

**SKILLS
FOR LIFE**

Creativity



IDB Inter-American
Development Bank

Copyright © [2022] Inter-American Development Bank. This work is licensed under a Creative Commons IGO 3.0 Attribution-NonCommercial-NoDerivatives (CC-IGO BY-NC-ND 3.0 IGO) license (<http://creativecommons.org/licenses/by-nc-nd/3.0/igo/legalcode>) and may be reproduced with attribution to the IDB and for any non-commercial purpose. No derivative work is allowed.

Any dispute related to the use of the works of the IDB that cannot be settled amicably shall be submitted to arbitration pursuant to the UNCITRAL rules. The use of the IDB's name for any purpose other than for attribution, and the use of IDB's logo shall be subject to a separate written license agreement between the IDB and the user and is not authorized as part of this CC-IGO license.

Note that link provided above includes additional terms and conditions of the license. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.



Authors



Carolina Cuesta

MEd, MSc. Purdue University

is a Fulbright Scholar and a Ph.D. student in Learning Design and Technology at Purdue University. Her research interests center around how to foster creativity and innovation in learning environments. She holds a Master's degree in Education from Purdue University and a Master's degree in Science, Technology, and Innovation Management from the University of Antioquia in Colombia. Carolina has been teaching Entrepreneurship and Innovation for 5 years.



Brad Hokanson Ph.D

University of Minnesota

is the Mertie W Buckman Professor of Design Education at the University of Minnesota. His research focuses on the development of creativity in learners. He received his Ph.D. in Instructional Technology from the University of Minnesota.

"I never made one of my discoveries through the process of rational thinking."

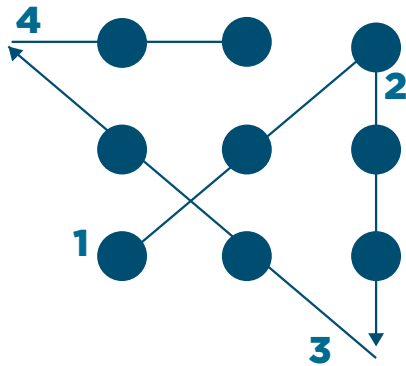
Albert Einstein, 1879–1955, Theoretical Physicist

Abstract

Creativity is a critical human 21st-century skill that allows us to produce novel and valuable ideas. Creative ideas are original and make a unique contribution to any field, but also, they help to solve complex problems that humanity is continuously facing. Creativity is essential at the individual level to solve problems on the job and in daily life. At the societal level, creativity can lead to new scientific findings, new movements in art, and new inventions. Corporations and governments are frequently looking to support and encourage developing creativity as a driver for innovation to promote technological development and economic growth. Educational institutions play a crucial role in this development and in fostering creative thinking. This brief will discuss how creativity has been conceptualized and will share some strategies to foster creativity in a learning environment and the workplace. Also, it will discuss how technology impacts creativity development.

1. Introduction

People often use the metaphor of “thinking outside the box” to refer to being creative, thinking differently, and generating ideas. It is believed that the term was coined in the 1970s or 80s by a group of consultants, who challenged their clients to draw nine dots on a piece of paper and then connect the dots without lifting the pencil using only four straight lines.



Still, with connecting nine dots, does it mean that I am more creative? If so, how can we go to get to Mars, ride a jetpack to the Moon, or end starvation from connecting nine dots? What does it mean to be creative?

Historically, the innovations that humanity has developed are often described as a creative breakthrough. Creativity has often been related to coming from great minds. When we think of creativity, innovation, and invention, we think about great artists and scientists, such as Vincent van Gogh, Mozart, or Albert Einstein. These are people who have made significant contributions to humankind in terms of knowledge, techniques, technology, and innovation.

But, if creativity is linked to the greatest minds in humanity, what about the rest of us? What about those of us who are not great artists or scientists? Can we be creative? If so, how?

Today, all challenges nowadays are more complex. The future is unpredictable, and we must prepare ourselves to face this uncertainty. Thus, creativity becomes a necessary skill to develop toward solving complex problems in the future. As a result of these concerns, international institutions like the World Economic Forum (2018) and the OECD (2013, 2018) highlight the importance of creativity as one essential skill in the labor market in the 21st century and expresses the importance of promoting creativity in classrooms as a necessary competence to develop in students to improve educational quality.

Creativity is a competency that can be developed, fostered, taught, and learned. Therefore, we all have the potential to be creative. In this brief, we will discuss what creativity is from different perspectives and theories, how we can measure creativity, and the possibilities to foster creativity in learning and work environments.

2. Everybody talks about creativity, but what is creativity?

There have been several debates related to the definition of creativity in the literature. However, most researchers and theorists agree that creativity involves developing a novel, useful, effective, original, valuable product, idea, or solution (Cropley, 2011; Hennessey & Amabile, 2010; Runco & Jaeger, 2012).

