CONTEMPORARY EDUCATION AND PEDAGOGICAL INNOVATION: A NEW PARADIGM

EDUCAÇÃO CONTEMPORÂNEA E INOVAÇÃO PEDAGÓGICA: UM NOVO PARADIGMA

EDUCACIÓN CONTEMPORÁNEA E INNOVACIÓN PEDAGÓGICA: UN NUEVO PARADIGMA

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ABSTRACT: This paper is the result of a research on contemporary education and pedagogical innovation based on the problematic: what is the relationship between contemporary education and pedagogical innovation? The paper aimed to discuss education from the perspective of pedagogical innovation, to conceptualize change and innovation, to reflect on contemporary education, and to trace a historical panorama of education. This is a bibliographic research carried out through readings, reviews, summaries, and fiches of theoretical material about the theme. The works of Papert (2008), Toffler (1970), Fino (2000), Sousa (2004), among others, were used as bibliographic references.

KEYWORDS: Education. Pedagogical innovation. Paradigm.

RESUMO: Este trabalho é o resultado de uma pesquisa sobre educação contemporânea e inovação pedagógica baseado na problemática: qual a relação entre educação contemporânea e inovação pedagógica? O trabalho pretendeu discutir sobre educação na perspectiva da inovação pedagógica, conceituar mudança e inovação, refletir sobre a educação contemporânea e traçar um panorâmico histórico da educação. Trata-se de uma pesquisa bibliográfica realizada através da realização de leituras, revisões, resumos e fichamentos de material teórico sobre o tema. Para a realização foram utilizados como referencial bibliográfico as obras de Papert (2008), Toffler (1970), Fino (2000), Sousa (2004), entre outros.

PALAVRAS-CHAVE: Educação. Inovação pedagógica. Paradigma.

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RESUMEN: Este trabajo es el resultado de una investigación sobre la educación contemporánea y la innovación pedagógica basada en el problema: ¿cuál es la relación entre la educación contemporánea y la innovación pedagógica? El trabajo tuvo como objetivo discutir la educación desde la perspectiva de la innovación pedagógica, conceptualizar el cambio y la innovación, reflexionar sobre la educación contemporánea y trazar una educación panorámica histórica. Se trata de una investigación bibliográfica realizada a través de lecturas, revisiones, resúmenes y registros de material teórico sobre el tema. Para esta realización se utilizaron como referencia bibliográfica los trabajos de Papert (2008), Toffler (1970), Fino (2000), Sousa (2004), entre otros.

PALABRASCLAVE: Educación. Innovación pedagógica. Paradigma.

Introduction

The history of education is marked by assumptions and concepts that guide and ground its path. The historical context of a society and the human conception it holds establishes, since its beginning, the foundations with which the practice of its education is justified through theories and methodologies aimed at human development. These epistemological and didactic actions mark certain periods through which the relationship established between education and its conception of man and society can be perceived.

Education in its most complete sense needs to help people to have a more effective and also affective contact with knowledge and the world around them. It should not be responsible for the reproduction of a society, but rather for its production, since the human being is understood as a process, something that builds and transforms itself, at the same time as it builds and transforms the environment in which it lives. In this complex relationship, men are transformed by the world they themselves transform. Thus, education must play a humanizing role, aiming at the improvement of society through the people it shapes.

This research seeks to understand contemporary education and pedagogical innovation based on the following problem: what is the relationship between contemporary education and pedagogical innovation? The work intended to discuss education from the perspective of pedagogical innovation, to conceptualize change and innovation, to reflect on contemporary education, and to trace a historical panorama of education.

This is a bibliographical research carried out through readings, reviews, summaries, and fiches of theoretical material about the theme. The works of Papert (2008), Toffler (1970), Fino (2000), Sousa (2004), among others, were used as bibliographic references.

History of Education from the perspective of paradigm shifts

As history runs its course, changes are taking place both within individuals and in society. This results in a change in the meaning that is attributed to education, provoking new thoughts and new actions. Since education is loaded with intentionalities, these pedagogical trends are reconfigured and acquire new forms. However, what characterizes a new trend is not the extinction of the previous one, but its superimposition over the former, because there is no pure trend along the way. This transformative adaptation of pedagogical intentions is characterized by social change, by criticism of the previous model of education as well as of the vision of the changed society and of the people in this society. It is also characterized by man's own need for change and adaptation to these external transformations. In the same way, "The emergence and the end of paradigms are results of transformations that occur in realities and theories, understanding knowledge as an infinite process" (KUHN, 1994, p. 38, our translation). And it is certain that humanity has sought to adapt to the various periods of its history, which due to the acceleration of change has made the human being a transient being and of temporal relations with beings and things (TOFFLER, 1970).

> In order to survive [...] the individual must become infinitely more adaptable and more capable than in any previous epoch. He must seek entirely new paths for support [...]. Before he can do this, however, he must understand in greater detail how the effects of acceleration penetrate his own life, adhere to his own behavior, and alter the quality of his existence. He must, in other words, understand the phenomenon of transience (TOFFLER, 1970, p. 25-26, our translation).

