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Teachers' opinions on the use of technologies in the teaching-learning process

Opiniones de docentes sobre el uso de las tecnologías en el proceso de enseñanza-aprendizaje

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ABSTRACT

Introduction: The impact of technological advances in educational environments continues to rise, while in the Picoazá Educational Unit the use of these resources is limited.

Objective: To explain the teachers' opinion on the use of Information and Communication Technologies (ICT) in the classroom.

Methods: The study was developed under a quantitative methodological approach, with a non-experimental descriptive design. A survey was used to collect information, which was processed using descriptive statistics.

Results: It was found that more than 50% of the teachers participating in the study do not make adequate use of ICTs and that more than 30% consider that they are not very important as didactic support in the teaching-learning processes. At the same time, 53% claimed to have only basic training, while 7% acknowledged having no training in ICTs as a tool for education. 100% express motivation to receive improvement in these aspects.

Conclusions: It is recognized as a necessity for the teachers of the aforementioned Educational Unit to implement a training program on the use of ICTs and its application in education.

Keywords: communication technology; information technology; learning process; teachers; teaching

RESUMEN

Introducción: El impacto de los avances tecnológicos en ambientes educativos continúa en ascenso, mientras en la Unidad Educativa Picoazá el uso de estos recursos es limitado.

Objetivo: Explicar cuál es la opinión que poseen los docentes, sobre el uso de las Tecnologías de la Información y las Comunicaciones (TIC) en el aula.

Métodos: El estudio se desarrolló bajo un enfoque metodológico cuantitativo, con un diseño no experimental de tipo descriptivo. Se utilizó una encuesta para recoger información, la que se procesó utilizando la Estadística Descriptiva.

Resultados: Se obtuvo que más del 50 % de los docentes participantes en el estudio no hacen un uso adecuado de las TIC y más del 30 % consideran que son poco importantes como apoyo didáctico en los procesos de enseñanza-aprendizaje. Al mismo tiempo el 53 % aseguró tener solo una formación básica mientras el 7 %, reconoce no tener ningún tipo de formación en TIC como

herramienta para la educación. El 100 % manifiesta motivación por recibir superación en estos aspectos.

Conclusiones: Se reconoce como necesidad para los docentes de la referida Unidad Educativa, se implemente un programa de superación sobre el uso de la TIC y su aplicación en la educación.

Palabras clave: docentes; enseñanza; proceso de aprendizaje; tecnología de la comunicación; tecnología de la información

Introduction

The technological component has always been an innovative element in education, since it entails changes in the teaching and learning process. Therefore, the integration of new technologies means in some cases the reconstruction of teachers' knowledge and attitudes, together with the adoption of new means and methods of teaching. Particularly the introduction of Information and Communication Technologies (ICT) has brought with it challenges for students and teachers.

This new component must be included in the basic pillars of education proposed by Unesco, which are being, knowing, doing and living. For this reason, the Ministry of Education of Ecuador is trying to include this type of technology in professor training programs and continuing education for teachers in the public sector.

To this end, it has launched some educational projects using the "*Me capacito*" platform, to provide teachers with various online courses on topics including digital innovation, digital platforms, technological literacy measures, as well as the adequacy and delivery of technological equipment and Internet access by the Ministry of Education to educational institutions. However, all these efforts are not enough to fully prepare teachers for the use of ICTs in the teaching process, in addition to achieving the technological readiness of the entire student population.

Nowadays, and with all the digitalization that is experienced daily, there is a great neglect, both by educational institutions and at the level of the Ministry of Education, in carrying out educational policies, so that teachers can facilitate their performance both in the classroom and in administrative management.

These public bodies, administrators of the proper functioning of the educational process, increase the teachers' workload, requiring them to comply with reports, matrices or some kind of administrative requirements, thus neglecting the teachers' purely pedagogical mission. On the other hand, they do not transfer enough knowledge or technological resources for teachers to be more efficient in the fulfillment of their work.

Most teachers are unaware of the existence of technological tools designed to provide alternative solutions to each of the actions that make up their performance in the educational process. Thus, under the current conditions, they perform their work attending to activities that could be classified as teaching content, exposition, administrative, evaluation, communication, management, research, among others.

It could be said that a significant number of teachers are not aware that there is a classification of these functions. In view of this reality, it is appropriate to carry out an analysis to specify and describe each of these situations of relevance in teaching and to offer some technological alternatives to help in this performance. On the other hand, there is no doubt that teaching has strengthened the cyberculture that originated with the Covid pandemic, which forced the use of virtual education as a means of training.

