

# RESEARCH-GUIDED PROGRAMS AND STRATEGIES FOR NURTURING CREATIVITY

*Jonathan A. Plucker, Jiajun Guo, and Anna Dilley*

Our economy and quality of life increasingly depend on innovative ideas and products, and businesses and society in general are calling for more creativity in our communities. This is being seen in schools, with an emphasis on problem solving and creativity in the curriculum, such as can be found in efforts to focus K–12 education on 21st century skills (Plucker, Kaufman, & Beghetto, 2015). Although there are increasing amounts of research on how to enhance creativity in the classroom, teaching for creativity is not a common practice in most K–12 schools (Sternberg, 2015). For example, Schacter, Thum, and Zifkin (2006) found on average that teachers perform very few creative behaviors. Many teachers know little about how to implement interventions for creativity enhancement, and they may even feel reluctant to learn how to approach the topic.

In this chapter, we review the major theoretical work that underlies intervention efforts, review specific techniques and strategies for fostering creativity, and examine broader policy issues that may impact creativity enhancement efforts.

## IMPORTANCE OF THE TOPIC

*Creativity* can be defined as the production of a perceptible product that is novel and useful within a social context (Plucker, Beghetto, & Dow, 2004). By unpacking this definition, we immediately recognize the idea of *novelty* in creative production, and indeed novelty or originality is necessary for creativity. Also necessary, although less recognized,

is *usefulness*, sometimes referred to as *task appropriateness*. For example, a student may write a remarkably original poem, but if it is turned in as an answer in a math class, it is not considered creative. The perceptible product is a poem, and the social context is the math class. Perceptible products do not, however, always need to be tangible productions. Even a spoken idea may be considered a perceptible product, because it can be recognized by others in a context. Social context is also important: The creativity of a product produced by a K–12 student may be very different from the creativity of the same work produced by an adult.

It is also helpful to examine models representing different types of creativity. One very popular such model, especially in school settings given its developmental approach, is the 4-C model of creativity (Kaufman & Beghetto, 2009). The model begins with mini-c creativity, which can be described as creative insights valuable to the person who has them but not necessarily valuable to others (see Chapter 19, this handbook). This is conceptualized as part of the learning process, “creating” new understandings. Little-c creativity comes after some practice from mini-c insights; it is also quite evident in a classroom, as most students perform at a little-c level. Pro-C creativity is the next level, which describes the creativity of active professionals in a field. These creative products are seen as valuable by a larger audience than either mini-c or little-c creativity. Big-C creativity is the final step in the hierarchy, which describes the creative innovations by eminent creators. Big-C creativity is often

considered big-C until it is viewed through the lens of history. Although a creator is producing at a pro-C level during their lifetime, it may be decades before they are recognized as a big-C creator.

Another way to view creativity is to examine the multiple influences that lead to creativity. Rhodes (1961) proposed a popular model, commonly referred to as the four P's of creativity: person, process, product, and press. Glăveanu (2013), reflecting advances in sociocultural theory and research, proposed an updated framework, known as the five A's: actor, action, artifact, audience, and affordances. These five A's are more grounded in sociocultural and ecological psychology than the original four P's and are arguably more comprehensive (see also Plucker & Barab, 2005; Plucker, McWilliams, & Alanazi, 2016). The actor (Rhodes's person) is the individual performing the creative behavior. The term is a fitting reminder of the creative productive process where a person must sell their ideas, much as an actor on a stage must sell the story to the theater. Action (Rhodes's process) is the creative act; the term focuses attention on the external nature of creative behaviors. As mentioned earlier, creativity is judged externally and must be expressed through actions. The creative artifact (Rhodes's product) is related to the perceptible product in Plucker et al.'s (2004) definition. The audience (Rhodes's press) is the sociocultural context and the individuals consuming the creative artifact. Affordances can be thought of as the physical aspect of Rhodes's press. They are materials in the environment that allow for creative actions and the actors' abilities to manipulate those materials in a way that suits the task at hand. These five A's provide a framework through which different aspects of creativity can be viewed, in research and practice.

## RELEVANT THEORY AND PRINCIPLES

How can educators help students realize their creative potential? Many researchers have grappled with this topic, and there are a variety of methods to enhance creativity. Yet we still face challenges that impede the application of what researchers have found about creativity enhancement in schools, such as lack of understanding of creativity and narrow-focused curriculum (Beghetto, 2015).

In schools where the environment is complex, it is not easy to infuse new elements, such as creativity, into daily teaching practice. In this section, we summarize recent work on research-based strategies and methods, ranging from relatively straightforward, classroom-based strategies (e.g., attitude change and ideational training) to strategies requiring external resources (e.g., the use of technologies and partnerships with creative practitioners).

## Pedagogical Techniques

The first set of strategies can be classified as classroom-based or pedagogical techniques. These techniques require careful preparation and planning so that they can be integrated into the established curriculum. Combining two or more techniques is recommended to make intervention or teaching more deliverable.

**Attitude change.** Attitudes toward creativity are influenced by prior experiences, and these attitudes develop and grow into complex, organized mental frameworks of knowledge, which may have a large impact on creative behaviors and outcomes. Creativity is not immune to inaccurate and widespread attitudes or myths. Plucker et al. (2004) have identified four myths that lead to inaccurate attitudes toward creativity.