What prevailed until then in the mid-seventeenth and eighteenth centuries was rural and family life surrounded by naturalness, survived by the work of handicrafts and agriculture, a culture that still remains the first stage of world economic development. This form of work, which prevailed until then, allowed the worker to be the producer of his own product while at the same time having access to what he produced. From beginning to end, all stages of production passed through his hands. Thus, work was neither divided nor specialized. At most, there would be more than one worker performing the same type of production, sharing only the working tools.

However, with the advent of industrialization, the great milestone of the emergence of modernity, the launching of the steam engine and the shuttle wheel, the spinning machine, the loom, among others, two main aspects mark the arrival of this new era: coal becomes very useful in the development and use of steam engines and the emergence of locomotives, which would serve to transport raw materials, people and workers and facilitate the process of

industrial trade. Through this came the growth of textile production, previously rustic and manual, which began to be produced by means of large machines. In this sense, industry became the main work alternative for the great majority of the population, manufacturing gave way to machining, the market grew with monetary trade, increasing production and standardization, which caused a large part of the European population, who lived in the countryside, to move to the big cities in search of a better life through jobs in factories, thus changing social relations, people's way of life and also the meaning and significance given to work, because

> Industrial society, founded on the synchronization of work, therefore needed individuals who had little to do with a rural and bucolic past, in which natural rhythms prevailed (FINO, 2000, s/p, our translation).

The population growth in urban centers brought benefits to the industry of the time, but caused major problems for urban life, such as the exaggerated growth of the suburbs, which "forced the public authorities to pay more attention to the problems created not only by children left to their own devices, but also by adults without occupation" (SOUSA, 2004, s/p, our translation). These people were surviving in terrible conditions both in their daily lives and in their workplaces, with exhausting working hours, up to 80 hours a week, low wages, in addition to the exploitation of women and children because of the large use of male workers in the construction of railroads, the increase of air pollution with the burning of coal that generated energy for the machines, and the high exploitation of natural resources. Unemployment and hunger became part of urban life, as well as prostitution and alcoholism. Around the industries there started to happen workers' movements that also began to organize themselves and to behave in different ways, as in the case of the "Ludism", in which the workers destroyed the machines, the "Cartism" that demanded the improvement of working conditions and the "Trade-unions", organization of workers' movements that in the future would become unions and associations (BRAZ; NETTO, 2007).

With the population mass established in urban centers and life reconfigured, the offer of education for this part of the population also starts to be offered in mass. An example of this is that, when reflecting on this particular historical moment, it is noted that public schools emerged to meet the needs of a society that was born with great strength and that brought in itself the marks of the new and growing industrialization, making it evident that the threshold of this new era required for itself, as Fino says, "a 'kind' of man equipped with skills that neither the family nor the church was able to provide" (FINO, 2011, p. 46, our translation). However, an important reflection must be made: what would this "kind" of man be? What

characteristics should have people whose training would be geared to meet the needs of large factories? As seen in Fino's quote, the formation of men for this new social reality would no longer be possible to be carried out by the families or by the church, which until then was the most common thing.

This reality of natural instruction carried out within the family or through social contact, the means by which learning and the sharing of knowledge took place, changes in the post-Industrial Revolution period, when, in this social moment marked by modernity, manual labor no longer met the standard required by society, which needed individuals prepared to comply with norms, rules, and to perform specific functions. This was also a moment marked by the emergence of a new model of education, because, as Toffler states, "the mechanical age [...] demanded a new kind of man. It demanded skills that neither families nor churches could provide on their own. It forced a revolution in the value system [...]" (TOFFLER, 1970, p. 321, our translation). This model of education was born characterized by the need to meet the factory social demand, a "mass education (that) was the ingenious machine built by industrialization to produce the kind of adult it needed" (TOFFLER, 1970, s/p, our translation).

In the face of this process, humanity saw the birth of a previously unnecessary institution that is now treated as fundamental for insertion into the world of work and that, later on, in many countries, becomes mandatory for everyone. Is the creation of a formal learning (or teaching) space really necessary for humanity? How would post-modern society be if the school had not appeared? This is a question that the human mind can only imagine, since the creation of the school is a fact and that it interfered in an impactful way with human relations and the way of conceiving and organizing life, work, family and everything else that societies conceive in the form of organization.

