


FUNDAMENTALS OF THE COGNITIVE PROCESS OF CREATIVITY AND ITS IMPLICATIONS IN THE ASSESSMENT OF LEARNING

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ABSTRACT

In this article, we present the partial results of a study conducted within the scope of the Postgraduate Program in Education (PPGE) of the Federal University of Amazonas (UFAM). The objective of this study was to explore the foundations of the cognitive process of creativity and its implications for the assessment of learning. To this end, we conducted bibliographical research with a qualitative approach, basing our discussions on theorists such as Vygotsky (2012), Luckesi (2011), and Libâneo (2013), among others. We conclude that creativity, as an essential component of cognitive processes – including memory and understanding – plays a central role in the effectiveness of the educational process. The lack of stimulation of creativity in the assessment of learning can lead to the perception of inadequacy on the part of teachers, highlighting the need for professional training that values this dimension. Furthermore, the cognitive development of creativity is directly related to the improvement of student's academic and professional performance, strengthening their social and work engagement and contributing to the construction of a more dynamic society focused on the integral development of the individual.

Keywords: Cognition. Creativity. Learning Assessment.

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INTRODUCTION

In this article, in which we present the results of a study conducted within the scope of the Postgraduate Program in Education (PPGE) of the Federal University of Amazonas (UFAM), we discuss the foundations of the cognitive process of creativity and its implications for the assessment of learning. Although studies on the foundations of the cognitive process of creativity and studies on the assessment of learning are concentrated in different epistemological fields, there is the emergence of promising exchanges in the effort to articulate these concepts, which can offer contributions to the teaching-learning process, since the assessment of learning is redesigned to allow or enhance creative learning. Therefore, creativity has been the object of continuous discussion in contemporary times, especially about pedagogical activity. In recent periods, there has been a growing interest in this topic. For Lins and Miyata (2008), assessing the construction of creativity and a mental image is a challenge for all teachers, because even if we analyze the number of effective studies on this topic, it is clear that the complication of these human functions makes their understanding somewhat complex.

Creative thinking has often been classified as a distinguishing feature of those individuals who reveal talents of superior intellectual competence. For Lins and Miyata (2008), creativity is a privilege granted to rare geniuses, which would also constitute a consequence of Gnostic philosophy when clarifying the divine sparks, derived from the demiurge creator of humanity, but which would only fall upon a select few.

Regarding this approach, it should be noted that two social universes discuss creativity and its importance in everyday life: the first universe is the world of work, in which all employers have required candidates and their employees to be able to be creative in their tasks; and the other universe, in which creativity is observed as an object of study, is Education (Lins; Miyata, 2008).

Assessment, we can understand as an act of investigating the quality of that which establishes its object of study and, therefore, portrays its quality (Luckesi, 2011). In this sense, assessment does not solve anything in itself but assists in decision-making about pedagogical and administrative actions from the perspective of the effectiveness of the desired results. This implies that the assessment of learning is like a subsidiary resource for the acquisition of satisfactory results in pedagogical facts planned in the school environment.

Although there is a movement to think of assessment as an isolated action and distant from the pedagogical, which has become a tradition both in school life and in representations of society, it is necessary to break with this pattern, because the action of assessment is much more than an isolated technical action (Luckesi, 2011). Therefore, as can be observed in the process of practicing school exams, one learns to view assessment as something separate from pedagogical action and such exams generally continue to disregard teaching and learning practices.

However, as highlighted by Luckesi (2011), assessment does not occur in this way, under penalty of not being an actual assessment process, since such a process is part of pedagogical action, forming a whole with the acts of planning and execution. In this context, based on the understandings of Lins and Miyata (2008) and Luckesi (2011), briefly presented above, our objective in this study was to explore the foundations of the cognitive process of creativity and its implications for the assessment of learning.

About the organization of this article, after this introduction, it was as follows: in the second section, we present some discussions about the theoretical and methodological aspects of the research; In the third section, we discuss the concepts of cognition, creativity, and their implications in the learning assessment process; and finally, we conclude by making some final considerations.

METHODOLOGY

We used a qualitative approach to develop this study. This approach focuses on a level of reality that cannot be quantified, a universe of meanings, motives, aspirations, beliefs, values, and attitudes, which corresponds to a deeper space of the relationships between processes and phenomena (Minayo, 2007).

