11 Enhancing students' creativity through creative-thinking techniques

Caroline Baillie

Why enhance creative thinking?

Teachers often pose the question: *how* can I help my students think more creatively, think up innovative solutions and perhaps even enhance their creative potential? However, we also need to think about *why* we want them to think creatively. I became interested in creative thinking as a way of helping engineering graduates solve problems for the world in innovative ways. To me, that means finding creative technical solutions to social and environmental problems – global problems, our problems. However, I am also concerned that we do not increase our effectiveness in destroying our planet or in killing each other with new and clever devices:

> the technologies which save us time and labour individually – that empower each of us – bind us collectively into a frenetic, mad race in which we often feel more caged by obligations and demands than before ... the people who succeed in this technologically hyper-charged environment make up a narrow elite that thrives on constant stimulus ... they usually don't think a lot about who they are, about what their ultimate aims are, or about the broader consequences of what they are doing.
>
> (Homer-Dixon, 2000: 102)

Homer-Dixon suggests that we need more ideas for solving technical and social problems but that societies cannot always supply the ingenuity they need at the right times and places. They face an 'ingenuity gap'. In the prologue to his book of the same name, Homer-Dixon discusses this gap which widens the 'already yawning gulfs' of wealth and opportunity within and between our societies. Homer-Dixon warns us of the 'dangerously self-indulgent and even delusional ... Western triumphalism'. In writing this chapter and in facilitating workshops that attempt to enhance creative thinking, it is important for me to first state my purpose and encourage others to do so also. Perhaps in taking a moment to reflect on our purpose, we will then be able to question it.

The Creative Universities project

In 2003, a group of university teachers and educational developers within the LTSN (Learning and Teaching Support Network of the UK) decided that we wanted to share the creative-thinking techniques we knew about with those who could use them in a responsible way to enhance the creative potential of their students and peers. We wanted to see whether we could investigate and share some of the 'know-how' about creative thinking that seemed to have been largely used to date by the private, and not the public, sector. We were funded by the LTSN to conduct a knowledge transfer experiment aimed at developing the creative capacity of 15 academics in a residential workshop, who would, in turn, share their know-how with others in their institution. The idea was to help academics to realise the potential of employing specific techniques to help their colleagues and students develop their creative potential. We asked four creative-thinking consultant practitioners to help our participants learn about their approaches to fostering creative thinking. We held a three-day experiential workshop which incorporated many fun, interactive exercises as well as social gatherings and music-making. We knew this would be a productive experience for the participants but what we hadn't realised was the huge power of this experience to wake up individuals to their true selves. I have never before experienced knock-on effects like those of that residential workshop. For months afterwards I was hearing third-hand about the participants having had 'life changing experiences'.

After the workshop we asked five volunteers from the group to become facilitators. Nine of the 15 volunteered and proposed that they would share the proposed fee so that all could participate. All nine selected one of the approaches to gain extra training and then tried to facilitate a workshop in an area of their choosing, with students or their colleagues. They used the same approaches that we had taught them. *The Travelling Case: How to Foster Creative Thinking in Higher Education'* (Baillie, 2003) describes in detail the experiences and the lessons learnt by each facilitator in their endeavours to foster creative thinking in others. In this chapter I briefly summarise the approaches used in the experiment, as well as the ideas that came from the participants about how to get the best out of these techniques in their particular teaching and learning contexts.

Creative problem-solving

All of the techniques we employed were based on the premise that they would be used in problem-solving. Participants engaged in creative-thinking exercises aimed at solving real problems. We worked with the essential framework of creative problem-solving that is described in *CASE: Creativity in Art, Science and Engineering* (Dewulf and Baillie, 1999). This is based on the following stages:

1 Preparation.
2 Question formulation, clarification and reformulation.

3   Purge, idea generation and incubation.
4   Idea clustering, evaluation and action planning.

There are many different versions of this scheme, split into four or five stages and different pathways but all have essentially the same stages.

Preparation

It's important to prepare for a creative session. The room needs to be set up so that it is as inspiring as possible – the most important elements are light, colour, flexibility in the use of space, comfort, warmth, music if desired and a good supply of goodies and drinks. You will also need a range of materials to encourage the notion of idea generation – flip-charts, post-it notes, marker pens, Blu-Tack and coloured stickers. Participants need to also be prepared for the session – depending on the context, they may be asked to bring along material, or do some prior reading.