The Industrial Revolution then gives rise to the public school that, in the way it was thought and structured, makes education "an organized activity, taking place in a proper place, with an appointed time, with times distributed for logically differentiated subjects" (SOUSA, 2007, s/p, our translation). With this pre-defined aspect, "learning ceases, in fact, to be a spontaneous and natural activity" (SOUSA, 2007, s/p, our translation) that happened at general levels to happen in which "tasks are highly specialized [...] with the logic of serial production" (SOUSA, 2007, s/p, our translation). With this new mold of education emerging, the man for the society of then tends to decline "to the new industrial order" (SOUSA, 2004, s/p, our translation) and adapt to this intentionally shaping education of concentrated beings, task performers, producers, goal fulfillers, silenced by the teacher's voice and the "factory

whistle", "able to stay between walls for days on end" (FINO, 2011, p. 46, our translation), in an environment of "repetitive work, [...] collective discipline" (TOFFLER, 1970, p. 390, our translation), "produced" with "[...] with low cost, social peace [...] adapted to the demands of a new production model" (FINO, 2011, p. 45, our translation) designed, as stated by Fino and Sousa,

> [...]according to a model literally inspired by factories so that the students, when they entered, immediately began to "breathe" an atmosphere full of elements and meanings that proved to be more important and decisive than the mere guidelines inscribed in the brief "official" public school curriculum (FINO; SOUSA, 2001, p. 373, our translation)

This model of school organization that emerges with the Industrial Revolution has become a paradigm, called by Fino as "paradigm of mass education" (FINO, 2011, p. 47, our translation), or factory paradigm. Formal and systematized education became rigidly established for two centuries and is still alive in the educational reality of the 21st century. However, even though this model was, for the time, current and, therefore, new in the system, it was born to meet a specific and industrial need and not exactly to form the free and emancipated man. Even though this thought did not hover over the vision of the educators of that time, the need for emancipation, freedom, and guarantee of rights has always been directly linked to human beings. Paulo Freire says about this statement when he provokes reflection on the natural condition of the human being and his vocation to "be more". This vocation is not a conquered right, it is a natural characteristic of being. However, although he says that the historical and cultural situations to which man is subjected can distort him from his condition, it is up to the school to help the being recognize his own essence.

> This is why the concern with human nature is so present in my reflections. With human nature constituting itself in history and not before it or outside of it. And historically, the human being has become what he has been: not only a finite being, unfinished, inserted in a permanent movement of search, but a being aware of his finitude. A being that, vocated to be more, can historically, however, lose its address and, distorting its vocation, become dehumanized. Dehumanization, for this very reason, is not vocation but distortion of the vocation to be more. That is why I say, [...] that every practice, pedagogical or not, that works against this core of human nature is immoral (FREIRE, 2001, p. 1, our translation).

Thus, the factory model of education is already born, taking into consideration the natural condition of the human being, outdated and de-contextualized, since this model does not guarantee the full development of the human being's potentialities, creativity and autonomy. In this school there is no place for free initiative, the development of personal

projects, the manufacturing activity stimulated by desire and dream, nor the protagonism, the turn and the voice. As mentioned before, it was a school created in the factory style, with students lined up, silent, paying attention to the teacher, authoritarian, "holder of knowledge" and of the techniques of "making people know". The educational process was guided by a repetitive, exhaustive, banking methodology in which the social division is present right from its early days, as Sousa says in the following quote: "[...] the assumption of two social classes (teachers, on one hand, and students, on the other) and, above all, the compartmentalization of knowledge, in a total alienation from emotions and affections" (SOUSA, 2007, p. 5, our translation).

This characterization of the factory school makes evident the conception of curriculum that it carried at first based on the Renaissance and Reformation, and later on the Industrial Revolution. Its main characteristic was logical and scientific rationality and its main goal was to train the working class that the bourgeoisie needed. If the school was to prepare workers for factory work, the organization of this institution, starting with its curricular structure, thought of as a map with well-defined boundaries, would also lead to this end. Snyders makes clear what in fact bourgeois society intended and to what ends it wanted to achieve:

> The bourgeoisie strives as far as possible to subject the school to its own class aims, to prevent it above all from contributing to the emancipation of the proletariat: "to bring the teaching of the people back to the level of submissive and uninhibited lackeys...to achieve docile servants and skillful workers. [...] The bourgeoisie strives to educate the young generation of workers and peasants in the hope of forming both useful servants, capable of providing them with benefits, and obedient lackeys who will not disturb their quietude and idleness (SNYDERS, 2005, p. 30-31, our translation).

Under this perspective and with the growth and advancement of science and technology and the shortage of manpower for the labor market, education now focuses on the competence of individuals starting from the principle that their relationship with things needs specific techniques and teaching is based on objective truths, as Sousa says: "The school is thus born with instrumental character: it was intended, through the curriculum, to process (transform) the student with maximum efficiency and minimum costs, in a business logic, commercial or industrial" (SOUSA, 2004, s/p, our translation). In this aspect, the curriculum as an integral part of formal and systematized education becomes an area of great interest to scholars of education.

Changes in Education starting with the curriculum

The educational act is not contemporary to the act of systematically teaching. The act of learning was not born within the formal spaces of education. Human beings have spent several centuries of their history without needing schools. However, today, few people can conceive of the world without this space that has gained such importance. There is no other institution in the world that can be given such credit by people than the school. In the same way that learning existed before school, the curriculum also existed before they even began to think about it. The technical characteristic of mass education at the beginning of public schooling made clear its curricular structure, even before there was a curriculum, and what the purpose of its education was.

