

## Creativity and problem-solving in Art education

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*This paper explores factors that are considered to contribute to creativity and problem-solving in art education. It then reports on two exploratory, small-scale action-research studies designed to investigate the extent to which art approaches incorporating the factors identified foster creativity and creative problem-solving in art. The results suggest that if creativity and problem-solving are to be developed in art then the total classroom programme probably must support this.*

### Introduction

Being creative, in Shipley's (1993) view, involves having and using original or unusual ideas to accomplish something. This could be in the form of creating a design, something deBono (1970) considers to be a special case of creative problem solving. Creativity is a highly desirable attribute since societies increasingly need members who can solve problems in innovative ways in the face of an uncertain future (Lowenfield, 1982).

Particular traits and conditions seem to be needed for creativity and creative problem-solving to flourish. These include

- (i) a spirit of inquisitiveness or curiosity and adventure (Dalton, 1985; Lowenfield, 1982; Merritt, 1964; Shipley, 1993),
- (ii) an ability to respond intuitively (Shipley, 1993) to visualise possibilities, and a willingness to consider ideas in divergent ways (Dalton, 1985; Lowenfield, 1982; Shipley, 1993), and
- (iii) the provision of a safe but challenging learning environment that enables learners to take risks, make mistakes without the fear of ridicule, and feel free to solve problems in their own ways (Jameson, 1971; Lowenfield, 1982; Merritt, 1964).

The implication of these for art education, Lowenfield (1982) claims, is that art must be experienced by learners as more than a series of little projects bearing little relationship to creativity. This is easy to say, but what does it mean in practice? And to what extent can creative problem-solving really be developed through art education in the primary school classroom - given Merritt's (1964) caution that the task could be very difficult? This paper investigates these questions through analysing the results of two small exploratory, action research studies which I carried out in 1996.

## Action Research

The two studies reported were qualitative in nature so that some preliminary understanding could be gained of the reality of trying to promote creative problem-solving through art in the normal classroom. The art tasks themselves involved design and construction, rather than drawing.

### *Samples*

I conducted the first study with a class of Standard 3/4 (9 to 10-year-old) children at a time when I was the relieving classroom teacher. The second study occurred with a class of Standard 1/2 (7 to 8-year-old) children, during which I acted as guest teacher.

### *The art sessions*

The topic for the first study was 'dinosaurs'. This was chosen because the children were currently involved in a unit on dinosaurs. The art work occurred during two block sessions of two hours each, taken on consecutive days. A description of the context of these art sessions is provided below.

'Bridges' was the topic chosen for the second study because I thought that this might be something that would interest the children. Time constraints meant that a single session of one hour and a half was used for this second study. Again, the context of the art construction session is described below.

### *Method*

Data on both studies were collected through (i) observations of, and interaction with, the children at work, (ii) field notes written during and immediately after each session, and (iii) observation of the products of the children's endeavours.

### *The 'Dinosaurs' context with the Standard 3/4 children*

The first of these two sessions began with a class 'brainstorm' about the features of various dinosaurs. The children were then challenged to consider whether, either along or with a partner, they could construct a dinosaur from boxes and cardboard provided. The challenges, in the form of questions, included:

- How could you make your dinosaur stand unaided?
- How could you make a mouth that is open wide?
- How could you put a tail on
- If you cannot find a box which is the shape you require, what can you do?

- How could you make a wing, or horn?
- Will you make a skeleton of a dinosaur or a full dinosaur?
- How big will it be?
- Will it be able to fly?

I then suggested to the children that they might like to sketch a dinosaur before they made it, but did not insist on this. The construction of the dinosaur followed, with the second two-hour session being devoted mainly on painting the dinosaur constructions.

### ***The 'Bridges' context with the Standard 1/2 children***

The single session began with the children 'brainstorming' their ideas about bridges, helped by them viewing pictures of various kinds of bridges. I encouraged them to consider the purpose of bridges, where they had seen them, what shapes they are, and what they are made of. I then challenged the children to design, construct and test a bridge that would support a toy car out of the materials provided, namely playdough, toothpicks, ice-block sticks, and one strip of thin cardboard. As a further challenge they were invited to see who could make the highest bridge, and the longest. Again, the children could choose whether to work along or with a partner.

### ***Data analysis***

To make sense of the data, I used a set of criteria based on the eight processes or traits associated with creativity identified by Lowenfield (1982) and endorsed by Dalton (1985). These were:

<i>Fluency</i>	Were many different ideas generated?
<i>Originality</i>	Did the children think in clever or unique ways?
<i>Flexibility</i>	Did the children view the problems from different perspectives?
<i>Elaboration</i>	Did the children develop or add to their own, or others' ideas?
<i>Curiosity</i>	Did the children ask questions or pose problems?
<i>Complexity</i>	Did the children seek order out of chaos, and different alternatives?
<i>Risk-taking</i>	Did the children have the confidence to take a guess, or have a go?
<i>Imagination</i>	Did the children build mental images, try to put themselves in another place or time, or reach beyond real boundaries?