- People are either born creative or not—this myth yields an inaccurate conclusion that creativity is an innate quality resilient to improvement.
- Creativity is intertwined with negative aspects of psychology and society—this myth evokes the image of a mad genius with neurotic tendencies.
- Creativity is a fuzzy, soft construct—this myth leads people to believe that creative behavior resides in the world of pop psychology and is not worthy of scientific scrutiny or empirically supported interventions that can enhance creativity.
- Creativity is enhanced within a group—this myth stems from the business community and leads to the belief that more people working together will produce more ideas, and that creativity will be greater.

These myths are detrimental to personal (e.g., the development on one's unique talents; Silvia et al., 2014)

and external (e.g., the enhancement of creativity in schools) processes. Because attitudes begin to develop in schools, it is logical to target preventing the development of these attitudes and myths at the source. One way to tackle this problem is to explicitly provide students with the correct creativity “schema” as supported by scientific research (Plucker & Dow, 2010). Students and teachers need to change their attitudes and beliefs so that they can apply instructional approaches supporting creativity enhancement. In addition to the beliefs about creativity, other more general beliefs, such as beliefs about the nature of knowledge, may also impact on teachers’ creativity instruction. For example, teachers who perceive their instruction as enhancing student learning by more than merely presenting factual and simplistic knowledge are more likely to infuse creativity into their teaching practice (Hong, Hartzell, & Greene, 2009).

**Ideational training.** Ideation training, also called divergent thinking training, aims to enhance the ideational aspects of the creative process, theoretically increasing the number of ideas produced. It has been claimed that ideational thinking is an indicator of creativity (Runco & Acar, 2012). The core of this type of training is to increase fluency (number of ideas), flexibility (the extent to which ideas are different from each other), originality (novelty of ideas), and elaboration (number of details generated).

Ideation training can be used for different subjects and has proven to be effective (Pyryt, 1999). For example, Baer (1996) used ideation training in the domain of poetry, and creativity on a subsequent poetry writing task was significantly improved. Baer suggested that ideational training should focus on skills related to the domain specific task to improve creative performance on that particular task. If teachers want to improve creative performance on different types of tasks, then the training should use a wide range of content in a variety of ideational exercises. Along the same line, Pang (2015) proposed several ideational tasks for different subjects that could promote creativity in classrooms. Students can be encouraged to interpret texts in different ways and to construct their own storylines

in reading and writing classes; math teachers could show students how to solve a problem using non-traditional methods to encourage risk-taking and creative thinking; in science class instructors could demonstrate the nature of constructing science knowledge by asking students to form and test their own hypotheses in an experiment; in art and music classes, where creativity manifests itself in every aspect, students could design, compose, and create their own artworks with the help of a variety of tools (e.g., music and picture editing software).

**Play intervention.** There is evidence that play-oriented or game-based approaches can support creativity development for people at different ages. This technique receives strong recommendation because games are common everyday activities that can be adapted into almost any creativity-focused instructional practice. Pretend play is especially useful for creativity enhancement in young children. Russ (2014), for example, made a compelling case for pretend play and suggested methods to conduct an intervention, suggesting that pretend play provides practice with real-world problem solving and processing emotions, both of which foster creativity (Russ & Wallace, 2013). Other researchers have implemented interventions solely on the basis of pretend play (Garaigordobil, 2006) or simply incorporating pretend play as part of a wider creativity intervention (Alfonso-Benlliure & Meléndez, 2013) with positive results.

Other forms of play also can boost creativity. For example, in a case study of two groups of children 10 and 11 years old, Cumming (2007) observed that, when endorsed and encouraged by teachers, students interact eagerly with poetry and each other, and display their creativity through word play. Cremin et al. (2006) observed that playfulness is an essential part of creativity pedagogies that focus on stimulating children’s ability to think about possibilities or to use their imagination. Imaginative and pretend play encourages children to make disparate connections between concepts, and lays the foundations for adult creativity.

**Modeling.** Many human behaviors are learned by observation through modeling, which also holds true for creative behaviors. Individuals,

by identifying relevant features and grasping underlying rules, are more likely to perform a creative behavior after a visual demonstration of the behavior. Evidence supporting the existence of creative modeling effects comes from a variety of sources, including classroom-based instruction literature (Yi, Plucker, & Guo, 2015). Teachers can be a major source of creativity. By demonstrating creativity themselves, teachers are establishing a creative environment that can inspire students and encourage them to come up with novel ideas, to take risks, and to make meaningful self-expression (Beghetto & Kaufman, 2014). Simply showing examples produced by other creative people or videos showing how others make creative products can also inspire students.

For example, Belcher (1975) found that the children who observed an original model obtained higher creativity scores than children who observed an unoriginal model. In Harris and Fisher's (1973) first study, groups exposed to flexible and inflexible models were found to solve problems more flexibly than control groups. Harris and O'Donnell (1974) extended the findings of previous studies to artistic tasks, asking two experimental groups (creative and uncreative) to look at a model's doodles and then give responses. In both groups, there was an apparent tendency to see the model's doodles as strengthening the probability of imitating the model's creative or noncreative responses.

