

Research Guide

College and Career Competency: *Creative Thinking*

Definition:

Creativity is “the production of novel, useful ideas or...solutions” (Amabile, Barsade, Mueller, & Staw, 2005, p. 368). It encompasses both the process of generating ideas or solutions to a problem and then actually applying the idea or solution (Amabile et al., 2005). Creative thinking then is defined as “thinking that is novel and that produces ideas that are of value” (Sternberg, 2003).

Essential Components for Students:

1. Regularly brainstorm and explore novel ideas.
2. Apply novel ideas in a useful (practical) way.

Research:










- Longitudinal research that has been followed over 50 years indicates a significant positive relationship between creative thinking as measured by the Torrance Test of Creative Thinking (TTCT) and personal and professional accomplishments. This research underscores the value of divergent or “out of the box” thinking and the importance of adults modeling that thinking and encouraging it in children (Runco, Millar, Acar, & Cramond, 2010).
- Numerous studies have found that immersion in creative environments has a positive impact on student academic attainment and aids in emotional development and social skills (Davies et al., 2013). For example, the physical environment should be open and spacious, allowing students to move around and make use of different areas to work in small groups. The pedagogical environment should allow students some choice in activities and support if they want to try something novel. The researchers found that creative learning environments can positively impact students’ academic achievement; confidence and resilience; **motivation** and engagement; development of social, emotional, and thinking skills; and school attendance.
- Schools tend to undervalue creative skills, but researchers have found that teaching creative skills in schools can improve academic performance (Sternberg, 2003). In fact, creativity can predict children’s school performance (Hansenne & Legrand, 2012).
- Creativity is seen as integral to helping children and adolescents be successful learners (Cachia, Ferrari, Ala-Mutka, & Punie, 2010).
- The importance of creative thinking to success in life and the workplace is widely discussed in the research literature. For example, creative thinking has been linked to well-being and successful adaptation to an uncertain and changing global environment (Karpova, Marcketti, & Barker, 2011). The European Union recognizes the importance of creativity and innovation “in addressing economic, environmental and social crises” (Cachia et al., 2010, p. 9).
- Creative thinking is declining overall, but especially throughout elementary school. An analysis of normative data used in the Torrance Test of Creative Thinking (TTCT) indicated that creative thinking has declined steadily in the United States from 1990 to 2011 among individuals of all ages (Kim, 2011). The decrease was most significant in children from kindergarten to 3rd grade (Kim, 2011).

- Some researchers have also found that children’s ability to produce novel ideas decreases in 4th and 5th grade, which corresponds to the point in education when children are typically taught socialization and conformity skills such as classroom etiquette, attention to accuracy, and appropriateness of ideas (Kim, 2011; Runco, 2003).
 - This TED talk http://www.ted.com/talks/ken_robinson_says_schools_kill_creativity provides Robinson’s (2006) perspective on how schools can hinder creativity.
- A positive mood and positive emotions have been found to promote creativity in both adults and children (Amabile et al., 2005; Greene & Noice, 1988). The researchers found that these positive emotions can be induced by offering compliments, a treat, or uplifting music (Amabile et al., 2005).
 - In a study involving 8th graders, students who were complimented on their clothing and offered a pack of gum were able to identify more names of fruits and birds than students in the control group (Greene & Noice, 1988).
- If a parent or teacher focuses too much on the outcome of the creative activity, such as meeting performance standards or exhibition deadlines, the child’s creativity can be undermined. The process of creative skills development becomes less important than meeting the adult’s expectation of achievement (Davies et al., 2013; Runco, 2003).
- A study on creative learning and innovative teaching within the European Union concluded that a school culture where creativity is appreciated for both teachers and students “is decisive for the development and implementation of creative and innovative educational practices” (Cachia et al., 2010, p. 51).

Assessments

Please note that the assessments listed here reflect what is currently being used in multiple disciplines to measure creativity. Not all of these measures will be easily used in classroom settings or by classroom teachers. However, the general knowledge that these measurements exist and the ability to review particular items from these assessments is valuable.