In this context, greater emphasis was given to the incorporation of ICTs in the teaching-learning process as the only way to give continuity to education through the use of digital materials. These aspects were previously demanded by the educational system, but teachers did not have the expertise in this subject, rather this situation of health and confinement forced them to prepare themselves in the management of these technologies (Fuentes-Campuzano et al., 2017).

However, in South American nations, there was a set of problems that prevented this virtual education from taking place due to the digital divide, the scarce infrastructure, the lack of electronic devices; together with the lack of teacher training in the use of ICTs, contributed significantly to this result (Rojas Galvez de Baluarte, 2022).

In this environment, it is necessary to think about teaching performance, since face-to-face teaching in schools has returned and digital tools such as mobile applications and social networks have become essential allies in the teaching and learning process. Along with this, there is still some resistance to change and a deficient use of technology. Therefore, it is necessary to understand the feelings of teachers, to understand their opinions and evaluations about their work effort, face-to-face and virtual.

However, in the Picoazá Educational Unit, few teachers make use of ICT in the teaching-learning processes for various reasons, including: not knowing the management and use of applications and free software, lack of motivation, lack of knowledge or because they are simply dedicated to fulfilling their work with the text that the government gives them.

All the above mentioned limits the use of technological resources as a support in the pedagogical work in the teaching-learning process. In order to contribute to solve this problem, the present research is carried out with the objective of explaining what is the opinion that teachers have about the use of ICT in their performance in the classroom.

Theoretical framework or conceptual references

Information and Communication Technologies in the current educational context

Undoubtedly, the current educational context is characterized by the need to make significant transformations in the teaching-learning processes in order to keep pace with technological advances.

Díaz Levicoy (2014, p. 47), states the following advantages for teachers in the use of ICTs:

- Professors can access countless knowledge and methodological sources for the development of their lectures, including the most recent publications on their research topics.
- They allow lectures to be given without the need for a physical space.

- Facilitate constant and fluid communication with other professors from the university and other institutions to develop research and share experiences.
- They allow quick access to the most relevant information on a topic of interest.
- They motivate professors to develop innovations and creativity in the treatment of contents.

In this sense, new paradigms have been introduced in educational management, an example of which are the virtual teaching-learning environments (Juca Maldonado et al., 2020).

At the same time, teachers have multiple resources to carry out their work: they can create their own virtual classroom with Moodle, manage their courses with Google Classroom, keep a daily record of their work with Additio App, record their classes in Zoom, create animations with Doodley, make interactive presentations in PowerPoint, make role plays and share them among students with Classcraft, use a digital blackboard with Classroomscreen, or integrate concepts through infographics, dossiers and many other types of documents (Escobar Hernández, 2021).

The current boom in resources based on artificial intelligence, robotics and augmented reality is not negligible. Each of them will be discussed in more detail below.

Artificial Intelligence

Artificial intelligence products have always been very attractive in the field of education. In this regard, Ocaña Fernández et al. (2019) point out that the new challenges of the information society demand multiple changes and that:

> The formats based on it promise a substantial improvement in education at all levels, (...) by providing students with a personalization of their learning according to their requirements, integrating the various forms of human interaction and ICTs. (para. 1)

The most evident is that the use of media (ICT) enhances education by offering a greater number of resources and media that enrich what is learned and expand it

in graphic, visual and sound ways that lead learners to use all their senses and acquire knowledge not only from the teacher but also as a process of personal construction or with their peers.

For his part, Escobar Hernández (2021), adds that artificial intelligence has developed to such a degree that machines are beginning to emerge that have a wide range of answers to the possible questions of students, or at least to those that have been detected as the most recurrent.

Parra Sánchez et al. (2022) present a model of personalization of learning resources using artificial intelligence techniques for the teaching of university mathematics. The model was built based on Felder and Silverman's learning styles and on a questionnaire of prior knowledge, applied to students in algebra, geometry and trigonometry, once they enter professional engineering careers.

The analysis made by Flores-Vivar and García-Peñalvo (2023) on the roles and challenges of artificial intelligence in online education is interesting. Among these are:

- Intelligent tutoring systems.
- Virtual facilitators.
- Intelligent content.
- Collaboration between teachers and Artificial Intelligence.
- Content analysis.
- Tutoring support outside the classroom.
- Automation of administration tasks

On the other hand, Flores-Vivar and García-Peñalvo (2023) refer to the following challenges:

- Teacher training in the use of new educational resources.
- Ethics involved in addressing the design of AI, verifying the type of response that the systems can provide without falling into biases or prejudices.
- Design of new pedagogical models applicable to the AI of immersive realities.
- Ethics and legality in intellectual property rights.