Creativity is not limited to the artistic fields, as most people believe but also occurs in areas such as science, business, engineering, manufacturing, technology, medicine, administration, and education (Cropley, 2011). Given that creativity can be developed in all fields, it can be explained from different perspectives and models.

Creativity Theories and Models

In addition to the different approaches to defining creativity, various models have been developed to help us understand it and foster it (see Table 1), like the Four P model (Rhodes, 1961); the Four C model (Kaufmand & Beghetto, 2009); and The Five A model (Glave nu, 2013), among others.

Table 1.
Models of creativity

Model	Components
Four P model	Person, Process, Product, and Press
Four C model	Big-c (historical creative accomplishments of the individual) Pro-c (professional accomplishments with years of experience) little-c (The product or idea developed might be valuable to others), and mini-c (the creative act or product is new and original for the individual himself)
Five A model	Actor, Action, Artifact, Audience, and Affordance

One of the most used models to understand creativity is the Rhodes's (1961) Four-P model. In this model, creativity can be conceptualized from the perspective of the creative person (a set of personal characteristics), the creative product (artifacts or results of a process), the creative process (creative thinking), and the creative press that is the pressure of environmental factors that can influence positively or negatively creativity development (Cropley, 2011; Kozbelt, 2011).

These models can guide practitioners and researchers to learn more about how to foster creativity in different settings. For example, to improve teaching for creativity, facilitate problem solving in any domain, and enhance economic development (Gruszka & Tang, 2017).

The Creative Person

To explain creativity from the person's perspective, we need to consider individual aspects and characteristics that make her/him different from others, such as cognitive processes, personality, ability, thinking style, attitude, and behavior, self-concept, and even idiosyncratic behavior (Kandler et al., 2016; Runco & Kim, 2011).

Sawyer (2012), in his book *Explaining creativity: The science of human innovation*, makes a historical evaluation of how several researchers have argued about the possible different personality traits and skills that a creative person exhibits. Here are some traits and aspects of a creative person:

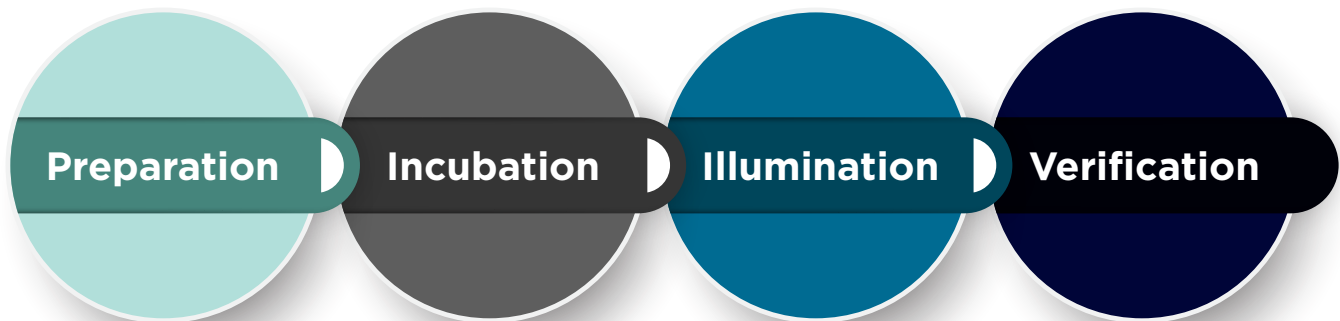


However, there is no guarantee that if a person shares the same characteristics as a highly creative person, they will also be creative without an appropriate environment that supports creativity (Runco & Kim, 2011). Personality traits are just one piece of the puzzle. Researchers have identified a large number of traits or attributes associated with high levels of creativity. However, creativity does not seem to be the result of one personality trait in particular but the mix of individual and environmental factors (Sawyer, 2012).

The Creative Process

There are mixed theories about how the creative process works. Some authors argue that once you have a creative idea, your creative process is done. But research on the creative process explains that creativity tends to happen in a sequence of steps and take place over time, and that most of the creativity occurs while doing the work (Sawyer, 2012).

One of the first models of the creative process is the Wallas (1926) four-stage model. This model is still the most popular used to explain the creative process. It entails **Preparation** (gathering information and problem finding), **Incubation** (take a step back from the process, the unconscious thought process happens), **Illumination** (generation of ideas for creative solutions), **Verification** (evaluation and analysis of ideas - enhancing).



The Creative Product

The creative product is the result of the creative process, which additionally includes palpable and observable artifacts such as paintings, novels, buildings, and inventions. Creative ideas can later be concretized into tangible forms, like, designs or patents (Plucker & Guo, 2018), or intangible results such as methods, laws, or protocols.

A few measures have been developed to assess creative products involving experts in specific domains, such as art, engineering, chemistry, and design, among others (Runco & Kim, 2011). Yet, there is no general measure that can be used to assess all creative products.

