



Revista Innova Educación

www.revistainnovaeducacion.com

ISSN: 2664-1496 ISSN-L: 2664-1488

Edited by: Instituto Universitario de Innovación Ciencia y Tecnología InuDI Perú



REVIEW

Didactic strategies to strengthen creative thinking in the classroom. A meta-analytic study

Estrategias didácticas para fortalecer el pensamiento creativo en el aula. Un estudio meta-analítico

Estratégias didáticas para fortalecer o pensamento criativo em sala de aula. Um estudo meta-analítico

Cecilia Delgado¹

Universidad César Vallejo, Chiclayo – Lambayeque, Perú

 <https://orcid.org/0000-0003-1521-3175>
dorrillomc@ucvvirtual.edu.pe

DOI (Generic) : <https://doi.org/10.35622/j.rie.2022.01.004>
DOI (Document in English) : <https://doi.org/10.35622/j.rie.2022.01.004.en>
DOI (Documento en español) : <https://doi.org/10.35622/j.rie.2022.01.004.es>

Received: 21/08/2021 Accepted: 12/11/2021 Published: 16/11/2021

KEYWORDS

creative thinking,
strategies, creativity,
education.

ABSTRACT. Creative thinking is a talent that all human beings possess; however, some exercise it more than others. From an educational point of view, this type of thinking can be strengthened through various means. The objective of this research was to analyze the basic concepts of creative thinking, their importance, and the most relevant didactic strategies used in the classroom for their effectiveness. For this, a descriptive-analytical study was carried out, reviewing diverse scientific literature in indexed journals. As a result, valuable information was obtained from 54 scientific articles, accessing various sources, databases, and repositories such as Ebsco, Researchgate, Google scholar, Pro-Quest, Scopus, Dialnet, and Eric. The results show that various strategies are worked on in the classroom that strengthens and develop creative thinking. It is concluded that creative thinking can be created from the first levels of primary education with motivating and meaningful activities for students.

PALABRAS CLAVE

pensamiento creativo,
estrategias, creatividad,
educación.

RESUMEN. El pensamiento creativo es un talento que poseemos todos los seres humanos, sin embargo, algunos lo ejercitamos más que otros. Desde el punto de vista educativo, este tipo de pensamiento puede ser fortalecido a través de diversos medios. El objetivo de esta investigación fue analizar los conceptos básicos del pensamiento creativo, su importancia y las estrategias didácticas más relevantes utilizadas en el aula para su efectividad. Para ello, se realizó un estudio descriptivo-analítico, revisando diversa literatura científica en revistas indexadas. Se obtuvo información valiosa de 54 artículos científicos, accediendo a diversas fuentes, bases de datos y repositorios como Ebsco, Researchgate, Google scholar, Pro Quest, Scopus, Dialnet y Eric. Los resultados muestran que existen diversas estrategias que se trabajan en el aula que fortalecen y desarrollan el pensamiento creativo. Se concluye que el pensamiento creativo se puede desarrollar desde los primeros niveles de educación básica con actividades motivadoras y significativas para los estudiantes.

¹ Master's degree from the César Vallejo University. **Correspondence:** dorrillomc@ucvvirtual.edu.pe



PALAVRAS-CHAVE

pensamento criativo,
estratégias, criatividade,
educação.

RESUMO. O pensamento criativo é um talento que todos os seres humanos possuem, no entanto, alguns de nós o exercem mais do que outros. Do ponto de vista educacional, esse tipo de pensamento pode ser fortalecido por diversos meios. O objetivo desta pesquisa foi analisar os conceitos básicos do pensamento criativo, sua importância e as estratégias de ensino mais relevantes utilizadas em sala de aula para sua eficácia. Para isso, foi realizado um estudo descritivo-analítico, com revisão da literatura científica diversa em periódicos indexados. Informações valiosas foram obtidas de 54 artigos científicos, acessando várias fontes, bancos de dados e repositórios como Ebsco, Researchgate, Google scholar, Pro Quest, Scopus, Dialnet e Eric. Os resultados mostram que existem várias estratégias trabalhadas em sala de aula que fortalecem e desenvolvem o pensamento criativo. Conclui-se que o pensamento criativo pode ser desenvolvido desde os primeiros níveis da educação básica com atividades motivadoras e significativas para os alunos.

1. INTRODUCTION

For many decades, researchers and educators have set their sights on creative thinking, considered one of the skills of the 21st century. However, in education, current educational programs and policies do not yet envisage the essential value of creativity in the personal formation of the human being. Thinking creatively is closely related to creating, coming up with something new, and moving away from habitual behaviors. It consists of using reason and passion simultaneously to perceive our reality differently, introducing ideas, customs, and different ways of being and doing life. Creativity gives us the light we need to rescue the curiosity and amazement that have been overshadowed by performing routine actions (Summo et al., 2016).