The educational phenomenon cannot be understood as a finished reality. Mizukami states that the educational phenomenon is, first of all, "a human, historical, and multidimensional phenomenon" (MIZUKAMI, 1986, p. 1, our translation) that does not "make itself known in a single and precise way in its multiple aspects" (MIZUKAMI, 1986, p. 1, our translation), although for a long time, for each period, it has focused its gaze on only one of the multiple dimensions. In a classical model of education, the focus on the subject and on the method valued the technical dimension of the process, the definition of objectives, contents, methods and evaluation, in a linear and systemic way, which designed a strategic education ending in specified and observable behaviors; in this model, only the student is evaluated.

In the first decades of the twentieth century, when in fact the curriculum begins to be the object of scientific study, a more accentuated way of thinking about education itself begins. To think about the curriculum is to think about the school itself. In the same way, the theories of curriculum that emerged are also pedagogical theories, as Silva says: "all pedagogical theories are also theories of curriculum", because "[...] they do not stop making speculations about curriculum, even if they do not use the term" (SILVA, 2009, p. 21, our translation). Hence then the educational path to be followed, from the first decades of the twentieth century on "curriculum studies" (SILVA, 2009, p. 12, our translation) with the publication of The curriculum, by Bobbitt, a book considered a "milestone in the establishment of curriculum as a specialized field of studies" (SILVA, 2009, p. 22, our translation), from which came the traditional theories, concerned with the "nature of learning" (SILVA, 2009).

Gimeno Sacristán (1999, p. 21, our translation) states that

> [...]curriculum phenomena include all those activities and initiatives through which the curriculum is planned, created, adopted, presented, experimented with, criticized, attacked, defended, and evaluated, as well as all those material goals that shape it.

From this perspective, when reflecting on the curriculum of the early twentieth century, with its factory origin, a model of curriculum that valued the content, said by Gimeno Sacristán as "traditional curriculum" (GIMENO, 1999, p. 169, our translation), the method in which the teacher intended to "train" the students prevailed, as Freire (2011, p. 16, our translation) said, when he called these educators "conservative" and "bankers", mechanically memorizing, repeaters of ideas. The teacher's characteristics and the profile of the teaching provided by them could not be different, since the students of this model should also have these same characteristics.

Even with its decontextualization, the factory school lasted, without being questioned, until the middle of the 20th century when, in 1957, with the launching of Sputnik by the Soviet Union, the United States began to blame the inadequacy of its own education for having been surpassed by another country in levels of knowledge, especially in science and mathematics. At the same time of this event, theorists were already concerned about rethinking the curricular structures in the search for a more effective education that would be able to make Americans surpass other countries in terms of knowledge. From this fact on, one begins to wonder if in fact this fragmented educational model, centered on memorization, in the absence of respect for the individuality of beings, centered on collectivity not as a means of cooperation and collective learning, but as a massive means of training for a specific function that was totally uncritical, apolitical and unreflective, would really be the ideal for the formation of beings.

The institution of the factory paradigm is now going through a moment of curricular crisis, not only because of the way it worked, but because of the way it related to social issues. It is not only technology and science that have changed, but the world as well. For this reason, the school no longer met the demands of this new world, and it should also change, because the man and the society characteristic of contemporaneity, fundamental parts of the new process of human, social, political and economic transformation, started to mobilize concerns about new ways and new models of thinking and doing education in order to meet the needs.

From then on, there was also a concern about teacher training, since something was beginning to change outside the school and the school itself had to keep pace with yet another moment of social transformation. School evaluation should also be changed through a more

effective control system. It is worth noting what Fino and Sousa say about this moment about what actually happened:

> [...] The success of the Soviet launching of Sputnik, even though it shook American confidence in the quality of their educational system, did not cause a movement of sufficient breadth to bring about major changes, either in the definition of their major goals or in organizational terms. If we discount greater care in the training of teachers in the aforementioned areas of mathematics and science, nothing very essential has changed, and the old system of mass production has remained intact (FINO; SOUSA, 2001, p. 6, our translation).

The curriculum then begins to be structured under a new aspect, going through the critical theories, focused on "human nature" (SILVA, 2009), in which Freire already began to say that educators should "form" the students (FREIRE, 2011, p. 16, our translation), more than simply "train". For him, the exercise of the teaching function requires that educators become "critical, progressive" much more than "conservative" and that, therefore, "teaching is not transferring knowledge, but creating the possibilities for its production or its construction" (FREIRE, 2011, p. 24, our translation). He states that the "problematizing educator", in his practice, sees the student as a "subject", unlike the "banking educator" who conceives him as an "object". The "problematizing educator", according to him, is creative, instigator, restless, curious, humble, and persistent, while the "banking educator" is simply concerned with teaching content, is "mechanically memorizing", "a cadenced repeater of phrases and inert ideas", and "thinks wrong" (FREIRE, 2011, p. 28-29, our translation).

