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Article

Innovative Educational Practices Mediated by ICT: Impact on the Quality of the Teaching-Learning Process

Prácticas Educativas Innovadoras Mediadas por las TIC: Impacto en la Calidad del Proceso de Enseñanza-Aprendizaje

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Abstract

Innovative educational practices represent a dynamic and adaptive approach to 21st century education. This article aims to analyze the impact of innovative educational practices mediated by Information and Communication Technologies (ICT) on the quality of the teaching-learning process; for this purpose, a literature review was conducted, different approaches and strategies that integrate ICT in the classroom were examined, and the benefits and challenges associated with the implementation of innovative educational practices in different educational environments were analyzed. The research followed a qualitative methodology, an exploratory study and a literature review were conducted to obtain information related to innovative educational practices and their impact on the quality of the ASP; a variety of research methods, techniques and instruments were used to achieve the objective of the study.

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Resumen

Las prácticas educativas innovadoras representan un enfoque dinámico y adaptativo para la educación del siglo XXI. Este artículo tiene como objetivo analizar el impacto de las prácticas educativas innovadoras mediadas por las Tecnologías de la Información y la Comunicación (TIC) en la calidad del proceso de enseñanza-aprendizaje; para ello se hizo una revisión bibliografica, se examinaron diferentes enfoques y estrategias que integran las TIC en el aula, y se analizó los beneficios y desafíos asociados con la implementación de prácticas educativas innovadoras en diferentes entornos educativos. La investigación siguió una metodología cualitativa, se realizó un estudio exploratorio y de revisión bibliográfica; para la obtención de información relacionada con las prácticas educativas innovadoras y su impacto en la calidad del PEA; se utilizó variedad de métodos, técnicas e instrumentos de investigación, los que permitieron alcanzar el objetivo del estudio.

Palabras clave: innovación educativa, Tecnologías de la Información y la Comunicación (TIC), calidad educativa.

Introduction

In a world characterized by rapid technological advances and social change, education faces the challenge of preparing students for an uncertain and complex future. In this context, innovative educational practices emerge as a vital response to promote meaningful learning and the development of relevant skills for the 21st century.

The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020a), in Goal 4 for Sustainable Development of Quality Education, states to ensure inclusive, equitable and quality education by helping countries to mobilize resources and implement innovative and contextually appropriate solutions to provide distance education leveraging high, low or no-tech approaches.

In relation to this, the GEM 2023 Report on Technology in Education argues that the use of technology in education worldwide must be through the lenses of relevance, equity, scalability and sustainability. They believe that education systems must always

ensure that the interests of learners are placed at the center and that digital technologies are used to support education based on human interaction rather than replacing it; and focuses on how to improve quality, both in the teaching and learning of basic skills and in the development of the digital skills needed in everyday life (UNESCO, 2023).

This indicates the need for a careful integration of ICTs in the teaching-learning process to maximize their potential, and the importance of adopting a holistic and collaborative approach to foster innovation and improve the quality of education. Developing innovative practices in the teaching-learning process entails an act of analysis and reflection by the teacher in relation to the student, his or her characteristics, needs and learning styles; and a critical and self-critical evaluation of his or her pedagogical practice, potentialities and needs to incorporate in his or her actions the appropriate and responsible use of various strategies, procedures and/or technological tools, with the purpose of achieving quality in the teaching-learning process.

The purpose of this article is to analyze the impact of innovative educational practices mediated by Information and Communication Technologies (ICT) on the quality of the teaching-learning process, based on the literature consulted.

Educational innovation currently plays an essential role in any educational system and is a key element to achieve quality education. In this regard, the (UNESCO, 2016)considers that educational innovation is a deliberate and planned act of problem solving, which aims to achieve higher quality in student learning, overcoming the traditional paradigm. It implies transcending academicist knowledge and moving from passive student learning to a conception where learning is interaction and is built among all.

