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TEACHERS' CREATIVITY AND INNOVATION: THE KEY TO EDUCATIONAL CHANGE

Introduction

Globalization, technological change and constant change have transformed economic, cultural and social processes around the world. Carvalho (2002) refers to globalization as something that fascinates and worries, which appears to be the last stage of colonialism, and which is seen as a new dimension of hope, as a utopia to take place. It is an expression of man's extraordinary technological ability. Computer science, the instantaneous circulation of messages, and the whole universe of technological realization are obvious examples of people's creativity. In reflective, anthropological, epistemological, and pedagogical terms, this evidence poses the demand on societies to develop a new school paradigm. This type of change transforms school into a place where the pedagogical relationship is established, since learning is realized only in situations that have meaning for the subject (Canário 2005).

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In the globalized society of cyberspace, technologies were able to automate everything, except for humans and their subjectivity, creativity, and intimate space. In this regard, the potential of the global society is the result of acculturation of its individuals, of their formation as persons endowed with and aware of their subjectivity, and capable of creative appropriation, i.e., of the recontextualization of messages (Carvalho 2002). It is at this juncture that school intervenes in the construction of individuals as people. Creative schools seek to form and transform, to develop and value potential creativity, entrepreneurship, the importance of human development from its context, aiming at the good of the individual, society, and the world (Sousa et al. 2016). According to Carvalho (2002), the creative relationship with knowledge arises from the intersection of two aspects, namely curricular and extracurricular ones, resulting in the wealth of school as a cultural lever, i.e., encompassing disciplinary spaces, spaces of creativity, and continuous connections within it. This will be the only way to allow students to appropriate and create knowledge the rules of in accordance with the cyberspace as a space of knowledge (Carvalho 2002). Other authors advocate for breaking with the conservative conception and paradigm in school institutions, and for new theoretical references which, backwards from individual work and fragmented knowledge, value the search for, interconnection with, and production of knowledge, as well as individual and collective creative potentials (Souza et al. 2016).

Education is the driving force behind the economic, social and human development of society (Silva-Guerra 2017), but its quality is determined by the role of teachers (OECD 1999; Silva-Guerra 2017) as professionals with technical training and postgraduate science degrees. In this sense, Silva-Guerra (2017) defends the optimization of teachers working in high-level education institutions, with advanced technology, and in environments that are conducive to creativity and innovation. Such teachers are intellectuals who transform societies (Giroux 1997), committed to social change and progress through creative and innovative pedagogical activities. They are fundamental pieces for human development.

This research, based on a theoretical framework, addresses the creativity and innovation of teachers as inseparable and interdependent allies for educational change.

Creativity and innovation – allied and interdependent

Talking about creativity frequently leads to the definition of creative processes as something related to dilettante and useless activities (Cavalcanti 2006). The English verb “to create” comes from the Latin “creare”, and me-

ans to "give existence to", "generate", "originate", "produce", "institute", "found", "first to do" (Great Encyclopaedia Portuguesa Brasileira, VIII, p. 36); and "creativity" is "capacity to find new solutions to a problem", "synonymous with inventive function", "intuition", "discovery", and sometimes even "intelligence". However, "these capabilities, although linked to cognitive processes, are essentially independent of individual differences in general intelligence" (Great Encyclopaedia Portuguesa Brasileira, Atualização III, p. 554).

Creativity, though little studied, is a complex construct, multifaceted, and its importance is unquestionable in any society requesting creative products and in the educational world in which creativity must be promoted (Oliveira et al. 2008). In this context, Gardner (1984) presents a vision of creativity that differs very little from his concept of intelligence. For him, a creative individual is a person who solves problems on a regular basis, produces products or defines field issues that from the outset are considered new, but which in the end come to be accepted in a concrete cultural context. The definition of creativity presents parallelisms with and differences from the definition of intelligence. For Gardner (2001, pp. 126-127), "Both involve problem solving and product creation. Creativity includes additional category of new questions, something that is not expected from anyone who is 'Merely' clever according to my terms. Creativity differs from intelligence in other aspects. [...] the creative person always acts within a scope, discipline or art. [...] a creative person does something that is initially new, but their contribution does not lie solely in the novelty [...] what makes a work or a person creative is the final acceptance of its novelty".

