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REVIEW

Creative thinking: a holistic study in education

Pensamiento creativo: un estudio holístico en la educación

Pensamento criativo: um estudo holístico em educação

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KEYWORDS

dimensions, strategies, creative thinking, theories.

ABSTRACT. The objective was to review various scientific articles to identify the relevant concepts, characteristics, and theories that underpin the construction of creative thinking and analyze the proposals that contribute to its improvement. For this, databases such as Ebsco, Scopus, Eric were reviewed, from which 50 relevant articles were selected. The methodology used is descriptive-analytical, which allowed us to reach the following results: there are a diversity of definitions, characteristics, and strategies that promote the improvement of creative thinking, and its development in students is crucial for good growth in society. In conclusion, the educational system must promote the knowledge and development of creative thinking in the teaching-learning process since this skill is required to access a job.

PALABRAS CLAVE

dimensiones, estrategias, pensamiento creativo, teorías.

RESUMEN. El objetivo fue revisar diversos artículos científicos para identificar los conceptos relevantes, las características y las teorías que fundamentan el constructo del pensamiento creativo, así como analizar las propuestas que contribuyen a su mejora. Para ello, se revisaron las bases de datos como Ebsco, Scopus, Eric, de las cuales se seleccionaron 50 artículos relevantes. La metodología empleada es de tipo descriptivo analítico, la cual nos permitió llegar a los siguientes resultados: existen diversidad de definiciones, características y estrategias que promueven la mejora del pensamiento creativo, asimismo, se evidenció su desarrollo en los estudiantes es crucial, para el buen desenvolvimiento en la sociedad. En conclusión, el sistema educativo debe promover el conocimiento y desarrollo del pensamiento creativo en el proceso enseñanza aprendizaje, ya que está habilidad es requerida para acceder a un puesto laboral.

PALAVRAS-CHAVE

RESUMO. O objetivo foi revisar diversos artigos científicos para identificar os conceitos, características e teorias relevantes que sustentam a construção do pensamento criativo, bem como analisar as propostas que contribuem para o seu aprimoramento. Para isso, foram revisadas bases

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dimensões, estratégias, pensamento criativo, teorias.

de dados como Ebsco, Scopus, Eric, das quais 50 artigos relevantes foram selecionados. A metodologia utilizada é descritivo-analítica, o que nos permitiu chegar aos seguintes resultados: há uma diversidade de definições, características e estratégias que promovem o aprimoramento do pensamento criativo, e o seu desenvolvimento nos alunos é fundamental para o bom desenvolvimento da sociedade. Conclui-se que o sistema educacional deve promover o conhecimento e o desenvolvimento do pensamento criativo no processo ensino-aprendizagem, uma vez que essa habilidade é necessária para o acesso a um emprego.

1. INTRODUCTION

Creativity in this century is essential to face the challenges of an unpredictable world (Carvalho, 2021). It is a necessary condition for the development of humanity; it has been identified as a predictor of educational success and well-being (Álvarez, 2010). Finally, it is the ability to provoke new, significant, and valuable responses, which contribute effectively and with relevance to solving problems, to have a better quality of life and prosper in a rapidly changing society (Álvarez, 2010; Gube & Lajoie, 2020; Srikongchan et al., 2021).

Previous studies affirm that creativity is required to develop science, technology, and art (Ulger, 2018). In Indonesia, the population has understood that a person's success is not only determined by intelligence but by creativity (Lestari & Sumarti, 2018). Therefore, students need to develop creative thinking. Unfortunately, current educational institutions do not provide spaces for students to learn to think differently; consequently, they do not generate new solutions to the situations they experience (Srikongchan et al., 2021); however, children's creativity can grow if educational institutions provide spaces for it, as they do in Indonesia through the child-friendly school's program (Lian et al., 2018).

Creativity takes on primary importance within human development (Chacón, 2011). It is essential to guarantee an optimal life; it is a critical element in the generation of learning and, therefore, academic performance (Lian et al., 2018; Ramírez, 2014). Consequently, it is considered one of the crucial skills that the 21st-century citizen requires to acquire (Akpur, 2020). This is reflected in the report of the World Economic Forum, where it is considered a skill that will be requested to access the labor market (Bezanilla et al., 2018). Therefore, improving creative thinking skills is decisive, as these will be increasingly necessary due to the increase in complex problems prompted by the rapid development of technology and social movements worldwide (Lestari & Sumarti, 2018).

Faced with this reality, the objective of this research was to review various scientific articles to identify the relevant concepts, dimensions, and theories that underpin creative thinking.

2. METHOD

A systematic review of an exploratory, descriptive nature of the conception of creative thinking, creativity, dimensions, theories, and strategies that seek to develop it methodically was carried out. The exploration was carried out in various databases such as Ebsco, Doaj, Proquest, Eric, Scopus, Google Academic, from which 50 relevant articles were selected, especially from the last five years.