Zaltman et al. (1973) propose a concept of innovation that addresses three interrelated dimensions; first, he describes innovation as an invention, which implies a creative process by which two or more existing concepts or entities are combined in a novel way to produce a previously unknown configuration. Secondly, he states that innovation is the process by which a novel idea becomes part of a user's cognitive state and behavioral repertoire; in the third dimension, he mentions that innovation is an idea, practice or material artifact that has been invented or considered as novel, regardless of whether it has been adopted or not (Margalef & Arenas, 2006)..

According to this approach, the first dimension highlights the creative aspect and the generation of something new from pre-existing elements; that is, innovation as invention underlines the need for creativity in the process of developing new ideas and solutions. It then presents innovation as a novel idea that is part of the user's cognitive state and behavior; it stresses the importance of understanding how innovation diffuses and becomes part of everyday practice. The last dimension, according to Zaltman et al. (1973) and as understood by the authors of the present study, emphasizes the intrinsic nature of innovation, regardless of its commercial success or market adoption. It recognizes that innovation can exist even if it is not widely implemented or adopted.

The interconnection of these aspects highlights the complexity and multidimensionality of the phenomenon of innovation; for these authors, to innovate is to invent, to produce something new or novel; however, for other authors, innovation refers to any change that generates value; as stated by Mulet (2014) cited by (Estrada, Escalona, Santiesteban, & Pérez, 2020). "to innovate is to use knowledge and generate it if necessary, to create products, services or processes that are new for the company or entity, or improve existing ones, thereby achieving success in the market".

In relation to educational innovation, Retamero (2010) cited by (Estrada, Escalona, Santiesteban, & Perez, 2020)states that it should be something more than "that new thing that teachers do in class, such as using computers, holding debates, etc.", or changing for younger teachers, or stop using guide texts for fabulous computers, and referred that innovating is also thinking critically, changing the participatory context for a better one, creating classroom or extracurricular environments, creating group learning (creating a community of educational work) as well as individual or improving the relationships that exist between teachers and students.

In this study, the approach of Retamero (2010) is shared, since the authors of this study consider that educational innovation is not limited only to the introduction of new methods, techniques or approaches in the teaching and learning process. This implies a reflection by the teacher on the characteristics, needs and potential of the students, as well as a critical and self-critical evaluation of his or her teaching practice, identifying both strengths and areas for improvement. In this way, the teacher can creatively and responsibly integrate the use of advanced technology, adopt alternative pedagogical approaches, foster interdisciplinary collaborations and apply evidence-based practices in his or her pedagogical work.

According to Estebaranz, 1994 cited by (Estrada, Escalona, Santiesteban, & Pérez, 2020)innovation should be understood as "a change planned by the school or educational center itself that affects people in their professional development as well as the organization (organizational development) and teaching (curricular development)".

The approach that innovation in education should be understood as "a change planned by the school or educational center itself that affects people in their professional development as well as the organization (organizational development) and teaching (curricular development)" is based on an integral and systemic vision of educational improvement.

From our point of view, this indicates that educational innovation is not limited only to changes in the curriculum or teaching methodologies, but encompasses the entire educational system. This includes aspects such as teacher training, school management, infrastructure and available resources, among others. Understanding innovation from a systemic perspective makes it possible to address educational challenges in a comprehensive and holistic manner.

In summary, understanding educational innovation as a planned change that affects the professional development of staff, organizational functioning and the school curriculum makes it possible to address educational challenges in a comprehensive manner and maximize the positive impact on the quality of education. This approach promotes a culture of continuous improvement and adaptation to the changing demands of society and the world of work.

Following the perspective presented by (Roman & Lara, 2014), innovation is revealed as a complex and multifaceted process, characterized by a diversity of interpretations and approaches that vary according to the context in which it manifests itself, whether in political, social, personal or educational spheres.

Background of study: Educational innovation and Information and Communication Technologies (ICT).