The most effective way for teachers to stimulate creative thinking in their pedagogical practice is by being creative themselves. Therefore, it becomes a challenge to design your classes oriented to provide the opportunity for your students to contribute original ideas, express themselves freely and confidently, take advantage of a cognitive error to transform it into a learning opportunity, invite them to investigate, and offer them problematic situations that promote thinking about various solutions and fostering adequate motivation (Zambrano, 2019).

Creativity is considered a dynamic process, understood as a form of change in the human being, the engine of personal development, and therefore the critical point for advancing an entire culture. There are factors involved in creating that are related to the individual ability of each person, such as cognitive (capturing information and its relationship with reality), affective (generating creative potential), and environmental (climatic conditions associated with creative potential personal). These factors must be present in the pedagogical practice of teachers (Hurtado et al., 2018; Lorenzo, 2020)

The 20-30 sustainable development goal schedule is set as target 4.4. "Guarantee relevant skills for the world of work". It considers the importance of acquiring skills for job performance such as problem-solving, critical and creative thinking, collaborative work, communication skills, and conflict resolution (UNESCO, 2017). Therefore, creative thinking is a vital capacity that must be addressed at all educational levels.

Finland is one of the first countries with the best performance in the ranking of the Program for International Student Assessment (PISA), in its educational policy, the development of future skills in students such as critical thinking, creativity, entrepreneurship, and the use of technology and artificial intelligence (N. García, 2020; Uriarte, 2018). Therefore, developing creative thinking in our classrooms is very significant, and for this, we

must apply various strategies that lead us to promote students' creativity. Thus, it seeks to make effective and noticeable changes in the school environment and build a better world.

It is possible to enhance creativity through educational practices, using novel didactic strategies, letting curiosity flow, doing what we are passionate about, and focusing on activities that allow us to imagine consequences of problems and experience the solution process from various points of view (Maggio, 2018).

In this sense, the present work proposed to analyze the basic concepts of creative thinking, their importance, and the most relevant didactic strategies that will allow developing this type of thinking. Likewise, definitions by various authors and a set of strategies are presented that will guide teachers in their pedagogical work and thus strengthen students' creativity in a motivating and meaningful way.

2. METHOD

The research was descriptive-analytical, where various information sources and databases were reviewed such as Ebsco, Pro-Quest, Scopus and Eric, Dialnet, Science direct, Researchgate, Google Scholar. In addition, an adequate search for information regarding creative thinking, creativity, its importance, and the most critical didactic strategies was carried out to strengthen this type of thinking.

For the exclusion criteria, duplicity and outdated information were considered. For the inclusion criteria, the article's title, abstract, and the method used were taken into account, considering students of all levels of education as the object of study.

Table 1:

Information systematization matrix

Universe	Axes	Sub-axes
Didactic strategies to strengthen creative thinking in the classroom. A meta-analytic study.	A brief review of the concepts of didactic strategies and creative thinking.	Definition of teaching strategies. Definition of creative thinking.
	Benefits/importance of developing creative thinking in the classroom.	Personal development. Adaptation to collaborative work. Transformation of our environment. Innovation of ideas. Make the right decisions.
	Didactic strategies to strengthen creative thinking in the classroom.	The pedagogical game. Problem Based Learning (PBL). Educational Robotics. Brainstorming. Mind maps. The Creative Drama. Use of the Moodle Platform.

3. RESULTS

Next, the results obtained from the documentary search are presented, which will provide theoretical and scientific support to this study.

3.1. Creative thinking

De Bono (2016) considers creative thinking as a possible ability to learn, like mathematics or music, banishing the idea that creativity is the task only of talented people or with a certain degree of madness. Creativity allows us to be proactive and look for new alternatives to certain situations beyond those already known; therefore, it is necessary for our lives.

Creative thinking is the innate ability every human being has to solve problems, make appropriate decisions, and understand that there is not only one possible solution but many in the face of difficulty. However, due to the educational system, we are losing this capacity as we grow up. Encouraging creative thinking in children is guiding them to be more autonomous, more resilient, and better leaders for our society, a task that begins at home and continues at school (Pérez, 2017).

Dogan et al. (2020) define creative thinking as a skill in people, which can be developed through the educational process with the appropriate material. In addition to being the key to adaptation to various contexts and solving problems or conflicts of all kinds, especially those related to science and technology. It is also taken into account that current knowledge societies challenge us to strengthen various skills of the 21st century. Therefore, critical and creative thinking are considered of great relevance by most experts and researchers in education.

For Delgado (2021) creative thinking is the ability to innovate ideas and solutions to difficult circumstances that appear to us in everyday life that are resolved. Therefore, we must develop creativity and generate better ideas that will serve us in the educational field and in daily life, that is, a way of facing reality genuinely and flexibly.