Sawyer (2012, 2019) for example, explains that Jazz it is a mixture of other kinds of music. It is dynamic and changes with new influences and ideas, and past experiences of the artist, to finally create a unique sound and composition. Only experts in Jazz can assess the creativity of the compositions. That is why learning is strongly related to creativity.

What we create is associated with our past experiences, and that makes our creations unique because our life experiences are unique (Sawyer, 2012, 2019).

The Creative Press (Environment)

The term creative press refers to the ecological environment and the factors that can influence creative behavior. Studies of press factors have demonstrated that there are supportive and inhibiting aspects of the environment, such as resources, policies, cultural, organizational, and social factors (Runco & Kim, 2011).

Other Models

Other models, like the componential models, explain how specific components, or elements, work together to produce the creative behavior, evidencing that multiple component must come together for creativity to occur (Sternberg, 2011).

Researchers on creativity agree creativity is not a singular phenomenon. It involves different complex components and characteristics (Table 2) that interact with each other; these components concern cognition, knowledge, personality, motivation, and the environment. The use of creativity models can allow policymakers and educators to have a framework to understand better and develop educational programs and policies to foster creativity.

Table 2.
Summary of componential creativity models and theories

Creativity Theories	Characteristics
The systems model of creativity (Csikszentmihalyi, 1964, 1988)	This “systems” approach to creativity highlights the interaction of the individual (who draws upon information in a domain and transforms or extends it via cognitive processes, personality traits, and motivation), domain (a culturally defined symbol system that preserves and transmits creative products to other individuals and future generations), and the field (people who control or influence a domain that evaluates and selects new ideas).
The componential theory of creativity (Amabile, 1983)	Creativity is the confluence of intrinsic motivation , domain-relevant skills , and creativity-relevant skills .
The Theory of Multiple Intelligences (Gardner, 1983)	This theory distinguishes the importance of the domain (the body of knowledge about a particular subject area) and the field (the context in which this body of knowledge is studied and elaborated, including the persons working with the domain). Both are important to the development, and ultimately, the recognition of creativity.
The evolving systems approach to creative work (Gruber, 1988)	Creative work evolves over long periods. A person’s knowledge, purpose, and affect grow over time, amplify deviations that an individual encounter, and lead to creative products. It is purposeful work and there is a constant interplay among purpose, play, and chance.
The investment theory of creativity (Lubart & Sternberg, 1995)	They suggest that five resources (intellectual styles , knowledge , personality , motivation , and environmental context) contribute to creativity. Creative people are willing and able to “buy low and sell high” in the realm of ideas. Buying low means pursuing ideas that are unknown or out of favor but that have growth potential. Often, when these ideas are first presented, they encounter resistance. The creative individual persists in the face of this resistance, and eventually sells high, moving on to the next new or unpopular idea.
The Amusement Park Theoretical Model (APT) (Baer & Kaufman, 2005)	Creativity is across domains: The APT Model is based on the metaphor of a large amusement park. There are initial requirements that, to varying degrees, are necessary to creative performance in all domains (e.g., intelligence, motivation). The first level (initial requirements) is very general, and each subsequent level gets more and more domain-specific. By the final level (microdomains), the theory is very domain-specific.

Source: Adpated from Sternberg R. J. (2011). Componential models of creativity. In Runco, M. A., & Pritzker, S. R. (Eds.). Encyclopedia of creativity. Academic Press.

3. Assessment and measurement

As discussed, creativity is a broadly used term. There is a range of creativity definitions, perspectives, and assessments. Sometimes, “creativity” is used to specify a personal characteristic, a cognitive process, or used as a descriptor of objects or ideas. Therefore, there is also a broad range of methods to evaluate it and assess it. For example, some self-assessments are used to measure creativity as personal characteristics. Creative behaviors and divergent thinking tests are used to measure everyday creativity by assessing multiple cognitive processes, and tests like the Consensual Assessment Technique (CAT) are used to evaluate the creativity of an object or idea.

Creativity measures can be classified into several types, depending upon their aim and content. Most are psychometric methods, they measure mental attributes, behavior, and performance. Yet, there is no single best measure for creativity, and every assessment has its strengths and limitations depending on its use (Kaufman et al., 2008).

Since creativity combines cognitive, emotional, and environmental factors that interact dynamically, researchers have been developing tests, scales, and ratings to measure these intrinsically human factors (Kanlı, 2020). Psychometric measurements of the creative person and process, measures cognitive factors like problem solving, idea generation, idea evaluation, flexibility, analogical thinking, associative thinking, and divergent thinking. The summary table made by Kanlı, (2020) as an adaptation form Kaufman et al., (2008) can help practitioners, educators, and policy makers to evaluate and design effective creativity assessments for different areas of study and industries (see Table 3).