- The most prevalent assessment tool used to measure creativity is the Torrance Test of Creative Thinking (Cramond, Matthews-Morgan, Bandalos, & Zuo, 2005; Kim, 2006, 2011; Runco et al., 2010). The TTCT consists of two domains, verbal and figural, and is seen as an alternative to intelligence tests for identifying gifted students as well as creative potential (Cramond et al., 2005). The copyright to the TTCT is owned by the Scholastic Testing Service (STS). Information on the TTCT instrument, including cost, can be found at this STS website: <http://ststesting.com/2005giftttct.html>.
 - Examples of figural items on the TTCT, retrieved from <http://innovators-guide.ch/wp-content/uploads/2012/12/torrance-creativity-test.pdf> (Innovator’s Guide Switzerland, 2012), are shown below.

Torrance Test	Starting Shapes	Completed Drawing	
		More Creative	Less Creative
In a standardized Torrance Test of Creative Thinking, subjects are given simple shapes (left column) and are asked to use them (top row) or combine them (middle row) in a picture or to complete a partial picture (bottom row). Evaluators judge whether the results are more or less creative.	Use 	 Mickey Mouse	 Chain
	Combine 	 King	 Face
	Complete 	 A fish on vacation	 Pot

- The creator of the TTCT instrument, Dr. E. Paul Torrance, recommended that individuals taking the test should have fun and enjoy the activities (Kim, 2006). The test, which requires 30 minutes, can be administered to individuals of all ages beginning with kindergarten and can be completed as a group or individually (Kim, 2006). Training is required to administer and score the TTCT, so consider asking a school psychologist.
- This simple 10-question online quiz helps develop **self-awareness** about aspects of creativity <http://thecreativityquiz.com/> (Christensen, n.d.). Questions include self-rating of creativity, willingness to listen to other perspectives or new ideas, and estimating the frequency of attempts at creating new things.

Instructional Practices:

- Creativity can be enhanced in several ways:
 - Find out what the individual student enjoys within the various content areas to increase intrinsic **motivation**,
 - Use careful scaffolding to craft slightly challenging assignments so the student is cognitively stimulated, and
 - Allow students to choose their own problems to solve (Runco, 2003).
- Three skills are considered important elements of successful training in creativity: 1. observing things from different perspectives to recognize opportunities, 2. generating ideas, and 3. evaluating ideas (Karpova et al., 2011).
- There is research evidence that the physical environment of the learning space can enhance student creativity (Davies et al., 2013). Specific recommendations include:
 - Ensuring that the classroom can be flexibly configured (e.g., moving or removing furniture),
 - Making the environment open and spacious,
 - Including displays of work in progress,
 - Providing access to different media (e.g., interactive white boards) and technology, and
 - Including outdoor space, which can be perceived as being “owned” more by the pupils compared to indoor space, which is often perceived as “owned” by the teacher (Davies et al., 2013).
- One of the most widely accepted models of creativity used in both education and business is the Osborne-Parnes model (Clifford, 2012). It consists of six steps that incorporate divergent and

convergent thinking—divergent thinking to generate ideas and convergent thinking to narrow down the ideas. The six steps are listed below; for more information, see <http://www.opencolleges.edu.au/informed/features/30-things-you-can-do-to-promote-creativity-in-your-classroom/> (Clifford, 2012):

1. *Mess-finding*. Identifying a goal, a wish, or a challenge.
 2. *Fact-finding*. Gathering data that is relevant to the goal, wish, or challenge.
 3. *Problem-finding*. Clarifying the problems that would need to be solved in order to achieve the goal, or meet the challenge.
 4. *Idea-finding*. Generating ideas about how to solve the problem.
 5. *Solution-finding*. Strengthening & evaluating ideas to find a feasible solution.
 6. *Acceptance-finding*. Determining a plan of action for implementing ideas.
- Divergent thinking facilitates idea generation because it produces multiple responses to a single question or problem (Karpova et al., 2011). For example, students can list things that irritate them about a particular experience when things don't work as they should. Students then brainstorm potential solutions to problems they have encountered.
 - Additional information on creativity and creative **problem solving** in the classroom can be found at the following links:
 - Odyssey of the Mind Curriculum Activities in the Classroom (Creative Competitions, Inc., 2006), available at <http://www.odysseyofthemind.com/curriculum.php>. This material can be applied at any grade level and includes activities that can be used with different topics. Students brainstorm, apply creative and critical thinking, and solve problems.
 - Bubble Test Rebellion: 40 Ways to Make Time for Creativity in Your Lessons (Hudson, 2014), available at <http://www.weareteachers.com/blogs/post/2014/08/10/40-ways-to-make-time-for-creativity-in-your-lessons>. This blog provides creative ideas for students in different grades. For example, students in grades 6-8 could collaborate on a class mural. Students in grades 9-12 could create a board game that teaches or practices new concepts being taught.