Question formulation, clarification and reformulation

The problem to be solved needs to be examined from many perspectives. This can be a creative stage and allow for divergence of ideas if there is flexibility around the problem. It can also be a convergent stage if the exercise helps to refine our understanding of the problem, such that by the time it is well defined it is almost solved. The process helps us to frame a problem or problems in different ways and stops us from rushing off to start solving the 'wrong' problem.

Purge, idea generation and incubation

Before the idea-generation stage, it is useful to have a purge or 'brain dump' to clear the working memory and move ideas to the brain store (just like a computer) so as to leave space for processing ideas. If the working memory is too full, the same idea keeps coming to the forefront. Brainstorming is the most common purging method used. It is often considered to be a creative-thinking approach but it is too simple to get really innovative ideas if the group are a little fixated with certain solutions. A quiet round is a good idea; ask the participants to write down as many solutions as possible; one idea per post-it note.

At the idea-generation stage, we need to come up with as many varied ideas as possible. It is important to stick with the main two principles, originally attributed to Osborn, who developed brainstorming in the 1930s (Osborn, 1993):

- Postpone your judgement.
- Hitch-hike on the ideas of others.

There are many different techniques to enhance the quality and quantity of ideas generated. Participants can call out ideas or write them on post-it notes and stick them up. It is up to the judgement of the facilitator to see which approach feels

right at the time. Inviting participants to write their ideas down on post it notes helps quieter participants to join in. The ideas need to be numbered – either on post-it notes or on a flipchart so that they can be easily selected at a later date. Once idea generation starts to dry up, another technique should be employed, so as to create as many ideas as possible.

Incubation can be at any stage during the process but, classically, after an initial sorting the ideas they can be developed – either by adding more information or by simply 'incubating' – resting, walking or sleeping!

Idea clustering, evaluation and action planning

Ideas can be evaluated in several ways, for example by using simple criteria to develop a rough cull or criteria that group ideas according to their feasibility and level of innovation. If the participants get this far in the time, they can use the time left to create a short plan for what comes next so that ideas taken from the workshop are more likely to get implemented.

Four approaches to creative thinking

Creative Problem Solving (CPS) techniques

The term 'Creative Problem Solving' or CPS is most often associated with the work of the Creative Education Foundation.[1] Many other companies have developed similar tools and principles and Fred Buining[2] joined us for the workshop. CPS is a 'toolkit' approach to creative thinking which often frustrates those people who believe that there is no way that you can 'teach' creativity but that it is an inherent quality of a person. However, the tools are based on ways of thinking and much practical research about what seems to work in helping people make lateral connections or interesting associations in their thoughts. By using these approaches you soon realise their potential in helping people 'think outside the box'. Once individuals or groups become used to some of the thinking suggested by the tools, they no longer need them and even develop their own tools.

The idea behind many of the random association methods of idea generation is that the brain has much stored information. If we can first purge what is in our working memory we will unlock the vast store that is available to us. If we then use methods to start the brain working and making connections – we can sometimes come up with ideas that we would not normally think of when analysing material in a linear manner. Such methods include assumption reversals and the flower technique. Other techniques rely on forcing us to think differently then linking back to the problem, for example using analogies (Hender *et al.*, 2001). Some examples of techniques used at the different stages are given below.

Question formulation

Usually there would be a problem owner who is asked to give a briefing of the problem. Everyone can ask questions for clarification – what are the barriers

preventing easy solution of this problem? What cannot be changed? Everyone is asked to formulate a question from this briefing in the form 'How can we ...?' Each person writes a problem on a post-it note and these are then pinned up or written up on a flipchart. The most important words are circled by the problem owner and a reformulation takes place. The final problem statement is written up on a flipchart for all to see. It should be visible throughout the session.

Idea generation

Reversals. In the reversals technique, we are asked to reverse the problem, so a problem statement such as, 'How do we help students become motivated to learn?' might end up as 'How can we prevent students from being motivated to learn?' We are usually much better at coming up with negatives so we fill a flipchart full of ideas such as 'bore them to death in a lecture, close the windows, speak in a monotonous voice, never relate it to real life', etc. We then reverse each idea in turn to see if any useful ideas come from this. Often we end up describing our actual teaching situation, which is rather embarrassing but not very creative!