The word "creativity" shares its etymology with the dimension of birth (Cavalcanti 2006), making it difficult to provide its precise meaning and to elaborate a consensual definition that illustrates it. In this context, Riley (2015) defines creativity as the ability to generate new ideas, as well as the ability to invent an original form, or as the ability to create a unique approach to creating something. He argues that, in general, non-creative individuals are thinkers knowledge and logic only to respond to requests, and that creative people are thinkers who have a more diversified range of interests and philosophical ideas, are prone to think in abstract terms and out of the box.

Creativity is inextricably bound up with human potential (Nuńez et al. 2012), an extremely complex dimension of human conduct, which involves not only the most basic processes (such as analogical thinking or problem solving), but also the processes ranging from the cognitive to the affective-motivational ones (Romo 2008). Therefore, one of the aspects of creativity is its cognitive complexity (Riley 2015). For Wechsler, creativity

involves the interaction of cognitive abilities, thinking styles, personality traits, environmental and cultural factors (Wechsler 2004).

Dealing with creativity, Rhodes (1961) identified its four strands represented as the 4 Ps of creativity: Person, Process, Product, and Press. Rhodes did not find a universally accepted definition of creativity, but offered a new way of thinking about it (Min et al. 2017). For Rhodes (1961), the word creativity names the phenomenon through which a person communicates a new product. The mental process involves the concept itself and the environment. However, recent definitions of creativity highlight one more aspect, namely value of the product (Min et al. 2017). Simonton (1995) added "persuasion" leaders' potential to influence others. Therefore, creativity can be seen as a form of leadership. Runco (2007) also contributed to the study of creativity by trying to reorganize the construct in a hierarchical structure by looking for a distinction between creative opposition and creative performance. Creative potential involves creative process and the influence of the environment, while creative product and persuasion belong to the category of performance (Min et al. 2017). The creative act is characterized by the originality, flexibility, productivity, elaboration, analysis, synthesis, mental openness, communication, sensitivity to problems and redefinition, as highlighted by Souza and Pinho (2006). Inspired by the idea of seeing creativity from the perspective of the 4 Ps introduced more than 50 years ago, Min and Gruszka (2017) studied the creativity model of 4Ps from different perspectives in several domains (including education, business, engineering). The researchers aimed mainly to determine how to stimulate creativity by activating each of its components. On the other hand, in the perspective of Min and Gruszka (2017), it seems that although the notion of creativity, its domains and preconditions are not completely understood, creativity not only provides satisfaction resulting from the expansion of knowledge, but also has possible pragmatic consequences. The 4 Ps creativity model advocated by Rhodes (1961) can be effectively used to shift researchers' attention to learning more about how to stimulate creativity in different contexts, for example, to improve creativity teaching facilitate problem solving in any everyday life, improve economic development, etc. Adverse situations are stimuli for creative change and transformations of reality. In moments of crisis or situations of serious conflicts, if the subject or an institution are confrontational or creative, they are almost always innovative (Suanno 2013).

Creating and innovating

Creation and innovation focus on various contextual conjunctures that in-

volve human life (Sousa at al. 2016). Creativity precedes innovation since the act of innovating requires starting from the assumption that acreative idea could materialize into something new, become a product, a practice, or an innovative action (Souza et al. 2016). That is, an idea is transformed into something concrete and desirable (Souza et al. 2016), and the innovative process has its own innovation. To "innovate", from the Latin "innovare", means to make innovations, to introduce any novelty in government, in laws, in belief, in custom, in science, in industry, etc., to premiere, launch, produce, find a new process, renew (Great Encyclopedia Brazilian Portuguese, XIII, p. 841). In our days associated with science and technology, the term has been commonly used (Wechsler 2004). Wechsler (n / d) points out that the accumulation of science and technology alone does not guarantee the emergence of an innovation. This requires pre-occurence of creativity that will enable scientific advances in a given field to be transformed or improved into something original and impactful. Otherwise, existing knowledge will only replicate, which has nothing in common with innovation.