In addition, as highlighted by Lüdke and André (2013), the qualitative approach is characterized by the natural environment as its direct source of data, requiring direct and prolonged contact between the researcher and the environment and/or the situation being investigated and, as a rule, intensive fieldwork. According to the authors, the data collected are predominantly descriptive, that is, rich in descriptions of people, situations, events, and transcripts of interviews and testimonies, photographs, drawings, and extracts from various types of documents.

As a theoretical-methodological procedure, we chose to conduct bibliographic research, which, according to Gil (2008), is characterized by the systematic and critical analysis of materials already published and widely available for consultation. Also according to Gil (2008), this type of research allows for gathering and interpreting information contained in books, scientific articles, dissertations, theses, and other relevant documents, and is fundamental for the theoretical basis of academic studies. Thus, this method makes it possible to identify, explore, and synthesize different perspectives on the topic, promoting a dialogue between the authors' ideas and the critical analysis developed by the researcher.

In this continuum, as highlighted by Martins and Pinto (2001), bibliographic research is not limited to the simple collection of information but is an essential step that allows understanding the depth and complexity of the phenomenon studied, while also offering support for the formulation of hypotheses and the construction of new interpretations. Therefore, it is crucial to select reliable and scientifically recognized sources, ensuring that the information used is relevant, up-to-date, and aligned with the objective of the study.

In any case, as we can see in the discussions of Martins and Pinto (2001) and Gil (2008), bibliographic research plays a central role in the historical and epistemological contextualization of the problem investigated, allowing the identification of gaps in existing knowledge and contributing to the delimitation of more appropriate methodological approaches. Thus, this procedure not only theoretically grounds the investigation, but also favors a broader and more critical understanding of the topic, expanding the possibilities for analysis and discussion.

DISCUSSIONS: COGNITION, CREATIVITY AND ASSESSMENT OF LEARNING

CONCEPTS OF COGNITION

Cognition is an act or effect of knowing, a process or faculty of acquiring knowledge, and, in a general sense, refers to what is related to knowledge, that is, to the storage of different compositions of information obtained through learning and experience (Vereza, 2016). In this sense, we can understand cognition as the mental capacity to think, reason, interpret, understand, acquire knowledge, remember, organize information, analyze, and solve problems. Given the multiplicity and multidimensionality of what can be learned and what makes up cognition, Cognitive Sciences attempt to explain how human beings acquire knowledge about themselves, others, and the world around them (Vereza, 2016).

In the various definitions, we find as a common core how cognition is seen primarily as a process of acquiring knowledge or reasoning, given the mention of memory, attention, and imagination. Thus, cognition is normally associated with the processes involved in acquiring knowledge. In this context, the notion of cognition as a process refers to the notion of cognitive development, another definition widely disseminated from the constructivist and socio-interactionist paradigms (Martins, 1997), mainly those known in Brazil from the contributions of Jean Piaget and Lev Vygotsky. In Piagetian theory, cognitive development is approached as a logical function, distributed in four stages in the process of acquiring structures, which form a unified set of knowledge or cognitive skills, thought of as follows: sensorimotor stage, from birth to two years of age; preoperational stage, from two years to seven years of age; stage of concrete operations or operational, from seven years to eleven years of age; stage of formal operations, from eleven to seventeen years of age (Piaget, 1999).

To better understand this area of development, Piaget (1999) argues that the term cognition is seen as an active and interactive process. It is a permanent process of advances and retreats between the person and the learning environment, it is a dialectical process because it does not depend only on the student nor only on external stimulation, thus, cognitive development depends on the interaction that is established between the student and the learning environment. In any case, cognitive functions encompass the domains of attention, perception, and language, namely verbal comprehension and fluency, various types of learning and memory, information processing, perceptive organization, and executive functioning.

In Vygotsky's theory, cognitive development is interpreted from a sociocultural perspective, which gives a strong focus on interactions in the social environment as a means that drives cognitive development (Vygotsky, 2012). The knowledge of cognition that justifies cognitive linguistics, in turn, is based on It is based on the perspective, both theoretical and common sense, that links cognition to the acquisition of knowledge (including linguistic) and a set of cognitive skills, often linked to intellectual capacity (Vereza, 2016).