Analogies. Making an analogy with something is a method we often adopt in order to explain difficult concepts to students. Finding an analogy with familiar objects or concepts can help participants to generate ideas. As an example of applying the technique in higher education, a research student in one of my workshops was trying to find ideas about where to go next with a very difficult chemistry problem. She told us that the chemical reaction she was studying was similar to building a brick wall – and she wanted to do it more efficiently but we couldn't change the bricks, the cement or the bricklayers. We brainstormed ideas on how to help the bricklayers become happier so that they would do their job more effectively. Ideas that are first brainstormed have only a 'fuzzy' connection to the original problem – and do not have to be sensible. One idea we came up with was – 'make it more sunny so that they enjoy getting a sun tan whilst they work'. We then suggested that participants look at the ideas and go back to the problem and make stronger connections to the original briefing. This idea became 'use UV light to speed up the reaction'. The student did not know if this had been done before, but she had certainly not thought of it herself and it seemed feasible to her.

Flower technique. The question 'owner' is asked to choose one of the words of the problem statement and this is written in the middle of a flipchart. Everyone is asked to call out words which they associate with this. Each new word is written in a petal of the flower. After a couple of minutes use some wild cards: 'thinking of cartoons – what word comes to mind?' The zaniest idea from the flower is used as the basis for another round of idea generation. In this way we move from ideas that are obviously associated with the initial idea to ideas that are 'far away' and that one would not normally be associated with the original idea.

Evaluation and action planning

The Centre for the Development of Creative Thinking (COCD) suggest the use of evaluation criteria colours to help cluster ideas. They use a COCD Box in which common, feasible ideas (blue) are in the bottom-left, original, feasible ideas (red) are in the bottom-right and original, not yet feasible ideas (yellow) are in the top-right. Everyone gets a small number of yellow, red and blue stickers and they can select their favourite in each category or they can place their ideas in a COCD box drawn on flipchart paper.

Clustering. Ideas can also be clustered according to category so that similar ideas are not competing against one another for votes. Then participants choose their favourite five ideas based on novelty, appeal and feasibility. A count of hands for each idea will demonstrate the most popular.

Action planning

Action plan template. COCD suggest the use of the Wx5, Hx2 template – what, when, who, where, why, how, how much? Participants work in small groups to come up with a plan of how to execute the idea they have just generated.

Fast presentation. Another COCD tool is the fast presentation if time permits – where participants are given a short amount of time to think about the idea and action plan, what is the goal, what is the positive effect of the action plan, what are the negative effects, how can these be turned around and what are the expected gains?

We can see that at each stage of the CPS these techniques may well develop a whole new round of idea generation! As well as a technique on its own, the CPS approach can be combined with any of the techniques discussed below.

The groups using the CPS approach found it to be very powerful and productive. The structured format with flexibility and familiarity facilitates a high quality and high volume of ideas. It takes practice to understand when to use which technique and to read your group effectively, and it is important to be open-minded about the range of techniques you can draw from at each stage.

