

21. Promoting creativity in education and the role of measurement

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Abstract

This paper outlines some of the factors involved in promoting creativity in education. Of particular interest is how teachers' attitudes and their perceptions of creativity are linked to their preferred ways of teaching and assessment. The role of measurement generally in enhancing creativity is briefly explored. Finally, it is argued that insufficient is known about cross-cultural differences in creative education and that a Europe-wide study would be desirable.

Introduction

Creativity, like education, is a complex, multidimensional concept which means that the simple question, *How can creativity be promoted in education?* begs further questions. These can be answered in a variety of ways depending on how these concepts are defined and which criteria are adopted as yardsticks of success.

Published definitions of creativity vary in a number of ways, such as the extent to which they:

- Focus on the individual, the creative process, product or idea, environment — or a combination of these. Examples of the latter include:

The creative process ... is the emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and the materials, events, people, or circumstances of his life on the other (Rogers, 1954, quoted in Vernon, 1970, p. 139).

Creativity is a process that results in novelty which is accepted as useful, tenable, or satisfying by a significant group of others at some point in time. (Stein, 1984, p.1.).

- Differ with regard to the level of creativity regarded as legitimate. For Ausubel (1978) only high levels of creativity count; Fabun (1969) views virtually everything invented as creative, but Ghiselin (1963) acknowledges both.
- Differ in terms of their discipline or theoretical perspective; within psychology this includes Behaviourist, Freudian, Humanistic, Piagetian and Cognitive approaches (Fryer, 1989).

Factors involved in promoting creativity in education

The capacity to be creative is an intensely human capacity. In this section the focus is on how students can be enabled to function as more creative individuals.

Valuing creativity

Firstly it is important to make it clear that creativity is valued. As a result of his research investigations across a variety of cultures (Torrance, 1995; 1965) concluded that creativity tends to flourish where it is valued. Similarly, I found that those UK teachers who were most keen to promote students' creativity also stressed the value of a whole school commitment to creative education. They particularly valued their head teacher's commitment (Fryer, 1996).

The designation of 2009 as the European Year of Creativity and Innovation is to be especially welcomed since it is likely to have a really positive effect. This is in contrast to the situation in mid 1980s UK when I began my investigations into UK teacher's views on creativity, teaching and learning. At that time, creative education was virtually a non-issue in Britain and the political climate was not at all favourable.

Inter-group differences in perspectives on creativity

Secondly, it cannot be assumed that everyone involved in promoting creativity in education sees creativity in the same way. For example, in my earliest research, Project 1000, I discovered clear and highly significant inter-group differences in perceptions of creativity between men and women, and when controlling for gender, between teachers of different subjects. These differences were also evident in the criteria the teachers preferred to use for assessing the creativity of their students' work.

For example, as a group, the female teachers were more inclined to see creativity in very personal terms — for example, as self-expression ($p < .01$) imagination ($p < .01$) and awareness of beauty ($p < .001$). The male teachers saw creativity more impersonally and they described it in terms of innovation ($p < .05$) and convergence ($p < .05$).

When assessing the creativity of students' work, the female teachers were more likely than the men to look for evidence of depth of feeling ($p < .001$), depth of thought ($p < .05$), originality ($p < .05$) and the extent to which students' work reflected the students' experience ($p < .01$). The male teachers preferred to evaluate students' work *per se* rather than attempting to assess whether or not it reflected their experience. They also valued the criterion 'elegance' more than the female teachers did ($p < .0001$).

With regard to different subject groups, the same kind of pattern emerged with every subject group envisaging creativity in more personal terms than those teaching maths, science and technology. These findings held good when the data was controlled for the sex of teachers. For example, the elementary school teachers, arts teachers and nurse tutors were more inclined to describe creativity as self-expression than were those teaching maths, science or technology ($p < .001$).

Furthermore, how the teachers defined creativity was found to covary with their preferred way of teaching. The female teachers generally preferred a pupil-oriented approach whilst the male staff preferred an instrumental approach. These differences appeared to be related in some way to an underlying value system linked to *person orientation* and this was confirmed by a later study (Fryer, 1994; 1996; 2006).

By means of discriminate analysis, it was possible to identify the variables which best differentiated between teachers most and least keen to develop creativity (only one teacher was found to be not at all in favour). These variables were mainly concerned with a willingness to take students' learning needs into account but also with a suspicion of creativity tests about which they knew little (Fryer, 1989, 1990a, 1990b 1996; 2006; 2008). Interestingly, the teachers who were most keen to develop their students' creativity tended to have a more balance perception of creativity (Fryer, 1989).