Society is, then, facing a new era in terms of pedagogical reality: the role of the teacher, the curricular structure of the school, the very meaning of school and its real function in the world are rethought. Is it still meeting the needs of a society again in a growing rhythm of change? What in fact would its actors need to do in order for this institution to once again achieve the merit of a safe place to put children and young people and to guarantee that learning would actually take place? Were what took place inside the classrooms effective learning situations that ensured coherence with what life outside its walls offered?

Technology: Synonym of pedagogical innovation?

At this time, around the 1970s, an instrument already began to be part of social reality, although still in quite a small number. The use of computers and videogames, although new, became part of social reality. However, "no similar experiments could be done on what schools could do in a world where computers were everyday objects" (PAPERT, 2008, p. 47,

our translation). It did not take long for the American government to start buying these machines for schools and the use of computers in education began to have hundreds and soon thousands of computers being used by children in formal educational settings, as well as thousands of software products that were intended to be educational were already available for sale on the market. Although not yet Papert's ideal, with one computer used per student in schools, he says the following:

> This growth of a "computer culture in school" was still far from a mega-change, but it had reached proportions that made it incomparably richer as a source of insight into educational change than the limited experiences of the previous decade. Within 10 years, American schools had bought 3 million computers, and hundreds of thousands of teachers took courses to learn how to use them; new industrial giants entered the education market, and 20,000 items purporting to be "educational software" went on sale. These dramatic events soon attracted media attention. Regardless of the numbers, the very idea of a child using a computer gave people a sense that something new, exciting, and a little disturbing was in the air (PAPERT, 2008, p. 48, our translation).

This was one of the issues that tried, at great cost, to "save" the school from its lag, but succeeded, at most, in a make-up aspect to it. It is still, for many people, the main need of contemporary schools. However, the insertion of technologies through the integration of computers in school institutions is, in many cases, a bad way to conceive the improvement of the school space, because this improvement must come from the social context itself where the acceleration of change occurs through, mainly, technological evolution. Based on this, teachers, students and other members of the school context feel relieved and happy to have computer labs in their schools. The teachers who guide their students to the laboratories and there they instruct, dictate, and direct the work are more confident and "free from the responsibility" of provoking a real change in the conceptual structures of teaching and learning.

Going deeper into the issue, what makes the educational reality even more precarious in relation to the use of computers is the teachers' minimal or no knowledge about the machine itself or even about the software that claims to be "educational", because, according to Valente, "without it (the software), the computer can never be used in education" (VALENTE, 1993, s/p, our translation). Even though teachers are in the dark about computers and software, such materials have been coming into schools for quite some time now. Unfortunate reality is that, according to Valente, without the proper knowledge of "educational" software the teacher is unable to be "the creator of learning environments and the facilitator of the process of intellectual development of the student" (VALENTE, 1993,

s/p, our translation), ending his practice in mere instructionalism or in the pure "teaching of computing" (VALENTE, 1993), where "the computer is used as an object of study, that is, the student uses the computer to acquire computational concepts" (VALENTE, 1993, s/p, our translation).

This is a problem that also goes through the teacher's training, because according to Fino, "a great part [...] did their initial training without having had any kind of training related to the use of software" (FINO, 2003, s/p, our translation). However, even if this initial training is obtained, the mere acquisition of conceptual knowledge about software and computers is not a guarantee of their use under Papert's constructionist perspective. For this, he needs initial and continuing education, and most importantly: appropriation of self-training, sequential and always unfinished.

The teacher can rework his or her performance by recognizing that "instruction is only good when it pushes development forward, that is, when it awakens and sets in motion functions that are in the process of maturation in the ZPD" (FINO, 2001b, s/p, our translation). The Zone of Proximal Development (ZPD), by recognizing "the role of the social other in the child's development" (FINO, 2001b, s/p, our translation), understands that the individual issues of the human mind happen from social processes, always with the subject acting under the tutoring of another more able to perform the possible tasks that will lead to the advancement of development. In Vygotsky's conception of ZPD, the teacher, by allowing the autonomy and creativity of the student-author, does not remain in the mere formulation of mental concepts about knowledge or the computer, but is enabled to internalize these concepts, from the help of a "peer-tutor" or in the "peer-interaction" (FINO, 2001b, s/p, our translation), recognizing the very knowledge he/she has constructed through the activity of autonomous creation with the aid of guidance that does not instruct the student, but allows him/her to internalize, in which the student-author is ready to "begin a new cycle of learning at a higher cognitive level" (FINO, 2001a, s/p, our translation).

