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Prácticas pedagógicas y tecnologías de la información: una experiencia en Ciencias Naturales de educación básica

Pedagogical practices and technologies of information: an experience in Natural Sciences in basic education

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Resumen: Las transformaciones y desafíos en las prácticas pedagógicas de los docentes, referidas a actividades de aprendizaje, discurso pedagógico y evaluación, tienen como objetivo analizar el proceso de articulación de las Tecnologías de la Información y las Comunicaciones, en particular la plataforma digital Moodle y su impacto en el proceso pedagógico del área de Ciencias Naturales en la educación básica secundaria de la Escuela Tecnológica Instituto Técnico Central.

Palabras clave: Prácticas pedagógicas; Tecnologías de la Información y las Comunicaciones; Educación básica secundaria; Aprendizaje

Abstract: The transformations and challenges in the pedagogical practices of teachers, related to learning activities, pedagogical discourse, and evaluation have as an objective the analysis of the process of interrelation of the New Technologies of Information and Communications, in particular the Moodle Platform and its impact in the pedagogical process of the Natural Sciences area in basic secondary education at the Technical School Central Technical Institute.

Keywords: Pedagogical practices; Technologies of Information and Communications; Basic secondary education; Learning

Introduction

The incorporation of information and communication technologies (ICT) into the teaching process has been transforming the pedagogical practices of the teacher, and thus the relationship of the students with the knowledge. Dussel (2011), says that new technologies have created a new scenario for thinking, learning and communication, generating new tools

available to think, act and express. This requires education to have a solid reflection from a pedagogical approach, where technologies are conceived and applied as strategies to improve learning and the construction of knowledge.

The Ministry of Education in its ten-year National Plan (2016-2026), in the fifth challenge seeks to "reorient the pedagogical practices that lead to a change in the teaching and learning process where students are allowed to develop skills necessary to apply knowledge in different environments "(p. 4). In this same sense to encourage the transformation of pedagogical practices, the Ministry considers important, to promote the pertinent, pedagogical and generalized use of the new and diverse technologies to support the teaching, the construction of the knowledge, learning, research and innovation, strengthening development for life.

This research analyses the process of incorporation of the ICT and its impact on the pedagogical practices of the teachers of the area of natural sciences in the secondary basic education of the Technological Central Technical Institute, and examines the role of the pedagogical theories; group learning for the development of self-learning pedagogy; the evaluation system, conceived as an experience of transfer and appropriation of content with respect to meaningful learning, as well as the presentation of pedagogical strategies aimed at consolidating the ICT-articulated curriculum

From the previous perspective, "the school is conceived as a space for training of knowledge, which assumes the challenge and the changes that come from the hand of the information society that seeks to design pedagogical strategies that must incorporate the teacher in the classroom" (Davini, 2015, p. 12).

The study sample was 9 teachers from the area of natural sciences of the subjects of Biology, Chemistry and Physics and 345 students of 6th, 7th and 8th grade of the Technological Central Technical Institute, a sample of 3 teachers was selected and 20 students of each grade for a total of 63.

Development

Theoretical background on the incorporation of ICT to pedagogical practices

The classroom as a space for the construction of knowledge leads to the analysis of practices, where there is no knowledge without a defined discursive practice that favors teaching and learning. From here discursive pedagogical practices can be understood as a domain of discursive production destined to reflect on the educational processes and, in turn, to explain and, sometimes, to propose norms for the processes of knowledge production. That take place in the educational -school field (Gvirtz, Larripa, and Oría, 2007).

From the theoretical point of view, this research is based on the concepts of the authors Sánchez (2000), Grosso (2000), Area (2008), Monge and García (2007), Baelo (2004), Marchesi (2007), who propose the incorporation of ICTs to promote new pedagogical practices in favour of better learning. Likewise, García, Loredo, and Carranza (2008) define the educational practice as the "set of situations within the classroom, which configure the work of the teacher and the students, according to certain training objectives circumscribed to the whole of actions that directly affect student learning "(p. 4). In this sense the practice covers everything that happens within the classroom as the design, development of programmatic contents -and within this the way students learn-, didactics and evaluation under the guidance of the teacher.

Tamayo (2007) affirms that the pedagogical practice as it is linked to a process of continuous reflection, builds knowledge, and wonders for how to teach, who to teach? what to teach, and why teach?, where to teach? inviting the teacher to ponder about the previous questions in the review of the aims, contents, didactic strategies, subjects and cultural contexts, which will lead to the design of new knowledge, making the school classroom a laboratory for learning and research.

In the case of mediation from information and communication technologies, Solano and Pérez (2015) show that technologies themselves do not improve educational quality, but are teacher-oriented; a good use will develop learning environments that will lead students to improve their skills, abilities and learning.

Previous research shows the interest in teaching, in particular pedagogical practices when mediated by ICT, the concern for resignifying classroom activities, changes in methodologies, the role of students and and improving students motivation.

