

## Designing Effective Projects: Using Knowledge Creativity

### Innovation and Ingenuity

Most educators would agree that creativity is generally a good thing. Yet few teachers have a clear idea of what creative student work looks like or what they can do to improve students' creativity. Fortunately, there is research to help in this area. Creativity is something that all of us have to some degree, and there are techniques teachers can use to help students become more creative.

According to Robert Sternberg, a nationally-respected researcher on the subject, "Creativity is the ability to produce work that is both novel and appropriate" (cited in Armstrong, 1998, p. 3). Highly creative individuals like Pablo Picasso and Albert Einstein have changed the face of the fields they work in by their fresh perspectives and original ideas. For the rest of us, however, "a thought would be considered creative if it is novel to the one who produces it, irrespective of how many others may have entertained that thought" (Nickerson, 2000, p. 394).

Children can be creative in many ways, by seeing new relationships that surprise their classmates and deepen a discussion. By "giving an example, giving a counter-example, questioning, proposing a solution, creating new relationships, providing context, inventing a problem" students can use their creativity to enrich their learning and the learning of others (Daniel, Lafortune and Pallascio, 2003, p. 18).

Creativity takes many forms in children—a first grader's surprise ending to a story about her stuffed animals, a fifth grader's plan for sharing playground equipment fairly, a high school junior's robot, and a biology student's method for rebuilding the habitat of a local bird. Creative endeavors like these benefit both the individuals who perform them and the society which nurtures them.

Helping students develop their creativity is a worthwhile goal if for no other reason than personal enhancement. A poem that is only read by the poet, an idea to make housekeeping more efficient, an insight into the world around us, may not be known to anyone, but still has the power to make life more meaningful and more pleasurable. Teresa Amabile (1983) argues that anyone with normal intelligence can aspire to be creative in some area, and everyone benefits from the "excitement and color" (Nickerson 1999 400) these creative accomplishments add to our lives.

While having "excitement and color" in our lives is certainly a worthy goal, most of us live in a real world, where we are held accountable for very different outcomes with our students. We worry about improving students' creativity when success is judged on the basis of academic learning and test scores? Sternberg and Lubart (1999) provide comforting news. They claim that research shows that when creative students are taught and assessed in ways that value their creativity, their academic learning also improves, so teaching to improve creativity can do more than make a person happier and more productive in society. It can also help students improve their test scores.

## **Components of Creativity**

People often tend to think of creativity as magical and mysterious. Certainly there is something strange and wonderful about the creation of a great work of art or an earth-shattering idea. Those who study creativity, however, believe that extraordinary products are made through essentially ordinary thinking processes, which means we can all develop our creativity to some degree.

Creative individuals possess a combination of intellectual abilities, personality traits, and subject-area knowledge. They have the cognitive ability to deal with complex situations, have a set of tools they can use to generate many ideas, and are able to concentrate completely on a task (Amabile 1983). According to Sternberg and Lubart (1999), creative individuals have what they call a “synthetic ability” to see problems in novel ways, an “analytic ability” to decide which ideas are worth following through on and which aren't, and the ability to convince others that their ideas are worthwhile.

Creativity is more than just the brain, however. People who are very creative also have personality and character traits that contribute to the production of unusual and appropriate solutions to problems. Two of the most important traits are the inclination to take sensible risks and the ability to tolerate high levels of confusion and ambiguity (Sternberg and Lubart, 1999).

There has been a great deal of discussion about the relationship between curiosity and flexibility. Being creative requires being able to see things from different perspectives and changing your point of view when the situation demands it. People who are creative also have self-efficacy, and believe in their ability to accomplish difficult tasks and are persistent at overcoming obstacles.

Very creative people are often thought to be highly intelligent. While this is occasionally true, evidence shows that the connection between intelligence and creativity is not straightforward. Sternberg and O'Hara (1999) found people with low IQs are not likely to be exceptionally creative but above 120, there is no correlation between traditional intelligence and creativity. They even suggest that individuals with very high IQs may be rewarded so much for their analytical thinking that they do not reach their creative potential.

## **Technology and Creativity**

In her 2002 review of the literature on creativity and technology, Avril Loveless explains the complicated relationship between creativity and technology. Tools such as digital audio, video devices, and computers can contribute to creative processes in a variety of ways. She explains that the features of technology such as provisionality, interactivity, capacity, range, speed, and automatic functions, allow students to do things that they could not do, or at least could not do as efficiently, without technology.

Because computers allow students to make changes and try out alternatives and keep track of how well they work, they are useful for revising and editing. The interactivity of computers allows users to receive and give feedback from processes or other individuals. Technology gives students access to great amounts of information that would have been unimaginable just a few years ago. Because computers can perform complex operations easily and quickly, users can put their efforts into more high-level processes such as the analysis, interpretation, and synthesis of information.

In the classroom, teachers can use technology to help students to brainstorm and evaluate ideas, make connections, collaborate, and communicate. They must remember, however, that it is not the access to technology that encourages creativity, but the creation of an environment in which technology can be used to accomplish goals in creative ways.

## Teaching Creativity

Some people may argue that it is impossible to teach creativity, that it is an innate quality like musical talent. However, like a talent, people can work to make themselves more creative, and teachers can help their students develop their creativity.

The classroom environment has a big impact on the development of creativity in students. Some suggestions for creating an environment that encourages creativity in a project-based classroom are:

- Have a variety of materials and equipment available.
- Reduce the negative consequences of risk-taking
- Expose students to a wide range of creative products
- Make available resources on a wide range of topics so students can find something that interests them and sparks their imagination
- Allow flexibility in time and classroom arrangement
- Encourage students to collaborate on projects
- Make sure that students have some quiet time during project work because noise can inhibit creativity
- Connect students with creative individuals in the community
- Set an example by thinking creatively yourself and sharing your products, your processes, and your joy in your accomplishments

Success in any aspect of education is linked to student motivation. Research indicates that intrinsic motivation enhances creativity while extrinsic motivation generally undermines it. (Amabile 1983). Competition for prizes for the “best” product has a detrimental effect on creativity, possibly because the energy and commitment necessary to produce novel ideas takes a great deal of effort, which extrinsically motivated individuals are unlikely to expend (Collins and Amabile 1999).

The issue is not black and white, however. Different kinds of motivation may be effective at different stages of the creative process. While students are exploring a problem and trying to think of ideas, they may be intrinsically motivated. On the other hand, extrinsic rewards may encourage students to learn the skills they need to complete a task or to persist when the initial enthusiasm wears off (Collins and Amabile 1999).

Research has shown that explicit instruction in strategies that produce creative products can help students become more creative (Runco and Sakamoto 1999). Strategies such as brainstorming, exploring multiple options, and evaluating validity, can be taught and assessed in a variety of ways and contexts. Forcing students to compare unlike concepts can also bring out creative responses.

Teachers must take care with the use of examples of finished products. Although providing students with examples is generally considered to be beneficial, participants in a research study created products that contained features of the examples even when they were specifically told to create something as different as possible from the example (Ward, Smith and Finke 1999). It may be more useful to provide students with examples of processes that experts use than with examples of possible products.

All students have a creative potential within them. Whether they realize that potential depends only partly on their motivation and ability. By using language that encourages creativity and creating an environment which challenges and supports students in their creative efforts, teachers can help students think and act more creatively.

## References

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