Creative thinking also called innovatively, leads us to discoveries, new points of view to genuine nuances, to new ways of thinking about perceiving things that happen to us. There are main products of this thinking, such as music, dance, theater, literature, inventions, and other innovations. There are also less obvious ones, such as formulating a question that guides us to seek different solutions and lead us to see the world. That surrounds us creatively and differently (Facione, 2007).

Creative thinking is conceived as an essential cognitive element of creativity in human beings, whose development will allow us to solve different problems that arise in daily life (Salamanca & Badilla, 2021). Strengthening this thinking today becomes a teaching challenge that guides us towards quality education. It is essential to know how much one knows or knows and if one thinks and acts creatively.

3.2. Importance of Creative Thinking

Creative thinking is a critical key piece for all people's personal and professional development because creativity allows us to acquire new knowledge, different ways of learning, and reveal new experiences. The invention is

present at all times in human life, in the activities carried out, the learning process, and the generation of new scientific knowledge or inventions (Ferreyra et al., 2020).

Creative thinking constitutes an element of great importance in the training of students because, through it, they acquire the ability to face various scenarios that demand to generate alternative solutions, express new ideas, ease to adapt to collaborative work, decision-making, knowledge production, the same ones that determine the progress of a nation, facing the various situations of a globalized world in permanent change (Chaverraz & Gil, 2017).

Starting from the understanding of the importance of developing creative thinking, we individually have the freedom to create new situations, to have an open mind regarding seeing life in different ways, to see beyond what we can observe, to transform into our form what is already established to include creativity in all our actions. Only if we act with autonomy, freedom, and creativity can we change the world we live in (Cevallos, 2016).

PISA in 2021 conceptualizes creative thinking as a competence that develops the generation, evaluation, and improvement of ideas, which will provide genuine and effective solutions and achievements in knowledge and impact imagination. For this reason, creative thinking will be considered as an innovative competence in the PISA 2022 assessment, in addition to mathematical competence, reading comprehension, and science as primary and secondary subjects, respectively (La razón, 2020).

It is scientifically proven that creativity, understood as a talent to innovate, imagine, transform every day and scientific situations, can develop from the first years of life. In this case, it is necessary to promote the development of creative thinking, which forces us to reason in new ways to carry out progressive actions on our own, transforming the approach and praxis.

Consequently, this imaginative talent mustn't be restricted from the beginning of existence, where the parents and the primary educators are part since they are the ones who initiate the teaching. The development of creative thinking is essential and should be accepted as a vital instrument for education and training. Therefore, it should be a priority in the current educational curriculum (Cevallos, 2016).

3.3. Definition of teaching strategies

Didactic strategies are considered procedures and actions. Teachers outline and apply their teaching-learning sessions, using various methods and techniques, to carry out the educational process where students must develop skills and competencies to achieve their learning (Hernández & Guaraté, 2019).

Didactic strategies are defined as the set of broad and general guiding actions that teachers contextualize, specify and adapt to their pedagogical work to achieve proposed educational goals to produce new and better knowledge in their students (Martínez et al., 2019).

Didactic strategies are the set of procedures and resources used in a thoughtful, flexible, and intentional way by the teaching agent to meet the proposed objectives in a given teaching-learning context where they are put into practice. They are divided into two large groups: teaching strategies, which the teacher uses to promote meaningful learning, and learning strategies, which students use to recognize and apply information obtained (Flores et al., 2017).

Didactic strategies establish a dialogical, constant, and triangular relationship between teachers, students, and methodologies, to achieve specific learning, even though the students do not know what method the teacher is using for this purpose. The teacher must respond in a thoughtful way to the question, what am I educating for? The answer to this question must guide the constant methodological adjustments to achieve meaningful learning and autonomous train students who perform effectively within society (Reynosa et al., 2020).

3.4. Didactic strategies to strengthen creative thinking

Strategy 1

The pedagogical game

Play is considered a valuable strategy to develop creative thinking. It allows children to express their imagination and fantasy to the maximum, thus initiating their desire to create and discover the environment surrounding them and the initiative to imagine situations new. It also contributes in a very significant way to the motor, social and cognitive development of students, forming an essential part of creativity (Albornoz, 2019).

he game's origins go back to the dawn of humanity. Platon and Aristotle attached great importance to it and recommended that children form their minds with various toys. In the nineteenth century, the first psychological theories about the game appeared; later, the game was considered a precious element, an excellent opportunity for learning and developing creativity. From a pedagogical point of view, the play addresses various dimensions of the human being: corporal, emotional and rational, which allows vital aspects of social adaptation, liberation, and transformation of Piaget, Vygotsky, and Brunner cultures (citado por Mota, 2018; Tamayo & Restrepo, 2017).