More robust evidence came from historiometric and case study research showing the influence of models on individuals with outstanding achievement. Researchers have found an increased likelihood of creative behavior following the observation of creative models (Simonton, 1984) or, in the case of junior scientists, the observation of senior scientist mentors (Hooker, Nakamura, & Csikszentmihalyi, 2003). Zuckerman (1977, cited in Amabile, 1983) studied Noble Laureates who received their prizes between 1901 and 1972 and found evidence of the critical role of modeling in scientific creativity. The Nobel Laureates felt that the contacts through which apprentices see how their mentors operate, think, and go about things, not the specific knowledge they imparted, constitute the major influence of models in scientific settings.

**Peer collaboration.** Peers can also serve as sources of inspiration and supplement many of the roles traditionally thought to belong to teachers alone (Hooker et al., 2003). Therefore, classroom environment is not confined to teachers' instruction; peers are also an important part. Peer critique is an approach that could be readily applied to daily teaching practice. Costantino (2015) argued that timely feedback delivered by friends and classmates is a powerful tool for teachers to facilitate a creative environment where students are more likely to focus on creative tasks and achieve creative goals.

An effective feedback process is characterized by clear goal setting, effective communication, actionable suggestions, and active monitoring. Not all students, however, may participate effectively in collaboration, especially in groups where members have large differences in abilities, goals, and social skills. One way to balance these differences is to provide a "script" for students to play specific roles (such as consultant and presenter), so that they can learn more from cooperation and collaboration (O'Donnell, 1999). Not only are those practices associated with promoting creativity, they can also boost student achievement.

**Structured freedom.** A primary creativity intervention goal is to let students take control of their own creativity and learning experience, which requires that the activities designed by teachers should provide structure and freedom. In a semi-longitudinal study conducted in elementary schools with different pedagogical approaches, Besançon and Lubart (2008) found that Montessori schools characterized by freedom and targeted activities can have a positive impact on children's creative development. A similar point of view was reached by Burgess and Addison (2007), who showed that students working with teachers and other adults liked the freedom to express themselves, but the adults' expertise and support was also critical in helping them to achieve creative goals (Burgess & Addison, 2007). Therefore, in a creativity-fostering environment teachers need to structure learning experiences to address individual and group needs, to use their expertise to explain things, and then step back to encourage independent and student-centered learning and work.

Cremin et al.'s (2006) case study of three creative teachers provides a more detailed picture of how freedom can be encouraged in structured activities. Three themes emerged from these teachers' reflection: standing back so that observing, listening to, and noticing the nature of the learner's engagement was prioritized; providing opportunities so that learners could initiate their own activities or make their own choices within a loosely framed activity; and developing shared agendas to create flexible time and space for children to explore their own ideas and foster their interdependence.

Another interesting case is the use of an art-based activity to stimulate the "internal" freedom, which would benefit creativity even in nonart domains. Sowden, Clements, Redlich, and Lewis (2015) found that asking children to do verbal improvisation or dance could subsequently raise their performance in tests of general creative abilities, which shows the possibility that creativity learned in art-based training may generalize to other domains.

### Use of External Resources

Perhaps preparing and designing activities that encourage creativity is not an easy task; it may be overwhelming for teachers to teach creativity in the classroom given all the other demands they face on a daily basis. Our current, education accountability systems still put a strong emphasis on achievement tests, which marginalize creativity instruction (Beghetto & Plucker, 2006). Furthermore, even though many teachers value and teach creativity in the classroom, this may be a time-consuming, uncomfortable, and stressful task for others (Cremin, 2006; Plucker & Beghetto, 2003). One way to deal with this issue is to provide students and teachers with external resources. In this sense, Glăveanu's (2013) five-A's model offers a more detailed picture of how creativity can be cultivated. Two sub-components of creative environment—audience and affordances—come into play when the teacher alone does not satisfy these needs. Specifically, affordance refers to the material part of creative environment, such as technology, and audience may refer to the social part of environment, such as creative community outside of school.

**Technology.** Technology offers students and teachers opportunities to access a sea of information, including knowledge, tools, and databases. Various technologies and sources of information can facilitate different aspects of life, including teaching and learning. Online databases, design software, communication technology, and even digital games, if used properly, can make contributions to creativity in school curricula. For instance, game-based platforms can be highly motivating for students to take part in scientific discovery experiments (Magnussen, Hansen, Plank, & Sherson, 2013). Handheld devices with installed software could make it more convenient for students to collect, analyze, and distribute data and information (Dunleavy, Dede, & Mitchell, 2009). Geographic information systems (GIS) and other computer visualization tools might help high-spatial thinkers to develop their talents, which may be hindered by traditional methods of teaching (Andersen, 2014). In addition, students' out-of-school literacy practice using digital technologies also offers an opportunity for schools to harness their creativity (Walsh, 2007). For disadvantaged students, technology can be especially useful in promoting creativity (Halsey et al., 2006). For example, in a video making project, Pignégué (2004) found that creating a video as a group enabled disaffected students to learn how to creatively use technologies and to effectively interact with other people.

**Creative communities of practice.** Another way to relieve a teacher's burden is to connect students with the creative community outside of school. There is strong evidence that taking students out of school to work with others in a professional environment or inviting creative practitioners into the classroom could greatly enhance children's creativity. Indeed, this is a key component of many models of gifted education, including the Schoolwide Enrichment Model (Renzulli, 1999; see also Chapter 12, this handbook).

