



Background for researching and understanding the development of CCPs in educational settings.

Antecedentes para la búsqueda y comprensión del desarrollo de los PCC en entornos educativos

Stefania Vargas Mejia

Pontificia Universidad Javeriana. Colombia vargas_stefania@javeriana.edu.co
<https://orcid.org/0000-0001-6550-112X>

Yesid Fernando Roa

Pontificia Universidad Javeriana. Colombia, roa-y@javeriana.edu.co <https://orcid.org/0000-0002-2762-4265>

ABSTRACT

This article is developed in order to verify and analyze the contexts and paradigms immersed in higher education processes in order to mobilize creative cognitive processes in teachers through the application and development of an orientation guide that favors their training contexts, accounting for the impact of these issues immersed in contemporary studies, which in turn perceive shortcomings focused on the development of creative cognitive processes. Several sources were examined from databases, magazines and complementary texts, which focused this exercise of teacher training in creativity, allowing to see it as a tool that allows the human being to develop skills and that these are applied in order to contribute to society and the citizen of the future.

RESUMEN

El presente artículo, se desarrolla a fin de verificar y analizar los contextos y paradigmas inmersos en los procesos de educación

superior para así movilizar los procesos cognitivos creativos en docentes mediante la aplicación y desarrollo de una guía de orientación que favorezca sus contextos de formación, dando cuenta del impacto de estas temáticas inmersas en los estudios contemporáneos, que a su vez perciben carencias enfocadas al desarrollo de procesos cognitivos creativos. Fueron examinadas diversas fuentes desde bases de datos, revistas y textos complementarios, los cuales focalizaron este ejercicio de formación de docentes en creatividad, Permitiendo verla como una herramienta que permite al ser humano desarrollar habilidades y que estas sean aplicadas con el fin de aportar a la sociedad y al ciudadano del futuro.

Keywords / Palabras clave

74

creativity, training, cognitive creative processes, higher education, higher education

creatividad, formación, procesos creativos cognitivos, educación superior

Introduction

With the understanding of creative cognitive processes or CCP as they will be called from now on, the mental representations and processes that underlie creative thinking are identified. According to Boden (1994), creativity consists of "using one's own computational resources to explore and sometimes get rid of known conceptual spaces" (p. 156), which means that every human being has, according to his experience, a series of mental representations of the world around him that are modified or changed by it. From this experience, creativity arises from cognitive processes that are related and allow the generation of new ideas and resources.

Recognizing creativity in today's world allows us to visualize and experience it as a capacity that allows human beings to develop skills, favoring the performance of tasks and the way to proceed in different situations. The purpose of this review article is to analyze research and innovation experiences in the field of CCPs and creativity in education, in order to obtain a broader perspective on the needs of educational contexts regarding this topic, also bearing in mind the conceptions of creativity and how it is incorporated into teaching. Additionally, to

find the contributions that have been made in order to nurture the content of the research carried out from this review.

The direct antecedents and efforts for the development of creativity in educational contexts are recent and continue to be strongly studied in relation to the demands of learning today. Research, theoretical proposals, published educational interventions and other articles that allow, through their studies, the contrast with the theory and concepts necessary for the approach of the subject in relation to CCPs, are considered antecedents. The question then arises, how to contribute to the promotion of PCC in higher education environments?

For the integration of the researches consulted in this article, categories were assigned that allowed to deepen from different lines without leaving aside the central concept. That is to say, the study of the approach to CCPs both from creativity itself and from the cognitive approach to it, aimed at current education. Thus, it is expected that this article will make an important contribution to the elaboration of the orientation guide for the development of PCC in higher education teachers, as well as to the investigation of the process of creativity in teaching and that it can generate reflections on the current demands in education and the updating of teachers so that their practices contribute innovatively and significantly to the training of future professionals of society.

Materials and Methods

This document synthesizes and compiles express content on the development of creativity, creative cognitive processes and those that are especially aimed at education and teachers in particular. For the above, we took into account specialized platforms in the supply and academic publication both educational and editorial, such as; Dokuma, Audiolis, Coursera, EDX, Platzi, databases such as; ECCO and Scopus, Latin American journals such as; LATINDEX and SSciELO, complementary texts such as; magazines of diffusion in education, books, book chapters, conferences, doctoral theses, articles published in scientific journals of impact, communications, congresses, papers or scientific conferences. Determining the existence of a wide development of creativity, from education and university teaching, from the evocation of the PCCs as methodological fragments in the elaboration of a guide.

For the implementation of this methodological strategy, descriptors or key words such as "creativity, training, cognitive creative processes, higher education" were taken as a basis through actors associated with the writing and achievement of this research, where a research process begins in 2021 and ends in 2023.

