

Education researchers at Pearson teamed up with the Partnership for 21st Century Learning to conduct a review of the research literature on teaching and assessing creativity in K-12 and college classrooms. What follows is a summary of the most significant findings.

Creativity is increasingly identified, by both education thought leaders and employers, as an important educational outcome. The P21 Framework for 21st Century Learning includes creativity as one of the four Cs, along with collaboration, critical thinking, and communication. Research suggests that a focus on developing creativity is important for several reasons:

- Evolving social, economic, and scientific problems facing the world today and in the future will require more flexible thinking and novel solutions.
- Creative individuals may enjoy higher academic achievement.
- Employers seek job candidates with strong creativity skills.
- Individual employee creativity is linked to organizational innovation, and work teams using more creative practices tend to enjoy higher performance.

### What Creativity Skills Do Learners Need?

There are many different approaches to defining creativity. However, creativity is commonly understood as the ability to produce novel and useful ideas. A person's creative potential depends on their:

- level of expertise in a given subject;
- ability to engage in unconventional or divergent thinking;
- intrinsic motivation to engage in creative activities;
- personality factors, such as a tolerance for ambiguity and a preference for risk-taking.

Creative potential also depends on the level of support within the creative environment, which can include a person's home, school, or work.

There is a developmental progression of creativity ranging from novices to eminent creators. Beginning creators typically spend more time mastering creative thinking strategies, processes and behaviors, whereas more mature creators tend to shift their focus to the novelty and usefulness of their creative outputs.

### How Can I Support My Students in Expressing Their Creativity?

Creativity can be taught, particularly creative problem-solving and divergent thinking. More specifically, research suggests that explicit instruction about divergent thinking processes and cognitive strategies such as brainstorming (idea generation) and problem-finding,

which involves efforts to identify, define, and represent a problem in a given space is an effective method for enhancing creativity.

Research also points to several aspects of creativity instruction that may enhance divergent thinking, including (for K-12 learners):

- cooperative or collaborative learning—working with others;
- case-based learning—learning through in-depth exploration of rich cases;
- observational learning or modeling—learning by watching others;
- pretend play, including role playing.

For college students, the following aspects of creativity instruction are promising:

- metacognition training;
- role-playing games and improvisation;
- diversification or stereotype-reduction training, which directly challenge stereotypes.

For learners in both K-12 and college settings, it is important to keep in mind that their ability to generate ideas that are truly unique and useful for a given context is highly dependent on their subject-matter knowledge. Particularly in introductory courses or as learners are first being exposed to certain topics, it may be better to emphasize their skill in applying divergent thinking strategies rather than whether students' ideas on a topic are really groundbreaking.

## How Should I Design Creative Activities for My Classroom?

When designing activities for teaching and assessing creativity, it is important to consider the factors related to creative potential and to establish a classroom environment that is supportive of creative expression. For example, given the reliance on domain knowledge, creative-thinking activities can be embedded into

regular instruction once a given topic has been introduced and students are well acquainted with the subject matter. Such activities might require students to formulate explanations or hypotheses to explain a puzzling collection of data or ask them to apply a familiar theory or framework to a new domain or context where it does not easily fit. As students are first honing their creativity, teachers can remind them to practice specific divergent-thinking strategies or processes they have been taught. Activities should be designed so that students feel free to make mistakes or have bad ideas without fear of ridicule or punishment. While students are learning, they should have opportunities to practice these skills and receive feedback on their ideas without the punitive consequences of being graded on their creativity. Over time, instructors can introduce more formal assessments of creativity and creative-thinking skills.

## How Should I Evaluate Students' Creativity?

Educators should consider incorporating both divergent-thinking tasks and creative-work products as forms of assessment. With divergent thinking, students' creative outputs can be evaluated in terms of their fluency (the number of relevant ideas), flexibility (the number of different categories into which those relevant ideas fall), originality (the novelty of the ideas), and elaboration (the amount of detail offered in support of the ideas). This can be done in the context of any number of specific subjects or cross-disciplinary topics. Educators can also evaluate creative-work products, such as poems, essays, sculptures, models, presentations, or other performances in relation to their:

- novelty or distinctness of their contribution relative to conventional solutions;
- relevance or utility in relation to the predefined parameters of the task;

Educators should share with students any rubrics they will use to evaluate either their divergent thinking or creative-work products, and those rubrics should describe the specific dimensions and performance criteria on which outputs or products will be judged.

The main conclusions and implications of the research for classroom practice are as follows:

Conclusion	Implication	Tips for Classroom Practice
Creativity is sought after by employers, and high levels of employee creativity are associated with high organizational performance.	Educators and employers should create environments that encourage creative expression.	Create a classroom environment characterized by learner autonomy, experimentation, low stakes for making mistakes, and opportunities for collaboration and playfulness.
Creativity is widely understood as the production of novel and useful ideas.	Educators should emphasize both novelty and usefulness as important criteria for interpreting creative contributions.	Consider novelty in the context of a developmental continuum, with novices demonstrating ideas that are "new for me."

Conclusion	Implication	Tips for Classroom Practice
Creative potential is a complicated function of domain knowledge, cognitive styles, intrinsic task motivation, personality factors, and the environment in which a person works.	Educators should be aware of the factors that contribute to creative potential.	Think about factors that might be holding learners back from reaching their full creative potential such as a lack of adequate domain knowledge or motivation to engage in the creative tasks.
There is a developmental progression of creativity from novices to eminent creators.	Educators should teach and assess with this progression in mind.	For younger students, emphasize creative processes and behaviors, and for older students gradually shift emphasis to the novelty and appropriateness of their creative achievements.
Creativity can be taught, particularly creative problem-solving and divergent thinking.	Educators should explicitly teach and provide feedback on strategies for divergent or unconventional thinking.	Give students opportunities to practice strategies such as problem-finding, conceptual combination, and brainstorming.
K-12 interventions that employ cooperative learning or collaboration, case-based learning, observational learning or modeling, and pretend play appear to improve divergent thinking.	K-12 educators should experiment with these types of techniques in the classroom.	Experiment with combining techniques, for example, doing small-group role play or modeling with cooperative-learning teams.
For higher-education learners, metacognition training, role-playing games and improvisation, and diversification or stereotype-reduction training have shown success in enhancing divergent thinking.	College instructors should consider how to infuse these kinds of techniques into their teaching.	
Divergent-thinking tasks are predictive of long-term, real-world creative achievements, and evaluation of creative-work products appears to produce reliable and valid measures of creativity.	Educators should consider incorporating both divergent-thinking tasks and creative-work products to assess creativity/creative potential.	Consider looking for evidence of divergent thinking within specific disciplines or domains and scoring work products using a defined creativity rubric with separate dimensions for novelty, usefulness, etc.