Among the essential characteristics of the game is the development of motor, cognitive, social, and emotional skills. It contributes to developing the capacity for self-assertion and leadership, develops their creativity when facing new situations, expresses their emotions by strengthening their creativity, imagination, and curiosity (Quicios, 2017; Unicef, 2018). Among the essential characteristics of the game is the development of motor, cognitive, social, and emotional skills. It contributes to developing the capacity for self-assertion and leadership, develops their creativity when facing new situations, expresses their emotions by strengthening their creativity, imagination, and curiosity.

Strategy 2

Problem-based learning (ABP)

Problem-based learning (ABP) is considered an essential didactic strategy in terms of developing creative thinking. It was designed in 1969 by Dr. Howard Barrows as a learning method in medicine whose starting point was to use problems; later, it was applied to the educational sector.

It consists of raising various problems related to the study areas, which the students will solve. Thus, it enables meaningful learning and new knowledge to be produced. Through the PBL, students actively participate in the

teaching-learning process, seeking possible solutions to the problem addressed creatively (Ortiz, 2020; Reinoso, 2018).

The ABP develops the concept, procedure, and attitude content through collaborative work. It applies to different areas of knowledge, especially in higher education, and its application is scarce in primary and secondary schools. The teacher fulfills the role of mediator, allowing a more excellent teacher-student approach. Its main characteristic is to contribute to the development of critical and creative thinking. The research, in addition to the exchange of experiences between students, gives way to opportunities that allow overcoming obstacles that are manifested in this society in constant transformation (BorochoVICIUS & Martins, 2021; Escalona & Perez, 2019).

Strategy 3

Educational Robotics

It is another strategy that has been included in the study plans of various countries worldwide due to its effectiveness in the development of logical thinking, capacity for abstraction, problem-solving and creative thinking. It arose in 1960 thanks to Seymour Papert, who was a scientist and professor at the Massachusetts Institute of Technology and proposed to build technological devices for children to interact and program-specific actions (Peralta, 2015).

Through the integration of robotics in pedagogical practice, students express their imagination through prototypes that demonstrate their originality, feasibility, and applicability in their context. It dramatically favors teamwork and collaboration and inserts students into the digital society in a practical way. This strategy consists of providing students with various didactic materials with mechanical parts, electronic components, and fasteners, which, when connected with technological tools, will result in the creation of programmable prototypes to solve a proposed problem (Astupiña, 2018; Ripani, 2017).

Strategy 4

Brainstorming

Brainstorming term in English translated as “brainstorming” is considered a didactic strategy that enhances creative thinking and innovation; initially, it was used in the business world. Currently, it is also applied to the field of education.

It was proposed by publicist Alex Osborn in 1954, becoming a creativity theorist. It is characterized by forming workgroups and allowing the generation of new ideas spontaneously in the face of a specific question or topic, exploring alternatives, and creating various possibilities or options (Legaz et al., 2017; Olivier, 2020).

The strategy consists of gathering several groups of 6 to 12 members, establishing the rules, and choosing a leader or coordinator per group who presents the topic clearly and briefly in 10 to 12 minutes. The groups contribute as many ideas as possible, and all are taken into account. Finally, the pictures are presented, analyzed,

and socialized (preferably do it the next day). The product of this strategy is the resolution of problems through the approach of several solutions.

Brainstorming is based on four fundamental principles: freedom of thought, avoiding early critical examination, the more ideas, the better, do the multiplying factor (Fernandez, 2017).

Para Pomar (2018) “with a brainstorm, you can break down the barriers of habitual thinking and produce a cascade of originality that is positive feedback” (p.16). Consequently, Brainstorming is considered an excellent strategy to strengthen creativity in our students.

Strategy 5

Mind maps

Mind maps are another of the strategies that strengthen creative thinking. It was developed around the 1970s by British psychologist Tony Buzan. Its importance lies in the fact that it allows you to organize projects, stimulate creativity, uninhibited written expression, and facilitate the exchange of ideas. It is the spark that ignites the imagination and boosts motivation to achieve goals and create, organizing our thinking. It is known as the form of the thinking brain, allowing the organization of information in an increasing and orderly manner, allowing the mind to act with complete freedom (Ramos, 2003).

To develop mental maps, seven steps must be taken into account: 1) We are located in the center of the sheet. 2) We draw an image that symbolizes the main idea of the topic. 3) Use many colors. 4) We draw branches or lines from the central image outwards. 5) We draw curved lines to attract attention. 6) We write keywords per line. 7) We use images that represent what we write on the lines. It is worth mentioning that nowadays, with the advancement of technology, mind maps can also be designed using various apps such as Go conqr, Canva, Google, MinMapFre, Mindmeister (Colegio Indoamericano, 2021; Ripani, 2017).

The elaboration of mental maps at school unlocks creativity; it is highly effective because it allows generating new ideas, stimulating creativity and innovation. Among the benefits that this strategy provides us, we have to: promote creativity, increase our capacity for analysis, enrich our communication, prioritize and organize information (Peshev, 2020; Universia, 2018).