Results

This section presents the results of the documentary analysis process carried out on the basis of the studies and proposals that respond to three review categories derived from the central focus of the search with respect to the study of creativity in the development of creative cognitive processes in educational contexts. These categories are: PCC, teacher training programs and training and habits on creativity in the 21st century.

Creative Cognitive Processes

The objective of the background research on CCPs is to understand these processes as mental operations that favor the creation of new ideas. The understanding of CCPs refers to the study of different models and approaches for the development of creativity that are consulted thanks to their relevance and significant findings with which a concept of creativity is proposed that encompasses skills to be enhanced in all human beings, understanding them as capable of formulating new ideas and generating innovative products that contribute to their context and to humanity.

The experts Finke, Ward and Smith (1992) present the Geneplore model, where they make a study of creativity that allows to understand it taking into account the observation of human behaviors such as the design and execution of cognitive tasks. This model is composed of two phases, the first refers to the gene, the generative phase, and the second phase called plore, which corresponds to the exploratory phase. In the generative phase, mental representations called preinventive structures are built and the exploratory phase is in charge of exploring these structures.

Camacho (2016) in his study of characterization of PCCs, by means of case studies applies the concepts for observation that stand out in the Geneplore Model in order to organize, systematize and interpret the performance of a task. For their part, Méndez and Ghitis (2015) focus

on the study of PCCs through the performance of a particular cognitive process as is the analogical transfer present in this model, which gives rise to creativity and represents that "a relationship or set of relationships in one context is transferred to another" (Finke, Ward, & Smith, 1992, p.21). The study of the Geneplore model has constituted for researchers in education, an important support by presenting the cognitive processes that interfere in the creative processes especially in teaching and learning with the intention of seeking strategies to promote skills in students of the present century. Castro and Córdoba (2015), propose an educational model that allows enhancing creative cognitive processes in light of the Geneplore model where thanks to the articulation of the work with teachers they were able to establish their perception of CCPs and how to work them daily in classes with students.

It is important to describe the cognitive processes carried out by both teachers and students in educational situations, in this sense, Manrique (2020) makes a typology applying a series of categories from the types of cognitive processes being these both of lower level such as attention, perception and memory, and those of higher level such as narrating and understanding.

Another important model within the cognitive approach is the Computational Representational Model of Mind proposed by Margaret Boden (1994), which describes the thought processes and mental structures on which creativity is based. Boden (1994) points out that creativity involves the development of everyday skills and abilities such as observing, remembering, and recognizing; exploration turns out to be a key concept in understanding creativity. This model was important for the research of Rubiano and Velásquez (2013) together with the Geneplore model, since by applying a cognitive task that consisted of the creation of a digital literary text they were able to characterize the CCPs used in the realization of this. According to Boden (1994), the more expert a subject is in a given field, the more possibilities there are for creativity, which is why professionals in literary studies were called upon to create the text.

Teacher Training Programs

The purpose of the search for background information on teacher training is to respond to the definition, management and implementation of training strategies that allow understanding a changing and structured world based on the participatory action

between student and teacher. Likewise, a modern concept such as PCC requires an understanding through training processes where its characteristics are studied and can be contrasted in the light of everyday teaching and learning. Thus, Alfonso and Rodríguez (2018) present the characterization of a virtual course with the objective of generating a training process for teachers regarding creative cognitive processes, where they sought to understand the cognitive models in the framework of the study of creativity, such as the Computational Representational Model of the Mind of Boden (1994), the Geneplore model of Finke, Ward and Smith, (1992) and the contributions of Sternberg (2009) regarding the elements to keep in mind so that CCPs are fostered. Similarly, Sosa (2020) proposes through his research, the training of teachers with emphasis on creativity in such a way that the elements derived from the reflection of creativity and the analysis of educational practice are integrated to contribute to the needs of the educational context in terms of creativity.

The growing development of society and with it its rapid change in many aspects including the educational dimension, invites us to think about the importance of improving the quality of education, an aspect in which governments make various efforts, finding as one of the pillars the training of teachers, understanding that improving the professionalization of teachers can contribute to this ambition of improving the quality of education and learning, for this we take what Reimers (2020) states

The importance of teacher quality has long been understood. As an intentional process designed to support learning, it stands to reason that the effectiveness of teaching is a result of the knowledge and skill of those who guide it.(p.19)

Works such as Rivera's (2020), aimed at training teachers in creativity through workshops, respond to the needs of the educational sector, as mentioned in the previous segment; providing tools to work with teachers and encourage them to develop creativity, which will improve their learning and teaching processes and will have a positive impact on their students.

