What is creativity in education?

School resources

Human beings have always been creative. The fact that we have survived on the planet is testament to this. Humans adapted to and then began to modify their environment. We expanded across the planet into a whole range of climates. At some point in time we developed consciousness and then language. We began to question who we are, how we should behave, and how we came into existence in the first place. Part of human questioning was how we became creative.

The myth that creativity is only for a special few has a long, long history. For the Ancient Chinese and the Romans, creativity was a gift from the gods. Fast forward to the mid-nineteenth century and creativity was seen as a gift, but only for the highly talented, romantically indulgent, long-suffering and mentally unstable artist. Fortunately, in the 1920s the field of science began to look at creativity as a series of human processes. Creative problem solving was the initial focus, from idea generation to idea selection and the choice of a final product. The 1950s were a watershed moment for creativity. After the Second World War, the Cold War began and competition for creative solutions to keep a technological advantage was intense. It was at this time that the first calls for STEM in education and its associated creativity were made. Since this time, creativity has been researched across a whole range of human activities, including maths, science, engineering, business and the arts.

The components of creativity

So what exactly is creativity? In the academic field of creativity, there is broad consensus regarding the definition of creativity and the components which make it up. Creativity is the interaction between the learning environment, both physical and social, the attitudes and attributes of both teachers and students, and a clear problem-solving process which produces a perceptible product (that can be an idea or a process as well as a tangible physical object). Creativity is producing something **new, relevant and useful** to the person or people who created the product within their own social context. The idea of context is very important in education. Something that is very creative to a Year One student – for example, the discovery that a greater incline on a ramp causes objects to roll faster - would not be considered creative in a university student. Creativity can also be used to propose new solutions to problems in different contexts, communities or countries. An example of this is having different schools solve the same problem and share solutions.

Creativity is an inherent part of learning. Whenever we try something new, there is an element of creativity involved. There are different levels of creativity, and creativity develops with both time and experience. A commonly cited model of creativity is the 4Cs[1]. At the **mini-c** level of creativity, what someone creates might not be revolutionary, but it is new and meaningful to them. *For example, a child* brings home their first drawing from school. It means something to the child, and they are excited to have produced it. It may show a very low level of skill but create a high level of emotional response which inspires the child to share it with their parents.

The **little-c** level of creativity is one level up from the mini-c level, in that it involves feedback from others combined with an attempt to build knowledge and skills in a particular area. For example, the painting the child brought home might receive some positive feedback from their parents. They place it on the refrigerator to show that it has value, give their child a sketchbook, and make some suggestions about

how to improve their drawing. In high school the student chooses art as an elective and begins to receive explicit instruction and assessed feedback. In terms of students at school, the vast majority of creativity in students is at the mini-c and little-c level.

The **Pro-c** level of creativity in schools is usually the realm of teachers. The teacher of art in this case finds a variety of pedagogic approaches which enhance the student artist's knowledge and skills in art as well as building their creative competencies in making works of art. They are a **Pro-c** teacher. The student will require many years of deliberate practice and training along with professional levels of feedback, including acknowledgement that their work is sufficiently new and novel for them to be considered a creative professional artist at the pro-c level.

The **Big-C** level of creativity is the rarefied territory of the very few. To take this example to the extreme, the student becomes one of the greatest artists of all time. After they are dead, their work is discussed by experts because their creativity in taking art to new forms of expression is of the highest level. Most of us operate at the mini-c and little-c level with our hobbies and activities. They give us great satisfaction and enjoyment and we enjoy building skills and knowledge over time. Some of us are at the pro-c level in more than one area.

The value of creativity in education

Creativity is valuable in education because it builds cognitive complexity. Creativity relies on having deep knowledge and being able to use it effectively. Being creative involves **using an existing set of knowledge or skills in a particular subject or context to experiment with new possibilities in the pursuit of valued outcomes**, thus increasing both knowledge and skills. It develops over time and is more successful if the creative process begins at a point where people have at least some knowledge and skills. To continue the earlier example of the ramp, a student rolling a ball down an incline may notice that the ball goes faster if they increase the incline, and slower if they decrease it. This discovery may lead to other possibilities – the student might then go on to observe how far the ball rolls depending on the angle of the incline, and then develop some sort of target for the ball to reach. What started as play has developed in a way that builds the student's knowledge, skills and reasoning. It represents the beginning of the scientific method of trial and error in experimentation.

Creativity is not just making things up. For something to meet the definition of creativity, it must not only be new but also relevant and useful. For example, if a student is asked to make a new type of musical instrument, one made of salami slices may be original and interesting, but neither relevant nor useful. (On the other hand, carrots can make excellent recorders). Creativity also works best with constraints, not open-ended tasks. For example, students can be given a limit to the number of lines used when writing a poem, or a set list of ingredients when making a recipe. Constrained limits lead to what cognitive scientists call desirable difficulties as students need to make more complex decisions about what they include and exclude in their final product. A common STEM example is to make a building using drinking straws but no sticky tape or glue. Students need to think more deeply about how the various elements of a building connect in order for the building to stand up.