Suanno (2013) points out that in adverse situations a creatively conducted project can generate something innovative. Simultaneously, Suanno verifies that there is a difference between creating and innovating, even though they complement each other. Teaching on the differentiating and interdependent process of creativity and innovation, Rajadel (2012) clarifies that all individuals are capable of generating simple or complex ideas, but these constructs should not be confused because innovation is the organizational capacity to transform a good idea into a product, service or process, to which must be added the success factor and contextual scenario. There is a difference between creating and innovating, but at the same time, one phenomenon complements the other. The act of innovating is born out of the need for change and the need to find the most appropriate response to this change.

Referring to the concepts of innovation, change, evolution and reform, Correia (1991) points out that they are frequently used indiscriminately. For this reason, he tried to circumscribe the concept of innovation by claiming that it is a deliberate and consciously undertaken change, assumed with precise goals to be achieved, i.e, to improve the system and enhance the effectiveness in goal achievement. Therefore, innovation is a planned process that pursues objectives compatible with those of the system, whose objective is to produce positive results (Silva-Guerra 2017). That process requires a paradigmatic breakdown that allows reconfiguring knowledge, introducing novelties (including technological ones) transcending regularities, and producing new knowledge and new frontiers (Souza et al. 2016).

It can be inferred from the above that creativity is understood as a conception of new ideas that is concern free about the usefulness or economic value of these ideas, while innovation emerges as a term widely used in organizations to emphasize and promote commercialization of a new product that can be used by a vast amount of people. In this sense, processes or strategies can be considered as innovators that creatively promote gains and benefits or produce social impact in various areas of knowledge.

Given that creativity and innovation involve high-impact improvement of the quality of life in multiple domains of modern societies, Wechsler (2004) developed a design for the integration that is necessary if creativity is to become innovation. The integration depends not only on individual creative efforts, but also on the interaction between multidisciplinary team members and environmental and cultural factors that facilitate their emergence, such as education and knowledge, organizational climate, as well as investment in creative and innovative processes or products and innovation policies within a given country. In line with these ideas and as the result of the observation of countries that have achieved high levels of development, the Organization for Economic Co-Operation and Development (OECD 2009) recommends a major investment in teaching creativity at work in order to mold people capable of innovating, who can next help achieve desirable levels of development in particular countries.

Educational innovation is considered to be a component of teachers' professional competence, not only as a comprehensive and multidimensional definition, but as a series of interventions, decisions, processes (with some degree of intentionality and systematization) that help modify attitudes, ideas, cultures, and contents, model their pedagogical practices and, in turn, introduce new projects and programs, curricula, teaching and learning strategies, didactic models, and ways of organizing and managing curricula, school and classroom dynamics (Carbonell 2001). Innovation is understood as an instrument for responding to the uncertain educational contexts of the society in which one lives, requiring teachers to exercise their creativity to deal with each new situation, and requiring them to be, above all, innovative.

The teacher in times of uncertaintly

Uncertainty is a constituent element of today's society (Carbonel 2001), from the knowledge to the learning society (Hargreaves 2004), which nevertheless keeps seeking references to certainty and security. Hence, the importance of taking risks, not being afraid of making mistakes, learning to live in insecurity, where the worlds of work and life compel people to

adapt to rapid changes and substantive innovations. Given this, Hargreaves (2004) states that economic success and a culture of continuous innovation depend on the ability of workers to continue learning and to learn from one another, and the knowledge economy depends on the ability to think, learn and innovate. However, innovation is the result of a wise and fragile balance between the collectively accumulated knowledge and the permanent need to rethink it (Carbonell 2001). Contemporaneity requires creative teachers who mold creative learners (Oliveira et al. 2008). This is unquestionable in today's world, especially since social progress is closely linked to education.