However, it is also the desire of many educators to bring about a change in their practice, taking advantage of theoretical knowledge and objects that will help them to make this change effective. There are many others who are indifferent to the urgent and clear need for revolution in the current educational paradigm. It is good to know that with the advancement of science and the growing "invasion" of technological means in educational institutions, the hope that reality will be transformed by the educational actors themselves increases, aware that they need to appropriate the knowledge of experience, which is that which passes inside each one of us, causing a revolution in the existing knowledge, promoting

the creation of new and updated knowledge. This appropriation of knowledge and teacher updating in the educational means will cause a true transformation in the students' learning, because this very process of knowledge construction, once reflected and appropriated by the teachers, will be delivered to the students, allowing them the deserved authorship and the dream protagonism that every student has the right to.

It is with this scientific and technological growth, through the progress of society, that the foundations of its thinking about the education of individuals are restructured. With this, education begins a journey towards the meaning of learning, the questioning of fixed ideas and the construction of a knowledge that also aims at questioning the curriculum and the attribution of meaning to the contents based on the reality of the participating individuals, their action on this reality and the effects produced by this action. Thus, knowledge is no longer perceived as part of a subject, nor of an object, but of the interaction of both.

Effective pedagogical innovation

Democracy and freedom begin to establish the forms of organization of society and the intellectual preparation of the individual to assume a certain function according to his or her aptitudes, also marking a teaching characteristic centered on the role of the teacher who should no longer determine the beginning, middle and end of pedagogical activity. Individual specificities are now especially valued, and social diversity and differences in cultures and classes are also taken into consideration. Therefore, the student must now be seen in his or her context. The appreciation of individual interests and the importance of the individual's experience with the environment opens the door to an education that values individual aptitudes and understands that the educational process must happen mainly through internal means and no longer only through external ones. This renewal of pedagogy puts the student in the focus of teaching, and the teacher is now a facilitator of learning. The critical analysis of the system tends to confront class separation by making the individual perceive himself as a being that does not conform to his situation and that appropriates knowledge and feelings of liberation. Therefore, the curriculum at that time should make the school prepare the student for the world.

The man and the society characteristic of contemporaneity, fundamental parts of the new process of human, social, political and economic transformation, reflected today through a pedagogical practice directed by post-critical theories, which show the consideration of education on the "nature of knowledge, culture and society" (SILVA, 2009, s/p, our

translation), essentially linked to "[...] our identity [...] our subjectivity" (SILVA, 2009, p. 15, our translation), mobilize inquietudes about new ways and new models of thinking and doing education. This rupture of the educational paradigm allows us to observe "an intellectual movement that proclaims that we are living in a new historical epoch, the Post-Modernity, radically different from the previous one, Modernity" (SILVA, 2009, p. 111). But, even though the school is still a reference of the conceptual meaning of education, it is, although facing so many changes happening in the outside world, long out of step with the current context, because being a symbol of modernity, we as a society have already passed this era. Therefore, the school is neither the center nor the place of true learning. As Silva says (2009, p. 111-112, our translation):

> Our notions of education, pedagogy, and curriculum are solidly grounded in Modernity and modern ideas. Education as we know it today is the modern institution par excellence. Its goal is to transmit scientific knowledge, to form a supposedly rational and autonomous human being... In this sense, the post-modernist questioning constitutes an attack on the very idea of education.

In this new world that emerges in which information, knowledge and the advancement of science outline the profile of an increasingly autonomous society, education, although with many attempts to adapt to the new reality still preserves the factory paradigm and reproduces to exhaustion the molds of traditional school insisting on a model of teaching-learning centralizer of a knowledge that no longer belongs only to it, because in the contemporaneity the school is no longer the locus of knowledge, but the world. (2012, p. 16, our translation):

> So profoundly revolutionary is this new civilization that it challenges all our old assumptions. Old ways of thinking, old formulas, old dogmas, and old ideologies, however cherished and however useful they may have been in the past, no longer fit the facts. The world that is rapidly emerging from the clash of new values and technologies, new geopolitical relations, new lifestyles and new modes of communication, demands new ideas and analogies, new classifications and new concepts. We cannot cram the embryonic world in the morning into conventional cubicles. Neither attitudes nor modes are appropriate.

The threshold of innovation is characterized as an important step towards the meaning of learning, the questioning of fixed ideas and the construction of knowledge that also aims to question the curriculum and the attribution of meaning to knowledge based on the reality of the participating individuals, their action on this reality and the effects produced by this action. Children build their cognitive structures through their relationship with the world and also individually. Piaget describes how this construction process happens, seeking a better

understanding of learning and the development of children, who are seen as active subjects, builders of knowledge.

Papert, however, when reflecting on Piagetian constructivism tried to relate it to the school, stating that the focus should be on learning and not on teaching, as has been the case until today. However, it is important to remember what Papert himself (2008, p. 134, our translation) tells us:

> Even the statement that every act of teaching deprives the child of an opportunity for discovery is not a categorical imperative against teaching. [...] the goal is to teach in such a way as to produce the greatest learning from the least amount of teaching.

However, instruction and the transmission of decontextualized and fragmented information must give way to autonomy, creativity, and the authorship of the students, who become the protagonists of their own learning. The school, as an institution responsible for the mediation of learning, should help them discover how to build their own knowledge.