Table 3.
 Brief overview of creativity assessments

Type of Assessment	Examples	Advantages	Disadvantages
Process-based assessment (e.g., divergent thinking tests)	Torrance Tests of Creative Thinking	Well-researched having years of research data available	May only tap limited aspects of creativity
Person-based assessment (e.g., Assessment by others)	Group Inventory for Finding Creative Talent or other instruments	Creativity is rated by a teacher, peer, or parent who knows the individual.	Questions about validity and reliability
Person-based assessment (e.g., Self-assessment)	Asking someone to rate his or her own creativity	Quick, cheap, and has high face validity	People can be subjective about their level of creativity
Product-based assessment (e.g., Consensual assessment technique)	Having experts rate a creative product	Allows for very domain-specific information about creativity,	Time consuming and expensive

Source: Kanlı (2020). Adapted from Kaufman, J. C., Plucker, J. A., & Baer, J. (2008). Essentials of creativity assessment (Vol. 53). John Wiley & Sons.

Despite this broad range of possible cognitive factors to measure, one of the most used tests to measure creativity are divergent thinking tests. Divergent thinking is a thought process used to generate creative ideas by searching for many possible solutions. Here, some examples and descriptions of some of the most used tests:

Torrance Test of Creative Thinking (TTCT)

One divergent thinking test that is highly utilized in research, academic, and training areas is the Torrance Test of Creative Thinking (TTCT) (Torrance, 1974). Although **divergent thinking** is an important indicator of creativity, it is just one part of the creative process (Four P model). In this test, the individual produces as many responses to verbal or figural stimuli as possible (generate ideas). The test is scored according to the concepts of originality (the ability to produce novel and unusual ideas), fluency (the ability to generate many ideas), flexibility (the ability to move fluidly between different representations or categories) and elaboration (the ability to develop ideas fully).

Consensual Assessment Technique (CAT)

The Consensual Assessment Technique (CAT) assesses **creativity products** (Amabile, 1982). The CAT is a method of assessing creative performance that can be used in any domain and it is recognized as one of the most effective tools for measuring creative work. It is based on the idea that the best measure of the creativity of a work of art, a theory, or any other artifact is the combined assessment and opinions of experts in that particular field.

Creativity Checklist (Ratings by Peers, Teachers, or Supervisors)

The Creativity Checklist that assesses the **creative process** (Proctor & Burnett, 2004). The Creativity Checklist is composed of characteristics thought to be indicative of a creative person, both cognitive and dispositional traits in 9 scales: fluent thinker, flexible thinker, original thinker, elaborative thinker, intrinsically motivated student, curious/immersed in topic, risk taker, imaginative/intuitive, and engages in complex tasks/enjoys a challenge.

Creative Behavior Inventory (CBI): Self-Reported Creative Activities

The creative behavior inventory (CBI) assesses how creative the **person** is through self-reported creative activities (Hocevar, 1981). The Creative Behavior Inventory (CBI), initially developed by Hocevar, was one of the first self-assessments of creative behavior and accomplishment to be widely used in research (Silvia et al., 2012). CBI measures creativity in domains such as literature, music, crafts, art, math, and science, and performing arts.



4. Nurturing Creativity skills

Much of the existing research in creativity is focused on individual, psychological, and/or personality variables. However, despite its importance, these variables often do not offer practical advice to educators (Beghetto, 2010).

Support for Creativity in a Learning Environment (SCALE)

The intentional design of learning environments that foster creativity is fundamental to support creativity. For example, Richardson and Mishra (2018) developed the Support for Creativity in a Learning Environment (SCALE), an instrument designed to assess how a learning environment supports student creativity. This tool provides educators with specific examples for the support of creativity in a learning environment. It consists of three categories: physical environment, learning climate, and learner engagement (Richardson & Mishra, 2018).

Physical Environment

The space of the learning environment itself should be open, containing furniture that is flexible to allow multiple spaces to work on. Also, teachers should have a variety of rich resources and materials for the student to use.

Learning Climate

The relationship between teacher and student, among students, plays an integral role in support of creativity. It is suggested that the learning climate be an open atmosphere in which students communicate freely, accept, and discuss new ideas, trust each other, and support taking risks. Where opportunity exploration, originality, and cooperation between teachers and students are valued.

Learner Engagement

This includes the actual tasks that students are involved in. Some tasks that support creativity involve active learning where the focus of learning is the process, not the product. Also, all members of the environment are seen as co-learners and co-teachers. Open-ended tasks that involve choice or focus on authentic problems. Pedagogical practices like inquiry or discovery-based learning support student creativity, especially when tasks are relevant and exciting.

The SCALE is an informal instrument that could be completed in one sitting in 10-20 minutes (Table 4). It will allow educators to reflect on the elements that can support creativity at a certain time in a learning environment (Richardson & Mishra, 2018).