Burgess and Addison (2007) used discourse analysis to study a partnership program where an action research team consisting of art teachers, artists, and gallery educators met to plan, implement, review, and revise a pedagogical program.

The researchers found that using external spaces as sites (e.g., art galleries) for learning could enable students to reconceptualize the process of creative learning. Connecting students with a creative community can also offer students the opportunity to learn more about the institutionalized context out of school. In Sharp et al.'s (2006) report, creative providers (e.g., those who provide creativity-related services—dancers, designers, musical directors) are an essential part of the creative partnerships that would bring a variety of impacts on students' creative development. These impacts or outcomes include creative knowledge and skills, communication and collaboration skills, personal development (such as self-confidence and sense of maturity), and changes in attitudes toward creative activities. At the same time, involving creative practitioners could also give those practitioners a sense of pleasure and pride, with long-term relationships established between providers and school communities. Involving creative communities is especially empowering for disadvantaged students. According to Cooper (2004), in his study of drama project/workshop, one boy with learning and behavioral difficulties found that he could use imaginative action, instead of formal knowledge, to get meaningful solutions to a problem.

## PRACTICE AND POLICY ISSUES

Armed with these techniques and strategies, teachers may feel confident that they can teach creativity to their students. However, the goal is far from being accomplished. In fact, this is just the first step for educators to support the development of students' creative potentials. It takes time to develop one's creative competence (Beghetto & Kaufman, 2014). The famous "10-year rule"—most people need at least 10 years within their chosen field to achieve big-C creativity—best illustrates this relationship between time and creative outcomes. It is without doubt that most people would meet different teachers and go through different levels of education and different institutions within this 10-year period, making it difficult for a single teacher or a particular school to have a long-term positive impact on students' creativity development.

## From Extrinsic to Intrinsic: Motivation Issues

External motivators, although helpful and easy-to-use in most intervention programs, have detrimental effects on creativity. A large body of research showed that external factors, such as reward, competition, expected evaluation, deadlines, and surveillance, can "kill" creativity (Hennessey, 2000). When children are promised a reward on completion of a creative task, such as a "good player certificate" (Lepper, Greene, & Nisbett, 1973), they are more likely to exhibit lower creativity in their work, even if the reward is just a perception and not actually received (Hennessey & Amabile, 1988).

Nonetheless, evaluation and reward are not always negative influences on creativity (Plucker & Dow, 2010). Some forms of evaluation expectation can enhance creativity of performance. If contingent reward is replaced by performance feedback focused on the specific task, students may still feel intrinsically motivated even if the feedback sounds "rewarding" (Harackiewicz, Abrahams, & Wageman, 1987). In fact, the positive impact of task-focused feedback taps into a core aspect of intrinsic motivation: It is the motivation to do something for its own sake, for the sheer pleasure and enjoyment of the task itself (Hennessey, 2010). Although theoretically intrinsic motivation exists within individuals (Ryan & Deci, 2000), which makes it almost impossible to intervene from the external, teachers still can provide "channels" or "activities" for the development of intrinsic interest because intrinsic motivation also exists between individuals and activities. Ryan and Deci (2000) have suggested that, to facilitate this internalization of goals and regulations, it is important to consider some basic psychological needs, including the need for autonomy that emphasizes "free choice", the need for competence in terms of self-confidence and self-efficacy, and the need for relatedness that promotes a sense of belongingness and connectedness.

Translating this theory into creativity intervention and combining this with what we have discussed about effective techniques revealed several implications; a major one of which is autonomy. Freedom, free choice, and opportunities are especially important for students to develop a sense

of control and autonomy. In fact, many creativity interventions either explicitly or implicitly use this principle, which works quite well in terms of intrinsically motivating young people. Choosing your own topics and tools (Besançon & Lubart, 2008), freedom of expression and the freedom to fail (Burgess & Addison, 2007), and the absence of pre-arranged steps and explicit rules (Cremin et al., 2006) are good examples for this principle.

Providing autonomy is just the first step, however, to support intrinsically motivated creativity. The second implication, also a special case of autonomy but more related to competence, is ownership. Teachers need to provide opportunities for students to produce something of which to be proud (Sharp et al., 2006), whether it is a product or an idea. By taking ownership of perceptible creative outcomes, students may feel more confident and more competent about their creative potentials. The increase of self-confidence and self-efficacy would then intrinsically motivate young people to continue to pursue creative goals. Children can achieve ownership in a variety of ways; sometimes it is as simple as asking children to “give us your own idea,” and encouraging them to make creative products, which can greatly boost their creative productivity.

Still, students need teachers to provide constructive feedback on their creative action and products. But students do not just need knowledge and skills as provided by teachers, they also need love, respect, and a sense of belongingness through teacher–student interaction. This opens the channel for students to internalize external regulations, rules, skills, and so on. From a cognitive perspective, teachers’ feedback on the outcomes of students’ free choices or their own decision-making processes is very important for supporting this internalization and integration, such as creative metacognition (CMC; Kaufman & Beghetto, 2013) and creative problem solving processes (Scott, Leritz, & Mumford, 2004). To develop CMC, teachers may provide informative feedback on students’ creative strengths and weaknesses, so that students can develop self-knowledge about their own creative potentials. Helping students to understand what and when creativity is appropriate is also an essential part of CMC. Training of creative problem solving that

focuses on cognitive processes, such as problem identification, idea generation, implementation planning, solution monitoring, and conceptual combination, has proven to be very effective as well.