Strategy 6

Creative Drama

Originally from Greece, where various representations were made worshiping their gods. Due to its incredible effectiveness in developing creativity, it is used by many teachers in the classroom. This strategy is a spontaneous representation to awaken creativity and imagination in its students. Its nature is symbolic, and it changes reality to build an imaginary space, whose communicative objective is evidenced by oral and corporal expression. The creative drama takes place in five phases: preparation, enactment, innovation, breakdown, and conclusion. In general, themes of society, its history, and customs are represented, becoming a mirror of its

community, generating a better understanding of the human being, its behaviors, and its culture (J. García et al., 2017).

Among the most outstanding characteristics of this strategy, we have that it allows the student to know their capacities, their abilities and relate them to their context, develops creativity because it is a spontaneous activity, its objective is that students become aware of the elements of the dramatic scheme such as characters, conflict, outcome, dialogues, intonation, costumes, context. It allows the body and emotional liberation to make the right decisions as real situations should (Bustos & Panata, 2016; Navarro, 2007).

Strategy 7

Use of the Moodle Platform

In recent years we have experienced significant transformations in society; one of them is the advancement of technology, which sets a precedent for future generations. These changes drive the need for new ways of teaching and learning. The current trend is to implement the use of Virtual Learning Environments (EVA).

Modular Object-Oriented Dynamic Learning Environment (Moodle), in Spanish Modular object-oriented dynamic learning environment, is an effective strategy to strengthen creative thinking because it is designed under a constructivist-social approach. Among its most essential characteristics, we have: it is free to access, supports self-learning, promotes collaborative work, generates a motivating and participatory environment, generates new communication scenarios, and uses it in 120 languages. For this reason, it is the platform used by 240 countries globally and 200 million users (Maliza et al., 2020; Ojeda & Yaurelys, 2018).

This virtual platform was created in 2002 by the Australian pedagogue and computer scientist Martín Dougiamas, who studied social constructivism online. The use of this platform is a fundamental strategy in education because it facilitates varied alternatives such as forums, meeting rooms, chat, tasks, glossary, wikis. In addition, the platform allows the teacher to carry out reinforcement activities using personalized resources, including workshops, files, benefit labels that bring us closer to students (Avello et al., 2017; Lomeña, 2020).

4. DISCUSSION

Flores et al. (2017) and Ramírez (2005) consider didactic strategies as the teacher's set of activities, procedures, and resources thoughtfully and flexibly to promote meaningful learning in their students and intentionally guide the processing of new knowledge. It can be affirmed then that developing creative thinking from the classroom implies the need to plan the learning sessions taking into account the most appropriate and motivating didactic strategies that awaken in the student the desire to learn something new and strengthen creative capacities, achieving that They quickly adapt to changes, which will also allow students to raise their self-esteem and autonomy.

The proper development of creative thinking from childhood is essential because it involves acquiring new ideas and concepts to face a need or conflict. Moreover, as Chaverraz and Gil (2017) indicate, guiding students towards strengthening this thinking allows them to improve their autonomy, as well as their leadership and empathy

capacity, because a human being who accepts that difficulties can be faced in different ways will be able to listen and get the opinions and ideas of others. Picture shared with Cevallos (2016) who states that the importance of developing creative thinking lies in that it allows personal growth, leads to better moods, also helps to develop imagination, as well as the creation of novel ideas for specific situations and thus improve our family, social and professional relationships.

Didactic strategies to strengthen creative thinking are aimed at meaningful learning by students. Among the most critical systems, “the pedagogical game” stands out as a fundamental activity, which addresses different dimensions of the human being both in the rational and emotional field, allowing to stimulate the students' capacities (Albornoz, 2019). On the other hand, PBL is also considered, where students solve various problems, leading to meaningful learning (Ortiz, 2020).

From what has been analyzed, it can be inferred that both the game and the ABP are essential in the strengthening of creative thinking; similarly, strategies related to technology have recently gained strength, such as educational robotics and the use of the Moodle platform, research Current consider that Information and Communication Technologies (TIC) are essential elements for students to think, investigate, innovate, create and acquire new knowledge, also taking advantage of the fact that students are considered digital natives (Maliza et al., 2020; Peralta, 2015).

In the same line of research, a strategy related to art such as “creative drama” can be mentioned, which due to its nature of improvisation and spontaneity, invites self-analysis, discovery and improves students' ability to express themselves, therefore providing an excellent opportunity to develop creative thinking (J. García et al., 2017). The use of this resource is minimal; in most schools, it is only applicable in commemorative events of the school calendar. It would be convenient to emphasize its application since it allows students to develop the capacity for expression and communication; it also appeals to their imagination and capacity for invention (Lanza, 2012).

Strategies related to the creative participation of students such as “Brainstorming” and “mind maps” allow to resolve conflicts and find solutions through brainstorming. Therefore, they are essential to develop creativity and practically organize thoughts (Fernandez, 2017; Ramos, 2003).