Table 4.
SCALE instrument

SCALE Component	Rating			
Physical Environment				
A variety of resources/supplies are available and accessible to students.	0	1	2	3
Examples of student work appear in the space.	0	1	2	3
A variety of workstations or areas are available to students.	0	1	2	3
The furniture allows for multiple arrangements and configurations.	0	1	2	3
Learning Climate				
Students are involved in discussions among themselves, with or without the teacher, that deepen their understanding.	0	1	2	3
The students are caring, respectful, and value differences.	0	1	2	3
The teacher is a facilitator, co-learner, explorer, or inquirer with students.	0	1	2	3
Mistakes, risk-taking, and novel ideas are valued or encouraged.	0	1	2	3
Learner Engagement				
Students are involved in tasks that are open-ended and/or involve choice.	0	1	2	3
Students are involved in activities that may include inquiry, project based learning, or interdisciplinary tasks.	0	1	2	3
Students use multiple perspectives/viewpoints/ways of knowing or various modes of investigation/problem solving.	0	1	2	3
Students demonstrate interest in or enthusiasm for the activity beyond being "on task."	0	1	2	3
Students spend time developing ideas for deeper understanding and/or reflecting on their learning.	0	1	2	3
Students work at their own pace and/or time is used flexibly.	0	1	2	3

Source: Richardson, C., & Mishra, P. (2018). Learning environments that support student creativity: Developing the SCALE. Thinking Skills and Creativity, 27, 45–54. <https://doi.org/10.1016/j.tsc.2017.11.004>

Scoring the SCALE:

- 0 No Evidence - No evidence for the item. The item was not observed.
 - 1 Minimal Evidence - Minimal evidence for the item. This may include only one or two students involved in the item or a minimal amount of time spent on the item.
- 2 Moderate Evidence - Moderate evidence of the item. Multiple but not the majority of students are involved. The item is observed for a limited amount of time.
 - 3 High Evidence - High evidence of the item. The item is infused throughout the environment with the majority of students involved in or much time spent on the item.

Other pedagogical approaches to teach creativity include a variety of strategies where the environment is less structured, includes more hands-on activities, and multiple learning ways. Additionally, the development of creativity can also be accomplished at a modest cost and while integrated into traditional subjects of learning. For example, according to Plucker and Guo (2018), using these strategies could help educators design interventions to foster creativity:

Play- and Game-Based Interventions

Play-oriented or game-based approaches can support creativity development for people of all ages. For example, Russ (2014) suggested that pretend play may provide practice for solving real-problems and processing emotions. Pretend play involves the use of fantasy, symbolism, make-believe, and expression of emotion to compose stories or narratives, generate ideas, and practice analogical and divergent thinking (Russ, 2014). In the game-based approach, educators must consider several factors, including game selection and how games align with their teaching and students learning goals.

Developing Creative Ideation

Ideation, or divergent thinking, refers to generating multiple responses or solutions to a problem. It is a key creativity indicator (Runco, 2010). Therefore, seeking unknown or divergent answers to challenges is key to develop creative thinking. Divergent thinking training is a widely used intervention to enhance the number and quality of students' ideas and can be used for different domains. For example, math teachers can show students how to solve problems using nontraditional methods so risk taking is encouraged (Luria et al., 2017).

Fostering Creative Attitudes

Most creative achievements result from hard work and considerable time rather than a brief flash of insight. Unfortunately, many people still believe that being creative is part of some mystical phenomenon inspiration while ignoring the intentionality and choice behind the creative act. A creative attitude develops in a creative environment which leads then to creative thinking. The stronger the creative environment, the more creative attitudes can be developed and displayed by the people in that environment (Jamali, 2020). Therefore, teachers, administrators, and policymaker's need to design creative environments to develop creative attitudes in their students and population. Hence their beliefs about creativity can influence society's beliefs about creativity.



Creative Modeling

According to Yi et al., (2015), modeling generally appears to have a positive effect on artistic creativity and divergent thinking. Many human behaviors, including creativity, are learned by observing an appropriate model. Evidence supporting these effects of creative modeling comes from a variety of sources, including classroom-based instruction (Yi et al., 2015). By demonstrating creativity (creative work produced by others), educators can establish a creative environment that could inspire students to take risks, generate novel ideas, and enhance their self-expression (Beghetto & Kaufman, 2014).

In addition to the pedagogical approaches mentioned above, instructional strategies like project-based learning and problem-based learning used to find solutions to real-world problems are effective ways to develop creativity. Consequently, designing learning activities that include creativity as a learning goal can foster creative thinking in the classroom. An example is, diversifying assessment standards and presentation media (using different tools and ways for presenting content and evaluating it) and practicing negotiated assessment to design creative ways to assess (involve the students in the course/training evaluations design).

Enhancing Creativity with Technology

Digital technology has impacted on how humans now live, work, think, communicate, and create (Zhao, 2012). Using different technologies, such as digital devices, applications, and social media, allows people to see new opportunities to solve complex problems of 21st century society (Plucker & Guo, 2018). However, the interaction between learning, technology, and creativity is still unclear in terms of effective tool design, knowledge, and practices for practitioners to use in the classroom to help students develop digitally creative skills and design learning experiences to foster creativity (Mishra & Henriksen, 2018; Zhao, 2012).