By clarifying language as one of the first higher processes, we are keeping in mind that it is from this mechanism that other elements are made possible, such as consciousness and reflection, which allow human beings to think about their ideas, understanding, imagining, and responding creatively to environmental problems. Thus,

Maturana (2001) emphasizes that the fundamental characteristic of language is its ability to radically modify human behavioral domains, allowing for new phenomena, with reflection and consciousness being important, among other things, to allow one to describe oneself and one's circumstances.

In this context, we emphasize three important cognitive skills: the first concerns the synthetic ability to redefine problems, that is, the ability to see the problem from a new angle; the second corresponds to the ability to analyze and recognize one's ideas, inferring what is worth investing in; and the third is the practical-contextual ability, that is, being able to convince other people about the value of one's ideas (Stenberg, 2010). In short, in this study, we understand cognition as a complex process of producing oneself and the world that occurs in relationships with peers, mediated by signs and languages shared in culture (Tomasello, 2019 apud Stenberg, 2010).

CONCEPTS ABOUT THE COGNITIVE PROCESS OF CREATIVITY

We begin our discussions with an objective definition of creativity. Thus, according to Robinson (2019), creativity is the process of developing original ideas that have value, a value that is as plural as the human one, because it is related to behaviors evaluated as valuable in a given society.

In this sense, creativity is important in science, in the discovery of new scientific facts, and new inventions. In addition, it also makes it possible to create new jobs. Therefore, the construction of educational practices that favor the development of creativity is part of a broad project, which branches out into the political and social spheres. In this context, imagination is the source of creativity, however, imagination and creativity are two different but complementary processes (Robinson, 2019).

According to Vygotsky (2012), the relationship between imagination and creativity in childhood occurs differently from that in adult life, as all factors acquire a different aspect at different times in childhood. It is for this reason that, at each stage of childhood development, creative imagination occurs in a particular way, depending on the stage of development in which the child is.

This imagination in childhood is profoundly influenced by the experiences that the child goes through, which are structured and grow continuously, carrying unique and profound characteristics that differentiate it from the experience of adults. In this context, Vygotsky (2012) emphasizes the relationship between the child and the environment in

which he or she is inserted. This environment, whether more complex or simpler, shaped by traditions and cultural influences, plays a fundamental role in stimulating and directing the child's creative process, which is significantly different from that observed in adults.

In addition, as we observed in Vygotsky (2012), it is important to emphasize that the interests of children are different from those of adults, which contributes to the functioning of their imagination being diversified. Thus, children's creativity reflects its dynamics, marked by perceptions and interpretations of the world that differ from adult perspectives, highlighting the uniqueness of creative thinking in childhood.

Also in line with the author's interpretations, children's experiences are more elementary than those of adults, and their interests are also more elementary, so that, eventually, their relationship with their context is equally less complex, lacking the accuracy and variety of adult behavior. Therefore, all of these factors are fundamental in defining the task of imagination.

In Vygotsky's (2012) view, childhood is considered to be the time when fantasy develops the most and, according to this idea, as the child develops, his imagination and the strength of his fantasy begin to diminish. It is for this reason that the real products of creative imagination, in all areas of the creative task, fall to mature fantasy. Thus, creativity is fundamentally related to two central points, personality, and motivation, and some aspects that contribute to the development of creative potential are autonomy, personal flexibility, openness to experience, self-confidence, persistence, and emotional sensitivity (Oliveira, 2021).

In addition, according to Robinson (2019), there are some cognitive skills necessary for the development of creativity, such as associative skills – the ability to connect remote ideas; analogical skills – referring to the use of relationships to compare, elaborate and even transform information; metaphorical skills – the ability to refer to an object in terms of others, producing figurative meanings through implicit comparisons (metaphors), giving rise to new forms of mental representations; and abstract skills – the ability to mentally isolate one or more elements of a whole.

Let us imagine the aforementioned skills that makeup and structure creativity in the educational context. There are many possibilities for exercises and even assessment processes that contemplate the connection between ideas or transformation of information, this is what we do all the time when we present a text and ask students to bring their relationships. In Higher Education, when we request mental maps, we induce the ability to

isolate elements, while at the same time establishing relationships between these objects and others.