Silva-Guerra (2017) states that competitive advantage comes from knowledge. In this perspective, there is a direct correlation between education and productivity and, therefore, the investment in human capital training is fundamental in strengthening the sector, development of institutions and countries. In fact, the modern labor market requires the capacity to engage with new technologies and knowledge that meet the needs of society, preparing young people for the assumption of new roles in the same (Mykhailyshyn et al. 2018). Silva-Guerra (2017) emphasizes a clear relationship between economic, social and human development that leads to greater innovation and competitiveness in the whole process that supports competitive professionals, underscoring the fundamental role of education. This includes higher academic education of teachers of the 21st century, with Master of Science degrees, PhD- and post-doctoral degrees, as indispensable axes for promoting, motivating and generating the culture of research, and generating knowledge and innovation. As stated by Carbonell (2001), one of the ideal requirements and conditions so that teachers could effectively, truly and permanently develop educational innovation are social recognition and personal self-esteem. Society must value education and acknowledge the importance of the teaching profession, recognizing teachers' commitment to the teaching of children and young people. Teachers should be at the top of the social status latter because they are the cornerstone of economic, social and human development.

The new scenarios imply new knowledge and path to the economic, social and cultural progress of people on the global stage. However, innovation is not prescribed or regulated, but motivated, induced and provoked, therefore, without teachers there is no process of innovation, change, no school project, nor functioning of the school (Bolivar 2003; Carbonell 2001; Grilo 1996; Thurler 2001).

Fernandes (2000) argues that for any change to occur in the education system, it is necessary to count on the participation and commitment of teachers, on their sensitivity and ability to innovate. This argument requires

that teachers reinvent their practice, use their global cognitive abilities in order to articulate and bring together diverse knowledge, turning innovation into the engine of teaching activity, which is the most intelligent response to the permanently changing reality. Within the framework of these concepts, Carbonell (2001) states that the role of the teacher is to create and to have a fluid and meaningful relationship with students in order to maximize the development of their potential. This entails cultivating special abilities in students, including: cognitive development, creativity and ingenuity, research, networking and teamwork, pursuit of continued vocational training, promotion of problem solving, risk taking, trust in colleagues, ability to cope with change, and the commitment to the continuous improvement of the school institution (Hargreaves 2004).

Innovation in school refers to redefining the whole approach to teaching, learning, and evaluation process (Blândul 2015). It includes educational, scientific, technological, infrastructural, economic, social, legal, administrative types of education (e.g. Mykhailyshyn et al. 2018). According to Mykhailyshyn, Kondur and Serman (2018), "Educational innovations are understood as a procedure or methods of educational activity that differs significantly from the established practice and is used to increase the level of efficiency in a competitive environment". Educational innovations include pedagogical innovation, scientific innovation and methodological, educational and technological innovation.

Discussing how to rethink and restructure the nature of teaching activity, Giroux (1997) warns that all human activity involves some form of thinking and argues that teachers must be regarded to be intellectuals transforming the public sphere. Also Freire (2003) advocates for emancipatory education by emphasizing that teachers cannot be simply perceived as operationally well-prepared to teach, but as men and women dedicated to the values of the intellect and to the enhancement of students' abilities. Freire (2003) argues that teaching is a creative act, a critical and non-mechanical one. Giroux (1997) also emphasizes that teachers should assume an active responsibility for questioning what they teach, how they should teach, and what broader goals they are striving for. This means that teachers should assume responsibility for educational purposes and conditions, or commitment to change. However, the change in a social organization like school implies, besides the individual transforming action, a form of reflecting on the action itself and, above all, on how individual actions are integrated with one another within the framework of interdependence of various actors, which contributes to the collective dimension of the process (Wechsler n.d).

Between continuity, change and uncertainty in his teaching task, the teacher is at the crossroads of social, technological and cultural changes, but continues to deal with with the functions of control, custody, retention and uneven distribution of culture (Carbonell 2001). This practice is the weapon against corruption, poverty, sadness, laziness and blindness to progress (Siva-Guerra 2017).

It is a challenge for teachers to expand their role (Formosinho 2001) in the complexity of various situations that affect daily school life and compel teachers to compete with the media, extra-school organizations and colleagues, and to constantly look for ways of situating themselves in relation to the student, education and society. This deep crisis that affects students, parents and, above all, teachers led to the continuous evolution of the teaching function and the style of pedagogical relationship (Postic 1990) whose role is to create conditions for invention (Papert 1997) through creating a fluid and meaningful relationship with students' potential (Carbonell 2001).