Training and habits on creativity in the 21st century

With the background on training and habits on creativity in the 21st century, we seek to understand the field of creativity, its incidence in educational environments and the different areas of knowledge in

order to inquire about the findings and the relevance of the topic in each particular context.

The world report issued by UNESCO (2005) entitled "Towards Knowledge Societies" states that:

Education must prepare learners to meet the challenges of the 21st century, in particular by encouraging the development of creativity (...) investment in education must be aimed at improving learning environments and the status of the educational professions as a whole (p. 211).

One of the challenges to generate a knowledge society is mediated by the need to foster the development of creativity, which influences the improvement of learning contexts, an element that is also mentioned in UNESCO's recommendations. Going deeper into the term, the 21st century brings the concept of creativity to the forefront as one of the main challenges to face social problems in a world that renews itself and is conditioned by information and technology. These challenges imposed by the new century confront the citizen's perspective and his or her capacity to respond to the demands of the context. For education it is important to train teachers who are in tune with the new world, teachers are needed who are aware of the needs of the educational population, who can create and innovate in their daily work (Cárdenas, 2019), as mentioned by Ortega (2014) in his research on creativity in the teaching of university teachers where the importance of training teachers in skills to meet current needs and provide relevant responses to social and academic university requirements is highlighted. Similarly, Agudelo (2019) presents the creative skills of teachers where creative processes are perceived as education skills and it is concluded that there is a need to incorporate skills and creative thinking within the training processes, as well as from the methodology to incorporate the teaching of creativity and creative teaching.

Knowing creativity from the university reality is essential to understand how a professor understands the term at this level of education and how it affects his teaching and training activity. Through a case study Poveda (2014), allows through his study to examine these factors and conclude on the need to understand creativity as a quality that accompanies every human manifestation in order to advance in all levels of knowledge and knowledge. This is why Ramírez (2010) in his research on implicit theories of creativity and

teacher training, manages to identify the meanings that students, teachers and advisors of the Bachelor's Degree in Preschool Education for the Indigenous Environment, attribute to creativity in order to understand the creative being of the educational actors, allowing to establish processes of construction of the meanings of creativity within the social reality.

In this sense, García et al. (2012) propose a process of recognition of the conceptions on creativity as in the previous research. However, in this case, they address elements related to the study of theories and cognitive models of creativity to establish a relationship with the educational practices developed in their study population corresponding to the teachers of the Bachelor's Degree program in Early Childhood Education at the Pontificia Universidad Javeriana in Bogotá.

Once the concept of creativity is recognized and strategies for its promotion and development are established, it is important to integrate it into the educational processes from the different areas of knowledge, taking into account that it does not belong to a single field such as the arts, creativity is present in every aspect of life and must be present in the educational field as the context and technological progress require effective and dynamic responses in the generation of knowledge. Prado (2020), makes significant contributions in this regard, detailing the integration of creativity with the teaching and learning processes carried out by university teachers, where the conclusions allowed determining the benefit for teachers to have this type of relationship in their processes. The integration of the components is also present in the study conducted by Sadio et al, (2020), by incorporating creativity from the use of ICT, which allows through the collection of experiences to enhance the development of creativity.

Conclusions

A review of various research studies on the study of creativity in the development of CCPs in the educational field has been presented, which has provided a broader view of the value given to creativity.

The studies propose strategies to enhance and promote the development of CCPs in teaching processes. To this end, it is essential to train and update teachers in the cognitive field of creativity in order to generate in them a reflection on their practices and the way they

plan their activities. The mobilization of thinking promotes problem solving, innovation, the implementation of new methodologies, the use of constraints for the creation of new products and the ability to generate changes in educational processes that respond to the requirements of today's society.

The contributions reviewed are not addressed in depth, however, it is possible to determine the impact they generate in the educational processes and the contribution to the present research. It is important to recognize the needs in the field of education and the demands of the 21st century in relation to learning processes where creativity plays an important role for the recognition of new methods that provide answers and support for an education that promotes motivation and fosters meaningful experiences.

The understanding of creativity makes it possible to establish it as an ability that can be developed by all people in all fields of knowledge, even in everyday activities.

It is recognized that the article has some limitations, for example, the impossibility of collecting all the contributions regarding the study of creativity and the cognitive approach to it, or the omission of research and proposals that focus on creativity from other areas of knowledge. This article presents a necessary and complementary review in a discipline of growing interest and development that assesses the relevance of the findings and complements the answers to the question posed initially.

