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REVIEW

Approaches, theories, and research on creative thinking. A review study

Enfoques, teorías e investigaciones sobre el pensamiento creativo. Un estudio de revisión

Abordagens, teorias e pesquisas sobre pensamento criativo. Um estudo de revisão

César Muñoz[1]
Universidad César Vallejo, Chiclayo – Lambayeque, Perú
https://orcid.org/0000-0002-1183-1307
mmunozvi7@ucvvirtual.edu.pe

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KEYWORDS

students, teachers, creative thinking

ABSTRACT. The objective was to review the existing scientific literature of the concepts, approaches, and research carried out on creative thinking. A balance was made of the scientific works found on this type of thinking in which the three proposed axes of the study were considered. The information was obtained from sixty articles published in journals indexed to the central databases and repositories such as Ebsco, Doaj, ProQuest, Eric, and Scopus. The methodology used consisted of the systematic review of documents with scientific information. Diversity of concepts approaches and scientific studies was found in this regard that considers creative thinking as an essential capacity for the development of people in all areas of human development.

PALABRAS CLAVE

estudiantes, docentes, pensamiento creativo

RESUMEN. El objetivo fue revisar la literatura científica existente de los conceptos, enfoques e investigaciones realizados sobre el pensamiento creativo. Se hizo un balance de los trabajos científicos encontrados sobre este tipo de pensamiento en los que se consideró los tres ejes de estudio propuestos. La información se obtuvo de sesenta artículos publicados en revistas indexadas a las principales bases de datos y repositorios como Ebsco, Doaj, ProQuest, Eric y Scopus. La metodología empleada consistió en la revisión sistemática de documentos con información de carácter científico. Se hallaron diversidad de conceptos, enfoques y estudios científicos al respecto que consideran al pensamiento creativo como una capacidad esencial para el desenvolvimiento de las personas en todos los ámbitos de desarrollo humano.

PALAVRAS-CHAVE

RESUMO. O objetivo foi fazer uma revisão da literatura científica existente sobre os conceitos, abordagens e pesquisas realizadas sobre o pensamento criativo. Foi feito um balanço dos trabalhos científicos encontrados sobre este tipo de pensamento em que foram considerados os três eixos de estudo propostos. As informações foram obtidas a partir de sessenta artigos publicados em

[1]Secondary education teacher, BA in Language and Literature. **Correspondence:** mmunozvi7@ucvvirtual.edu.pe

alunos, professores, pensamento criativo.

periódicos indexados nas principais bases de dados e repositórios como Ebsco, Doaj, ProQuest, Eric e Scopus. A metodologia utilizada consistiu na revisão sistemática de documentos com informações científicas. Foi constatada diversidade de conceitos, abordagens e estudos científicos a este respeito que consideram o pensamento criativo como uma capacidade essencial para o desenvolvimento das pessoas em todas as áreas do desenvolvimento humano.

1. INTRODUCTION

Creativity is one of the capacities that allow proposing innovative solutions to various problems or challenges that human beings face in their daily lives (Moromizato, 2007). Likewise, creative thinking as a particularity of human knowledge is a higher-order thought process that allows valuable and straightforward ideas (Redifer et al., 2021; Zhuang et al., 2021). This is one of the skills of the 21st century that the digital age requires to be inserted effectively in the academic and work world (De Prada et al., 2020; Saregar et al., 2021; World Economic Forum, 2014).

The interrelation of critical thinking, collaborative work, digital skills, and socio-emotional skills contributes to developing creative thinking, especially in children (UNESCO, 2015). Hence the need to enhance 21st-century skills through relevant learning activities to successfully face technological massification and its potential impacts (Jirout & Zimmerman, n.d.; Yildiz & Guler Yildiz, 2021).

Various research results show that despite the permanent concern to develop creative thinking, there is insufficient development of it. For example, in Nsukka, Nigeria, the development of creative thinking in mathematics is below average and even lower in schools of single-sex students (Inweregbuh et al., 2020). Similarly, in a Peruvian primary school, it was found that there is no positive relationship between creative thinking and performance in the area of communication, mathematics, and the general global average (Peramás & Escurra, 2018).

Currently, globalization requires incorporating creativity in school and professional training contexts to prepare students to successfully face various challenges (Hernández et al., 2015). For this, it is necessary to start from the interests and needs of the students, use active methodologies that promote creative thinking in a favorable environment that allows teachers and students to learn from error (Estrada & Guadalupe, 2017; Silva & Maturana, 2017).