Over the last few years, there has been a significant growth in studies exploring educational innovation and Information and Communication Technologies (ICT). These studies have highlighted how the strategic use of ICTs in education can radically transform the way teaching and learning takes place. From the integration of online learning platforms to the development of customized

educational applications, research in this field has revealed the potential of ICTs to improve the accessibility, quality and effectiveness of the teaching-learning process; these studies include:

(Parra & Agudelo, 2020)In their research, they reflect on the pedagogical practices with the use of Information and Communication Technologies (ICT) that have been highlighted as the most significant didactic practices, summarizing that their transforming character is associated with the potential for innovation that can be generated from them; they conclude in their work that innovation fertilizes a creative, critical and open thinking that comes to life in pedagogical practices.

The approach of Parra & Agudelo (2020) highlights the importance of pedagogical practices that integrate Information and Communication Technologies (ICT), emphasizing their transformative potential and their ability to foster innovation in the educational environment. Arguing this approach involves analyzing how ICTs can positively influence didactic practices, promoting creative, critical and open thinking in students.

The transformative nature of pedagogical practices with ICTs is supported by evidence that these technologies can enhance innovation in the classroom and promote creative, critical and open thinking among students. The effective integration of ICTs in teaching not only enriches the educational process, but also prepares students to face the challenges of the constantly evolving digital world.

On the other hand, (Jiménez, 2020) presents in his research the features, trends and challenges faced by teachers in their teaching practices in the 21st century based on the new existing learning niches. She implements the study in fifty-six Colombian educational institutions with the objective of identifying the existing forms of teaching, as well as resizing the role of didactics based on various investigations implemented by more than seventy teachers. The main results compiled from the three challenges that characterize the project: the resizing of teaching strategies, the conceptions of the curriculum and the teachers' thinking on the use of ICT.

In his research Jiménez (2020) highlights that the educational environment is undergoing a rapid transformation due to technological advancement and the expansion of digital resources. Teachers are faced with an increasing diversity of tools and platforms that can be used in the teaching-learning process. This situation poses both opportunities and challenges for educators, who

must adapt their pedagogical practices to take full advantage of the potential of these new technologies.

In addition, this research contributes to the understanding of how ways of teaching are evolving in response to the demands of an increasingly digitized society. New learning niches, including virtual spaces, online resources, and interactive tools, are influencing the way teachers design and conduct their classes. It is essential that educators recognize these trends and are prepared to integrate them effectively into their teaching practice.

In relation to this, the authors of the present study consider of great value the re-dimensioning of didactics in the current context. As teaching methodologies evolve, it is necessary to review and update traditional pedagogical approaches to ensure that they remain relevant and effective in the 21st century. This implies not only incorporating new technologies, but also promoting a more active, participatory and student-centered approach to the learning process.

On the other hand, (Sandoval, 2020)develops a study with the objective of analyzing the integration of ICT tools as a didactic strategy in collaborative learning in academic training spaces as part of the rethinking of the teaching practice. The results obtained in this study show that the educator must assume a new role mediated by ICTs as opposed to mandatory preventive isolation. Another finding was the strengthening of the use of ICT in the virtual context of the classes generated by the educators, giving a new impulse to the formative process based on significant innovative experiences. The author concludes that the pandemic generated a disruption in the educational system, for this reason, the directors of educational institutions should have as alternatives for effective learning the model of education in virtual modality as an added value to their educational proposal in response to the new post-COVID-19 context.

On the other hand, (Parra & Rengifo, 2021)(Parra & Rengifo, 2021) conducted an analysis of innovative pedagogical practices mediated by ICT, carried out by teachers of an educational institution in Popayán - Cauca, (Colombia); concluding that teachers apply incremental innovation in the classroom, according to curricular needs and daily praxis, but do not continuously use Web 2.0 tools and Virtual Learning Environments, to articulate extra-class work; among the reasons for this situation are connectivity problems, resistance to change and poor institutional educational management.