References

- Amabile, T.M., Barsade, S.G., Mueller, J.S., & Staw, B.M. (2005). Affect and creativity at work. *Administrative Science Quarterly*, 50(3), 367-403. doi: 10.2189/asqu.2005.50.3.367
- Cachia, R., Ferrari, A., Ala-Mutka, K., & Punie, Y. (2010). *Creative learning and innovative teaching: Final report on the study on creativity and innovation in education in EU member states*. Luxembourg: Publications Office of the European Union. Retrieved from <http://publications.jrc.ec.europa.eu/repository/handle/JRC62370>
- Christensen, T. (n.d.). The Creativity Quiz. Retrieved from <http://thecreativityquiz.com/>
- Clifford, M. (2012). Thirty ways to promote creativity in your classroom. Retrieved from <http://www.opencolleges.edu.au/informed/features/30-things-you-can-do-to-promote-creativity-in-your-classroom/>
- Cramond, B., Matthews-Morgan, J., Bandalos, D., & Zuo, L. (2005). A report on the 40-year follow-up of the Torrance Tests of Creative Thinking: Alive and well in the new millennium. *Gifted Child Quarterly*, 49(4), 283-291. doi: 10.1177/001698620504900402
- Creative Competitions, Inc. (2006). Odyssey of the Mind and NASA Curriculum Activities for the Classroom. Retrieved from <http://www.odysseyofthemind.com/curriculum.php>

- Davies, D., Jindal-Snape, D., Collier, C., Digby, R., Hay, P., & Howe, A. (2013). Creative learning environments in education—A systematic literature review. *Thinking Skills and Creativity, 8*, 80-91. doi: 10.1016/j.tsc.2012.07.004
- Greene, T.R., & Noice, H. (1988). Influence of positive affect upon creative thinking and problem solving in children. *Psychological Reports, 63*(3), 895-898. doi: 10.2466/pr0.1988.63.3.895
- Hansenne, M., & Legrand, J. (2012). Creativity, emotional intelligence, and school performance in children. *International Journal of Educational Research, 53*, 264-268. doi: 10.1016/j.ijer.2012.03.015
- Hudson, H. (2014). *Bubble test rebellion: 40 ways to make time for creativity in your lessons*. Retrieved from <http://www.wereateachers.com/blogs/post/2014/08/10/40-ways-to-make-time-for-creativity-in-your-lessons>
- Innovator's Guide Switzerland. (2012). Torrance Tests of Creative Thinking. Retrieved from <http://innovators-guide.ch/2012/12/joy-paul-guilford/>
- Karpova, E., Marcketti, S.B., & Barker, J. (2011). The efficacy of teaching creativity: Assessment of student creative thinking before and after exercises. *Clothing and Textiles Research Journal, 29*(1), 52-66. doi: 10.1177/0887302X11400065
- Kim, K.H. (2006). Can we trust creativity tests? A review of the Torrance Tests of Creative Thinking (TTCT). *Creativity Research Journal, 18*(1), 3-14. doi: 10.1207/s15326934crj1801_2
- Kim, K.H. (2011). The creativity crisis: The decrease in creative thinking scores on the Torrance Tests of Creative Thinking. *Creativity Research Journal, 23*(4), 285-295. doi: 10.1080/10400419.2011.627805
- Robinson, K. (2006). *Ken Robinson: Do schools kill creativity?* [Video file]. Retrieved from http://www.ted.com/talks/ken_robinson_says_schools_kill_creativity
- Runco, M.A. (2003). Education for creative potential. *Scandinavian Journal of Educational Research, 47*(3), 317-324. doi: 10.1080/0031383032000079272
- Runco, M.A., Millar, G., Acar, S., & Cramond, B. (2010). Torrance Tests of Creative Thinking as predictors of personal and public achievement: A fifty-year follow-up. *Creativity Research Journal, 22*(4), 361-368. doi: 10.1080/10400419.2010.523393
- Sternberg, R.J. (2003). Creative thinking in the classroom. *Scandinavian Journal of Educational Research, 47*(3), 325-338. doi: 10.1080/0031383032000079281