A study on the incorporation of creative thinking in schools concluded that techniques to develop this type of thinking should be integrated into teacher training. These will allow recognizing the appropriate context to introduce creativity in the curricula and strengthen their pedagogical work in the classroom. Therefore, institutional support is required to incorporate their innovations in a planned way (Carvalho et al., 2021).

In a study carried out in Spanish university students of education and communication sciences, a high degree of creative thinking was found, which improves students' interpersonal relationships in their university activities (Gamarra & Flores, 2020).

Likewise, a study was carried out with teachers in Colombia to investigate whether creative thinking is strengthened through the problem-based learning strategy (PBL). The results obtained indicate that if the PBL strategy is applied in pedagogical work, the creative competencies in students are significantly strengthened (Ramírez, 2014).

In his study on the stimulation of creative thinking, Muñoz (2010) argues that using creative and innovative strategies in the classroom is of utmost importance. This will allow the student to develop autonomy through reflection and regulation of their autonomous learning processes.

Creative thinking is a fundamental factor in forming individuals capable of facing the challenges of today's world. Therefore, there is also a need to understand the multidimensional nature of creative processes to be used for the benefit of education (Carvalho et al., 2021; Moromizato, 2007).

In this sense, the research objective was to review the scientific literature of various research studies on the development of creative thinking at all educational levels globally. Before this, a balance was made of the study of the concepts and approaches of this type of thinking to collect information that allows fulfilling the proposed objective.

2. METHOD

A systematic literature review of 67 articles in both English and Spanish was carried out (Kitchenham, 2004). These were selected considering three axes of study: conceptualization, approaches, and research on creative thinking.

The review analysis was structured based on the systematization of articles taken from Ebsco, Doaj, ProQuest, Eric, and Scopus databases. Studies published between the years 2017 to 2021 were preferably considered. Studies of little relevance to the subject matter were excluded. As inclusion criteria, the title of the article, the author, and the methodological quality were taken into account.

To search for information, descriptors related to the axes of study such as "creative thinking" and "creativity" were used. To obtain selected citations in the databases in English, the Boolean operators AND, OR, and NOT were used (Carranza, 2018).

Table 1

Universe, axes and subunits of study

Study universe	Study areas	Study units Definition - Authors
Conceptual bases on creative thinking	Creative thinking concept	Autor 1 Hernández et al. (2018)
		Autor 2 Dogan et al. (2020)
		Autor 3 Karaca et al. (2020)
		Autor 4 Al-mahasneh (2018)
		Autor 5 Puspitasari. et al. (2019)
		Autor 6 Khuana et al. (2017)
	Approaches or theories of creative thinking	Autor 1 Gutiérrez y Rodríguez (2020a)
		Autor 2 Chávez & Rojas (2021)
		Autor 3 Romo (1984)
		Autor 4 Hidalgo et al. (2018)
		Autor 5 Sternberg & O'Hara (2005)
		Autor 6 Hinojoza & Regalado (2020)
		Autor 7 Hidalgo et al. (2018)
		Autor 8 Olenka, (2008)
	Research on creative thinking	Autor 1 Carvalho et al. (2021)
		Autor 2 Dogan et al. (2020)
		Autor 3 Saregar et al. (2021)
		Autor 4 Wahyudi et al. (2020)
		Autor 5 Araya et al. (2019)
		Autor 6 Paramás y Escurra, (2018)

Autor 7	Parra et al. (2020)
Autor 8	Moreno et al. (2013)
Autor 9	Şenel y Bağçeci (2019)

Source: own elaboration based on data from Ebsco, Doaj, ProQuest, Eric and Scopus

3. RESULTS AND DISCUSSIONS

It is unavoidable to specify that the concept of creative thinking is quite broad and complex due to its multidisciplinary nature. It includes various dimensions of human endeavor and multiple aspects of its relationship with the environment. The recent conceptualization of some of them is shown below:

3.1. Conceptual bases of creative thinking

Table 2

Authors and conceptualizations of creative thinking

Author / authors	Conceptualizations
Hernández et al. (2018)	Ability to think, imagine and act differently. It brings new meaning, solves problems, and adds value to a job.
Dogan et al. (2020)	Ability to produce new, valuable, and appropriate objects or ideas.
Karaca et al. (2020)	It is a concept that intertwines with play to create new connections between disconnected objects, symbols, words, or experiences.
Al-mahasneh (2018)	The complex mental activity aims to transform and improve common ideas through the search for innovative solutions outside common patterns.
Puspitasari. et al. (2019)	Logical and divergent thinking seeks to build new ideas and concepts to meet a need caused by challenging problems.
Khuana et al. (2017)	A type of thinking allows the generation of new methods, approaches, and perspectives to tackle challenging problems.