In terms of critical thinking, the following criteria were applied:

Did the children's art activity involve analysis, planning, problem-solving, decision-making, and evaluation?

Several more general criteria were also employed:

*Willingness*                      Were the children willing to undertake the art activity?

	Were they prepared to go beyond the adequate?
<i>Modelling</i>	Did I model enthusiasm for exploring and seeing things from various perspectives?
<i>Support</i>	Was I able to provide a supportive learning environment?

## Results and Discussion

The results and discussions which follow focus on the extent to which the learning sessions and environment fostered creative problem-solving by the children. Some general observations are provided first, and then the children's responses in terms of the above criteria are considered.

### *Standard 3/4 children and their dinosaurs*

#### **Some General Observations**

Six interesting categories of responses by the children emerged from my observations.

***A curious beginning*** The day before the first session I told the class that we would be doing some art the next day, and they seemed really keen and excited at the prospect. However, when the day arrived and I mentioned that we were now going to do some box construction, I was asked when we would do the art! I asked them what they meant, and they wanted to know when they would be allowed to draw. It transpired that they had not done any construction during the year and so had a restricted view of what art encompassed. Nevertheless when I explained the nature of the art we would be doing they were very interested and, of course, I was keen to see how they went.

***Shall we design first?*** Some of the children took up my suggestion that they sketch a dinosaur before they begin the construction. These children spent some time considering their design. Others, however, rushed to grab the boxes. I observed that a number of the box-grabbers seemed to contemplate the size and shape of the boxes and how they might use them in their construction. It was as if they had an idea in their head of what they would make and were looking for specific box for this purpose. Other box-grabbers though seemed to give no prior thought to what their dinosaur would be like. They just 'went for it'.

***Ah, I know who to work with.*** Some of the children had considerable difficulty deciding who they would work with. I watched, fascinated. It seemed that some were concerned with working with someone who already had an idea, so that they could just join in and go along with the idea. What tended to happen with those partnerships was that at some point there would be a disagreement about an aspect and the partnership would disband, the original child continuing with her or his idea and the other tending to try to find someone else to work with. I tried to encourage these 'hangers-on' to

work alone but they were very resistant to the idea. I suspect that they felt insecure about their ability and potential to create something worthwhile.

**A question of self-confidence** I got the strong impression that the ‘hangers-on’ needed help to develop their confidence so that they could exercise their ‘inner freedom’ (Merritt, 1964) to create an original piece of work on their own. Probably they would need teacher support over a substantial period of time to achieve this confidence. The link between self-confidence and creativity certainly struck me during this learning session.

**Now, that looks a good way to do it.** I was very interested to observe that when one child completed a dinosaur, three or four other boys adapted what they were doing so that their constructions resembled the completed one. Again, the ‘adaptors’ were probably the children who felt less secure about their own construction ability, or maybe they recognised superior design features on the completed work.

**Problem-solving strategies varied.** Children used a range of problem-solving strategies during the construction process as they encountered various difficulties. I overheard, and was asked, questions such as:

*How can I get the tail to stay on?*

*The jaw won't stay open; how can we get it to stay open?*

*It won't stand up properly; how can we get it to stand up by itself?*

*The cardboard is too thick for the stapler; how can we get it to stick together?*

*I have cut the holes too big; now what can I do?*

I noticed that some children worked away at their own problems while others would approach me. I think that the children approaching me with their problems were hoping that I would tell them what to do. Perhaps they thought there was one right way to do it and I would know, or may be they felt they needed my approval to continue on. I also found it interesting that when I suggested to these children that if they couldn't solve their construction problem then they ask around their peers or have a look at others' work, they were keen to do this but were often given definite refusals, for example, “Don't copy me!” To be fair, this was not always the response; some children were keen to share their ideas and help others.

## **How the Children Managed in Terms of the Criteria**

**Fluency** Originally there were many ideas floating around, but there was evidence of copying too.

**Originality** This is a difficult one to evaluate. Were the ways they constructed their dinosaurs clever or unique? Most had similar construction ideas so perhaps I would have to conclude, no.

**Flexibility** The problem I posed of constructing a dinosaur was certainly viewed from different perspectives. Some saw it as an opportunity to make a stand-up figure

while others thought in terms of a flying dinosaur. A few even decided to make an egg and have a baby dinosaur coming out of it.

**Elaboration** Throughout the process of construction most of the children were adding to their original ideas.

**Curiosity** The children were not so much seeking out problems as confronting and dealing with them as they arose.

**Complexity** Some children spent time seeking alternatives to their various construction problems, but others came directly to me for help or copied peers.

**Risk-taking** Some children did not have the courage to work alone or on their own ideas, although others did.

**Imagination** While observing the children selecting boxes I could tell by the decisions some were making that they had built visual images in their minds about what they wished to create. I also had the distinct impression that some were putting themselves back into 'dinosaur-time' to help them determine what they would create.