The research presented is novel in the educational field because it proposes various strategies to strengthen creative thinking, considering the experiences carried out at the international, Latin American, and local levels. Likewise, the importance of this thinking to guide students was explained simply. However, there were some difficulties, such as the limited information provided and the cost of reviewing some books and articles of valuable information.

5. CONCLUSIONS

After having made a documentary review of various articles related to the development of creative thinking, its importance, and the strategies that should be used to strengthen it, the following conclusions have been reached:

Creative thinking is the ability to create new ideas, have an open mind, and find multiple solutions to a problem; it is beneficial to improve our performance in the school context and daily life, trying to perceive the world with a creative vision.

The importance of creative thinking lies in the fact that it allows us to adapt in the best way to society, inspires us, and will enable us to experiment, make the right decisions and find various creative solutions that will allow our personal, social, professional, and work development.

Teachers are faced with the great challenge of changing our pedagogical practice, implementing novel didactic strategies such as pedagogical games, problem-based learning, educational robotics, Brainstorming, mind maps, creative drama, and the use of Moodle platform. The same maps have been applied in different contexts, obtaining optimal results in strengthening creative thinking. Therefore, it is recommended to innovate our pedagogical practice using the suggested strategies.

Agradecimientos / Acknowledgments:

Expreso mi agradecimiento a los docentes del programa de Doctorado en Educación de la Unidad de posgrado de la Universidad César Vallejo, Perú.

Conflicto de intereses / Competing interests:

La autora declara que no incurre en conflictos de intereses.

Rol de los autores / Authors Roles:

No aplica.

Fuentes de financiamiento / Funding:

La autora declara que no recibió un fondo específico para esta investigación.

Aspectos éticos / legales; Ethics / legal:

La autora declara no haber incurrido en aspectos antiéticos, ni haber omitido aspectos legales en la realización de la investigación.

REFERENCES

- Albornoz, E. (2019). El juego y el desarrollo de la creatividad de los niños/as del nivel inicial de la escuela Benjamín Carrión. *Conrado*, 15(66), 209-213. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1990-86442019000100209
- Astupiña, T. (2018). *Robotica y Desarrollo del pensamiento creativo de los estudiantes de la Institución Educativa 22533 Antonia Moreno de Caceres Ica* [Universidad Nacional de Huancavelica]. <https://repositorio.unh.edu.pe/handle/UNH/1671>
- Avello, R., Rodríguez, R., & Osmani, J. (2017). Una experiencia con Moodle y herramientas Web 2.0 en el postgrado. *Universidad y Sociedad*, 8(4). <https://rus.ucf.edu.cu/index.php/rus/article/view/459>
- Borochovcicius, E., & Martins, E. (2021). Aprendizagem baseada em problemas: Uma experiência no ensino fundamental. *Educação em Revista*, 37. <https://doi.org/10.1590/0102-469820706>
- Bustos, M., & Panata, D. (2016). *La dramatización como estrategia didáctica para fomentar el pensamiento creativo de los estudiantes de la escuela República de Colombia del cantón Saquisilí* [Universidad Técnica de Ambato]. <https://repositorio.uta.edu.ec/handle/123456789/23218>
- Cevallos, D. (2016). La importancia del pensamiento creativo. *Illari*, 1, 43-45.

<http://repositorio.unae.edu.ec/handle/56000/333>

Chaverraz, D., & Gil, C. (2017). Creative thinking skills associated to the writing of multimodal texts. An instrument for its assessment in primary school. *Revista Folios*, 45, 3-15. <http://hdl.handle.net/20.500.12209/8663>

Colegio Indoamericano. (2021). *5 apps para hacer mapas mentales*. <https://blog.indo.edu.mx/apps-para-mapas-mentales>

De Bono, E. (2016). *El pensamiento creativo El poder del pensamiento lateral para la creación de nuevas ideas*. Paidós. http://www.utntyh.com/wp-content/uploads/2013/04/El-Pensamiento-Creativo_De-Bono.pdf

Delgado, J. (2021). *¿Qué es el pensamiento creativo? ¡Atrévete a pensar fuera del molde!* crehana. <https://www.crehana.com/cl/blog/marketing-digital/que-es-el-pensamiento-creativo/>

Dogan, N., Manassero, M., & Vázquez, Á. (2020). El pensamiento creativo en estudiantes para profesores de ciencias: efectos del aprendizaje basado en problemas y en la historia de la ciencia. *Tecné, episteme y ddaxis: TED*, 48, 163-180. <https://doi.org/10.17227/ted.num48-10926>

Escalona, L., & Perez, S. (2019). Alternativa didáctica para estimular el pensamiento creativo de los profesores y estudiantes. *Revista archivo médico de Camagüey*, 23(1), 75-84. http://scielo.sld.cu/scielo.php?script=sci_abstract&pid=S1025-02552019000100075&lng=es&nrm=iso