This study demonstrates that, although ICTs offer a transformative potential in education, their effective implementation may encounter various challenges. According to the results of the study conducted by Parra & Rengifo, 202, teachers apply incremental innovation within the classroom, which suggests that they are open to adopting new pedagogical practices, but they do so gradually and adaptively. This gradual approach may be influenced by curricular needs and daily praxis, where teachers seek to integrate ICT in a coherent manner with the established educational objectives and the teaching-learning dynamics present in the school context.

However, the authors point out that teachers do not continuously use Web 2.0 tools and Virtual Learning Environments to articulate extra-class work. This situation can be attributed to various factors, among which connectivity problems, resistance to change and poor institutional educational management stand out.

(Adoumieh, 2021)develops a research related to the didactics of language mediated by ICT, based on the problems identified in the pedagogical praxis where it became evident that students find it difficult to carry out the didactic transposition of this knowledge. In addition, there is the scenario of virtual environments and the increasingly latent reality of how to teach language to digital natives. After the analysis of technological tools to support language teaching, Storyjumper was selected as an innovative proposal in the creation of stories; the results of this research show that students improved their communicative competence, the skills to manage and take control over what was developed, the capacity for self-criticism, teamwork, respect and tolerance for the opinions of others.

In this research, the author demonstrates through the results obtained, how the incorporation of multimedia resources, simulations and interactive activities, contribute to the development of 21st century skills, such as critical thinking, problem solving and collaboration. Moreover, it allows teachers to cater to different learning styles and motivate students to explore and discover on their own.

By developing innovative practices in the teaching and learning process, using digital tools to research, analyze and communicate information, students not only acquire academic knowledge, but also develop fundamental competencies for their academic and professional future.

Few studies have been found in Ecuador related to innovative practices and the use of ICTs in the teaching-learning process; however, it is worth mentioning the studies conducted by:

(Balladares, 2019)who investigates the existing digital divide in the country and the need to eliminate it, for this he proposes digital and informational competencies for an educational digital inclusion both inside and outside the classroom, in order to seek equal opportunities of information and knowledge for all. The author asserts in his research that digital inclusion seeks to ensure educational quality, considering ICTs as strategic allies for this purpose, and promoting the development of digital and informational competencies in teachers.

Similarly, (Granda, Jaramillo, & Espinoza, 2019)analyze what is the real situation that exists in the Ecuadorian educational environment regarding the implementation of ICT. Among the main findings is the existence in Ecuador of a regulatory framework for the use of ICT in educational activity; however, the implementation of these technologies is still a task to be fulfilled, since there are limitations in the technological training of teachers, little use and variety of ICT, teachers' idleness in their use and persistence of traditional teaching and learning methodologies.

In this order of ideas, (Pita, Cevallos, & Maldonado, 2021)present in their research the existence of digital gaps in online education and its impact on today's society; they address everything related to the digital divide, i.e. the space that exists between those who have greater access to technologies and those who do not, as well as the different causes and consequences of this. With the objective of diagnosing the current situation of the country, in terms of technologies, information and digital culture, to determine the needs according to the social and cultural strata. This leads the authors to a deep reflection on the transition to digital knowledge, and the shortcomings and obstacles encountered when making use of it. As main conclusions, the importance of promoting access to Information and Communication Technologies is highlighted, not only through the provision of equipment and connectivity, but also through technological training, convinced that technological learning is essential for the development of the country.

These authors address the issue of digital divides and their impact on education from different perspectives; from our perspective, access to technological resources and connectivity problems continue to represent a significant barrier in Ecuador. This situation is especially

noticeable in contexts where Internet access is not equitable or where technical limitations hinder the effective use of Information and Communication Technologies (ICT). In addition, another digital divide that affects the quality of education is related to the preparation of teachers to address this challenge. In pedagogical practice, teachers show insufficient development of digital and informational competencies, which prevents them from taking full advantage of available digital tools and applying innovative teaching strategies that promote meaningful learning in students.