This art activity certainly involved **problem-solving** and **decision-making**. Additionally, the children were **evaluating** their work as they progressed as evidenced by their concern about how they could attach the cardboard pieces and whether their creation would stand up. The children were generally **willing** to take on the activity, but some found it difficult to continue when they saw the good work being done by others. **Alternative** solutions were generated by the children as they encountered various problems. For example, if they found the box they wanted was unavailable, then they had to decide how they could adapt other boxes, or if they found that what they had in mind didn't work then they had to think of a better way. Some of the children **looked beyond the adequate** and were keen to rework the construction and painting of their dinosaurs on a third day, and finalise how to display them. Others, however, were more than happy simply to get their dinosaurs to a point where they could paint them, and then move on to another activity.

I felt that I modelled **enthusiasm** for the project as a whole, and especially for exploring how to use the boxes and cardboard, but on reflection I do not consider that I modelled enthusiasm for viewing dinosaurs from different perspectives. Maybe we could have talked more about the different ways that dinosaurs could be portrayed.

### ***Standard 1/2 children and their bridges***

#### **Some General Observations**

***A motivating introduction*** I went into this classroom before the lunch break and the classroom teacher chose some children to help me make the playdough. This proved to be fun for the children and got them into a state of anticipation for the art

lesson which followed lunch.

**The questions of individual work or partnership** I decided that, after the difficulty some of the children in the Standard 3/4 class had experienced working in pairs, that I would encourage these younger children to begin the project individually by designing their own bridge and then, if they wished, they could choose to work with a partner. I hoped that by doing this I would still allow the children choice but that they would be encouraged to come up with their own ideas on paper so that they had something to contribute to a partnership, or something to work on alone. On reflection I feel that this was a sensible approach. I noticed that most of the children were keen to work with a partner to begin with but when I reiterated that they needed to do their own design first, more than half the class ended up working on their own bridge.

**A variety of approaches** What stood out immediately for me were the incredible diverse ways that the children used to approach the bridge construction problem. It made the teaching and observation very satisfying indeed.

### **How the Children Managed in Terms of the Criteria**

**Fluency** There were certainly many different ideas generated by the children.

**Originality** I was amazed at the clever and unique ways that the children used to approach this problem. Interestingly, a child came up to me very soon into the session and asked me how on earth you could make a bridge with playdough and toothpicks. I must admit that I hadn't actually thought about it and wondered myself how I would go about it. It was therefore fascinating to see the incredibly diverse ways that children used.

**Elaboration** On many occasion I witnessed children adding to and changing their construction. Often it was in response to something falling, or after they used the car to test the strength of the bridge and found that it didn't hold up. I wished that I had had a video camera to record the many changes that took place in their constructions.

**Curiosity** The children were definitely seeking many different alternatives to overcome their difficulties. The result was that many different bridges were created.

**Risk-taking** With one exception, the children were prepared to take risks, for construction example, by making guesses about what might work. The exception was a child who continued to seek my approval throughout the session.

The art activity involved **planning** as part of their design efforts, **problem-solving** and **decision-making** throughout the construction process. It also involved **evaluation** as they progressed, especially as they tested their bridges and, if necessary, modified them. All the children were very **willing** to undertake this art activity, and many **alternative** solutions were generated. Some moved well **beyond the adequate** and came up with extras to go with their bridge, such as the installation

of a fixed speed camera. Again I felt that **modelled enthusiasm** but, as with the dinosaur sessions, perhaps not enough about viewing things from different perspectives.

## Conclusion

These were very brief studies but nevertheless I feel that some conclusions can be drawn from the experiences. Firstly, to expect to teach non-creative children to be creative thinkers in the course of a short art project is quite unrealistic. Merritt's (1964) caution about the task not being an easy one seems justified.

Secondly, I agree with Lowenfield (1982) and Dalton (1985) when they suggest that creative thinking involves a psychological disposition that needs to be developed across learning areas. I can see that as a teacher I would need to encourage many of the Standard 3/4 children especially to be curious, think divergently and visualise throughout the classroom programme. Creativity is obviously influenced by feelings of self-confidence as much as it is by the other factors.

Thirdly, Lowenfield's (1982) list of eight characteristics associated with creativity provide a useful framework for thinking about the creative process from a teaching point of view. At least they helped me be aware of the dimensions involved rather than thinking about creativity in some vague, general sort of way.

## References

- Dalton, J. (1985) *Adventures in thinking: Creative thinking and co-operative talk in small groups*. Australia: Nelson.
- deBono, E. (1970) *Lateral thinking: A textbook of creativity*. London: Wardlock Educational.
- Jameson, K. (1971) *Junior school art*. London: Macmillan.
- Lowenfield, V. (1982) 'The development of creativity' in *Creative and mental growth*. New York: Macmillan.
- Merritt, H. (1964) *Creativity as a goal in guiding free expression in children's art*. Hold, Rinehard and Winston.
- Shiple, D. (1993) "The creative arts centre", in *Empowering children: Play-based curriculum for lifelong learning*. Ontario: Nelson.

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