Source: own elaboration based on data from Ebsco, Doaj, ProQuest, Eric and Scopus

3.2. Theories or approaches that support creative thinking

Table 3

Theories, Approaches, Key Concepts, and Considerations

Theory / approach	Key conceptualizations and considerations
Gestalt Theory	The creative process, for Gestalt theory, implies the optimal understanding of the problem to obtain an innovative solution (Gutiérrez & Rodríguez, 2020a).
Guilford's divergent thinking.	Through creativity skills such as fluency, flexibility, and originality, the thought process generates ideas to face adverse circumstances with multiple responses (Chávez & Rojas, 2021).
Association theory Mednick.	This theory explains that creative thinking forms new disparate associative elements in unique combinations to make practical proposals (Romo, 1984).
Theory of multiple intelligences of Gardner.	The multidimensional construct of interrelated autonomous sets allows to solve problems creatively and flexibly (Hidalgo et al., 2018).
Sternberg and Lubart's theory of investment in creativity.	Theory starts from the existence of creative potential in individuals, generated from investments and indebtedness in creative abilities. Therefore, buy low and sell high in the field of ideas (Sternberg & O'Hara, 2005).
Vygotsky's sociocultural approach.	Creativity corresponds to brain activity that, apart from retaining and reproducing previous experiences, elaborates on these new approaches and cultural interactions (Hinojoza & Regalado, 2020).
Urban model.	It is presented as a result of the joint action of three cognitive components (divergent thinking, general knowledge, and specific knowledge) and three components related to personality (commitment to the task, motivation, and tolerance to ambiguity), at three individual levels of action, social or historical-social (Hidalgo et al., 2018).
Systemic approach to Csikszentmihalyi.	It suggests that creativity is not an individual product but is generated from the individual's interaction and sociocultural context (Olenka, 2008).

Source: own elaboration based on data from Ebsco, Doaj, ProQuest, Eric and Scopus

3.3. Research on creative thinking

Table 4. Database of consulted articles

Author	Title	Content-Conclusion
Carvalho et al., (2021).	Development of creative thinking in the educational field.	Creativity is a firm ally that will prepare students for future challenges. Therefore, it is necessary to have qualified teachers with a good school environment in an institutional context that facilitates and supports creativity in teaching. Educational leaders and managers must ensure the incorporation and establishment of planning in this process.
Dogan et al., (2020).	Creative thinking in students for science teachers: effects of problem-based learning and on the history of science	Problem-based learning and the history of science used as strategies enhance the creative abilities of future Turkish teachers. However, problem-based learning is the most significant incidence of improvement in creative skills. The history of science approach also contributes, but to a lesser extent.
Saregar et al., (2021).	CORE learning model: its effectiveness towards students creative thinking	The creative thinking skills of students at East Lampung Islamic High School increased considerably after applying the Connect, Organize, Reflect and Expand (CORE) learning model. The research findings show the program's effectiveness as it had a high effect on the development of creative thinking in students.
Wahyudi et al., (2020).	The impact of the 3CM model within learning to improve students' creative thinking ability	Another learning model that enables students to improve mathematical problem solving and creative thinking skills is the 3CM (Cold-Critical-Creative-Significant) model. The program applied in Indonesia allows primary education students to think autonomously, systematically, and innovatively. It will enable you to develop innovative products and conclude with a meaningful thought.
Araya et al., (2019).	Creative mathematical thinking in primary school classrooms: didactic	In a study carried out in Chile with elementary school students on creative mathematical thinking, considering their didactic environment, clarifying results were found. Those students who were in classrooms where they were actively involved in the construction of ideas, accompanied by teachers with skills to pose mathematical problems, obtained significantly higher mathematical creativity scores

	environments that enable its development	than those who did not. Hence the relevance of the work done by the teacher in the classroom for the development of creative thinking.
Peramás y Escurra, (2018).	Creative thinking and school performance in second-grade primary school children from a private educational institution in the district of La Molina, Lima, Peru.	There is a positive and significant relationship between creative thinking and art. However, there is no difference between creative thinking and general school performance. Nor is there that kind of relationship between creative thinking and the area of mathematics and communication. Results were found in 5th-grade primary school students in a private school in Lima. The test to evaluate fundamental indicators of creativity EIBCR-M (PRIM) was applied for this finding. The importance of implementing programs that develop expression skills in students through art and other areas of learning is highlighted.
Parra et al., (2020).	Analysis of creative thinking and levels of student activation after a gamification experience.	Gamification produces positive effects on teachers and students. This study was carried out with various Andalusian universities in Spain. The results show high motivation, activation, and creative thinking levels that gamified experiences produce. Although levels of creativity are higher in teachers, the level of activity achieved in students is essential. This raises their level of commitment and their leadership in building their learning.
Moreno et al., (2013).	Incidence of creative thinking in school coexistence	The study results applied to fourth-grade students in the city of Pasto-Colombia show that creative thinking can be developed, but its effects do not influence school coexistence. However, these results made it possible to identify the high levels of improvement in creative thinking and narrative literary creativity strategies through playful, individual, and team dynamics.
Şenel y Bağçeci, (2019).	Developing students' creative thinking skills through journal writing	An applied study in a private primary school in Gaziantep-Turkey shows that just ten minutes a day of writing significantly enhances the development of creative thinking. In addition, the creative journal writing strategy results offer a tremendously positive effect on the development of student's creative thinking skills.