- Development of Digital Literacy/Artificial Intelligence plans.
- Ethical challenge in the treatment of student data and information.
- Human–computer interaction (HCI) paradigm.
- Resource optimization.

Finally, these authors point out that the most important thing is “to train the trainer, i.e., teacher training plans through which teachers and educators can receive adequate training” (Flores-Vivar and García-Peñalvo, 2023, p. 43).

Robotics

Educational robotics is an important component of Science, Technology, Engineering and Mathematics (STEM) education, introducing students to complex scientific and mathematical thinking (Arabit García and Prendes Espinosa, 2020) and in the development of 21st century skills such as collaboration, problem solving, creativity and innovation (Cabello Ochoa and Carrera Farran, 2017).

In the opinion of Bravo Sánchez and Forero Guzmán (2012), educational robotics is a valuable tool for the basic education classroom, but its success depends largely on the preparation of teachers.

Sánchez Tendero et al. (2019), refer to a study with the objective of:

> To check whether the use of robotics in early childhood education increases children's motivation with respect to the subject, helps them to improve their learning and to establish more positive socio-affective relationships. The intervention was carried out through a didactic unit in the area of “knowledge and interaction with the environment”, with 48 students of the infant education stage, aged 5-6 years, with a quasi-experimental design with the only difference being the use of a methodology based on the use of robots in the experimental group, as opposed to a traditional methodology in the control group. The results revealed that motivation, learning and positive socio-affective relationships increased with the use of robotics as a didactic tool in the early childhood education classroom. These results point to the need to increase teacher training in this type of technology in order to maximize its impact in the classroom. (p. 11)

Following this line, García Valiente and Navarro Montaño (2017), describe a research whose objective was “to know the educational impact of the use of robotics as a teaching-learning resource in early childhood education” (p. 81). In this intervention, a robot was used that was simple to handle, with varied educational possibilities to work on contents of different subjects and with an appealing design for children. The results of the application of the intervention have been positive, mainly in the motivation for learning content in different areas such as logic-mathematics, reading and writing, artistic expression, and temporal notions.

Augmented reality

The increase in the use and possibilities offered by mobile devices, tablets or smartphones in our daily lives, means that these tools can be incorporated, at no additional cost, and with great didactic possibilities, in university training contexts. This aspect “undoubtedly contributes to the proliferation of technologies such as Augmented Reality (AR), which allows, relying on the aforementioned devices, to facilitate the combination of digital information and physical information in real time” (Cabero Almenara et al., 2019, p.106).

In this sense, it is pointed out that the immersive and realistic contexts offered by “well-designed” augmented reality environments contribute to the development of cognitive skills and the transfer of knowledge to real-life environments.

Hidalgo Cajo et al. (2021), for their part, refer to a study on the use of AR for teaching anatomy. The quasi-experiment showed full satisfaction of the experimental group with the experience received and they consider that AR resources awaken in them the motivation to use them, due to their easy handling and the interaction they experience between the content and the virtual objects, generating knowledge with entertainment.

Preparation of teachers for the use of ICT in today's educational context

The previous brief approach to the presence of information and communication technologies in the current educational context indicates that teachers must be in a

continuous and permanent preparation exercise to offer their students learning opportunities supported by ICTs.

Teachers must be able to adapt to the demands of this changing society. If this happens, the teacher will not only contribute to train digitally competent professionals in their area of expertise, but will also be able to have the necessary tools to face a globalized world and a society that demands the formation of digital citizens (Solís de Ovando and Jara Jara, 2019).

In the opinion of Suarez Segovia et al. (2023), both the teacher and the student require a new posture before the educational fact. However, this is more complex for the teacher who must adapt to new strategies very different from those learned in their training; therefore, it requires an attitude of openness, where they are active in their own transformation process that goes hand in hand with the dizzying changes and the expansion of a multiplicity of strategies and digital resources.

Undoubtedly, progress in relation to the use of digital competence in students will only be feasible if teachers have sufficient knowledge and mastery to adequately include them in teaching (Centeno-Caamal, 2021).

Particularly, in Distance Education (DE), teacher preparation is essential and should be planned according to the training needs of teachers and the demands of the digital society, enabling the teacher to build digital teaching skills. To raise teacher training in DE, allows recognizing a new reality and new educational models, breaking with old paradigms towards a reflective and autonomous pedagogical practice (Santos Guimarães et al., 2019).