According to Guo and Woulfin (2016), technology can get students and teachers to engage with information in different ways, allowing for a better understanding of complex data. Another benefit of using technology in the classroom is the enhancement of communication and collaboration in creative activities. With mobile devices' proliferation, students can engage in interactive and collaborative problem-solving in complex, authentic classroom practices, such as in a simulated problem context (case-based learning, problem-based learning).

There is a calling from the academic community (Henriksen et al., 2021), to policymakers, educators, and international institutions to continue discussing how technology can enhance creativity. Henriksen et al., 2021 states that it is vital to do more classroom-based empirical research and participatory or action research to create greater cohesion between research, policy, and practice.

5. Implications

In a rapidly changing world, generating and evaluating ideas to develop new knowledge and creating social and economic value is imperative for advancing a knowledge-based economy and revindicating some countries' innovation weaknesses. Despite the importance of supporting creativity development in society, researchers have noted that school systems still function in traditional ways, with restrictive practices for teachers and students, such as fixed curriculum, linear single answer assessments, and structured and rigid content that could limit creative thinking (Collins & Halverson, 2018). Therefore, countries worldwide have been evaluating educational policies and developing policies to foster creativity and creativity related skills (Henriksen et al., 2018). For example, some the countries, such as Australia, Bulgaria, the Czech Republic, Finland, and Slovakia, have included creativity into their curriculum policies as an educational outcome or essential skill needed for students (see Table 5).

Table 5.
International Educational Policies for Creativity

Country	Policy
Australia	The Australian Curriculum (ACARA, n.d.) is the most important set of policy frameworks. It stipulates the minimum curriculum for F-10 students in learning areas (subject disciplines), cross-curriculum priorities, and general capabilities. Importantly, one of the seven General Capabilities for F-10 is Critical and Creative Thinking.
Bulgaria	The term “creativity” did not appear officially within educational law until 2016 when the New Pre-School and School Education Law came into action. There, the term creativity appears in article 77, expressing the key competencies expected by Bulgarian students, such as competence #8: cultural awareness and competence for expression via creativity.
Czech Republic	In the Czech national curricular advisory document, creativity and creative activities in the curriculum (2013) for elementary schools are associated primarily with artistic performance (Art Education, Music Education, Dancing Education, etc.). Creativity is implemented in the supplementary domains of Ethical Education, Film and Audio-visual Education, Dancing, and, in a cross-curricular theme, Personal and Social Education. In students’ creative activities, the emphasis is put on artistic production in educational domains.
Finland	The National Core Curriculum (NCC) guides the Finnish compulsory basic education for students aged 7-15 (FNBE 2016). It provides a uniform foundation for education providers to create local school-level curricula, thus enhancing educational equality. The NCC recognizes creativity as one element of learning, which receives 80 mentions on 473 pages.
Slovakia	The State Education Program (SEP) is the key national curriculum document, and its updated version has been implemented in schools since 2015. The SEP states the aims or expected outcomes of school education, lists the compulsory topics for school subjects, and defines the required competencies of students. Creativity is present in this document, and the principles of active and creative education are characterized in the SEP.

Source: Adapted. Henriksen et al., (2018). Creativity and technology in education: An international perspective. Technology, Knowledge and Learning, 23(3), 409-424.
<https://doi.org/10.1007/s10758-018-9380-1>

Creativity is a necessary and crucial skill to respond effectively to change (Shen, 2012), and education has a central role in fostering creativity and creative practices. Education systems will need to:

Adapt to the changes, aspirations and anxieties about the role of creativity in our wider society, not only in realizing personal learning potential in an enriching curriculum, but also in raising achievement, skill and talent for economic innovation and wealth creation (Loveless, 2007, p. 5).

In a broader sense, countries can develop creative industries by nurturing creativity skills. One of the earliest efforts in this direction was the widely hailed Cox Review Report from the United Kingdom. The Cox Report (2005) outlined several different efforts the UK government could use to stimulate the creative industries, such as design, arts, digital media, and advertising, among others.

More importantly, all countries must be creatively competitive, including those within the Latin American region. Although different countries have different conditions, resources, and industries, all share a need for the improvement of creative skills of their population. To do so, two key concepts are critical to advance creativity on a national basis. First, educators and employers should create environments that encourage creative expression, behavior and thinking. Second, creativity should be taught in schools, particularly creative problem-solving and divergent thinking.

Without a clear idea of the goal of creativity in policy, it is not easy to cultivate it in teachers and students. Yet, teachers are essential to infusing it into practice (Hall & Thomson, 2005). Consequently, it is vital for the Latin American and the Caribbean region to evaluate policies and discuss creativity as an engine to develop innovation and economic growth.