Facione, P. (2007). *Pensamiento Crítico: ¿qué es y por qué es importante?* eduteka. <http://www.eduteka.org/pdfdir/PensamientoCriticoFacione.php>

Fernandez, F. (2017). *Qué es y Cómo Practicar Bien el BrainStorming*. Lectura ágil. <https://lecturaagil.com/brainstorming/>

Ferreira, H., Sañudo, L., Martínez, J., Morales, L., López, S., Bruzzo, C., Civarolo, M., Pérez, M., Marcucci, M., Bossio, A., Chiodi, G., Gueta, L., Vega, V., González, M., Abad, E., Sartor, I., & Rabbia, H. (2020). *Miradas y voces de la Investigación Educativa II: Curriculum y Diversidad. Innovación educativa con miras a la justicia social. Aportes desde la investigación educativa*. <http://pa.bibdigital.ucc.edu.ar/2495/>

Flores, J., Ávila, J., Rojas, C., Sáez, F., & Díaz, C. (2017). *Estrategias didácticas para el aprendizaje significativo en contextos universitarios*. Unidad de investigación y desarrollo docente.

García, J., Parada, N., & Ossa, A. (2017). El drama creativo una herramienta para la formación cognitiva, afectiva, social y académica de estudiantes y docentes. *Revista Latinoamericana de Ciencias Sociales, Niñez y Juventud*, 15(2), 839-859. <https://doi.org/10.11600/1692715x.1520430082016>

García, N. (2020). *Finlandia: el país donde los alumnos adquieren las mejores habilidades para el futuro*. el economista. <https://www.eleconomista.es/ecoaula/noticias/10328439/01/20/Finlandia-El-pais-donde-los-alumnos-adquieren-las-mejores-habilidades-para-el-futuro.html>

Hernández, C., & Guaraté, A. (2019). Modelos didácticos para situaciones y contextos de aprendizaje. En *Tendencias Pedagógicas* (p. 188). Narcea.

Hurtado, P., Garcia, M., Rivera, D., & Forgiony, J. (2018). Las estrategias de aprendizaje y la creatividad: una relación que favorece el procesamiento de la información. *Revista Espacios*, 39(17), 12. <https://www.revistaespacios.com/a18v39n17/a18v39n17p12.pdf>

La razón. (2020). *¿Qué es el informe Pisa?* <https://www.larazon.es/sociedad/20201103/i65jfkny5bc35ougaeyyavqxam.html>

- Lanza, D. (2012). Estrategias didácticas para el desarrollo de la creatividad en educación primaria. *V Congreso Mundial de Estilos de Aprendizaje*. <https://dialnet.unirioja.es/descarga/articulo/4640391.pdf>
- Legaz, I., Gutiérrez, L., & Luna, A. (2017). Brainstorming como recurso docente para desarrollar competencia investigadora. *Journal of Internet Cataloging*, 5(2), 1-14. https://doi.org/10.1300/J141v05n02_01
- Lomeña, A. (2020). *Con todos ustedes, el creador de Moodle*. huffpost. https://www.huffingtonpost.es/entry/con-todos-ustedes-el-creador-de-moodle_es_5f11b378c5b6d14c33666ae9
- Lorenzo, N. (2020). *El pensamiento creativo: La creatividad generadora de la transformadora*. Atesora group. <https://www.atesoragroup.com/recursos/blog/pensamiento-creativo-la-creatividad-generadora-de-transformacion/>
- Maggio, M. (2018). Habilidades del siglo XXI: cuando el futuro es hoy. En *Panorama portal a la educación*. Fundación Santillana. <https://panorama.oei.org.ar/habilidades-del-siglo-xxi-cuando-el-futuro-es-hoy/>
- Maliza, W., Medina, A., Vera, G., & Castro, N. (2020). Aprendizaje autónomo en Moodle. *Revista Ciencia e Investigación*, 5, 632-652. <https://revistas.utb.edu.ec/index.php/sr/article/view/1027>
- Martínez, M., Rocha, J., & Rosales, K. (2019). *Incidencias de las nuevas estrategias didácticas en la asignatura de matemática, con estudiantes de séptimo grado de secundaria en el turno matutino del Instituto Nacional de Oriente localizado en el Municipio de Granada, departamento de Granada durante e* [Universidad Nacional Autónoma de Nicaragua]. <https://repositorio.unan.edu.ni/12557/>
- Mota, N. (2018). El juego vocal en la educación infantil y primaria. *Tabanque. Revista Pedagógica*, 31, 59. <https://doi.org/10.24197/trp.31.2018.59-78>
- Navarro, R. (2007). Drama, creatividad y aprendizaje vivencial: algunas aportaciones del drama a la educación emocional. *Cuestiones Pedagógicas*, 161-172. [http://institucional.us.es/revistas/cuestiones/18/10 drama, creatividad.pdf](http://institucional.us.es/revistas/cuestiones/18/10%20drama,%20creatividad.pdf)
- Ojeda, N., & Yaurelys, P. (2018). Cibercreatividad: un té, un tú y un nosotros. *Revista de Investigación*, 42(94). <https://www.redalyc.org/journal/3761/376160142003/html/>
- Olivier, E. (2020). *Brainsterming: Concepto y beneficios*. <https://www.genwords.com/blog/brainstorming>
- Ortiz, M. (2020). Un acercamiento a la historia del aprendizaje basado en problemas en el contexto global. *Sathiri - sembrador*, 15(2), 118-152. <https://doi.org/10.32645/13906925.984>
- Peralta, G. (2015). *Robótica educativa: Una estrategia en el desarrollo de la creatividad y las capacidades en educación en tecnología*. <https://www.ilae.edu.co/web/libros-html/libro-253/index.html>
- Pérez, N. (2017). *Por qué es importante el pensamiento creativo*. Estilo de vida. <https://hellocreatividad.com/por-que-es-importante-el-pensamiento-creativo/>
- Peshev, M. (2020). *11 Strategies to Improve Your Creative Thinking Skills*. The missing piece. <https://mariopeshev.com/creative-thinking-skills-strategies/>
- Pomar, P. (2018). *Cómo hacer Brainstorming y no morir en el invento* (Thinkernau). Independently published.
- Quicios, B. (2017). *La importancia del juego en la escuela*. guía infantil. <https://www.guiainfantil.com/articulos/educacion/juegos/la-importancia-del-juego-en-la-escuela/>
- Ramírez, A. (2005). Reseña de "Estrategias docentes para un aprendizaje significativo" de Frida Díaz Barriga