As far as is known, these findings were new and the discovery of these inter-group differences justified my decision to resist providing the teachers with a definition of creativity in advance of data collection.

Understanding what is involved in being creative

In order to promote creativity, it is also necessary to be aware of what enables people to be creative. Key factors include:

- motivation — this may be manifest as intense curiosity and persistence, or willingness to work hard at resolving something which is unclear and when seeking a creative solution;
- a repertoire of heuristic/creative problem-solving strategies and the capacity to apply these appropriately;
- the capacity to imagine, especially the ability to envisage alternative scenarios/courses of action, and to select the most promising;
- access to, and familiarity with, the relevant body of knowledge;
- information-finding skills;
- other transferable skills, such as communication and ICT skills;
- domain-specific skills.

Teachers' ability to stimulate creativity

Teachers have a key role to play in enhancing creativity. Teaching for creativity can happen in the course of normal education. It doesn't necessarily need special time set aside (Fryer, 2003). The more teachers understand about creativity and its relationship to learning and motivation, the better equipped they are to enhance their students' creativity. So teacher training in creative education is crucial. Teachers can:

- stimulate students' motivation — in the tasks they set, when giving feedback on their performance, in their interactions with their students, and in the way in which they construct the learning environment;
- allow students to work alone for at least some of the time — so that they can get deeply absorbed in tasks they find motivating;
- enable students to apply a range of heuristic/creative problem-solving strategies appropriately — whilst being aware that some students find this so easy that what they most need is help in focusing on their most promising ideas;

- enable students to evaluate solutions and, where appropriate, implement them;
- develop students' knowledge and skills;
- demonstrate that they value creativity;
- encourage questions and respect unusual questions;
- take students' learning needs into account — with regard to their progress in creativity, their level of development and academic performance: a key challenge concerns how to enable young children to retain their intense curiosity whilst acquiring the knowledge and skills they need to continue to be creative as they grow up;
- set tasks which require creativity — so that students can learn to be creative by creating, just as they learn to read by reading;
- enhance the creativity of their more confident and capable students by introducing task constraints designed to stimulate their ingenuity.

What does appear to be counterproductive is a laissez-faire approach. When permissive education was popular in 1960s UK, it was widely assumed that to promote creativity, all one had to do was to provide the resources and young people would simply create. But, as Torrance and Myers (1970) have argued, promoting creativity in education, demands the most highly skilled teaching.

The role of measurement in enhancing creativity

In order to ascertain whether or not creativity has been successfully promoted in education, it has to be measured. But it is impractical to measure 'creativity' per se. Clearly, it is necessary to break down this task in ways which enable key research questions to be addressed, as we did in *Science Alliance*, a project designed to enhance elementary school children's creativity, interest in science and motivation to learn (Bolingbroke and Fryer, 2009).

The pilot phase of Science Alliance was funded by the UK's National Endowment for Science & Technology (NESTA) under the African Caribbean Representation in Science and Technology (ACRISAT) Initiative and Phase Two by Kirklees Education Authority, UK.

In the pilot phase of Science Alliance we wanted to know what difference the project made to:

- the children's ability to generate useful, original and innovative ideas
- their self esteem
- their interest in science.

It involved four inner-city schools which served an ethnically-diverse population in Brighton. Whole classes of children aged 9–11 worked to produce a Science Alliance website for other children to use. The teachers' retained responsibility for science education and the Creativity Centre worked with teachers and pupils to develop the children's imagination and creative problem-solving abilities, their self-confidence, motivation, ICT, video and photography skills. The project was also designed to enable all the pupils to understand and appreciate the contributions of African and African-Caribbean scientists — a previously neglected source of inspiration for many young people.

As far as assessment was concerned this included:

- feedback from teachers
- feedback from pupils
- the work the pupils produced
- teacher ratings of pupils' creativity
- a measure of self-esteem
- objective creative thinking measures for pupils (before and after the project activity).

The objective measures included a teachers' checklist — a five point scale on which they were asked to rate each pupil's creativity; two 10-minute creative thinking measures for pupils (one verbal and one figural), and a self esteem scale called *How I feel today*. The creativity measures were designed to assess idea generation in terms of quality, originality and the number of categories of ideas. They were administered in a non-threatening atmosphere (at the beginning and end of the project) and were introduced as 'activities' rather than tests. Although they were effective in distinguishing between schools' performance, we intend to refine them further before making them more widely available. In other words our findings on the objective tests need to be cautiously interpreted. Employing them in *Science Alliance* enabled us to collect

some of the early data needed in working towards this refinement as well as offering a degree of objectivity to the evaluation of this project. Indeed, an important reason for including objective measures in any assessment procedure is that they do provide a check on more subjective means of assessment. At the same time, it is important to note that most psychological assessment does involve a certain degree of subjectivity — with regard to what and how to assess, for example.