The study by Mikhailova (2018) suggests that there are significant differences in manifestations of creativity and innovation among students of different ages, which led to recommendations for improving psycho-pedagogical innovative potential. In this sense, Silva-Guerra (2017) argues that good education in the earliest age generates in students spiritual and mental peace, being synonymous with commitment and harmony for the people concerned.

Khodabakhshzadeh, Hosseinnia, Moghadam, Ahmadi (2018) found that that creativity is essential for teachers, is connected with effectiveness, has a direct impact on learning and more importantly on the future life of students. The researchers also noticed that the motivation of teachers is related to teachers' effectiveness, in turn, the effectiveness of teaching correlates with creativity and professional ethics. The results of this study provide contributions for teachers and students to reflect on their own representations of creativity (Khodabakhshzadeh et al. 2018).

Investigating the profile of the innovative teacher, Capelo (2007) points out that innovative teachers are involved in innovative pedagogical initiatives, have a greater propensity to take risks and manage, use non-directive methodologies, take into account characteristics of a group, avoid monotony, make use of creativity, sensitize students to learning tools, facilitate the use of tools needed to build knowledge, pursue the program, reflect on their actions, are dynamic and seek to enhance their training. Therefore, an innovative professor has various qualities and shows them in his practice. Laurillard (2002) emphasizes the teacher's capacity for self- and student assessment, for promotion of collaborative and multidisciplinary learning,

metacognition by means of seeking new forms of teaching and learning, conducting the search for new ways of teaching and learning, flexible and adaptable, by using multiple resources and technologies to accommodate diverse learning styles and create ideal learning environments. Consequently, it would seem that schools in order to develop educational proposals (Pastor 2011) offer to students different situations that favor the development of divergent thinking. For its part, Gervilla (2003) states that it is necessary to teach students to respond to change, to develop critical qualities, and to react to external stimuli in ideas and thoughts. Finally, an innovative teaching practice is the one that focuses on multiple paradigms of knowledge, which seeks to foster meaningful learning from creative and innovative changes, and is crucial to social progress. It is a job that permanently forces teachers to live in scenarios of uncertainty and which undergoes constant changes.

Final considerations

The theoretical foundations call for a paradigmatic change based on creativity and innovation, a process that values the creative potential of students and teachers' education, encourages emancipatory education, prepares students for uncertainty in adverse and challenging scenarios, and contributes to social progress.

Those foundations stress, above all, that creativity and innovation are allied and interdependent, and have a key role in the educational process. It is also agreed that education leads to the progress of people and countries, that educational change happens only through involvement, motivation, creative and innovative teaching environment. Innovations must be designed, managed, and carried out by the faculty. Society requires new teachers for new students, whose main task is to improve the quality of teaching. Thus, creativity and teacher innovation, despite being two multidimensional constructs that require much research, seem to be the key to educational change.

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Keywords: creativity, education, innovation, teachers.

Globalization and technological revolution have transformed economic, cultural and social processes around the world. Modern societies require that teachers introduce new pedagogical practices to improve the quality of education. An overview of theoretical contributions suggests that creativity and innovation are inseparable and interdependent allies in emancipatory education. That is why it is important for education systems to employ adequately trained and well-paid teachers and officials who create an environment conductive to creativity and innovation.

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KREATYWNOŚĆ NAUCZYCIELI I INNOWACJA: KLUCZ DO ZMIAN W EDUKACJI

Słowa kluczowe: innowacje, nauczyciele, twórczość, systemy edukacji.

Globalizacja i rewolucja technologiczna przekształciły procesy gospodarcze, kulturowe i społeczne na całym świecie. Współczesne społeczeństwa wymagają od nauczycieli wdrażania nowych praktyk pedagogicznych, mających na celu poprawę jakości edukacji. Przegląd badań wskazuje, że twórczość i innowacyjność nauczycieli są nierozłącznymi i współzależnymi sojusznikami edukacji emancypacyjnej. Dlatego ważne jest, aby w systemie edukacji byli zatrudniani odpowiednio przeszkoleni i dobrze opłacani nauczyciele oraz urzędnicy, którzy kreują sposób pracy, tak aby tworzyć środowisko sprzyjające twórczości i innowacyjności.