

Analyzing the impact of technology on higher education: challenges and opportunities within the Ecuadorian context

Análise do impacto da tecnologia no ensino superior: desafios e oportunidades no contexto equatoriano

Analizando el impacto de la tecnología en la educación superior: retos y oportunidades en el contexto equatoriano

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The study highlights the need for improved connectivity, device availability, and targeted training to maximize technology's benefits, thereby enhancing educational accessibility and quality in higher education. This evidence can be useful for policy makers and education managers.

Originality/value:

The article is original since it presents empirical evidence, in addition to approaching in perspective a relevant discussion due to the difficulties presented in the Ecuadorian educational context.

ABSTRACT

Introduction: Technology serves as the framework for tools and resources that enhance collaboration, participation, and quality in higher education. This study analyzes the technological impact on higher education, focusing on access and equity, quality and personalization of learning, and changes in educational models. **Methods:** A quantitative and descriptive research design was employed, involving 400 participants: 200 students and 200 teachers from the higher education system in Ecuador. **Results:** Both students and teachers highlighted improved access to educational resources, flexible scheduling, and recognized the significant impact of technology on higher education. However, challenges such as lack of connectivity, insufficient devices, inadequate training, and limited government support persist. **Conclusion:** The findings underscore the importance of addressing these challenges to maximize technology's positive impact on education. Future research should incorporate qualitative methods, expand geographic scope, and evaluate long-term effects to provide more comprehensive insights.

Keywords: Technology, Higher Education, Challenges, Opportunities, Ecuador.

RESUMO

Introdução: A tecnologia serve como andaime para ferramentas e recursos que aumentam a colaboração, a participação e a qualidade no ensino superior. Este estudo analisa o impacto tecnológico no ensino superior, com foco no acesso e na equidade, na qualidade e na personalização do aprendizado e nas mudanças nos modelos educacionais. **Métodos:** Foi empregado um projeto de pesquisa quantitativa e descritiva, envolvendo 400 participantes: 200 alunos e 200 professores do sistema de ensino superior do Equador. **Resultados:** Tanto os alunos quanto os professores destacaram a melhoria do acesso aos recursos educacionais, a flexibilidade de horários e reconheceram o impacto significativo da tecnologia no ensino superior. Entretanto, persistem desafios como falta de conectividade, dispositivos insuficientes, treinamento inadequado e apoio governamental limitado. **Conclusão:** Os resultados ressaltam a importância de enfrentar esses desafios para maximizar o impacto positivo da tecnologia na educação. Pesquisas futuras devem incorporar métodos qualitativos, expandir o escopo geográfico e avaliar os efeitos de longo prazo para fornecer percepções mais abrangentes.

Palavras-chave: Tecnologia, Ensino Superior, Desafios, Oportunidades, Equador.

RESUMEN

Introducción: La tecnología sirve de soporte para herramientas y recursos que mejoran la colaboración, la participación y la calidad en la educación superior. Este estudio analiza el impacto tecnológico en la educación superior, centrándose en el acceso y la equidad, la calidad y la personalización del aprendizaje, y los cambios en los modelos educativos. **Métodos:** Se empleó un diseño de investigación cuantitativo y descriptivo, con 400 participantes: 200 estudiantes y 200 docentes del sistema de educación superior de Ecuador. **Resultados:** Tanto estudiantes como docentes destacaron la mejora en el acceso a recursos educativos, la flexibilidad de horarios y reconocieron el impacto significativo de la tecnología en la educación superior. Sin embargo, persisten retos como la falta de conectividad, la insuficiencia de dispositivos, la formación inadecuada y el limitado apoyo gubernamental. **Conclusión:** Los resultados subrayan la importancia de abordar estos retos para maximizar el impacto positivo de la tecnología en la educación. Las investigaciones futuras deberían incorporar métodos cualitativos, ampliar el ámbito geográfico y evaluar los efectos a largo plazo para ofrecer una visión más completa.

Palabras clave: Tecnología, Educación Superior, Retos, Oportunidades, Ecuador.

INTRODUCTION

Today technology has evolved to the point of transforming the way of doing things, all aspects of human life have been influenced by technology and education does not go unnoticed, technology has been able to provide innovative educational strategies transforming teaching through collaboration and personalization of the educational experience. There is a boom in the use of digital platforms and tools, this leads to a trend towards adaptation to the new demands and challenges of today's society called digital knowledge society (Fundación CYD, 2020; Haleem et al., 2022; Salas-Pilco et al 2022; Zhang & Aslan, 2021; Bernacki et al., 2020).