The medicine wheel

Cris de Groot of the 'Nowhere Foundation' introduced us to an ancient tool originating from the tribes of Native Americans. The medicine wheel represents a Mandala, which are used by many different tribes to help with thinking, meaning and existing. The wheel (Figure 11.1) symbolises a map of the cosmos. It promotes a holistic view of a problem and encourages participants to think about a problem from many different perspectives. It therefore helps us towards balance and wholeness in our problem working. It was used by the elders of the tribe – the medicine men – until about 1930 when it was opened to all. The main use was to help the tribe with a difficult decision. A circle was drawn on the ground and the tribe would put the issue in the centre for all to consider. The circle was segmented and labelled with words for different
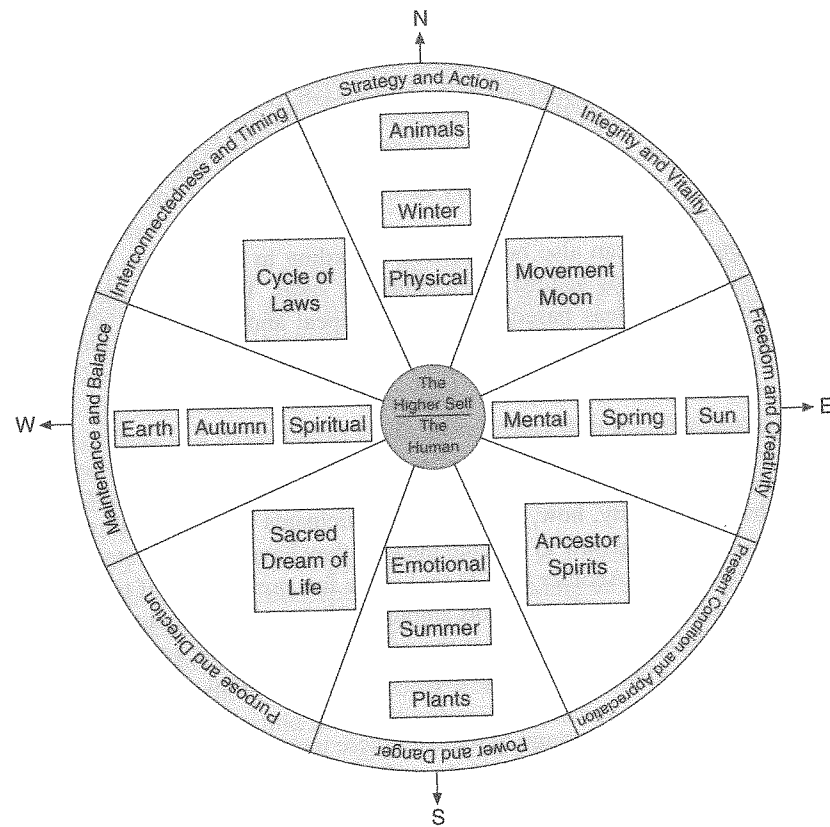
Figure 11.1 The medicine wheel (Filmore and Thomond, in Baillie, 2003: 20).

values, each of which would provide a different perspective through which the issue facing the tribe could be viewed.

The chiefs of various tribes take up positions based on their experience and wisdom in the tribe. These then become the 'wisdom council' and the wheel is used to decide on important matters that require coherence and widespread agreement. The technique works best when it is used for important issues to the members, and each person must stand in a place they truly believe in.

Starting in the East, the Heyokar tribe (known for riding into battle whilst sitting backwards on their horses to confuse the enemy) speak for freedom and creativity within the problem at hand. The responses are delivered clockwise. Each response begins with 'We are ... and we speak from ...' and each response ends with 'The ... chiefs have spoken'. It is a formal oratory, delivered to the council.

The tribes

Heyokar Chiefs: Freedom and creativity.
The Peace Chiefs: Present condition and appreciation.
The War Chiefs: Power and danger.
The Medicine Singer Chiefs: Purpose and direction.
The Women Chiefs: Harmony and balance (Maintenance and balance).
The Council Chiefs: Inter-relatedness (Interconnectedness) and timing.
The Hunter Worker Chiefs: Strategy and action.
The Law Dog Chiefs: Vitality, energy and integrity (Integrity and vitality).

At the end of the responses, the Wisdom Council vote on the issue as presented by each tribal chief, either 'I agree' or 'I am unsure'. This voting is done by the hand-signals of 'setting the sun' (agree), and of an unsettled sun (unsure). Any uncertainty is explained, discussed and reviewed. It is important that the responses are taken seriously and that each person sticks to the perspective of their own position.

The wheel can help teams to take a look at their 'whole self' and in this way can see behaviour patterns, and move to new ways of thinking. The Nowhere Foundation has developed the use of the medicine wheel and forces their clients to remain in tension with the energy that delivers creativity – rather than rushing to solutions. The ability to remain in a state of 'not knowing' is often the most elusive part of being creative. The wheel is most often used to help an organisation to look at their future. A group of 5–12 people might work together to assess the future of their organisation and consider it from different perspectives.

In applying the technique in higher education, one of the workshops discussed in *The Travelling Case* (Baillie, 2003) considered the problem 'How does the sustainability agenda interact with the luxury car industry now and in the future?' Small groups were asked to consider this problem from one of the perspectives around the wheel and to capture their ideas on post-it notes. Each group in turn (starting with the East) placed their notes on the large segment of a wheel drawn on a huge piece of paper on the floor. They then explained what they meant to the group, discussion followed and the process passed to the next group in a clockwise direction. As an example of the approach to problem solving, *the interconnectedness and timing* group considered the interconnections necessary to leverage influence for further work to make the luxury car industry see the economic, social and environmental benefits of sustainability. This proved a very useful way of approaching such a daunting task.