References

- Amabile, T. (1982).** Social psychology of creativity: A consensual assessment technique. *Journal of Personality and Social Psychology*, 43, 997-1013. <https://doi.org/10.1037/0022-3514.43.5.997>
- Amabile, T. (1983).** The social psychology of creativity: A componential conceptualization. *Journal of Personality and Social Psychology*, 45(2), 357-376. <https://doi.org/10.1037/0022-3514.45.2.357>
- Baer, J., & Kaufman, J. C. (2005).** Bridging generality and specificity: The amusement park theoretical (APT) model of creativity. *Roeper Review*, 27(3), 158-163. <https://doi.org/10.1080/02783190509554310>
- Beghetto, R. A. (2010).** Creativity in the classroom. In James C. Kaufman, & Robert J. Sternberg (Eds.). *The Cambridge handbook of creativity* (pp. 447-461). Cambridge University Press.
- Beghetto, R. A., & Kaufman, J. C. (2014).** Classroom contexts for creativity. *High ability studies*, 25(1), 53-69. <https://doi.org/10.1080/13598139.2014.905247>
- Collins, A., & Halverson, R. (2018).** *Rethinking education in the age of technology: The digital revolution and schooling in America*. Teachers College Press.
- Cropley A. J. (2011).** Definitions of Creativity. In Mark A. Runco, & Steven R. Pritzker (Eds.). *Encyclopedia of Creativity (Second Edition)* (pp. 511-524). Academic Press. <https://doi.org/10.1016/B978-0-12-375038-9.00066-2>
- Csikszentmihalyi, M. (1988).** Society, culture, and person: A systems view of creativity. In R. J. Sternberg (Ed.) *The nature of creativity* (pp. 325-339). Cambridge University Press.
- Egan, A., Maguire, R., Christophers, L., & Rooney, B. (2017).** Developing creativity in higher education for 21st century learners: A protocol for a scoping review. *International Journal of Educational Research*, 82, 21-27. <https://doi.org/10.1016/j.ijer.2016.12.004>
- Gardner, H. (1983).** *The theory of multiple intelligences*. Heinemann.
- Glavanu, V. P. (2013).** Rewriting the language of creativity: The Five A's framework. *Review of General Psychology*, 17(1), 69-81. <https://doi.org/10.1037/a0029528>
- Gruber, H. (1988).** The evolving systems approach to creative work. *Creativity Research Journal*, 1(1), 27-51. <https://doi.org/10.1080/10400418809534285>
- Gruszka-Gosiewska, A., & Tang, M. (2017).** The 4P's creativity model and its application in different fields. In Lisa Min Tang, Christian Werner (Eds.). *Handbook of The Management of Creativity and Innovation: Theory And Practice* (pp 51-71). World Scientific.
- Guo, J., & Woulfin, S. (2016).** Twenty-first century creativity: An investigation of how the partnership for 21st century instructional framework reflects the principles of creativity. *Roeper Review*, 38(3), 153-161. <https://doi.org/10.1080/02783193.2016.1183741>
- Hall, C., & Thomson, P. (2005).** Creative tensions? Creativity and basic skills in recent educational policy. *English in Education*, 39(3), 5-18. <https://doi.org/10.1111/j.1754-8845.2005.tb00621.x>
- Hennessey, B. A., & Amabile, T.M. (2010).** Creativity. *Annual Review of Psychology*, 61, 569-98. <https://doi.org/10.1146/annurev.psych.093008.100416>
- Henriksen, D., Creely, E., Henderson, M., & Mishra, P. (2021).** Creativity and technology in teaching and learning: a literature review of the uneasy space of implementation. *Educational Technology Research and Development*, 69, 2091-2108. <https://doi.org/10.1007/s11423-020-09912-z>
- Henriksen, D., Henderson, M., Creely, E., Ceretkova, S., ernochoová, M., Sendova, E., ... & Tienken, C. H. (2018).** Creativity and technology in education: An international perspective. *Technology, Knowledge and Learning*, 23(3), 409-424. <https://doi.org/10.1007/s10758-018-9380-1>
- Hocevar, D. (1981).** Measurement of creativity: Review and critique. *Journal of Personality assessment*, 45(5), 450-464. https://doi.org/10.1207/s15327752jpa4505_1
- Jamali, U. (2020).** Fostering creativity using robotics among gifted primary school students. *Gifted and Talented International*, 34(1-2), 71-78. <https://doi.org/10.1080/15332276.2020.1711545>
- Kandler, C., Riemann, R., Angleitner, A., Spinath, F. M., Borkenau, P., & Penke, L. (2016).** The nature of creativity: The roles of genetic factors, personality traits, cognitive abilities, and environmental sources. *Journal of Personality and Social Psychology*, 111(2), 230-249. <https://doi.org/10.1037/pspp0000087>
- Kanli, E. (2020).** Assessment of Creativity: Theories and Methods. In Pooja Jain (Ed.). *Creativity-A Force to Innovation*. (pp 1-21). IntechOpen. <https://doi.org/10.5772/intechopen.93971>
- Kaufman, J. C., & Beghetto, R. A. (2009).** Beyond big and little: The four c model of creativity. *Review of General Psychology*, 13(1), 1-12. <https://doi.org/10.1037/a0013688>
- Kaufman, J. C., Plucker, J. A., & Baer, J. (2008).** *Essentials of creativity assessment* (Vol. 53). John Wiley & Sons
- Kozbelt (2011).** Theories of Creativity. In Mark A. Runco, Steven R. Pritzker (Eds.). *Encyclopedia of Creativity (Second Edition)* (pp. 473-479). Academic Press. <https://doi.org/10.1016/B978-0-12-375038-9.00223-5>
- Lubart, T. I., & Sternberg, R. J. (1995).** An investment approach to creativity: Theory and data. In Steven M. Smith, Thomas B. Ward, & Ronald A. Finke (Eds.). *The creative cognition approach*, (pp 269-302). Massachusetts Institute of Technology.
- Luria, S. R., Sriraman, B., & Kaufman, J. C. (2017).** Enhancing equity in the classroom by teaching for mathematical creativity. *ZDM*, 49(7), 1033-1039. <https://doi.org/10.1007/s11858-017-0892-2>
- Mishra, P., & Henriksen, D. (2018).** *Creativity, technology & education: Exploring their convergence*. Springer International Publishing.
- OECD. (2013).** *OECD Skills Outlook 2013: First results from the survey of adult skills*. OECD Publishing. <https://doi.org/10.1787/9789264204256-en>
- OECD. (2016).** *Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills*. <https://doi.org/10.1787/9789264265097-en>