Universe and axes of study

Table 1. Creative thinking, a holistic study in education

Universe	Study areas	Study units
Exploring creative thinking, a holistic study in education	A brief review on the conception of creative thinking.	What is creative thinking?
	Dimensions	What are the dimensions of the creative process?
	Theories of critical thinking	What theories support creative thinking?
	Strategies	What teaching strategies promote creative thinking?

Source: self-made.

3. RESULTS

3.1. Definition of creative thinking

Creative thinking is a diverse word. It's expressed as thinking of change, development, play, and cognitive effort to achieve something (Caldwell et al., 2020). It is also understood as the characteristic hallmark of man's cognition, which allows creating ideas, novel, and valuable answers to solve problems (Zhuang et al., 2021). Creative thinking is a new way of thinking and acting on reality (Carvalho et al., 2021). They are cognitive activities that process the information received to produce new representations (Nugroho et al., 2020; Ulger, 2018).

Creativity is original and valuable thoughts, answers, or products (Redifer et al., 2019). It is based on aesthetics, beauty and is related to art (Medina Rodriguez & Rodriguez Peralta, 2017). Creativity is also defined as developing new ideas or socially valuable objects such as painting and music (Paramás & Escurra, 2018). It is conceptualized as the intuition to solve problems with new procedures, such as the balance between analysis, inventiveness, and practice (Chacón, 2011).

3.2. Dimensions of the creative process

Many authors try to explain the process of generating creative ideas; each of them has different characteristics or dimensions, such as those shown below.

Table 2. Systematization of dimensions of the creative process

Dimensions	Definition of the creative process
Preparation, incubation, lighting, verification	Preparation, identification of the problem and selection of information; incubation with no conscious control; lighting, issues are solved with solutions found (Yildiz & Guler, 2021).

Originality, novelty, difference, or singularity and effectiveness.	Originalidad es la generación de ideas novedosas que llaman la atención. Diferencia, o singularidad, idea particular y efectividad, certeza, garantía de que es una buena idea (Akpur, 2020)
Quantity, quality and originality	The quantity, number of ideas; quality, the degree to which a picture is fit for purpose, and originality, unexpected ideas about something to be made proposals (Laske & Schröder, 2017).
Sensitivity to problems. Fluency Flexibility Originality Domain Analysis Synthesis Redefine.	Guilford: 1. Sensitivity to problems, need to see the unconventional 2. Fluency, a multitude of thoughts, and associations. 3. Flexibility, decompose the laziness of thought 4. Originality, new idea 5. Control over the situation 6. Analysis, specify, recognize. 7. Synthesis, closing capacity 8. Redefine, redefine ideas (Mallart & Deulofeu, 2017).
Fluency, flexibility, originality	Fluency is as many ideas as possible with ease. Flexibility is thinking differently. Originality consists of generating different and innovative ideas (Saad & Rowais, 2019).
Fluency originality, elaboration, flexibility	Fluency is the idea production phase. Originality consists of the production of unusual ideas. Elaboration persistence in the production of ideas and flexibility, production of various ideas (Bart et al., 2017; Gube & Lajoie, 2020).
Fluency, Innovation, Novelty and imagination.	Creativity is operationalized as a combination of fluidity, the ability to create many ideas; innovation, new ideas; novelty, cause impact and imagination (Parra et al., 2020).
Fluency, Flexibility, Originality, elaboration	Fluency: ability to create many ideas. Flexibility: the ability to propose many ideas that belong to different categories. Originality: ability to produce unusual ideas. Elaboration: ability to develop ideas (Groyecka et al., 2020).

Note: data from Google Scholar, Ebsco, Proquest, Eric, Scielo.

3.3. Theories Support Creative Thinking

Table 3. Systematization of theories that support creative thinking

Theory	Definition and description
Lateral thinking theory	Supports that the use and practice of lateral thinking techniques allow increasing creative capacity, constituting a stimulus for the spontaneous conception of new ideas (Muñoz, 2010).
Threshold theory of intelligence	Explain the relationship between creativity and intelligence (Campos & González, 1994).
Theory of Intellect: Divergent Thinking, from Guilford	Creativity is that thought that develops criteria of originality, inventiveness, and flexibility. Through divergent thinking, creativity can be reflected both in the invention of objects and/or techniques and in the ability to find new solutions by modifying the usual approaches (Blas et al., 2018) .
Guilford's Theory of Divergent or Lateral Thought.	Divergent or lateral thinking is characterized by generating multiple and ingenious solutions to the same problem. It is a spontaneous, fluid, and non-linear mental approach based on curiosity and also nonconformity (Rodríguez, 2016).
Theory of multiple intelligences	Consider creativity as a multidisciplinary phenomenon, but at the same time, he recognizes that, in his study on this subject, he places greater emphasis on personal factors using biological, epistemological, and sociological perspectives to make a comprehensive approach (Sánchez, 2015).
Teresa Amabile's social model	Consider the socio-environmental influences on the development of creativity. It integrates three components: a) domain skills such as talent, knowledge, experience, and technical skills; b) creative processes: work style, mastery of strategies that favor the production of new ideas c) intrinsic motivation: performing the task for pure pleasure, it can be favored by the social environment (García et al., 2015).
Csikszentmihalyi's system theory	He argues that creative work, one that changes some relevant aspect of culture, does not occur within people's minds but is the product of the interaction between a person's thoughts and a sociocultural context. It is a systemic phenomenon, rather than an individual one (Sternberg, 1988).