References

- Agudelo, C. (2019). *Habilidades Creativas De Los Maestros Del Programa Ondas Caldas*. [Master's thesis, Universidad Autónoma De Manizales] Digital file. <https://repositorio.autonoma.edu.co/jspui/handle/11182/367>
- Alfonso, J., Rodríguez, S. (2018) *creativity for teachers: characterization of a virtual course To train teachers in creative cognitive processes*. [Master's thesis, Pontificia Universidad Javeriana]. Digital archive <http://hdl.handle.net/10554/39012>
- Boden, Margaret A. (1994). *The creative mind: myths and mechanisms*. Gedisa.
- Camacho, J. (2015). *Characterization of creative cognitive processes in expert and novice teachers through the realization of a*

- cognitive task proposed from the area of mathematics in elementary school*. [Master's thesis, Pontificia Universidad Javeriana]. Digital file
<https://repository.javeriana.edu.co/bitstream/handle/10554/17126/CamachoParraJohannaCarolina2015.pdf?sequence=3&isAllowed=y>
- Castro, J., Córdoba, E. (2015). *Educational model for the development of creative cognitive processes*. [Master's thesis, Pontificia Universidad Javeriana]. Digital archive
<http://hdl.handle.net/10554/17135>.
- Cardenas, L. (2019). Creativity and Education in the 21st century. *Inter-American Journal of Research, Education and Pedagogy RIIEP*, 12(2), 211-224. <https://doi.org/10.15332/25005421.5014>
- Finke, R., Ward, T., Smith, S. (1992). *Theory, Research and Applications*. Cambridge, Massachusetts. MIT Press.
- García, A., Hernández, Y., Mesa, T., Sierra, R., & Castro, Y. (2012). *Concepciones sobre creatividad en docentes universitarios de la Licenciatura en Pedagogía Infantil de la Pontificia Universidad Javeriana de Bogotá D.C.* [Master's thesis, Pontificia Universidad Javeriana]. Digital archive.
<http://hdl.handle.net/10554/3127>.
- Manrique, M. S. (2020). Typology of cognitive processes. A tool for the analysis of teaching situations. *Education*, 29(57), 163-185. <https://doi.org/10.18800/educacion.202002.008>
- Méndez, M., Ghitis, T. (2015). Creativity: A cognitive process, pillar of education. *Estudios pedagógicos*, 41(2), 143-155. <https://dx.doi.org/10.4067/S0718-07052015000200009>
- Ortega, H. (2014). *La creatividad en la enseñanza del docente universitario de la Universidad Autónoma de Zacatecas, México* [Doctoral thesis, Universidad Complutense de Madrid] <https://dialnet.unirioja.es/servlet/tesis?codigo=98044>
- Poveda, B. (2014). *Creativity in university teaching*. [Doctoral thesis, Universidad Autónoma de Madrid]. Digital archive.
<http://hdl.handle.net/10486/663386>
- Prado, G. (2020). *Integration of creativity in the teaching - learning process of university teachers of a Faculty of Communication in*

- North Lima. [Doctoral thesis, Universidad de Piura] Digital file
<https://hdl.handle.net/11042/4672>
- Ramírez, F. (2010). *Implicit theories of creativity and teacher education. The Meanings of Creativity in the Bachelor of Preschool Education for the Indigenous Environment*. [Doctoral thesis, University of Murcia, Spain]. Digital file.
<http://hdl.handle.net/10201/22294>
- Reimers, F. (2020). Educating teachers for a better world. A comparative study of six teacher education programs to educate for the 21st century. Springer Briefs in Education
- Rivera, M. (2020). *Development of creativity in teachers through a workshop*. [Doctoral thesis, Universidad Cuauhtémoc]. Digital archive.
- Rubiano and Velásquez (2013). *Characterization of creative cognitive processes in the production of a digital story*. [Master's thesis, Pontificia Universidad Javeriana]. Digital archive
<https://doi.org/10.11144/Javeriana.10554.12347>
- Sadio-Ramos, F.J., Ortiz-Molina, M.A., & Bernabé Villodre, M.M. (2020). Music teacher training to enhance creativity from the use of ICT: a biographical experience. *Revista Electrónica Interuniversitaria Interuniversitaria de Formación del Profesorado*, 23(2), 155-166.
- Sternberg, R. (2009). *Handbook of creativity*. Cambridge University Press.
- Sosa, A. (2020). *Teacher training with emphasis on creativity: a proposal from the emerging paradigm*. [Master's thesis, Universidad Autónoma de Chihuahua] Digital archive
<http://repositorio.uach.mx/id/eprint/301>
- UNESCO (2005). *Towards the Knowledge Society*. UNESCO Publishing.
<http://unesdoc.unesco.org/images/0014/001419/141908s.pdf>