On the other hand, the Ecuadorian Ministry of Education, in its quest to improve educational quality, coverage and guarantee of rights, through techno-pedagogical innovation and technological equipment, connectivity, teacher education and training, has developed the Digital Education Agenda 2021-2025, which is considered a public policy instrument aimed at the digital transformation of education in Ecuador. This agenda allows the planning, implementation and evaluation of strategies and actions aimed at the development of Digital Learning and the formation of Digital Citizenship in all members of the educational community (students, teachers, educational staff, managers and families). This document outlines the path to generate the necessary conditions for the establishment of a community that learns about and through technological tools in digital environments. (Ecuador, Ministry of Education, 2021).

Materials and methods

The research follows a qualitative approach and is an exploratory and literature review research, because its purpose is to analyze the impact of innovative educational practices mediated by Information and Communication Technologies (ICT) on the quality of the teaching-learning process, from the literature consulted.

Among the scientific methods used are: analysis-synthesis, the hermeneutic method, and the inductive-deductive method, which allows the authors to collect, analyze and interpret the information obtained on innovative educational practices mediated by ICTs.

The methodology followed in the research consists of three moments or stages:

Literature search: A systematic review of scientific studies related to innovative educational practices mediated by ICTs was carried out.

The sources are located in bibliographic databases such as: Dialnet, Digitalia, Esboco, E-Libro, Scopu, Scielo, Redalyc, among others.

Ninety-eight studies were located, but 73 were excluded because they were not relevant to the research objective. The inclusion criteria used were:

Publication date: selected studies have been published as of 2018.

Context: Studies developed in the educational context and those carried out in the region, particularly in Ecuador, are selected.

Type of research: original studies are selected, generally indexed articles.

Language: All selected studies are published in Spanish.

Organization of the information, in this stage the sources found are organized in a systematic, logical and chronological manner; Microsoft Word and Excel programs are used to easily organize the information by author, title, and contributions.

Finally, the selected sources are analyzed, which allows the authors to analyze the impact of innovative educational practices mediated by Information and Communication Technologies (ICT) on the quality of the teaching-learning process, based on the selected literature.

Results

The results of the literature review consulted allow the authors to demonstrate that innovative educational practices mediated by ICTs have a positive impact on the quality of education as long as they are used responsibly.

It can be confirmed that innovative educational practices bring a number of potential benefits, such as increased student interest and motivation, better academic performance and more effective preparation for the world of work. However, it also presents significant challenges, such as resistance to change, the digital divide, insufficient teacher training, appropriate selection of technological tools and resources, and the need for educational policies that support the effective integration of ICT into the school curriculum. Overcoming these challenges requires a holistic approach that involves all stakeholders, including educators, students, school administrators and policy makers.

In addition, innovation implies the continuous professional development of the teaching staff; educational institutions must provide training and education opportunities that enable teachers to acquire new skills, update their knowledge and adapt to the changing demands of the educational environment. A planned change in the school must consider the impact on the professional development of the teaching staff to ensure its effectiveness and acceptance.

Innovation also has implications for the structure and functioning of the school organization; this may include changes in staff roles and responsibilities, resource allocation, organizational culture and decision-making processes. It is critical that innovation is effectively managed at the organizational level to ensure its successful implementation and long-term sustainability.

Another significant aspect found in the literature consulted and with which we agree is that educational innovation has an impact on curricular development, since it involves the introduction of new methodologies, pedagogical approaches, educational technologies and curricular content. It is important that curricular changes are aligned with educational objectives and students' needs, and that they are implemented in a coherent and collective manner throughout the educational institution.

Innovative educational practices aim to enrich the teaching-learning process, offering more dynamic, personalized and contextualized experiences to students; they encompass a wide range of approaches and strategies, including the use of online learning platforms, interactive digital educational resources, real-time collaboration tools, simulations and educational games, among others.