Source: own elaboration based on data from Ebsco, Doaj, ProQuest, Eric and Scopus

3.4. Discussion

It isn't easy to elaborate a universally accepted concept of creative thinking, due not only to the diversity of conceptions generated by the different perspectives with which the other authors look at it and through which they provide their contributions (Villamizar, 2012).

An attitudinal approach is what Hernández et al., (2018) formulate when defining it as the ability to think, imagine and act differently. In addition, it brings new meaning to action and solves problems. However, Karaca et al., (2020) approach it from a playful-creative perspective. They affirm that it is a concept intertwined with the game to create new connections between objects, symbols, words, or disconnected experiences.

Likewise, some proposals focus more on the practical and utilitarian parts, defining creative thinking as the ability to produce new, valuable, and appropriate objects or ideas (Dogan et al., 2020). Along the same lines, Al-mahasneh, (2018) conceptualizes it as a complex mental activity aimed at transforming and improving common ideas by searching for innovative solutions outside of common patterns. Puspitasari. et al., (2019) complement what Dogan and Al-mahasneh said because they consider logical and divergent thinking as the one that builds concepts and ideas to solve challenging problems.

For all these considerations, it is that for some time, the development of creative thinking has gained interest as an object of study from different disciplines, among which we can mention: education, psychology, art, business, advertising, and medicine. However, in the educational setting, it has gained more relevance due to its formative nature inherent in the development of skills through education.

Regarding the theories described, creativity receives multiple contributions that come together in a complementary way with the development of individual skills. Gestalt theory and multiple intelligences point to the knowledge of the problem and the interrelation of multidimensional constructs that seek a creative solution through multiple responses (Chávez & Rojas, 2021; Gutiérrez & Rodríguez, 2020b; Hidalgo et al., 2018).

Likewise, the existence of complementarity between the systemic and sociocultural approaches can be affirmed since both consider that creativity results from the interaction of the individual and their context (Hinojoza &

Regalado, 2020; Olenka, 2008). Similarly, Urban's model considers an aspect related to social performance within one of its components, searching for creativity (Hidalgo et al., 2018).

The data found in the various studies have yielded conclusions that coincide with the need to provide educators in training and in-service with the necessary tools to carry out their work. This facilitates and strengthens their creativity, which will benefit the students (Carvalho et al., 2021; Dogan et al., 2020). Likewise, the application of instruments, programs, and improvement plans gave positive results in developing creative thinking in students of all educational levels.

Creativity and innovation have always been topics of great relevance since they constitute key competencies to obtain competitive advantages in all fields of knowledge and all sectors of society. In this sense, and according to the literature consulted, it can be affirmed that creativity and innovation have been present in the genome of human evolution and have served as a guide to our society up to the current time.

4. CONCLUSIONS

The development of creativity facilitates the consolidation of that human potential and social transformation necessary today. This allows society models to be proposed or formulated with the formation of individuals who have the initiative and capacity to solve current problems and face the constant changes in this highly competitive and globalized world with attitude.

However, if plans or programs are applied without the appropriate scientific rigor, creativity is not necessarily the solution to current educational problems. Similarly, these educational improvements to strengthen creative thinking are reflected only in normative documents.

The development of creative thinking allows students to think, imagine and act differently. So that they transform simple ideas into innovative solutions to solve challenging problems. Only in this way would it contribute to the formation of ordinary students into individuals capable of changing their reality and facing the difficulties that today's society demands.

The diversity of concepts, theories, approaches, models, programs, and studies about creativity provides much information. Leaders and pedagogical managers are obliged to use this information to prepare improvement plans, focusing on developing skills related to creative thinking.

It is expected that this review study encourages the investigative spirit of educators and continues in the investigation regarding the relationship between the development of creative thinking with all disciplines of human endeavor, especially with education. This will allow identifying and proposing strategies that provide students with the necessary tools to face this competitive world's obstacles and challenges wisely.

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