Creativity must also have a result or an outcome. In some cases the result may be a specific output, such as the correct solution to a maths problem, a poem in the form of a sonnet, or a scientific experiment to demonstrate a particular type of reaction. As noted above, outputs may also be intangible: they might be an idea for a solution or a new way of looking at existing knowledge and ideas. The outcome of creativity may not necessarily be pre-determined and, when working with students, generating a specific number of ideas might be a sufficient creative outcome.

Myths about creativity

It is important that students are aware of the components that make up creativity, but it is also critical that students understand what creativity is not, and that the notion of creativity has been beset by a number of myths. The science of creativity has made great progress over the last 20 years and research has dispelled the following myths:

- Creativity is only for the gifted
- Creativity is only for those with a mental illness
- Creativity only lives in the arts
- Creativity cannot be taught
- Creativity cannot be learned
- Creativity cannot be assessed
- Schools kill creativity in their students
- Teachers do not understand what creativity is
- Teachers do not like creative students

The science of creativity has come a long way from the idea of being bestowed by the gods of ancient Rome and China. We now know that creativity can be taught, learned and assessed in schools. We know that everyone can develop their creative capacities in a wide range of areas, and that creativity can develop from purely experiential play to a body of knowledge and skills that increases with motivation and feedback.

Creativity in education

The world of education is now committed to creativity. Creativity is central to policy and curriculum documents in education systems from Iceland to Estonia, and of course New Zealand. The origins of this global shift lie in the 1990s, and it was driven predominantly by economics rather than educational philosophy.

There has also been a global trend in education to move from knowledge acquisition to competency development. Creativity often is positioned as a competency or skill within educational frameworks. However, it is important to remember that the incorporation of competencies into a curriculum does not discount the importance of knowledge acquisition. Research in cognitive science demonstrates that students need fundamental knowledge and skills. Indeed, **it is the sound acquisition of knowledge that enables students to apply it in creative ways**. It is essential that teachers consider both how they will support their students to acquire the necessary knowledge and skills in their learning area as well as the opportunities they will provide for applying this knowledge in ways that support creativity. In fact, creativity requires two different sets of knowledge: knowledge and skills in the learning area, and knowledge of and skills related to the creative process, from idea generation to idea selection, as well as the appropriate attitudes, attributes and environment.

Supporting students to be creative

In order for teachers to support students to be creative, they should attend to four key areas. Firstly, creativity needs **an appropriate physical and social environment**. Students need to feel a sense of psychological safety when being creative. The role of the teacher is to ensure that all ideas are listened to and given feedback in a respectful manner. In terms of the physical environment, a set of simple

changes rather than a complete redesign of classrooms is required: modifying the size and makeup of student groups, working on both desks and on whiteboards, or taking students outside as part of the idea generation process can develop creative capacity. Even something as simple as making students more aware of the objects and affordances which lie within a classroom may help with the creative process.

Secondly, teachers can **support students to develop the attitudes and attributes required for creativity**, which include persistence, discipline, resilience, and curiosity. Students who are more intellectually curious are open to new experiences and can look at problems from multiple perspectives, which builds creative capacity. In maths, for example, this can mean students being shown three or four different ways to solve a problem and selecting the method that best suits them. In Japan, students are rewarded for offering multiple paths to a solution as well as coming up with the correct answer.

Thirdly, teachers can **support the creative process**. It begins with problem solving, or problem posing, and moves on to idea generation. There are a number of methods which can be used when generating ideas such as brainstorming, in which as many ideas as possible are generated by the individual or by a group. Another effective method, which has the additional benefit of showing the relationships between the ideas as they are generated, is mind-mapping. For example, rather than looking at possible causes of World War Two as a list, it might be better to categorise them into political, social and economic categories using a mind map or some other form of graphic organiser. This creative visual representation may provide students with new and useful insights into the causes of the war. Students may also realise that there are more categories that need to be considered and added, thus allowing them to move from surface to deep learning as they explore relationships rather than just recalling facts. Remember that creativity is not possible without some knowledge and skills in that subject area. For instance, proposing that World War Two was caused by aliens may be considered imaginative, but it is definitely not creative.

The final element to be considered is that of **the outcomes - the product or results - of creativity**. However, as with many other elements of education, it may be more useful to formatively assess the process which the students have gone through rather than the final product. By exploring how students generated ideas, whether the method of recording ideas was effective, whether the final solutions were practical, and whether they demonstrated curiosity or resilience can often be more useful than merely grading the final product. Encouraging the students to self-reflect during the creative process also provides students with increased skills in metacognition, as well as having a deeper understanding of the evolution of their creative competencies. It may in fact mean that the final grade for a piece of work may take into account a combination of the creative process as observed by the teacher, the creative process as experienced and reported by the student, and the final product, tangible or intangible.

References

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Endnotes

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