Fifty-three pupils completed both the pre- and post-measures. One school did not take part in the second phase of assessment (as their teacher had suffered bereavement). In other schools not all students were present for both testings.

With regard to self-esteem, no significant differences were found in the overall pilot group. This is not surprising since self-esteem tends to be fairly stable over time. Perhaps of somewhat greater concern is the finding that teacher ratings of pupil creativity bore little relationship to the pupils' performance on the figural tests. This is not surprising either, since previous research (see for instance Williams, 1964) has shown that teachers often find it difficult to recognise creativity in their pupils.

On the figural creativity tests there was evidence of a significant overall improvement. In one school in particular the improvement was outstanding, including improvements by pupils of all ethnic backgrounds, pupils with learning difficulties and those diagnosed as dyslexic. Just about every pupil in the group from this school already had a fairly high level of self-esteem, but only one had been rated by their teacher (at the start of the project) as above average in creativity. It was clear from informal conversations with this teacher that every child in this class was really valued. This teacher was extremely keen on Science Alliance and really encouraged pupils to get involved. As well as showing significant improvement on our creativity measures these children also did very well on their SATs, gaining results above the local average.

What is perhaps even more relevant than numerical scores (at this stage of test development) is that there is evidence in the test data of increases in imagination, originality and language development. It is clear that the thinking of many of the children had 'taken off'. For example, the figural test involved pupils creating original drawings from identical stimulus shapes. The drawings the children produced in the second testing were more complex and more integrated than in the first. Instead of simple faces, flowers and stick men, they had devised complex fish traps, a cathedral, Brighton Pavilion, an owl, and a whole vegetable patch, for example. This included

the work of one dyslexic pupil (whose raw creativity scores had improved from 5 to 40) and who had also produced a most intricate contribution to the Science Alliance website which comprised an animation of an astronaut travelling in a spaceship built from all kinds of bits and pieces.

It was also evident that pupils were using more complex sentence structures (adjectival phrases and adverbial clauses) to describe their second batch drawings and these demonstrated more imaginative and original thinking. To cite just two small examples: instead of 'a man' there was 'a man with a propeller hat' or 'three mates seen from above'; instead of simply 'a boat' there were 'wooden planks on a pirate ship'.

Good research practice

In keeping with good psychological practice, it is important to employ a variety of measures, since all research measures have their strengths and weaknesses. There are many kinds of data collection methods and data sources available including objective tests, structured or unstructured observations, self-reports, teachers' reports, students' ideas, questions or work. But it is not necessary to employ them all — otherwise there is a danger that the process of assessment could destroy the very phenomenon which is being assessed.

In other words, data collection needs to be carefully planned and sensitively carried out, with the minimum of impact. Measures need to be carefully chosen (or developed) to ensure that they are appropriate for the population being assessed and that they meet acceptable levels of validity and reliability. Ethical considerations also need to be taken into account. Additionally, in keeping with good practice, it is important to be willing to reassess regularly and to revise one's views. Careful data analysis using appropriate techniques is essential, as is the careful interpretation of findings.

Conclusion

In this paper, a number of factors implicated in the development of students' creativity have been briefly reviewed. It has been argued that measurement does, indeed, have a role to play in enhancing creativity and that the investigative process is just the same as when researching equally fuzzy concepts — such as 'work' or 'play', for example. However, the quality of research is enhanced when investigators are conversant with the vast body of knowledge on creativity and creative education. This makes it easier to question assumptions — about creative education provision, for example

(as discussed in Fryer & Fryer, 2005) — and to identify gaps in knowledge. One such gap is the dearth of information on cross-cultural perspectives on creativity. This is something which we have started to address at the Creativity Centre (for instance Fryer, 2004; Bolingbroke & Fryer, 2009). At the same time there is a need for more cross-cultural studies in this field in order to build up a European map of the way in which creativity is (or isn't) being enhanced in education and the implications for future policy and practice. It would be really useful to compare educational provision in different European countries and the effect on students' creativity, taking account of the various social, economic and political contexts. This would be no mean task, since it would not simply involve a comparison of like with like. Yet, despite the differences and difficulties, it should be possible to identify useful points of comparison.

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