The process allows for a diversity of perspectives without conflict, encourages team-focused problem-solving and digs deep to the root of the problem. However, it is sometimes difficult for people to relate to the 'spiritual' undertones, and the headings are confusing for many. The medicine wheel can appear to be inappropriate for many of our participants' problems. They want tangible outcomes. This technique specifically puts the participants into a space of 'not knowing' and hence into a place of highly creative output. One recommendation from our facilitators was to change the titles on the wheel to suit your group's needs and to take

the essence of the process whilst removing those parts which could put off participants. Doing this might also encourage a sense of ownership for the process.

Mind and body approaches

Mike Metelits, of the organisation 'Nothing Special', introduced us to the 'Mind and body' approach to creative thinking. The aim of these techniques is to help people be in touch with sensations in their bodies and to use them as well as their minds to help drive their needs in life. Recognising stress and tension that we may be carrying in our bodies (perhaps since childhood) is an acknowledged part of a psychotherapist's or chiropractor's work. Exercises involving deep breathing can increase awareness of the body and a feeling of being 'centred'. This is not an easy feeling to describe – but we can imagine it is one in which we feel 'comfortable in our skin' or balanced. The idea is that once we are aware of the feeling of being centred, then we can easily understand when we are pulled off-centre. We spend too much time with fruitless activities and thoughts dealing with being off-centre instead of on more productive and creative ones. The techniques can help to promote a general creative potential by freeing us of tensions; they are also intended to promote confidence and encourage deeper insights. Some of the basic approaches are as follows – each exercise is followed by a group debrief, in which participants are encouraged to discuss the physical feelings associated with exercises.

First, stand and breathe in a relaxed and open manner – find your own feeling of 'being centred' to gauge more accurately when ideas put us 'off-centre'.

In pairs, the idea for the next stage is to move into each other's personal space – slowly and considerately, maintaining eye contact throughout.

One person can push the other gently to apply different pressures from the side and front. The partner at this stage can ask questions about a problem or issue that is in focus. Switching to cognitive mode causes a lack of centredness. Variations to the questions and stresses added to this situation help us understand how we separate cognitive and sensory issues.

These approaches are often the most difficult for participants to relate to – and the least structured and rational. They are also the ones which would take the most time to learn how to facilitate and also to have an effect. As such they generally produce either the most significant result or none at all because the person is too blocked to cope with the foreign feelings that they evoke. One of our participants found that in situations where it was not going to be possible to use the whole technique, using some aspects as a warm-up and focusing exercise were invaluable.

The main advice from our facilitators for these techniques was that you need to think through purpose and context well. Students may need to lose stress but may not be in a position to appreciate the technique. To properly understand the technique needs time and practice. Participants may tend to want to ask questions about every technique and lose the body connection – focusing only on the mind. This approach can work well if judgement is suspended in the warm-up phase of the workshop.

TRIZ

TRIZ stands for *Teoriya Resheniya Izobreatatelskikh Zadatch*, a Russian acronym, approximately translated as *Theory of Inventive Problem Solving*. Genrich Altshuller began to share ideas with fellow thinkers of different disciplines and started to see patterns in the thinking which crossed disciplinary boundaries. TRIZ research started in 1946 when he began to study successful patents to find out what it was that caused the innovation in thinking to occur. There have been over 1,500 person years of research into TRIZ and over 2.5 million patents have been and still are being analysed. The main result was that patterns or principles seemed to be duplicated in many different problem scenarios in many different disciplines. A basic set of 40 principles seemed to relate to most problems. There is also a strong indication that the strongest solution renders unwanted or harmful effects into useful resources (much like nature, which uses all of its waste products instead of discarding them). It seems also that the strongest solutions overcome conflicts or trade-offs. The trade-offs have been collated in a 'contradiction matrix' which suggests which of the 40 inventive principles have been used for the strongest solutions to similar problems. A further finding was that technological change appears to be predictable and future trends of evolution have been identified.