### From Small Scale to Large Scale: Policy Issues

**School-wide practice.** A more effective and efficient way to deal with the problem of pedagogical pressure perhaps is to adopt a school-wide practice which involves school administrators and classroom teachers. Many strategies and techniques are largely influenced by school-wide support. A critical factor that makes school-wide practice more important and more effective than teacher- or classroom-level practice is stability. Once a school adopts a particular educational philosophy, the philosophy would guide all aspects of practice over a relatively long period of time. For example, if the philosophy is that knowledge is open to exploration and creativity is an essential part of learning, a school may design its curriculum, organize classroom settings, and arrange its daily activities in a way that aligns with these tenets.

Sefer (1995) provided an example in which a 5-year experimental program was established in a school to teach creativity through drama play. Results show that the long-term program had a positive impact on creativity on the basis of formative and summative evaluations. Renzulli’s (1999) schoolwide enrichment model provides another feasible plan for schools to adopt. When talent development becomes a schoolwide goal, all students can benefit from the program. Some activities may provide opportunities for students to explore their creative potentials, such as enrichment clusters where students who share common interests come together to produce a product or a service for real-world situations. Studies have found that such enrichment activities accompanied by more specific pedagogical methods, such as the talents unlimited model (Newman, 1991, 2004), could assist students in developing their abilities to produce creative products. Hennessey (2015) also advocated for a type of school, called an “open” school, whose main philosophy is that teaching should be

learner-centered. She believes that creativity can be fostered if students are intrinsically motivated to learn.

**Policy environment.** As Sternberg (2015) pointed out, when educators want to implement those carefully controlled and closely monitored programs and practices on a larger scale, there are minimal effects on creativity. One explanation to this phenomenon may be that inertia in the educational system poses a persistent barrier to any effort aiming to make changes (Beghetto & Kaufman, 2014; Beghetto & Plucker, 2006). That said, if there is to be a long-term positive impact on creativity development, attention should be shifted toward a more systematic approach (e.g., reform of educational policy).

There is evidence that change in policy level may result in such an impact. For example, Cheung and Lau's (2010) study in Hong Kong showed that a period of education and curriculum reform that emphasizes creative thinking could have a positive influence on a whole generation. Currently in the United States, there is a reform effort focused on higher order thinking skills, including critical thinking and creativity (Partnership for 21st Century Skills, 2014), but whether the movement can have a long-term and large-scale effect is still in question given that standardized testing as a form of student assessment and teacher evaluation, which has little to do with creativity, is still highly valued in American schools.

However, standards may not be as detrimental to creativity as people think (Baer & Garrett, 2010; Combs, 2013). For example, Baer and Garrett (2010) attacked this notion of standard-creativity conflicts by noting that creativity not only requires divergent thinking but also convergent thinking, content knowledge, and domain skills. In his study, he found that most educators naturally associate creativity with divergent thinking and accountability with convergent thinking. Combs (2013), after a close examination of state standards, demonstrated that the standards would not necessarily rule out creativity or related thinking skills. She examined the Kentucky Core Academic Standards and identified some standards that specifically require higher-order thinking skills or promote creative

achievements: “gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate information while avoiding plagiarism,” or “conduct short as well as more sustained research projects on the basis of focused questions, demonstrating understanding of the subject under investigation” (p. 8). Therefore, the standards themselves do not prevent or discourage the teaching of creativity. What prevents it, however, might be how we implement these standards.

In fact, some state legislators have already been searching for some ways to motivate schools to provide opportunities for creativity and innovation. For example, Massachusetts has been working on the Index of Creativity and Innovation that aims at rating public schools on teaching, encouraging, and fostering creativity in students (Massachusetts Department of Elementary and Secondary Education, 2012). The state established a commission to develop the index, requesting that the commission complete a report detailing any factors to be considered in the index. In addition, Massachusetts also provides funding to support the design and implementation of curricula that promote creativity and innovation skills (Massachusetts Department of Elementary and Secondary Education, 2015). In a similar vein, the Oklahoma Innovation Index was developed by a statewide coalition of policymakers, researchers, and business leaders, measuring the number of opportunities for creative work in schools (Creative Oklahoma, 2015).

## SUMMARY AND CONCLUSIONS

Fostering creativity is a long-term endeavor that builds on small steps. The list of strategies reviewed in this chapter should provide some guidance for those individuals and groups striving to enhance creativity. Teachers are encouraged to experiment with different techniques and strategies to find ways that best fit their own practice, and school administrators can provide support by establishing a creative climate in schools and providing more resources for their teachers. Finally, policymakers can help create a positive climate toward innovation by modifying educational accountability systems

to reward schools and educators that foster student creativity and, at the least, provide flexible accountability structures that do not disincentivize attempts to foster student creativity.