We can say that the creative individual is characterized by the relevance of his/her motivations and the intensity of the reasons that lead him/her to overcome obstacles and overcome barriers. Therefore, the creative personality is interested in change and originality, which can favor the acceleration of creative thinking. It is worth noting that the understanding of the creative personality is that it is always ready to abandon old classifications and to perceive rich and new possibilities.

Thus, for Henriques (2015), creativity refers to the most characteristic skills of the creative person, and the creative product depends on personality traits and motivation, emphasizing originality and operationalization. Thus, creativity is the ability to produce new (original) works. However, in discussions about creativity, some theories give more emphasis to the motivational and personality traits of the creative individual, while others emphasize the intellectual traits and cognitive styles present in the creative person. In Alencar and Fleith's (2003) approach, creativity meets three basic conditions: a) a new or at least statistically infrequent response; b) the response must be in line with reality and serve to solve a problem; and c) it must include an evaluation, elaboration, and development of original insight. In this cognitive approach, the cognitive traits and styles present in the creative individual are highlighted and understood as basic or fundamental to the creativity of the individual's cognitive characteristics. Thus, for a scientific understanding of this problem, it is necessary to approach creativity more as a rule than as an exception, since creativity constitutes a necessary condition for existence, and everything that goes beyond the limits of routine, even with a small novelty, is due to the human creative process.

About its study, according to Gardner (1996, p. 31), creativity can be investigated following some fundamental guidelines. Firstly, the author highlights that "a person is creative in one domain and not in all domains", suggesting that creativity is specific to a field of knowledge and does not necessarily extend to several areas. Secondly, Gardner states that "creative individuals regularly manifest their creativity", indicating that creative expression tends to be a consistent characteristic of these individuals. Thirdly, he observes that "creativity involves the creation of products or the elaboration of new questions, as well as the solution of problems", highlighting the innovative and problem-solving aspect of the

creative process. Finally, the author emphasizes that creative activities are only recognized as such when they gain acceptance within a given culture.

For Vygotsky (2012), one of the most fundamental questions in Educational Psychology is the case of creativity, its development and promotion, and the meaning of creative activity for the general development and maturation of the child. The creative process that manifests itself in games is found in early childhood. Children's play serves as a reflection of what they have seen and heard from their elders. It is not a simple memory of what they have experienced, it is a creative reworking of impressions, of a new reality response to their demands and emotional needs.

Discussing the issue in question, Ostrower (2004) emphasizes that human creative nature is formed in the cultural context since all people develop in a social reality, whose cultural needs and values shape their life values. In the individual, their creativity represents the potential of a unique being and its creation will be the realization of these potentialities within the context of a given culture. Creating corresponds to forming, giving shape to something. Therefore, creativity allows man to have the ability to know how to think critically, to have a critical eye, and to know how to solve the problems that he finds in society.

This theme is important in the field of Education because it mobilizes the creative potential in all disciplines, also, it is relevant in the reformulation of teaching methods, in the elaboration of lesson plans, and the change of attitudes on the part of teachers and students. Thus, teaching for creativity implies first promoting not only creative attitudes, excluding the simplistic principle that the individual is a creator only and solely by the effect of heredity.

As highlighted by Ostrower (2004), among the various theories that focus on and stand out in the study of creativity, one of the most prominent is the psychological theory, which dialogues with the theories of Sternberg and Lubart, which argues that to make a significant contribution to a given area, it is necessary to know that area, and with the Personality Theory, which highlights people with high productivity, focusing much more of their attention and energy on work. Thus, psychological theories seek to study the problem of personality and creative behavior, because a personality has a unique pattern of individual traits by which each individual differs from another so the pattern of creativity manifests itself in creative behavior. In this scenario, creative personalities differ in their "action", from which the rhythms of creativity arise, in which the social and cultural

importance of creativity is great. Thus, cognition is a process through which the world of meanings originates as the being finds itself in the world, constituting relations of meaning, that is, it gives meaning to the reality in which it is faced. Creativity is a process that encompasses different stages, such as understanding gaps in some type of information, identifying solutions for this gap, and breaking down barriers. In any case, cognition and creativity play a fundamental role in the context of education and the adaptation of the individual to the environment, since the creative personality tends to easily improve the difficulties that appear in its communication until it reaches the true encounter with itself and with others. For Bock, Furtado, and Teixeira (2008), the relationship between cognition and creativity develops in a historical, cultural, and social context. From this perspective, Education has the role of highlighting both as fundamental for the development and expression of individuals. In summary, we can understand that the cognitive process of creativity in the context of Education acts to stimulate reflective learning, reasoning, the use of problem-solving strategies, etc. (Fonseca, 2011).