Simon Dewulf and Darrell Mann, of Creax Company, Belgium, worked with us to help participants experience TRIZ. The following principles of TRIZ were elaborated:

1   Ideality – increasing benefits whilst eliminating cost and harm. You can work backwards from the 'Ideal Final Result' to something which is achievable now with minimal addition and optimal use of resources.
2   Functionality – identifying the purpose and effects of each element. Mapping a specific function to a generic function so that solutions from all areas can be shared (knowledge database). The example Simon and Darrell like to use is that of 'removing water'. Once this has become the generic problem 'move liquid' there are 33 methods for moving the water suggested.

The principles and tools combine to help individuals and groups brainstorm with many people before them who have solved similar problems. If the specific problem can be framed in a generic way, then one of the TRIZ tools may be employed to come up with creative ideas. The generic solution can then be translated back to the specific. The individuals' creativity is still needed to make these transitions to and from the generic.

For those who find the 'Mind and body' system described above frustrating – the order and structure of TRIZ provides a relief. To those who naturally come up with ideas it can seem constraining. Simon and Darrell are keen to point out that finding a solution is like searching for hidden treasure on an island. Brainstorming is akin to looking all over the island whereas using TRIZ helps you know where to begin looking once you have identified the island and the fact that there is treasure there to be found. Learning to use TRIZ properly can take

some time but once you start to use it, it does help to develop ways of thinking that naturally become part of your creative problem-solving approach.

Summary of key lessons and the implications for teaching to facilitate creative thinking

The techniques above were applied to workshops with students and staff in a whole variety of disciplines and contexts across higher education. Creative problem-solving was used with product design staff and students, disability services and architecture students, HE teachers, managers and staff and education developers. The medicine wheel was used with research students in manufacturing sciences and electrical engineering students. 'Mind and body' techniques were used with urban design staff and students, library staff, art and design students and industrial design students. TRIZ was used with computing technology and product design staff and students, and with art and design students.

As shown from the above list, it was not the case that the more systematic techniques were applied to technical disciplines and the more intangible methods to artistic disciplines, as we might have assumed that the students would respond better to these respective approaches. In fact, very little that the facilitators reported of their experience related to the background discipline. It was clear that the acceptance of the more esoteric techniques such as 'Mind and body' were more related to personality and background than discipline. It was found that TRIZ is sometimes perceived as so complex that it is hard to introduce to younger students. The relative success of the different techniques was not 'measured', but rather evaluated qualitatively. We were not interested in the absolute number of ideas generated by these techniques but in the quality of ideas and thinking that we saw being developed in staff and students. The reports from our facilitators were unanimous – these approaches will help to foster creative thinking in many varied contexts. However, they learnt very quickly some of the lessons needed to help them optimise the potential of these techniques to enhance the creative potential, rather than forge even more blocks for the participants. The following sections give a summary of the suggestions made by our facilitators after they had learnt some key lessons in implementing these techniques.

Facilitation

A good facilitator will determine the success of the techniques and approaches. As with all educational approaches, the tool is only as good as the craftsperson using it. Sometimes it seems as if one technique does not work in a particular context when in fact, given a different facilitator, it may have been the perfect choice. The facilitator must try to match the technique to the problem and to the participants, and be sensitive enough to shift the focus flexibly as the session demands. One important factor in running a good session is to manage energy levels – to keep the group 'up'. It is important that facilitators are confident in their approach, and have hope and belief in the process, commitment to the tech-

nique and offer trust to participants. One of the facilitator's key roles is to be able to make connections between 'fuzzy' ideas and the problem. When trying to help students to see the connections it becomes important to offer examples in ways of thinking. This 'lateral thinking' often takes some practice. Facilitators need to be outside the process and not involved in the debate and must relinquish control – one of the hardest qualities for a teacher! It is best to move around the space and make it seem effortless – make people feel special and empowered, yet grounded.

Conditions

Creative potential may be blocked by the presence of important external and internal barriers (Dewulf and Baillie, 1999). Internal barriers such as those causing someone to avoid taking risks or to be held back by fear will be developed by the participants' backgrounds – there is little that can be done about this in the workshop other than to help individuals become aware of their own blocks. We have a much better chance of controlling external conditions and the environment in which we are working. We can use these to set up the *optimal tension zone* of our participants which will be different for each person. Our goal should be to try to increase the chances for all participants of reaching this zone. We can generate support for the workshop or creative training session within the department or degree programme so that participants feel that it is an important part of their work. We can also create a room which inspires – use of space, maximising the senses, use of sound, light, colour.