## References

- Alfonso-Benlliure, V., Meléndez, J. C., & García-Ballesteros, M. (2013). Evaluation of a creativity intervention program for preschoolers. *Thinking Skills and Creativity*, 10, 112–120. <http://dx.doi.org/10.1016/j.tsc.2013.07.005>
- Amabile, T. M. (1983). *The social psychology of creativity*. <http://dx.doi.org/10.1007/978-1-4612-5533-8>
- Andersen, L. (2014). Visual-spatial ability: Important in STEM, ignored in gifted education. *Roeper Review*, 36, 114–121. <http://dx.doi.org/10.1080/02783193.2014.884198>
- Baer, J. (1996). The effects of task-specific divergent-thinking training. *Journal of Creative Behavior*, 30, 183–187. <http://dx.doi.org/10.1002/j.2162-6057.1996.tb00767.x>
- Baer, J., & Garrett, T. (2010). Teaching for creativity in an era of content standards and accountability. In R. A. Beghetto & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom* (pp. 6–23). New York, NY: Cambridge University Press.
- Beghetto, R. A. (2015). Teaching creative thinking in K12 schools: Lingering challenges and new opportunities. In R. Wegerif, L. Li, & J. C. Kaufman (Eds.), *The Routledge international handbook of research on teaching thinking* (pp. 201–211). New York, NY: Routledge.
- Beghetto, R. A., & Kaufman, J. C. (2014). Classroom contexts for creativity. *High Ability Studies*, 25, 53–69. <http://dx.doi.org/10.1080/13598139.2014.905247>
- Beghetto, R. A., & Plucker, J. A. (2006). The relationship among schooling, learning, and creativity: “All roads lead to creativity” or “You can’t get there from here”? In J. C. Kaufman & J. Baer (Eds.), *Creativity and reason in cognitive development* (pp. 316–332). <http://dx.doi.org/10.1017/CBO9780511606915.019>
- Belcher, T. L. (1975). Modeling original divergent responses: An initial investigation. *Journal of Educational Psychology*, 67, 351–358. <http://dx.doi.org/10.1037/h0076614>
- Besançon, M., & Lubart, T. (2008). Differences in the development of creative competencies in children schooled in diverse learning environments. *Learning and Individual Differences*, 18, 381–389. <http://dx.doi.org/10.1016/j.lindif.2007.11.009>
- Burgess, L., & Addison, N. (2007). Conditions for learning: Partnerships for engaging secondary pupils with contemporary art. *International Journal of Art and Design Education*, 26, 185–198. <http://dx.doi.org/10.1111/j.1476-8070.2007.00528.x>
- Cheung, P. C., & Lau, S. (2010). Gender differences in the creativity of Hong Kong school children: Comparison by using the new electronic Wallach–Kogan creativity tests. *Creativity Research Journal*, 22, 194–199. <http://dx.doi.org/10.1080/10400419.2010.481522>
- Combs, D. (2013). Creativity to the core: How the Kentucky Core Academic Standards can enhance creativity. *Kentucky Journal of Excellence in College Teaching and Learning*, 11(4), 1–11.
- Cooper, C. (2004). “A struggle well worth having”: The uses of theatre-in-education (TIE) for learning. *Support for Learning*, 19, 81–87. <http://dx.doi.org/10.1111/j.0268-2141.2004.00325.x>
- Costantino, T. (2015). Lessons from art and design education: The role of in-process critique in the creative inquiry process. *Psychology of Aesthetics, Creativity, and the Arts*, 9, 118–121. <http://dx.doi.org/10.1037/aca0000013>
- Creative Oklahoma. (2015). *Oklahoma innovation index*. Retrieved from <http://stateofcreativity.com/oklahoma-innovation-index>
- Cremin, T. (2006). Creativity, uncertainty and discomfort: Teachers as writers. *Cambridge Journal of Education*, 36, 415–433. <http://dx.doi.org/10.1080/03057640600866023>
- Cremin, T., Burnard, P., & Craft, A. (2006). Pedagogy and possibility thinking in the early years. *Thinking Skills and Creativity*, 1, 108–119. <http://dx.doi.org/10.1016/j.tsc.2006.07.001>
- Cumming, R. (2007). Language play in the classroom: Encouraging children’s intuitive creativity with words through poetry. *Literacy*, 41, 93–101. <http://dx.doi.org/10.1111/j.1467-9345.2007.00463.x>
- Dunleavy, M., Dede, C., & Mitchell, R. (2009). Affordances and limitations of immersive participatory augmented reality simulations for teaching and learning. *Journal of Science Education and Technology*, 18, 7–22. <http://dx.doi.org/10.1007/s10956-008-9119-1>
- Garaigordobil, M. (2006). Intervention in creativity with children aged 10 and 11 years: Impact of a play program on verbal and graphic–figural creativity. *Creativity Research Journal*, 18, 329–345. [http://dx.doi.org/10.1207/s15326934crj1803\\_8](http://dx.doi.org/10.1207/s15326934crj1803_8)
- Glăveanu, V. P. (2013). Rewriting the language of creativity: The Five A’s framework. *Review of General Psychology*, 17, 69–81. <http://dx.doi.org/10.1037/a0029528>
- Halsey, K., Jones, M., & Lord, P. (2006). *What works in stimulating creativity amongst socially excluded young people*. Slough, England: National Foundation