Pedagogical practices and the incorporation of ICT in learning

The pedagogical practices acquire a new dimension in the learning of the basic education when they incorporate technological tools and social networks that generate curiosity and inquiry by proving the theories of the disciplines. This means that apprentices are willing to be protagonists to experience a didactic sequence of observation, contemplation, argumentation-against argumentation, generalization, conclusions and decision-making-, which activates the neurons around problem solving, and becomes a pleasant activity that contributes to a learning of discovery and change of mental schemas, where ICT are catalyst ingredients of emotional and cognitive attractions.

Hence, "the implications of these changes of perspective are clear. On the one hand, the interest is shifted from the analysis of the potentialities of ICT for teaching and learning towards the empirical study of the effective uses that teachers and students make of these technologies in the course of the teaching activities and learning (...)" (Coll, 2008, p. 115).

ICT makes it possible for the discourse of pedagogical practice to flow through the novelty of the management of the virtual world. This means that the trainee has the time he or she wants to express, communicate and interact with the teacher and the companions, in order to share the progress of the tasks and exercises, to receive feedback, about what he does and does not do well , having the opportunity to correct or learn from the mistakes to access the truth of the education of the scientific spirit.

So, when the class is over, the apprentices can continue to think about the academic problems, which makes it easier to continue with the resolution of the exercises or tasks, correctly and uncertainly, being the most significant modification of structural knowledge schemas, based on the knowledge it possesses and the potential of ICT to imagine the answers according to the assumptions enunciated in the classroom, ie "ICT represent a very broad and very rich field to develop teaching and learning tasks; both on the forms and on the contents (although both aspects are inseparable)"(Aguiar, et al, 2014, p. 13).

On the other hand, the autonomy of the teacher to imagine and think pedagogical plans in the virtual classrooms has no limits, because it depends on the teaching creativity of the teacher to materialize the teaching processes; and so the apprentice advances according to the rhythm of personal autonomy and of the collectivity. ICT is a good way for apprentices to develop criteria for a pedagogy of self-learning, in which it implies interacting with objects by themselves; to understand the texts that the world offers them, to learn how to solve the problems on their own account; learning to classify information and maintaining motivation to achieve goals about what you want to learn. This indicates that ICT is an ideal channel, to learn to know which technological tools enable access to the resolution of knowledge problems; learning to make or understand that procedures facilitate the comprehension of facts, events and happenings; exercising the self-will or mental attitude of wanting to learn by ourself, having as a reference the idea of autonomous learning of Aebli (1998).

ICT stimulates the dominance of autonomy, because teachers and apprentices risk thinking about a didactic of the digital world in terms of curricula, basic forms of teaching, learning styles, ways of accessing information, question and answer approach to reach the truth of the education of the scientific spirit, among others.

In other words, it requires a pedagogical base in the digital world that points out the capacities or competencies to learn how to learn, how the contents will be worked out from mental schemas of the learning theories, the sequence or didactic steps to develop skills-emotional, cognitive, pedagogical, investigative, argumentative, textual, interpretative, decision making and others-, the method or way to achieve the problematization of knowledge and modify the cognitive structures, bibliographic resources or technological means to broaden the horizon of disciplinary issues and the way to carry out the evaluation of learning according to the pillars of the psychology of human learning. In other words, "social practices linked to new technologies and digital media challenge the educational institution and, specifically, the modes, structures and logics that from the school are encouraged and historically backed up" (Aguiar, et al, 2014, p. 31).

The contents acquire relevance when questions and answers arise that have an instructional design route framed in a theory of learning, which uses technological tools as an excuse for pedagogical mediation. Pedagogical practices and the incorporation of ICTs is relevant when learning activities go from pragmatic learning to epistemic learning. This means that teaching and educability must overcome a knowledge of the doxa or opinion, in which beliefs prevail over what is supposed to be knowledge. For this reason, a epistemic learning requires intervention of the reason to deliberate and to meditate on what it learns, in order to the usefulness of the knowledge for a cognitive and metacognitive self-regulation, in which regulation, control, and plans of improvements to perform tasks and exercises interact with peers and appropriate a repository of pedagogical strategies, as Matthew (2001) holds.

Likewise, Pozo (2008) argues that explicit learning is achieved through the transfer of knowledge, when it exceeds repetitive, associative and reinforcing learning, to give meaning about how it learns, which is constituted in a question, in a problem or in a hypothesis, to interrogate about the successes and misunderstandings of knowledge, that is, the pedagogical practice, supported in the ICT has to stir the epistemic function of the knowledge, if it tries to achieve the education of the scientific spirit.

Conclusions

The pedagogical practices to which ICT has been incorporated, offer a different educational perspective regarding the roles that teachers and students play, such as: content domain, group learning and learning assessment. The roles of teachers and students mediated by ICT change in the sense that on the one hand, it tries to impose the academic language and on the other hand, the semiotics of the apprentice that nourishes the cultural environment and the personal experiences is interposed, that contributes to a situational disciplinary discourse from circumstances in the local context.

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