In this sense, Pozos Pérez and Tejada Fernández (2018) identified seven digital competencies that teachers have to develop in order to meet current demands in their educational context, incorporating ICTs:

- Planning and design of classes in virtual environments.
- Development and conduction of collaborative learning experiences.
- Orientation, guidance and evaluation.
- Management of professional growth and development with ICT support.
- Research, development and pedagogical innovation with/for the use of ICT.

- Diversity, ethics and responsible use of ICT.
- Environment, occupational health and safety with the use of ICT. (p. 75)

For their part, Solís de Ovando and Jara Jara (2019), point out that the study of digital competencies of university teachers should be approached comprehensively and be oriented towards the use of ICT in educational contexts, with special attention to didactics, creation and innovation in teaching methodologies. That is, not only oriented to how much they know about technologies, but how much they incorporate them in their teaching performance.

Similarly, digital competencies in teachers are considered a knowledge, which includes knowledge in relation to language at the digital level. It includes the competence of knowing how to do, which involves search, analysis, evaluation, how to interpret information critically, problem solving; and it also includes a knowing how to be, which involves the taking of citizen awareness, the corresponding execution of duties and rights and respect for the globalized environment (Centeno-Caamal, 2021).

Revelo Rosero et al. (2018) conducted a study in Ecuador focused on the development of a model for the integration of teachers' digital competence for their professional development in mathematics teaching. The results showed a profile composed of 44 indicators corresponding to 21 digital skills that respond to basic, intermediate and advanced levels in mastery, use and innovation in five areas: information and literacy, communication and collaboration, digital content creation, security and problem solving.

After reviewing the criteria of several authors, Morales Arce (2013) explains what a basic education teacher should be competent in, digitally speaking:

- To know the uses of ICT in the educational field.
- To have a positive attitude towards ICT, a tool of our culture that should be used and applied in many domestic and work activities.
- To know the use of ICT in the field of their area of knowledge.
- To skillfully use ICT in their activities: text editor, e-mail and Internet browsing.

- To acquire the habit of planning the curriculum integrating ICT (as an instrumental means in the framework of the activities of their area of knowledge, as a didactic means and as a mediator for cognitive development).
- To propose training activities to students that consider the use of ICT.
- To permanently assess the use of ICT. (p. 90)

Methodology

The study was developed from a quantitative methodological approach, with a descriptive non-experimental design. The teachers' opinions on the use of ICT in their classroom performance were collected through a survey consisting of six questions. The following indicators were taken into account for the elaboration of the survey:

1. Level of ICT use in the classroom.
2. Level of ICT introduction from the teaching planning.
3. Importance given to the use of ICT in the teaching-learning process.
4. Level of teacher training in the use of ICT and technological resources.
5. Motivation to participate in teacher training courses on digital resources and the use of ICTs in education.

The population is made up of 101 teachers of the Picoazá Educational Unit. A purposive sample of the morning session was considered, corresponding to the high school level, seventh grade of basic education and the initial level, made up of a total of 45 people, including 2 authorities, 42 teachers and 1 clinical psychologist.

Results and Discussion

A survey was used to collect the information, which was designed in Google Forms and sent to the e-mail or WhatsApp number of the teachers involved. For the analysis of the data, descriptive statistics were used, which allowed the following interpretation of the results.

The first question is aimed at finding out whether technology is used as a didactic tool in the classroom. In this case, 10 of the respondents marked “always”, while a

total of 8 teachers marked “almost always” and a total of 27 indicated that they did so, but only occasionally (Figure 1). These responses show that more than 50% of the teachers participating in the study do not make adequate use of ICT, which evidences shortcomings in their preparation.

Figure 1

Answers to question 1

In response to the question “Do you take into account the use of ICT when planning your teaching activities?”, a total of 8 indicated that they always did, 7 stated that they did so occasionally, while 30 indicated that they almost never included them (Figure 2). In line with the answers to the previous question, these show that the use of ICTs as a teaching tool in the teaching-learning process is not conceived and that, therefore, the unquestionable advantages of ICTs, which are recognized and shared by many authors, are not taken advantage of.

Figure 2

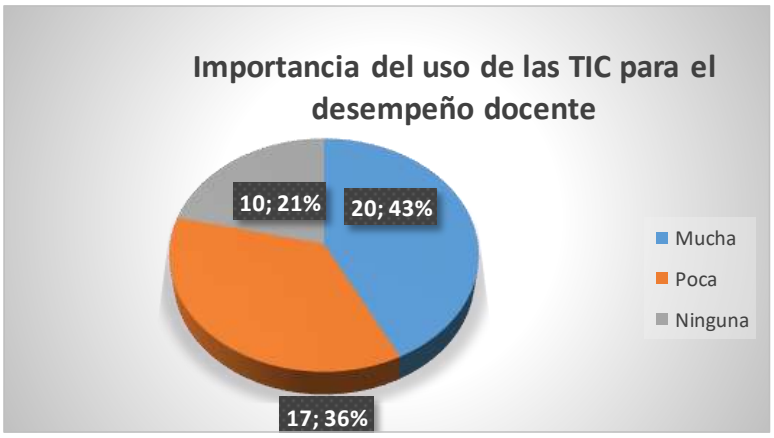
Answers to question 2

When referring to the importance they attach to the use of technological resources as didactic support in the teaching-learning processes, 43% of the respondents (20

