter how minor. To help another individual to overcome suffering, pain or illness gives me a feeling that, I believe, is not and cannot ever be experienced by any other group of individuals.

- a) The subjects are vast and varied, allowing scope for the teacher/learner to branch out. There are medical, psychological, social and political aspects to all branches of medicine.*
- b) Interactions between teachers and learner happens at multiple levels e.g. , medical student, versus SHO/Registrar/Professor/Consultant/nurses, other members of the allied professions such as pharmacist/social worker etc.*
- c) Each case/patient is unique allowing scope for different sorts of teaching.*
- d) The ever-changing modes of investigation and treatment being developed.*

How do teachers of clinical subjects help/enable students to be creative? What forms of teaching encourage/enable students to be creative? What contexts/conditions for learning encourage/enable students to be creative?

Any form of teaching that encourages the student to question accepted wisdom and to see beyond the obvious appearance is likely to encourage creativity. The Socratic approach to learning in its many manifestations is one method. Role modelling possibly, other than that it's hard to see the link.

Accepting, non-judgemental, those with tradition of producing independent thinkers, practitioners. Most conditions do not stimulate creativity unfortunately.

Some forms of curriculum and lesson design promote creativity (eg student selected components) but more often we do not. They do a lot of skills practice but not sure this promotes creativity. Following adult learning principles could help promote some creativity.

In medicine, I guess whenever students are being taught by a clinical teacher who understands the processes, they will encourage/enable creative approach in the student; to be creative needs some degree of participative safety, and ideally linked with assessment because of the latter's drive on learning. Discussion will also enable creativity.

I am not sure we do much, working in small groups should do, giving time for special study modules, project work.

We devise scenarios for our virtual patients and our simulated patients, to be used in PBL and clinical skills teaching; devise scenarios for resource sessions in basic sciences, and public health; generate scenarios for ethics discussions; devise projects for SSCs (student-selected components in the medical course, now a requirement from the GMC).

They don't. Audit is seen as a tool to measure against established standards that are challenged only through scientific study.

Increasingly in medical education new ways of delivering and assessing material are being explored, in both basic and clinical areas, in which creativity plays a significant part e.g. increasing inclusion of humanities in curricula

Crisis situations, where there is a staff shortage and many patients/clients waiting, seem to be fertile ground for creative thinking. In one situation, a student had to take over a consultation when the senior clinician was called away on an emergency. The student had to immediately decide what to do, how to do it and how to convey the change of plan to the patient and his/her relatives without them realising that there actually had been a change of plan.

Encouraging independent thought rather than prescriptive learning, encouraging students to recognise the value of their own feelings and experience in shaping them as practitioners, introducing them to the arts and humanities as part of core curriculum and enabling them to develop and study the skills of the writer and artist helping them make connections with the skills of the clinician.

So far this seems to be the introduction of the arts into medical education ie. arts and humanities discipline groups, interdisciplinary education eg. arts therapy, theatre, etc.

Likely contexts are those which are both blame-free and value experimentation. You can see why creativity is either suppressed or covertly un/acknowledged.

How do we reconcile professional codes of practice/accountability in a high-risk setting with the tolerance of ambiguity/openness to experience necessary for creativity to flourish? Contexts which do not repress creativity are those which are free from: perceptual expectations

*emotional blocks
cultural blocks
environmental blocks
intellectual blocks
expressive blocks*

By encouraging self expression; listening to their 'stories' and experiences, fears and aspirations and allowing them to develop and grow when appropriate or possible; valuing their opinions and perspectives; encouraging the contextualizing of information and putting things into practice; use of role play/drama, storytelling, reflection, encouraging creative presentations - posters etc

Communication skills group work - use of role play/reflection/contextualisation and practical application of theory; experiential learning. Problem Based Learning - development and delivery of creative presentation styles; non-tutor led groups encourages the students to develop roles within the group, learning styles, sharing of knowledge and skills - all of which are creative processes; elective modules; informal discussions and sharing of ideas.

Give structure and safety for experimentation - this involves respect and a developmental approach. Problem solving exercises/projects.

Communication skills learning is essentially how to construct moment-by-moment relationships and problem solving, so it is a good example of creativity: nurtured essentially by safe structures, and an acknowledgment that this is new knowledge that has to be created in the moment - there are no right answers so feel free to create your own. How to access the evidence base of others' wisdom is also important so that creativity builds the body of knowledge - but too often teachers and learners are anxious to pin down all the answers (overlong and detailed communication skills guides eg), thus stifling creativity and real engagement.

I am a clinical teacher and position my teaching from a work-based angle. I believe in providing a real life or clinical context to help bring out reflection and creativity in practice (if that is what you mean by creativity or includes the notion of creativity).