> Constructionism is built on the assumption that children will do best by discovering for themselves the specific knowledge they need; organized or informal education can help most by making sure that they are being supported morally, psychologically, materially, and intellectually in their efforts. The kind of knowledge that children need most is what will help them gain the most knowledge (PAPERT, 2008, p. 135, our translation).

Situating ourselves more specifically on the existing institutions in society and reflecting on the ideal type of education desired for human beings, in the midst of all this conflicting, fast and diverse process of social change, it would not be possible to notice or not to focus on the school and its locus in the contemporary world. Furthermore, it is essential to focus on the effectiveness of the school's role in the face of global complexity. Has it produced positive and significant effects for what is expected from a formal educational institution? Has it kept up with the excessive transformation and intellectual and technological advances? A superficial analysis of its physical and curricular structure might already reveal that the answer to the last questions is negative. In the same way, a deep diagnosis of the school and teaching may express what has actually happened so that even the educational actors themselves have already thought about the current clash about the changing framework between modernity and post-modernity and the school-world incompatibility in this context, because there is no solution for the school unless it changes the paradigm.

Perhaps it is not possible to say that the school is the same as it was a hundred years ago and that nothing has changed. However, it is necessary to recognize that the minimal

changes that have occurred were not enough to raise the school to the level of an institution that meets the requirements of real change, because its changes do not happen at the required social pace and are very different from everything that has happened in society in recent decades. Papert, in his book "The Children's Machine", tries to "draw our attention to what practically everyone knows about our school system: it has changed, but not to the point of substantially changing its nature" (PAPERT, 2008, p. 18, our translation). What are the real reasons for the slow progress of the school? Many would attribute this factor specifically to the lack, the minimal use, or the bad use of technology in educational spaces.

Perhaps it is not possible to measure how far this argument goes, but it is certain that, as the school is one of the fundamental institutions of civilization, and as this civilization is largely computerized and largely covered by the use of technology, it may seem logical the reasoning that because it is not effectively updated in new technologies and that, even those that already have technological apparatus in their educational environments, by not using these instruments with the necessary purposes, they are at the mercy of the most severe criticism to the effectiveness of their teaching. It is certain that society is not satisfied with the school's performance, much less the students themselves and "as children reject a school that is not in tune with contemporary life, they become active agents of pressure for change". (PAPERT, 2008, p. 21, our translation).

What is the true role of the use of technological means in formal educational institutions? The computer cannot be acclaimed as the object capable of forming the integral human being so desired by today's society; however, the use of the computer in an enriching way as a means to provoke the intellectual autonomy of the student, where the teacher is able to intentionally direct the critical and productive handling of the machine by the students, will provide an interactive relationship through the possibilities offered to them for the construction of a personal project, because as Papert states, "the best learning occurs when the learner takes charge, as the young Piaget did" (PAPERT, 2008, p. 37, our translation).

The use of technology in the educational environment does not guarantee the effectiveness of learning, nor is it synonymous with innovation, because technology represented only as a set of current instruments can mask the school with an ostensible aspect of modernity, but inside reigns the mark of traditional teaching fixed in the transmission of information and not in autonomous knowledge or "intellectual self-determination" (PAPERT, 2008, p. 21, our translation). This mere brush with technology in schools makes the student passive to the teacher's instruction, who has become a slave to a fragmenting curriculum of computer use, through instructionalist and programmed means. This form of teaching based

on the use of the computer may fill the eyes of many who believe that the effect of things is in the objects and not in the action of the human being on them, but Papert tells us that it is necessary "to make the student the subject of the process instead of making him the object" (PAPERT, 2008, p. 28, our translation). Thus, this form of teaching is not able to respond to the true meaning of innovation, and can only be seen as a change. Change and innovation are different things, although they are commonly confused among many, because there can be change without innovation, but there is no innovation without change.

Change is objective, innovation is subjective. Objective derives from object, from something that is outside, exposed; subjective derives from subject, and says about something that is inside a subject. However, the conception and the constitution of the "I" happen from outside to inside when the subject, in contact with the objects understands the world and builds itself; but the meaning of this construction occurs when the objective becomes subjective, at the moment the object starts to be transformed by the subject, in a circular path of internalization of what is outside and externalization of what is inside.

> In education [...] there is nothing passive, nothing inactive. Even dead things, when incorporated into the circle of education, when they are given an educational role, acquire an active character and become active participants in this process (VYGOTSKY, 2001, s/p, our translation).

The meaning of innovation is intrinsically linked to the original meaning of the word education, which in Latin has a double way of understanding: "to bring out" or "to lead out. In a simple form of explanation, the school, as a possible space for innovation, must function in both ways, bringing out the individual potentialities of the subjects, while always taking them to a better place. Innovation actions must establish a personal, interpersonal, and multidimensional relationship between subjects and educational actions. Personal because innovation should go beyond the technical dimension aiming to reach the human dimension of relationships; interpersonal because it should go from the individual human relationship to a collective relationship of interaction, since, when it comes to pedagogical innovation, it should produce a collective renovation effect; finally, multidimensional, because educational achievements need to create the basis for a new and true global knowledge in which the human being is considered in its various dimensions being plausibly built, constantly rebuilding itself.