Participants

In our project, we tried to uncover those elements that keep participants enthralled, excited, motivated and engaged in sessions. One of the factors described above – energy management of the group – is key. In order to do this, it is necessary to 'read' your group and keep the dissenters under control. They might find the process very difficult and resist because they feel silly, possibly putting others off in the process. Motivation established at the outset is essential – the group needs to see the relevance of the work, so an emphasis on problem ownership might help. The problem-solving process needs to be democratic so that all participants are engaged and alert, feeling at once listened to and in control. The group size is important – when working with large groups it may be necessary to break these down into smaller groups for some of the creative exercises – however, the management of energy and suspension of disbelief needs to be maintained throughout. If working with tutors or peer tutors they will need training before being successful.

Problems

It is useful for students to learn how to be creative by trying to solve problems that mean something to them. However, when the intention is to develop th

creative thinking of a group it is probably better not to have a really difficult problem to work on. It is important to gain some 'quick wins' so that the group starts to feel that they are in fact being very creative and enhance their confidence. This will help ideas to flow better. It is often useful to work with a problem owner who describes the briefing at the start of the session but who must not interrupt the session if it appears to be moving off the point. Group ownership is also important so that everyone feels that they care about the problem being solved. This can be developed in the early stages by the reformulation exercises described above where the group gets to re-write the problem in their own words.

Process

A good facilitator will be able to select a technique that will work at the onset, and change to another as necessary. Techniques that break mind sets are important and a balance of divergent and convergent processes works well. The skills of selecting techniques will come with time. It is essential that the facilitator is able to be humble and to admit when a technique is not working. It is also important to time the stages, know at which point to move on, allow for flexibility to suit the process and the participants' needs and expectations and allow for breaks.

At the start, the use of icebreakers is essential. The one thing that all the trainers and lecturers involved in this project stressed was that it was best to mix and match techniques and approaches rather than to stick to one method in a ritualistic manner. Some very cognitive techniques such as TRIZ can cause ownership of the problem to be lost if not carefully managed. Random approaches such as the use of abstract representation using finger paintings, for example, can forge the link to personal feelings and ownership that may be needed for buy-in to ideas. However, sometimes the opposite is true – some participants will find the random approaches too 'hit and miss' and will be relieved when entering a TRIZ phase. It is important for participants to understand that all ideas are valued so that they feel part of the process. The continual feedback, rewards and praise are all part of the energy management. Fun needs to be maintained at all times, but it has to be balanced with perceived and real productivity. The company Idea Factory in the UK once told me that when running workshops in the UK compared to the USA they had to take out '50% of the fun' otherwise UK participants would not take it seriously!

Facilitating creative thinking in education

In our first publication (Dewulf and Baillie, 1999), we attempted to discuss principles that might be applied to foster creative thinking generally in teaching and learning – ways in which we as teachers could provide stimulus to students and counter the effects of previous barriers. In this chapter we have described the approaches taken within a UK-wide experiment to foster creative thinking in universities. We focused on specific techniques that may be employed to help

students and staff solve problems in more creative ways. We have detailed the way in which they might be used and we have presented a condensed version of the lessons learnt about their potential usefulness by facilitators working in many different contexts and disciplines. It is clear that in many areas it will not be possible to incorporate entire workshops as discussed above. However the principles of these methods are strong and may be adapted to suit many different contexts. Within any lesson/workshop plan it might be possible to ask staff/students to take part in a short creative exercise and to solve problems related to their current studies or responsibilities. Any of the techniques described above can be used as a whole method or in a mix-and-match mode.

There are no rules to creative thinking – however, the skill of the facilitator is to create the atmosphere that is conducive to idea generation, as well as selecting the most appropriate technique, for the participants, in their context and with their particular problems to solve. Avoiding risk-taking is one of the biggest barriers to creative thinking, but exploiting some of these tried and tested techniques is worth the anxiety felt in the first few sessions. Creative potential will increase not only in your students but in yourself.

Notes

1 www.creativeeducationfoundation.org/.
2 Centre for the Development of Creative Thinking (COCD), the Netherlands.