In this context, innovative educational practices that integrate ICTs have become a fundamental pillar for improving the quality of the teaching-learning process. Information and Communication Technologies (ICT) have radically transformed the way teaching and learning take place.

In consideration of the (United Nations Educational, Scientific and Cultural Organization, 2017).the introduction of ICTs in the educational field in recent years has revolutionized educational processes; they have become didactic tools for the work of educators and learners, making the management of educational systems more effective. The Internet provides a variety of resources that facilitate access to and processing of information that can be transformed into knowledge. These technologies have democratized education,

giving opportunities to all people equally, it is a universal path to knowledge.

The creative and responsible use of ICTs enriches the learning experience by providing interactive and multimedia tools that capture students' attention and promote active participation in the educational process. Digital resources, such as videos, simulations, educational games and multimedia presentations, offer multiple ways of presenting information, adapting to different learning styles and facilitating the understanding of complex concepts.

The Internet, on the other hand, allows students to access high-quality educational resources from anywhere and at any time, facilitating self-directed learning and independent study. Online education platforms and massive open online courses (MOOCs) have expanded educational offerings, allowing people from all over the world to access courses taught by renowned experts.

Another benefit of ICTs is that they allow for the personalization of learning, because they offer adaptive resources and personalized learning platforms that adjust to the pace and level of each student. Learning management systems (LMS) allow teachers to monitor student progress, identify areas of difficulty and provide individualized feedback, which improves the effectiveness of the teaching-learning process.

ICTs offer a wide range of tools and resources that can enrich the teaching and learning process. From interactive applications to online learning platforms, these technologies provide new ways of presenting information, encouraging active student participation and facilitating the understanding of complex concepts.

In addition, the use of ICTs allows educational content to be adapted to the individual needs of students, promoting personalized and differentiated learning. By incorporating multimedia resources, simulations and interactive activities, teachers can cater to different learning styles and motivate students to explore and discover on their own.

Another relevant aspect of ICTs is that they promote a culture of innovation; both teachers and students are inspired to experiment, explore and create. By using emerging technologies such as virtual reality, artificial intelligence or 3D printing, unique learning experiences can be designed that challenge preconceived ideas and stimulate creativity.

However, it is necessary to recognize the challenges faced by teachers in implementing innovative ICT-mediated pedagogical practices in the teaching and learning process. Although there is a willingness to innovate, it is important to take into account the existing barriers, such as connectivity problems, resistance to change and poor institutional educational management, in order to promote a more effective use of ICTs in education.

Innovative pedagogical practices require an active willingness on the part of teachers to explore new methodologies and tools, as well as to adapt to technological advances; however, there is resistance to change on the part of some teachers, which hinders the full adoption of ICTs in the classroom. Lack of adequate training and institutional support may also contribute to this resistance to change.

Finally, poor institutional educational management can hinder the effective integration of ICTs into the school curriculum. It is essential that educational institutions provide the necessary support in terms of infrastructure, resources and teacher training to promote the successful implementation of ICTs in the classroom.

Discussion

Innovative educational practices whenever they adopt a holistic approach that combines technology, pedagogy and collaboration; prepare students for the future, promote meaningful and developmental learning, and improve the quality of teaching and learning.

Innovative ICT-mediated educational practices have the potential to transform education and improve the quality of the teaching-learning process. However, their effective implementation requires a holistic approach and careful planning that addresses both the benefits and challenges associated with the use of ICTs.

Innovative ICT-mediated educational practices have a positive impact on the quality of the teaching-learning process. Studies have shown that these practices can improve student motivation and engagement, facilitate access to quality educational resources, promote peer collaboration and foster the development of critical thinking, problem solving and meaningful learning; but they also raise challenges and concerns.

The digital divide can exacerbate educational inequalities, as not all students have equal access to technology and internet connectivity.

In addition, over-reliance on ICTs can lead to a loss of basic skills, such as the ability to concentrate and critical thinking, if not used in an appropriate and balanced manner.

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