In the interactive process of the educational dynamics, several factors are forming trends in the application of technologies in the educational work and in the operational processes of pedagogical practice. We know that there is a clear breaking point, which has been the COVID-19 pandemic, factor that transformed radically the dynamics (especially in Ecuador) (Quinto Saritama, et al, 2023) and laid the foundations of what we can imagine as higher education 4.0 (Guerrero-Quiñonez, et al. 2023; Miranda et al., 2021). But it is interesting to see how other dimensions such as emotional intelligence and the very conception of soft skills are being incorporated into the teaching-learning process (Azevedo Hungria & Victor, 2024; Mora et al., 2024). This opens space for technology-intensive transformations to have greater diffusion, especially in the Ecuadorian context where there is already a certain initial propensity of educational communities towards technology (Castellano et al., 2020).

In Latin America, according to Lion (2019), the lack of access to computers and internet in homes is often compensated by the availability of these resources in educational centers. However, their use in this environment is usually restricted in terms of schedules, variety of available applications and accessible content. The integration of Information and Communication Technologies (ICTs) in education has been the focus of attention in several countries in the region over the last two decades. As a result, many countries have implemented ICT policies in education, which has led to their institutionalization and a wider allocation of resources.

While it is true that technology is beneficial for education, according to Carvalho (2024), we must not overlook the challenges that this process still poses, since it is evident that there are inequalities, conflict in the proper use and exploitation, the need for investment in technological infrastructure and training because the devices alone are not efficient, it is necessary that teachers and students have the necessary knowledge to make the most of technology and use it as a means to enhance and promote educational quality. It is essential that information technologies are available to support teaching staff, students and administrative staff, according to Andrey & Vargas (2020) this ensures that all those involved in the teaching and learning processes have access, and are kept up to date with modern strategies and methods, which fosters motivation and interest in learning. Furthermore, this integration of technology can transform the classroom environment, recognizing that emotions play a crucial role in the learning process.

But what is the impact of technology in education, specifically in higher education in Ecuador, a country with a marked digital, economic and social divide. For Morales et al. (2023), the use of technology in Ecuador is a challenge due to the existing digital divide, since not all students have devices and tools or access to internet in quantity and quality, especially in rural areas. The lack of training is also a challenge because teachers require updated knowledge to achieve the development of their competencies and digital skills and use technology effectively in the classroom. Despite these challenges, technology provides an opportunity to improve the quality of education and achieve meaningful and more accessible learning by eliminating barriers of time and space.

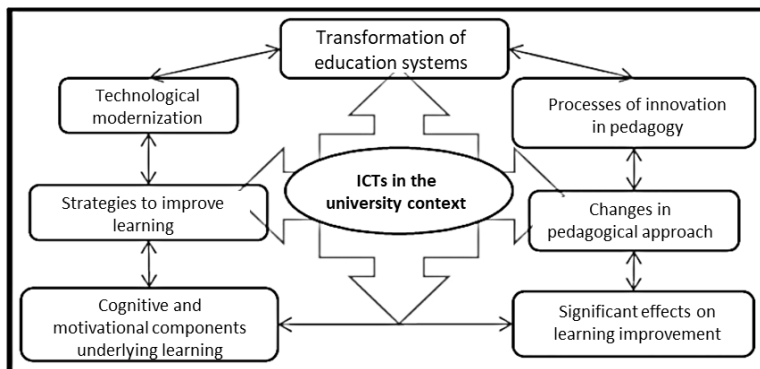
Educo (2020) states that according to the IV Study on the Use of Technology in the Classroom, technology has become fundamental in higher education, with 73% of respondents using ICTs daily in their classes. The digital whiteboard and projectors are the devices most shared by students, followed by laptops and desktop computers. However, the introduction of technology in the classroom faces significant challenges, such as the need for teacher training (44%), connectivity problems (37%) and the lack of sufficient devices for students and teachers. Despite this, only 30% of respondents received ICT training from their school, and many considered it insufficient. Even so, 54% of respondents recognize a high evaluation between the use of technology and increased motivation among students.

Therefore, this research focuses on identifying the impact that technology has had on Ecuadorian higher education, identifying the challenges and opportunities.

Technology in higher education

For Poveda & Cifuentes (2020), despite barriers such as lack of technological competence in teachers and resource limitations, technology continues to be an integral part of learning. The transformation of the educational model towards an active and participatory one implies the effective use of information and communication technologies (ICT) and telematic systems to adapt to changes in society and remote teaching. ICT in the university exerts the following transformation.