Students are taught from the beginning of the course about coping with uncertainty and that there are often no right answers. Although there is a core curriculum there are also student selected components within all undergraduate medical courses, which allow students' to develop their own creativity by working on projects within areas of personal interest. Students are often allowed to design these parts themselves if they wish. Students can also take longer time out from the course to do a BSc or PhD in an area which interests them.

I have tried various things, including creative writing workshops, life drawing, a cinema season, and a student-selected component where students choose their own project conflating an area of humanities with medicine. I do not think one solution fits all. May require a "menu of options" for students to choose, as student engagement is important. If the student is not interested, then there is no point.

- Has helped to get students out of usual environment occasionally*
- Helps to ask questions*
- Helps to see senior doctors being creative in approach (gives permission/role modeling)*
- Encourage to work towards something like publication or presentation*
- Inter-disciplinary learning between medicine and artists or literature scholars is very stimulating as the perspectives/discourses do not sit comfortably with one another*

PBL encourages creativity through "brainstorming" and through requiring whiteboard work (diagrams, spider diagrams, mind-maps etc); working with simulated patients demands thinking through a range of possibilities in communicating - our method expects a "now try something else" approach (the Calgary-Cambridge model);

Small group learning

Reflection - ideally within a group to begin with then through the use of a learning portfolio; although written reflection does 'exclude' the internal reflectors

Drawing on their own personal experience and experiences which have 'touched' them

I guess teachers have to show by example and give examples of how they are creative in their response to solving problems and how they draw on other resources.

Role modeling, intellectual challenge, emotional support, creating appropriate learning opportunities, exposing them to full range of skills applied for patient benefit.

Also specific intellectual challenge to expand thinking, self questioning, reflection.

Certain types of learning activity - PATIENT contact probably the most potential, also research, and student selected studies (SSMs) – particularly medical humanities.

Student centred learning in any form - nurturant / hands off parenting

PATIENT contact

Electives

Projects esp voluntary agencies / exposure to minority communities.

Provide problems, encourage brainstorming without initial judgement, encourage critical thinking, encourage a holistic approach, reward lateral thinking. There is more room for creativity within intercalated honours courses and vacation projects, which students generally enjoy. Some group work involves the production of presentations/websites, which can be creative.

The best way to answer this is to tell you about a course we have introduced this year as part of the Health and Society programme. It is for 1st medical year students. We run a project which is run MBA style ie the students are in teams and submit a team project and each student then receives a team mark. The projects are designed around cases and they have to research various aspects of the case (medical, societal, ethical, professional etc), write a press release, find websites etc. We also have analysed the team dynamics and plan to compare these with team scores to see whether there is a relationship. There are a number of learning outcomes but one is clearly creativity.

How do teachers of clinical subjects evaluate students' creativity? How do you assess/reward creativity? What criteria do you use to evaluate creativity?

I don't think we do beyond the assessments for student selected components. Assess/reward creativity in med ed? ASME/AMEE I guess. Occasional pat on back from faculty. No criteria personally as don't know how we're defining it!

Can't think of anything.

Clever ways to deliver already agreed things are evaluated for their technical merit. Later these would be evaluated by the degree to which they attract money.

I'm not sure that it is evaluated as such.

Sadly we don't, other than through the research options, this is one of the few ways in which students are allowed to think outside the box – even then it is limited.

I may be familiar with a few examples of teachers attempting to evaluate or assess creativity but I do not think this is being encouraged or promoted on an organizational or professional level.

I don't think they do - we actively encourage thinking 'outside of the box' with the portfolio, but it is the basis for formative assessment-once assessment contributes to final marks-needs to be second marked and subject to stricter criteria which all stifle creativity.

We don't really evaluate creativity except perhaps in assessing clinical reasoning, and assessment of the kinds of formal teaching that nurture creativity.

This is done to a certain extent in the assessment of special study modules and intercalated degrees. I have been involved in exercises where students have had to reflect on a critical incident they have observed, which has stretched their creative faculties.

Mainly by assessment of the student selected component and by assessment of other presentations and communications.

I use the criteria that might be used in the creative disciplines. Students submit essays, critiques and creative pieces for assessment, the latter with commentaries if necessary. Log diaries, portfolios and reflection.

Depends which perspective you take on creativity eg. pragmatic versus social-personality approaches.

I assume some assessment processes look at the creative elements e.g. posters.

Increasingly students are being required to submit original work in their assessments, either in the form of personal reflections or original research. The assessment of these inevitably involves an assessment of creativity but at the moment it tends to be subjective.

By valuing the effort, relevance and willingness to work beyond the minimum required or outside the normal parameters; basically through a reward process - positive constructive feedback from peers and tutors.