Guilford's Transfer Theory.	It is an essentially intellectual proposal that maintains that the creative individual is motivated by the intellectual impulse to study problems and find solutions to them (García et al., 2015).
Association theory	The human being finds in the association a way to increase their knowledge. Associations are established between two subjects that have no relationship; according to the number of connections they make, the degree of creativity is determined (Blázquez, 2009).

Note: data from Google Scholar, Ebsco, Proquest, Eric, Scielo.

3.4. Didactic strategies to improve creative thinking

Table 4. Systematization of didactics that improve creative thinking

Strategies	Purpose	Results
Problem-based learning (PBL) is the ideal approach to develop creative thinking (Escribano & Del Valle, 2008).	That the student learn by himself to develop his cognitive capacity, such as creativity, and that teachers can use it to help students determine solutions to non-routine problems complex problems (Ulger, 2018).	There was a significant effect on students' ability to solve problems comprehensively (Şenel & Bağçeci, 2019). Ulger (2018) confirms that ABP helps you think more creatively. Efficiently develop creative thinking skills (Şenel & Bağçeci, 2019).
Project-based learning	It is a methodology that allows students to acquire knowledge and key skills in the 21st century. As well as giving creative answers to real-life problems (Lestari & Sumarti, 2018; Sumarni & Kadarwati, 2020)	It showed a significant result in improving the creative thinking skills of Indonesian students (Sumarni & Kadarwati, 2020). It can improve students' creative thinking skills (Lestari & Sumarti, 2018).
Philosophy for children	Teach students to think multidimensionally: critical, creative, and careful (Paniego, 2017).	The children developed the ability to philosophize, improving their critical and creative thinking skills (Lázaro, 2016).
Gamification experiences	t is an educational methodology that motivates students to face complex problems.	The application of gamified experiences with students and teachers revealed high levels of activation, motivation, and creativity, developing skills necessary to

	enter the world of work (Lestari & Sumarti, 2018; Srikongchan et al., 2021).

Note: data from Google Scholar, Ebsco, Proquest, Eric, Scielo.

4. DISCUSSION

Various authors with different points of view and relevant contributions to creativity have been selected, agreeing that it is one of the most precious human qualities that guarantee an optimal life (Álvarez, 2010; Chacón, 2011; Moura et al., 2021; Paramás & Escurra, 2018). However, there is no unification of this concept. Hence it can be said that creativity is defined as an intelligent action that generates multiple solutions to problems through original and unique points of view (Redifer et al., 2019). Likewise, creativity is considered the faculty that every person possesses and is subject to the circumstances for its development (Groyecka et al., 2020). Therefore, teachers must consider that creativity should be seen as a potential that can be developed in the teaching-learning process, carrying out activities that arouse curiosity, improvisation, and the generation of ideas.

The authors of the reviewed literature coincide by pointing out that creativity goes through various phases which aim to generate new ideas, synthesize them and determine their effectiveness, which is specified by solving problems (Bart et al., 2017; Mallart & Deulofeu, 2017; Parra et al., 2020; Yildiz & Guler, 2021). Teachers do not consider the phases of creativity within pedagogical work, which is why students have limitations in the development of these skills.

It is highlighted that there is abundant bibliography on various theories of creativity, which have in common principles, characteristics that seek to explain and understand the process of creativity, which is considered an innate quality of the human being, which allows it to adapt to survive through finding solutions to the situations you face (Bart et al., 2017; García et al., 2015; Ulger, 2018). The cited theories provide the educator with a wealth of information and guidance to improve the teaching-learning process and optimize the quality of education.

In the review of the articles on the strategies that develop creative abilities, various methodologies that show significant results as a result of their application stand out (Şenel & Bağçeci, 2019). Therefore, the teacher must be trained and perfected in the proper use of strategies to develop their creativity and function successfully in this eternally changing world.

5. CONCLUSIONS

Creative thinking is a fundamental competence that must be developed in the educational system since it contributes to the integral formation of the student. It is considered as the ability of the individual to solve a problem. This skill can be learned and developed from the educational environment, not only in the arts but in all areas that make up the curriculum; However, it does not seem that teachers prioritize the development of this thinking in the teaching-learning process.

The creative process goes through various phases or dimensions to achieve its development, which aims to establish new ideas, develop them, synthesize them and determine their effectiveness, specified in work created, which is generally a proposed solution to a troublesome situation.

The diversity of theories of creativity provides a wealth of information that helps teachers know why to work this thinking and how to do it to stimulate the creative mind in students. What is sought is to improve their learning and have more significant opportunities for success in life.

The multiple strategies generated to develop creative thinking are resources whose essential function is to help students arouse curiosity, their capacity for investigation and inventiveness, and participate in problem-solving. Its application in the development of learning experiences is considered crucial.

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