LEARNING ASSESSMENT

Learning assessment acquires its meaning to the extent that it is linked to a pedagogical project and a teaching project, and does not have an end in itself, but rather helps a course of action that seeks to build a previously thought-out result. This is why assessment cannot be thought of, analyzed, defined, or outlined without a project that articulates it.

For Luckesi (2008), the practice of learning assessment contributes by serving as a basis for decision-making to build knowledge, skills, and habits that enable the effective development of students, through active assimilation of society's cultural legacy. However, the fundamental objective is the development of cognitive capacities, and motor skills in conjunction with all aptitudes, habits, and convictions of life. Capabilities such as analyzing, understanding, synthesizing, overcoming, comparing, judging, choosing, and knowing how to decide are not innate and can be developed based on knowledge relationships.

In human society, knowing is always a formative project, in the sense that there are intentions designed and ways of proposing relationships that structure and give body to the different projects of human beings and society. Thus, the assessment of learning must be a perspective of breaking with the technical, segregating, punctual, and individual project of traditional assessment that, aligned with the factory format, sought to verify the quality of

learning as if students were on the same conveyor belts as any inanimate object in the factories (Luckesi, 2008).

There are many disadvantages of this model, such as its punitive, anti-pedagogical, and reproductive nature of social inequalities. But we want to highlight here its limits in terms of the lack of depth of what can be assessed, as well as the distance of this instrument about the theoretically produced understanding of cognitive development, and then defend the assessment of learning in its creative dimension, as a project to overcome these limits.

For Luckesi (2008), it is difficult for educators to move from habits concerning teaching exams to habits concerning assessment. The causes that give rise to this difficulty can be summarized by three topics: 1) the contributions of the history of education, since the exams we know today were systematized with the emergence of modernity, in the 16th century; 2) the model of society in which we live, the bourgeois model, is exclusionary in its constitution, a characteristic reproduced by exams; and 3) the unconscious repetition of what has happened to each of us, throughout our educational life.

However, for the author, the assessment of learning must be democratic, inclusive, and welcoming to everyone, which combats the hierarchical and exclusionary social model of bourgeois society. Acting inclusively in an exclusionary society requires critical awareness and political will to confront this way of being, which is no longer part of us.

According to Luckesi (2008), the use of learning assessment as an instrument of investigation and intervention aimed at obtaining successful results in educational institutions represents a disruptive action about the current social model. This practice challenges a society marked by exclusions, promoting an inclusive way of acting that requires political effort and commitment to transformation. While exams were structured in the 16th century, learning assessment emerged only in the 20th century, marking a significant change in education. In this sense, teachers who use learning assessment as a pedagogical tool need to be clear that they are breaking with an exclusionary educational tradition, rooted in five centuries of history.

In addition to this, it is worth highlighting that assessment, in any human task, is essential to achieve productive results, as it allows for the diagnosis and investigation of problems, using the data obtained to intervene effectively and guide processes towards

desired objectives. This approach reflects contemporary practice, where the act of assessment is an indispensable tool for those seeking to achieve qualitative and acceptable results in their actions. Thus, assessment not only measures results but also guides and qualifies processes to promote positive and inclusive changes (Luckesi, 2008).

In Luckesi's (2008) approach, a central question arises: what is the pedagogy underlying an educational practice that focuses solely on preparing students for the university entrance exam, understood as an exam? This pedagogy does not form the student as a historical, critical, investigative being, aware of his or her incompleteness; on the contrary, it molds him or her only as someone who must produce results according to the parameters established by the school.

In this context, for teachers to focus on formative assessment, it is essential that they perceive students as beings in movement, in constant development, and base their actions on this understanding. This does not mean that preparing for college entrance exams should be neglected; it can and should be one of the concerns of educational practice, but not the only one. Preparation for exams can be carried out, for example, through mock exams at school, without resorting to practices that generate excessive anxiety and make the learning environment oppressive.