teachers) attach great importance; a total of 17 teachers, representing 36%, indicated that they are of little importance as didactic support in the teaching-learning processes, while 21% admitted that they are of no importance at all (Figure 3). These percentages are encouraging because they indicate that the majority recognize, to a greater or lesser extent, the importance of these resources for education.

Figure 3

Answers to question 3



When inquiring about the level of training in the use of ICT and other technological resources in the teaching-learning process, a total of 18 teachers indicated that they had intermediate level training, which represents 40%. A total of 24 indicated that they had basic training, which represents 53%, and a total of 3 indicated that they had no training in ICT as a digital tool for education, which represents 7% (Figure 4). In accordance with the above, it may be interesting to study the relationship between the level of teachers' knowledge of ICTs in education and the habit of using them. In this scenario, these technologies play an important role in student learning, both in face-to-face and virtual environments.

When asked about the motivation to improve in the use of ICT in educational processes, 100% of the teachers said they were interested in taking improvement courses on these topics (Figure 5). Thus, it is possible to affirm that there is some enthusiasm among teachers to make use of ICTs, but the lack of mastery in their

use contrasts notably with the motivation they express. In this sense, it can be seen that students have greater knowledge, so it is important to emphasize the need for teacher guidance for the proper use of these resources.

Figure 4

Answers to question 4

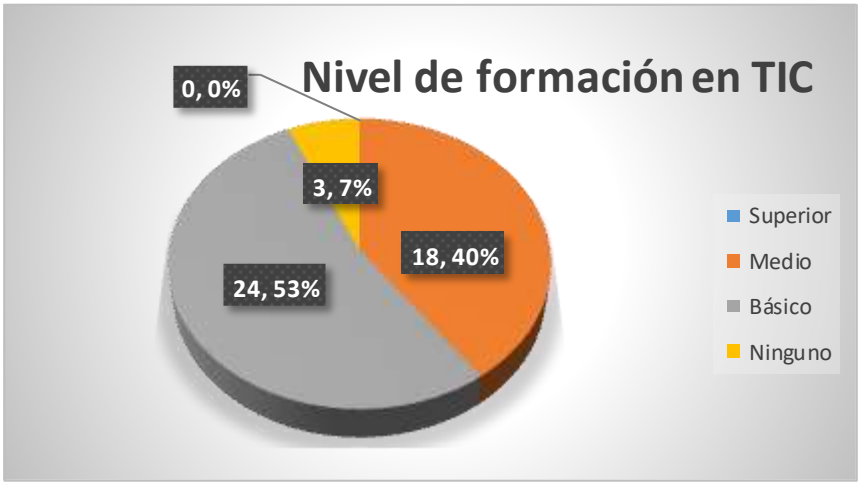


Figure 5

Answers to question 5

Once the questionnaire was processed, a group interview was conducted with the intention of finding out what could be the causes that influence this result.

According to the question about what are the major constraints that prevent the use of ICT in the teaching processes within the institution, the vast majority stated that it is the lack of technological resources, since it is an educational unit that has a real enrollment of 2,986 students and only has a computer lab with 32 computers. Internet service is available, but its signal is irregular and there is only coverage in the laboratory sector; the classrooms are uncomfortable and there are a total of 40 to 45 students per classroom, which makes it difficult to energize the educational processes.

Conclusion

The study conducted led to the conclusion that the teachers of the Picoazá Educational Unit make limited use of ICT in their performance before and during the teaching-learning process. Among the factors that influence this mode of action, the fact that they do not give due and necessary importance to the use of these tools stands out.

It is recognized as a priority need for the teachers of this Educational Unit to implement an Improvement Program on the use of Information and Communication Technologies and their application in education.

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Conflict of interest

The authors declare that they have no conflicts of interest.

Authors' contribution

P.J.S.O.: Wrote the introduction to the article, methodology, elaborated the research instruments, processed the information gathered and drew up the conclusions.

L.R.R.R.: Made the theoretical foundation, revised the writing of the article and placed the citations and bibliographic references.

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