Effective communication involves creativity, not reciting a mantra of 'right' questions etc. However, some assessments can reward the mantra if we are not careful. The overall mark in the OSCE stations (ie., the 'feeling' mark which is given as well as the detailed check lists, and some people say is good enough/compares with the detailed mark when done by skilled examiners) can sometimes reveal the person who has ticked the boxes, but that is all, and so can the simulated patient mark.

In Personal Professional Development (PPD) courses, 'reflection' assessment is usually about creativity, I feel. Students can be endlessly creative about assessment and that is often rewarded, though not consciously by the institution.

In Student Selected Components (SSCs), many of which are clinical and all are clinically relevant, a student has to be 'creative'. Criteria? Missing. Something about going that bit further/being surprising?

Difficult! Certainly SSCs are assessed by verbal or written reports which can be graded "excellent if they go beyond the routine expected level of activity and show creativity; clinical and especially communication skills (we teach and assess both together) can be informally rewarded for creativity (by praise from tutors) but our assessment system doesn't allow scope for discretion - it tends to work as a "threshold" assessment, good enough or not.

I think this is very difficult, as setting fixed criteria constrains free thought (restriction, distortion etc.). Some constraints such as deadlines a good idea, though!

- *Encourage self-evaluation*
- *Presentation by students to peers and teachers with positive feedback (need safe environment)*
- *Encourage critical thinking in essays. Essays are out-of-fashion but hugely important (in my view) as a tool to develop creative thinking skills through writing. The main disadvantage is marking them.*

Portfolios, projects, presentations, assignments (see website).

"Portfolio assessment Year x. The report should be a minimum of 1500, a maximum of 2000 words, and can be done in note form where this will not detract from the reader's ability to understand what is meant. A maximum of 5 references will be assessed, and these are included in the word limit. You should include anonymised examples, based on your experience as gathered in your reflective portfolio, to show why you have decided that certain goals and issues matter.

The report should show that the student:-

- *Uses relevant examples from their ongoing portfolio to apply their experience throughout the MBBS to this year's report topic.*
- *Shows ability to engage emotionally as well as intellectually, and to reflect on self and others honestly and thoroughly.*
- *Relates their learning to values and attitudes that are appropriate to good medical practice as defined by GMC documentation*
- *Uses their portfolio to demonstrate how they are setting, progressing and achieving goals appropriate to their current and future professional practice*

What factors inhibit students' creativity in medical education?

The course

I don't think we do encourage creativity, but an assessment driven culture.

The assessment driven curriculum - which is a necessity in medicine, but can also act as an impediment to creativity. Also the fact that the curriculum is overloaded.

Medical students on the whole are extremely talented individuals - they all seem to have grade 8 cello, are president of the schools' county debating society, captain of netball, and read French novels in French! The educational process then stifles their creativity.

Over-emphasis on factual learning.

Pressure to conform should not be underestimated. There is general culture of not valuing anything other than the 'scientific' paradigm, even this is rather restrictive.

Fear of failure and criticism, fear that it is not Hard Science and so less valuable. We dissuade them of this by pointing them to the emerging and well respected literature in this area.

*Fear
Humiliation
Lack of practice
Undervaluing creativity
Overvaluing rationality
Poor contexts
Poor intellectual ability
Poor technical skill
Lack of motivation/passion*

In Communication Skills the environment in which they are taught and the method of delivery is very important - a lecture format in any environment or attempting to deliver an experiential workshop in a lecture hall environment are very inhibiting. Groups that are too large to facilitate confident expression and sharing of ideas and skills; inability to put skills and knowledge into practice; forcing a teaching method or style upon the participants, such as role play without the tutor being skilled in its use.

Still that aspect of medical education described in the article about 'abusive family systems'.

Students' (and teachers') perfectionism and fear of mistakes, arising partly from the above.

Fear of patients/people, for some. Patient involvement is good for breaking this down.

An overt-reliance on traditional science and disease processes. Also a bias against systemic thinking, action approaches to inquiry and multidisciplinary working.

Assessment process - In undergraduate (and postgraduate) medicine the assessment process drives a perspective of learning as acquisition of "facts" independent of teacher and learner. These are reproduced in MCQs, etc. Similarly, practical tests and OSCEs all encourage conformity rather than creativity. The volume of "facts" to learn takes a lot of time and devalues other ways of learning.

National and professional guidelines, such as NICE, DoH, Royal College, etc., produce recommendations for practice with levels of evidence. Much of this may be critiqued in terms of absolute truth, but nevertheless needs to be adhered to unless you want to get criticised by colleagues, professional bodies etc. for unusual practice.