- for Educational Research. Retrieved from <https://www.nfer.ac.uk/publications/NES01/NES01.pdf>
- Harackiewicz, J. M., Abrahams, S., & Wageman, R. (1987). Performance evaluation and intrinsic motivation: The effects of evaluative focus, rewards, and achievement orientation. *Journal of Personality and Social Psychology*, 53, 1015–1023. <http://dx.doi.org/10.1037/0022-3514.53.6.1015>
- Harris, M. B., & Fisher, J. L. (1973). Modeling and flexibility in problem-solving. *Psychological Reports*, 33, 19–23. <http://dx.doi.org/10.2466/pr0.1973.33.1.19>
- Harris, M. B., & O'Donnell, M. J. (1974). Effects of a symbolic model's originality, sex and doodles on original responses. *Psychological Reports*, 35, 951–954. <http://dx.doi.org/10.2466/pr0.1974.35.2.951>
- Hennessey, B. A. (2000). Rewards and creativity. In C. Sansone & J. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 55–78). <http://dx.doi.org/10.1016/B978-012619070-0/50025-8>
- Hennessey, B. A. (2010). Intrinsic motivation and creativity in the classroom: Have we come full circle? In R. A. Beghetto & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom* (pp. 329–361). <http://dx.doi.org/10.1017/CBO9780511781629.017>
- Hennessey, B. A. (2015). If I were Secretary of Education: A focus on intrinsic motivation and creativity in the classroom. *Psychology of Aesthetics, Creativity, and the Arts*, 9, 187–192. <http://dx.doi.org/10.1037/aca0000012>
- Hennessey, B. A., & Amabile, T. M. (1988). The conditions of creativity. In R. J. Sternberg (Ed.), *The nature of creativity* (pp. 11–38). New York, NY: Cambridge University Press.
- Hong, E., Hartzell, S. A., & Greene, M. T. (2009). Fostering creativity in the classroom: Effects of teachers' epistemological beliefs, motivation, and goal orientation. *Journal of Creative Behavior*, 43, 192–208. <http://dx.doi.org/10.1002/j.2162-6057.2009.tb01314.x>
- Hooker, C., Nakamura, J., & Csikszentmihalyi, M. (2003). The group as mentor: Social capital and the systems model of creativity. In P. B. Paulus & B. A. Nijstad (Eds.), *Group creativity: Innovation through collaboration* (pp. 225–244). <http://dx.doi.org/10.1093/acprof:oso/9780195147308.003.0011>
- Kaufman, J. C., & Beghetto, R. A. (2009). Beyond big and little: The four c model of creativity. *Review of General Psychology*, 13, 1–12. <http://dx.doi.org/10.1037/a0013688>
- Kaufman, J. C., & Beghetto, R. A. (2013). In praise of Clark Kent: Creative metacognition and the importance of teaching kids when (not) to be creative. *Roeper Review*, 35, 155–165. <http://dx.doi.org/10.1080/02783193.2013.799413>
- Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology*, 28, 129–137. <http://dx.doi.org/10.1037/h0035519>
- Magnussen, R., Hansen, S. D., Plank, T., & Sherson, J. F. (2013). Scientific discovery games for authentic science education. In P. Escudeiro & C. Vaz de Carvalho (Eds.), *Proceedings of the 7th European Conference on Games Based Learning* (pp. 344–351). Porto, Portugal: Instituto Superior de Engenharia do Porto.
- Massachusetts Department of Elementary and Secondary Education. (2012). *Massachusetts commission to develop an index of creative and innovative education in the public schools*. Retrieved from <http://www.doe.mass.edu/research/reports/2012/09CIEindex.pdf>
- Massachusetts Department of Elementary and Secondary Education. (2015). *Massachusetts creativity/innovation initiative*. Retrieved from <http://www.doe.mass.edu/grants/2016/189>
- Newman, J. L. (1991). *The effects of the talents unlimited model on students' creative productivity* (Unpublished doctoral dissertation). University of Alabama, Tuscaloosa.
- Newman, J. L. (2004). Talents and type IIIs: The effects of the talents unlimited model on creative productivity in gifted youngsters. *Roeper Review*, 27, 84–90. <http://dx.doi.org/10.1080/02783190509554295>
- O'Donnell, A. M. (1999). Structuring dyadic interaction through scripted cooperation. In A. M. O'Donnell & A. King (Eds.), *Cognitive perspectives on peer learning* (pp. 179–196). Mahwah, NJ: Erlbaum.
- Pang, W. (2015). Promoting creativity in the classroom: A generative view. *Psychology of Aesthetics, Creativity, and the Arts*, 9, 122–127. <http://dx.doi.org/10.1037/aca0000009>
- Partnership for 21st Century Skills. (2014). *Our vision and mission*. Retrieved from <http://www.p21.org/about-us/our-mission>
- Pignéguy, S. (2004). Our Didcot: An inclusive arts project devised by a learning support unit. *Support for Learning*, 19, 77–80. <http://dx.doi.org/10.1111/j.0268-2141.2004.00324.x>
- Plucker, J. A., & Barab, S. A. (2005). The importance of contexts in theories of giftedness: Learning to embrace the messy joys of subjectivity. In R. J. Sternberg & J. A. Davidson (Eds.), *Conceptions of giftedness* (2nd ed., pp. 201–216). <http://dx.doi.org/10.1017/CBO9780511610455.013>
- Plucker, J. A., & Beghetto, R. A. (2003). Why not be creative when we enhance creativity? In J. H. Borland