Plucker, J. A. & Guo, J. (2018). Creativity: Definitions, Interventions, and Assessments. In J. L., Roberts, T. F., Inman, & J. H. Robins (Eds.). *Introduction to Gifted Education* (pp. 299-320). Prufrock Press.

Proctor, R. & Burnett, P. (2004). Measuring cognitive and dispositional characteristics of creativity in elementary students. *Creativity Research Journal*, 16(4), 421-429.
<https://doi.org/10.1080/10400410409534553>

Rhodes, M. (1961). An analysis of creativity. *The Phi Delta Kappan*, 42(7), 305-310. Retrieved June 22, 2021, from
<http://www.jstor.org/stable/20342603>

Richardson, C., & Mishra, P. (2018). Learning environments that support student creativity: Developing the SCALE. *Thinking Skills and Creativity*, 27, 45-54. <https://doi.org/10.1016/j.tsc.2017.11.004>

Runco, M. A. (2010). Divergent thinking, creativity, and ideation. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity* (pp. 413-446). Cambridge University Press.
<https://doi.org/10.1017/CBO9780511763205.026>

Runco, M. A., & Jaeger, G. J. (2012). The Standard Definition of Creativity. *Creativity Research Journal*, 24(1), 92-96.
<https://doi.org/10.1080/10400419.2012.650092>

Runco, M. A., & Kim, D. (2011). The four Ps of creativity: Person, product, process, and press. In Mark A. Runco, Steven R. Pritzker (Eds.). *Encyclopedia of Creativity (Second Edition)* (pp. 534-537). Academic Press. <https://doi.org/10.1016/B978-0-12-375038-9.00102-3>

Russ, S. (2014). *Pretend play in childhood: Foundation of adult creativity*. American Psychological Association.

Sawyer, K. (2012). *Explaining Creativity: The science of human innovation*. Oxford University Press.

Sawyer, K. (2019). *The creative classroom: Innovative teaching for 21st-century learners*. Teachers College Press.

Shen, T. L. (2012). Inspiring the creativity and imagination of university students during creative curriculum by teaching design. *Procedia-Social and Behavioral Sciences*, 45, 615-620.
<https://doi.org/10.1016/j.sbspro.2012.06.599>

Silvia, P. J., Wigert, B., Reiter-Palmon, R., & Kaufman, J. C. (2012). Assessing creativity with self-report scales: A review and empirical evaluation. *Psychology of Aesthetics, Creativity, and the Arts*, 6(1), 19-34. <https://doi.org/10.1037/a0024071>

Sternberg R. J. (2011). Componential models of creativity. In Runco, M. A., & Pritzker, S. R. (Eds.). *Encyclopedia of creativity* (pp. 226-230). Academic Press. <https://doi.org/10.1016/B978-0-12-375038-9.00040-6>

Torrance, E. P. (1974). *The Torrance Tests of Creative Thinking: Norms-Technical Manual Research Edition - Verbal Tests, Forms A and B - Figural Tests, Forms A and B*. Personnel Press.

Wallas, G. (1926). *The art of thought*. Harcourt Brace.

World Economic Forum. (2018). *The Future of Jobs Report 2018*. Centre for the New Economy and Society.
<https://doi.org/10.1177/1946756712473437>

Zhao, Y. (2012). *World class learners: Educating creative and entrepreneurial students*. Corwin Press.

SKILLS FOR LIFE

21st Century Skills is an initiative led by the InterAmerican Development Bank (IDB) that brings together public and private sector stakeholders. The initiative strengthens learning ecosystems to equip Latin American and Caribbean citizens with transversal skills.

<https://clic-skills.iadb.org/en/skills21@iadb.org>