In the classroom, assessment should be understood as an integral part of the educational process, not as an end in itself, as Luckesi (2008) warns us. Quality teaching is that which prioritizes the learning process and, consequently, achieves significant and satisfactory results. And, therefore, the assessment of learning should promote the deep assimilation of concepts, demonstrated in a practical and daily manner in classroom interactions, valuing and enabling the student's integral development, respecting their trajectory, and stimulating their critical and creative potential.

From Libâneo's (2013) perspective, assessment is an essential and ongoing teaching task in teaching and is indispensable for systematically monitoring the teaching and learning process, as it allows comparing the results achieved during the interaction between teacher and students with previously established objectives, allowing for the identification of advances and difficulties and guiding necessary adjustments for the effectiveness of the pedagogical process. In this context, we highlight the importance of assessment in its diagnostic function, as it serves as a basis for the continuity and improvement of teaching work, especially about planning, functioning as an instrument for

precise monitoring of academic and scientific development, contributing to adapting strategies for pedagogical approaches to the needs of students.

This diagnostic approach proposed by Libâneo (2013) is not limited to a single moment, but occurs in a cyclical and integrated manner: at the beginning, to identify the students' starting point; during, to monitor and redirect the process; and at the end, to evaluate the results about the objectives set. Therefore, evaluation is not only a measurement mechanism, but a reflective resource that allows the teacher to understand and face the challenges inherent in the educational process, consciously assuming the progress and difficulties of students.

Regarding the relationship between creativity and learning assessment, Lins and Miyata (2008) emphasize that creativity has been widely debated in contemporary times, especially in the context of pedagogical activity, and is considered a crucial aspect to be encouraged among students. However, despite being a topic that has been investigated for decades, there is a growing interest in the subject; however, evaluating the construction of creativity continues to be a great challenge for teachers.

For Lins and Miyata (2008), the assessment of creative learning aims to develop creative thinking skills in students, personality characteristics associated with creativity, and specific strategies that promote the development and expression of these skills. Furthermore, for the authors, the assessment practice by teachers should consider aspects that favor creativity in their students, creating pedagogical environments that stimulate originality and innovation.

Lins and Miyata (2008) also point out that the assessment of creativity depends on previous experiences stored in the individual's cognitive structure, and these processes are intrinsically related to factors such as fluency, flexibility, and originality. Also according to the authors, creative thinking is essential in the assessment of learning, contributing to more effective pedagogical practices aligned with the contemporary demands of education. Thus, creativity is not only an educational objective but also an indispensable tool for the success of students' cognitive and social development.

In short, learning assessment, when articulated with a coherent pedagogical project, transcends its merely technical character, becoming an essential instrument for the integral development of students. Furthermore, the inclusion of creativity as a central element in assessment, according to Lins and Miyata (2008), reinforces the relevance of pedagogical environments that stimulate originality and innovation. Therefore, assessment should not

only measure knowledge but also foster essential skills to face contemporary challenges. Therefore, learning assessment should be understood as a dynamic and reflective resource, capable of guiding transformative pedagogical practices, promoting the creative and critical potential of students, and contributing to the construction of a more equitable and meaningful education.

FINAL CONSIDERATIONS

In this article, we aimed to explore the foundations of the cognitive process of creativity and its implications for learning assessment. Therefore, discussions on creativity in education seek to develop strategies that promote its expression, highlighting the essential role of motivation and self-esteem as factors that enhance creativity in the educational environment. In this context, the assessment of learning plays a crucial role in creating a space conducive to creativity and should be based on the development of students' skills and promote the construction of knowledge, abilities, and habits that allow their full development, through the active assimilation of society's cultural legacy. It is concluded that creativity, as a component of cognitive processes – such as memory and understanding – is central to the effectiveness of the educational process, so the lack of stimuli for creativity in the assessment of learning can generate a perception of inadequacy on the part of teachers, highlighting the need for professional training that values this aspect. In addition, the cognitive development of creativity directly contributes to the improvement of students' academic and professional performance, strengthening their social and work engagement, corroborating the construction of a more dynamic society focused on the integral development of the individual.

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