- (Ed.), *Rethinking gifted education* (pp. 215–226). New York, NY: Teachers College Press.
- Plucker, J. A., Beghetto, R. A., & Dow, G. T. (2004). Why isn't creativity more important to educational psychologists? Potentials, pitfalls, and future directions in creativity research. *Educational Psychologist*, 39, 83–96. [http://dx.doi.org/10.1207/s15326985ep3902\\_1](http://dx.doi.org/10.1207/s15326985ep3902_1)
- Plucker, J. A., & Dow, G. T. (2010). Attitude change as the precursor to creativity enhancement. In R. A. Beghetto & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom* (pp. 362–379). <http://dx.doi.org/10.1017/CBO9780511781629.018>
- Plucker, J. A., Kaufman, J. C., & Beghetto, R. A. (2015). *What we know about creativity*. Washington, DC: Partnership for 21st Century Skills. Retrieved from [http://www.p21.org/storage/documents/docs/Research/P21\\_4Cs\\_Research\\_Brief\\_Series\\_-\\_Creativity.pdf](http://www.p21.org/storage/documents/docs/Research/P21_4Cs_Research_Brief_Series_-_Creativity.pdf)
- Plucker, J. A., McWilliams, J., & Alanazi, R. (2016). Creativity, culture, and the digital revolution: Implications and considerations for education. In V. Glăveanu (Ed.), *Palgrave handbook of creativity and culture research* (pp. 517–533). London, England: Palgrave Macmillan.
- Pyryt, M. C. (1999). Effectiveness of training children's divergent thinking: A meta-analytic review. In A. S. Fishkin, B. Cramond, & P. Olszewski-Kubilius (Eds.), *Investigating creativity in youth: Research and methods* (pp. 351–365). Cresskill, NJ: Hampton.
- Renzulli, J. S. (1999). What is this thing called giftedness, and how do we develop it? A twenty-five-year perspective. *Journal for the Education of the Gifted*, 23, 3–54. <http://dx.doi.org/10.1177/016235329902300102>
- Rhodes, M. (1961). An analysis of creativity. *Phi Delta Kappan*, 42, 305–310.
- Runco, M. A., & Acar, S. (2012). Divergent thinking as an indicator of creative potential. *Creativity Research Journal*, 24, 66–75. <http://dx.doi.org/10.1080/10400419.2012.652929>
- Russ, S. W. (2014). *Pretend play in childhood: Foundation of adult creativity*. <http://dx.doi.org/10.1037/14282-000>
- Russ, S. W., & Wallace, C. E. (2013). Pretend play and creative processes. *American Journal of Play*, 6, 136–148.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78. <http://dx.doi.org/10.1037/0003-066X.55.1.68>
- Schacter, J., Thum, Y. M., & Zifkin, D. (2006). How much does creative teaching enhance elementary school students' achievement? *Journal of Creative Behavior*, 40, 47–72. <http://dx.doi.org/10.1002/j.2162-6057.2006.tb01266.x>
- Scott, G., Leritz, L. E., & Mumford, M. D. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal*, 16, 361–388. <http://dx.doi.org/10.1080/10400410409534549>
- Sefer, J. (1995). The effects of play oriented curriculum on creativity in elementary school children. *Gifted Education International*, 11, 4–17.
- Sharp, C., Pye, D., Blackmore, J., Eames, A., Easton, C., Filmer-Sankey, C., . . . Wilson, R. (2006). *National evaluation of creative partnerships: Case study report—Revised final version*. London, England: Creative Partnerships.
- Silvia, P. J., Beaty, R. E., Nusbaum, E. C., Eddington, K. M., Levin-Aspenson, H., & Kwapil, T. R. (2014). Everyday creativity in daily life: An experience-sampling study of “little c” creativity. *Psychology of Aesthetics, Creativity, and the Arts*, 8, 183–188. <http://dx.doi.org/10.1037/a0035722>
- Simonton, D. K. (1984). Artistic creativity and interpersonal relationships across and within generations. *Journal of Personality and Social Psychology*, 46, 1273–1286. <http://dx.doi.org/10.1037/0022-3514.46.6.1273>
- Sowden, P. T., Clements, L., Redlich, C., & Lewis, C. (2015). Improvisation facilitates divergent thinking and creativity: Realizing a benefit of primary school arts education. *Psychology of Aesthetics, Creativity, and the Arts*, 9, 128–138. <http://dx.doi.org/10.1037/aca0000018>
- Sternberg, R. J. (2015). Teaching for creativity: The sounds of silence. *Psychology of Aesthetics, Creativity, and the Arts*, 9, 115–117. <http://dx.doi.org/10.1037/aca0000007>
- Walsh, C. S. (2007). Creativity as capital in the literacy classroom: Youth as multimodal designers. *Literacy*, 41, 79–85. <http://dx.doi.org/10.1111/j.1467-9345.2007.00461.x>
- Yi, X., Plucker, J. A., & Guo, J. (2015). Modeling influences on divergent thinking and artistic creativity. *Thinking Skills and Creativity*, 16, 62–68. <http://dx.doi.org/10.1016/j.tsc.2015.02.002>