Power relationships within the hierarchy of medicine encourage conformity

- Being driven by exams to learn a syllabus - we try to avoid this by having a PBL curriculum, and extensive experiential learning.*
- That it is unrecognized in summative assessment so students disregard it.*
- That some teachers are concerned about 'switching students off' the humanities so avoid introducing!*
- The difficulty of bringing clinicians and artists together when the disciplines are structured so differently and have such different values.*

Too much work

The fear of failure

Some very factual tasks

Having to survive financially

Being young in their career ie not able to be in a real relationship with patients and be confident and experimental

Over-loaded curricula, too much didactic teaching, plus the very necessary requirement to achieve and conform to defined professional standards.

Lots of facts to learn, skills to master, to be able to show that they have been able to achieve the 'right thing'.

Assessment, time pressures, high hurdles for student to pass, (there is a balance, if there is no assessment they spend no time on it) overbearing or derogatory teachers. It is not conceived as an important part of the curriculum by the teachers (perhaps some of them are not very creative).

How important a place do you feel creativity currently occupies in the curriculum? Do you feel it is adequately valued?

As the curriculum is already over-loaded, it is difficult to see how you could justify spending much time on this. However, you can achieve it by example. If students see that their teachers have a balanced life outside the science/medicine disciplines, they will be more likely to follow this model.

Not currently important and inadequately valued.

Inadequately valued; creative thinking is actively discouraged by a technocratic approach and behaviourist teaching where the teacher rewards the student for reproducing the given facts/skills rather than synthesising or processing for themselves.

Not at all.

Little place and little value accrued

It needs to be more highly valued but we need to take a very wide view of what constitutes creativity. It clearly includes the arts, literature and music but it also includes original scientific thought.

Not valued in the curriculum but is valued as part of an individual's personal development.

I'm not sure that creativity is particularly valued in the undergraduate course.

It is not very well recognised. The students are sometimes amazingly creative in their extra curricular school activities and we give them no rewards for this, and much of the teaching and learning is about memorising and understanding knowledge.

Recent overt espoused celebration of creativity in medical education is only that - espoused but not practiced.

By those who value it - yes! Generally, no.

Creativity is not discussed as a factor, so no, it is not adequately valued, or at least not explicitly valued.

Creativity is OK but need to evaluate whether it has impact.

Creativity, in a broad sense, and across all domains, has always occupied a central place in academic and professional practice, and in research has probably always been valued at some level. Not sure about it being so valued in the educational sphere, although, again, the best teachers (and educational researchers) have always been creative, haven't they?

My instinct is that clinicians who have developed an interest in the arts are better clinicians. When communicating with patients/clients, their language and approach is much richer than that of clinicians who appear to have only science-related interests. As an arts-based lay person, I often find that medical/clinical practitioners don't communicate well with lay people/patients/clients because we find them too blunt and matter-of-fact. By contrast, they seem to get frustrated when people are too imaginative and lacking in fact-based information.

I am afraid your questionnaire does not define your concept of creativity clearly. Though I feel that too much emphasis on creativity in medical curriculum may be seen as adding a soft option. I still strongly feel that outside the boundaries of curriculum, creativity remains important for a refined medical practice and patient care.

I think it is valued as a means of teaching, so there is more access for the students to role play, video work, student led learning; there are pockets of learning where creativity is required, such as PBL, and there is some value placed on creative methods of treatment such as complementary medicines but I don't think the students creativity is generally regarded as important within the curriculum.

I do think it should be considered as important though. It is important to develop individuality; to break down inhibitions; to encourage students to place a value on their own and others' creativity because it may be significant to a patient or carer for example. They may need to have their creativity encouraged to enable them to express the impact of their illness experience, for example. It may give the student another means by which they can communicate with a patient. Creativity prevents 'stasis' - caring for and about human beings is an evolving and creative process which must be facilitated.

I consider myself a creative teacher - I need to have my creativity encouraged and valued and I believe the students' creativity should also be encouraged and valued.

We could do probably more to tap students' creative resources, though many attempts, via SSCs, PPD, research projects are made.

More arts in PPD would be good - usual problem of 'factory farming' medicine and how to pay the kind of attention that arts engagement needs - how do arts/drama schools projects do it? Group arts projects would be good but no-one in medicine in particular wants to engage with stuff they 'are not good at'.

I do think it is recognised in HYMS, but to be asked the question is to be challenged by it!

It is very much better in XXXX than elsewhere in my experience.

It may not be highly valued but after all they are going to be medics which is a relatively earthbound job. I think we are still laying ground rules for professional creativity though I am sure the students wouldn't see this.

It occupies a low place. I do not think it is valued enough.