- Arceo y Gerardo Hernández Rojas. *Tiempo de educar*, 6(12), 397-403. <https://www.redalyc.org/pdf/311/31161208.pdf>
- Ramos, M. (2003). Desarrollo de la creatividad y mapas mentales. *Revista ciencias de la educación*, 2(22), 79-102. <http://servicio.bc.uc.edu.ve/educacion/revista/a3n22/22-5.pdf>
- Reinoso, V. (2018). El aprendizaje basado en problemas como estrategia para promover la creatividad en la educación. *Polo del Conocimiento*, 3(10). <https://doi.org/10.23857/pc.v3i10.734>
- Reynosa, E., Serrano, E., Ortega, A., Navarro, O., Cruz, J., & Salazar, E. (2020). Estrategias didácticas para investigación científica: relevancia en la formación de investigadores. *Revista Universidad y Sociedad*, 12(1). http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2218-36202020000100259
- Ripani, M. (2017). *Programación y robótica: objetivos de aprendizaje para la educación básica*. Ministerio de Educación. <http://cosechador.siu.edu.ar/bdu3/Record/BNMBDIG--000227460>
- Salamanca, I., & Badilla, M. (2021). From computational thinking to creative thinking: an analysis of their relationship in high school students. *Icono*, 19(2). <https://doi.org/10.7195/ri14.v19i2.1653>
- Summo, V., Voisin, S., & Téllez, B. (2016). Creatividad: eje de la educación del siglo XXI. *Revista iberoamericana de educación superior*, 7(18). <https://doi.org/10.22201/iissue.20072872e.2016.18.177>
- Tamayo, A., & Restrepo, J. (2017). El juego como mediación pedagógica en la comunidad de una institución de protección, una experiencia llena de sentidos. *Revista Latinoamericana de Estudios Educativos*, 13(1), 105-128. <https://revistasojs.ucaldas.edu.co/index.php/latinoamericana/article/view/4016>
- UNESCO. (2017). *Desglosar el Objetivo de Desarrollo Sostenible 4: Educación 2030, guía*. https://unesdoc.unesco.org/ark:/48223/pf0000246300_spa
- Unicef. (2018). *Aprendizaje a través del juego*. <https://www.unicef.org/sites/default/files/2019-01/UNICEF-Lego-Foundation-Aprendizaje-a-traves-del-juego.pdf>
- Universia. (2018). *Los beneficios de los mapas mentales*. Orientación. <https://orientacion.universia.edu.pe/infodetail/consejos-tecnoversia/orientacion/los-beneficios-de-los-mapas-mentales-4176.html>
- Uriarte, Y. (2018). Modelo tridimensional psicosocio-cultural para desarrollar la creatividad en educación primaria. *Revista de Investigación y Cultura*, 7(1), 1-10. <https://dialnet.unirioja.es/servlet/articulo?codigo=6317319>
- Zambrano, N. (2019). El desarrollo de la creatividad en estudiantes universitarios. *Revista Conrado*, 15(67), 355-359. <https://conrado.ucf.edu.cu/index.php/conrado/article/view/970>