However, it is important to think: what is the role of the teacher and the student of the 21st century in being inserted in this context? To begin with, it is necessary to clarify that the teacher and the student learn in communion, although they have different roles; and that men's

actions take place according to the function that each one exercises and that knowledge will be practical when it is born in thought and becomes concrete in the action of those involved. For the teacher, the challenge lies in questioning his methods and transforming them, because innovation is a process from within the creative being, self-reflective, nonconformist with the current situation, and who has a vision of the future, because Toffler (2012, p. 433, our translation) tells us that

> [...]the responsibility for change [...] lies with us. We must start with ourselves, teaching ourselves not to close our minds prematurely to novelty, to the surprising, to the apparently radical.

The student is free to choose his own learning path, because, as Papert says: "the best learning occurs when the learner takes charge, as the young Piaget did" (PAPERT, 2008, p. 37, our translation).

Still in reference to the role of the two main educational actors, teacher and student, and the place of each one in innovation and recalling the importance of the subject-object relationship, it is relevant to point out that education has in its essence an artistic property due to its practical, theoretical-practical, manufacturing and creative characteristics, and there is no pedagogical innovation without continuous creativity. Innovation, then, is the fruit of the subjects' action and not the imposition of an external law; this pedagogical action on educational instruments must be internally generated to produce external results, because pedagogical innovation is practice, it is action. The creativity, the desire, the ideal must override the risk of failure, establish a break from routine, and the personal projects need to be given credit. This pedagogical action should be understood as the teacher's action regarding the renewal of his methodology and the student's action and understanding of his cognitive potential, as well as the school's qualitative change coming to meet the established school curriculum. The teacher re-creates his action, mediating the learning process of the student who, in turn, creates his own path for the construction of learning in an autonomous way.

Innovation is change with effect. This effect does not refer only to the knowledge that is acquired by the student at the end of the path, but mainly during the path, because in education the ends are important, but the paths must be valued equally. It is not enough to know that the student has learned, but to realize that he himself has understood the way he has learned. He must realize that he has not reached an end, but that this inconclusion arises from the constancy and permanence of the process that must be extended throughout life. Making reference to Papert (2008), the fact that the child has built its own intellectual structure means

that it has appropriated the culture that surrounds it, which reinforces the idea that the child does not build itself from nothing.

Thus, by appropriating the knowledge she has built herself, the child becomes the subject of innovation and her learning is the new object. However, by giving meaning to its object, the knowledge, it becomes no longer an object, but the subject itself, because the way the conception of the individual being is established after appropriation of culture, the knowledge built by the subject claims that he becomes a new being, the protagonist of his learning. On this reflection, it is important to reference Fino (2008, s/p, our translation) when he says that the "innovative teacher, if he were running for the Oscars, not of Hollywood, but of education, would be a candidate for the best secondary actor award, while the learner would be the natural candidate for best lead actor".

Final remarks

With innovation in focus and the construction of the subjects' knowledge being carried out by themselves, humanity will certainly have a new beginning and with this it can guarantee a new path that does not lead the world to an end, but to a constant renewal and improvement. To believe in this possibility is to rest in the certainty that it is the appreciation of the subject that transforms the object and that it is the construction of a new subject that provokes the construction of a new and better object. To invest and believe in the possibility of renewal of teaching is to try to make this new teacher refuse the immobility of the current didactic structure and fight to effect the transformation of the current and immobile school institution. Believing in the renewal of the school is, therefore, the possibility that the world has to help in the construction of a renewed subject. To renew the subject is to make a commitment to the education of the future and to be concerned with the society of the future, because "to master change, we must anticipate it" (TOFFLER, 1970, p. 316, our translation). And Fino (2009, p. 14, our translation) tells us that:

> That's what innovation is all about. It is not about looking for palliative solutions for an institution on the brink of decline. It's about looking beyond it, imagining another, no longer being hampered by the forces that lead inexorably toward the past.

Pedagogical innovation must be guided by a discontinuity in traditional pedagogical practices. This leads to an updating of pedagogical modes of action, of contexts at the micro level by instilling a critical eye on the organization and functioning of educational systems.

Addressing pedagogical innovation implies dealing with learning processes and pedagogical practices in a way that gives primacy to student autonomy (BRAZÃO *et al*., 2020, p. 553, our translation).

Finally, with the principle of innovation established, the idea of what is desired for education is likewise confirmed. The future is always very close and to work for the education of the future is to seek the effectiveness of the formation in the present, because innovation is precisely the internal desire provoking the action that is external and present. This search should always provoke the creation of pedagogical acts that guarantee the formation of the subject in the present that is aware of its intellectual capacity to transform itself as a subject to innovate, which will ensure society a good path towards the future.

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