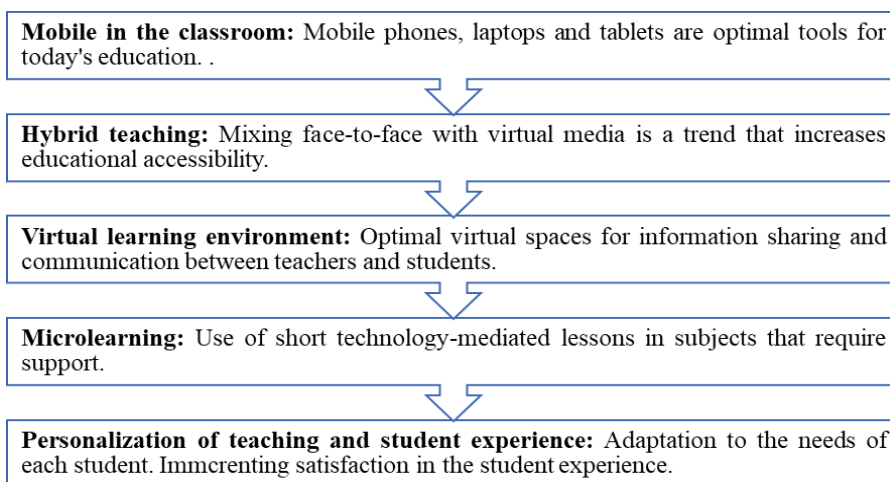
Figure 1. ICT at the university



Note: Elaboration based on Poveda & Cifuentes (2020).

Teachers play a fundamental role in the application of technology in higher education, since they are in charge of designing the teaching process and defining the methods and resources to be used in the process. The main trends for higher education according to Carvalho (2024) are:

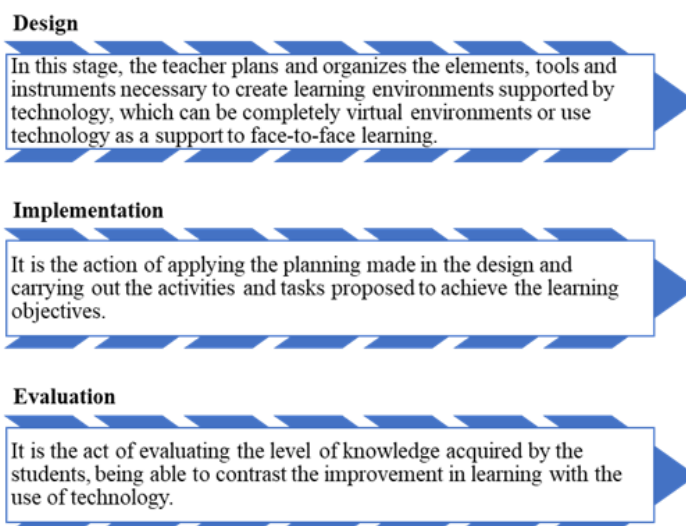
Figure 2. Technological trends in higher education



Note: Own elaboration, based on Carvalho (2024).

According to Díaz et al. (2021), technology from a pedagogical perspective consists of three phases:

Figure 3 Technology from a pedagogical perspective



Note: Own elaboration based on Díaz et al (2021).

The advantages of the use of technology in the classroom for Angulo et al., (2021) are:

- ✓ Students have the opportunity to participate, interact and learn from various platforms, which promotes active participation during classes. In addition, they have the flexibility to learn remotely and at times that suit their individual needs, being able to adapt the lessons according to their preferences.
- ✓ High-quality organizational, planning and teaching tools are available to teachers, saving them considerable time on administrative tasks and making it easier for them to review content or make progress in the academic program.
- ✓ Technology platforms provide the possibility of integrating all school personnel: students can share their concerns, teachers can manage their groups, and administrators can track the progress of the class.
- ✓ Educational technology allows school personnel to be aware of the individual needs of students and provide them with the necessary support. In addition, there are educational programs that identify the risk of dropping out of school early, which allows for interventions and support to be provided to students in a timely manner.
- ✓ In economic and environmental terms, educational technology leads to great savings, as it reduces the need for classroom materials and transportation to attend face-to-face lessons, which in turn contributes to environmental care.

According to Nivela et al. (2021), the use of technologies in higher education has made it possible for both students and educators to select tools that they consider relevant to their own teaching and learning process. These tools include, among others, blogs, e-books, digital pens, social networks, cloud storage platforms (such as Google Drive and Dropbox), video services (such as YouTube), virtual whiteboards, digital games, mobile learning (m-learning), classroom presenters, videoconferences, online teaching materials, video recordings, online collaborative spaces (wikis), the incorporation of game elements (gamification), simulators and the customized adaptation of the curriculum, with strong technological support.

Challenges and opportunities for the use of technology in Ecuadorian higher education

The generational disparity between teachers and students for Angulo et al. (2021) is manifested in the perception that young people live in a highly technological world, where the gap between both parties is increasingly evident. Teachers feel that students are immersed in a constantly evolving technological environment, while many of them lack the necessary preparation to use these new tools effectively. Our research focuses on finding alternative methodologies to bridge this gap and guide students in the effective use of technology in higher education. One option for teachers is to participate in courses that allow them to learn and apply these tools in an accessible way, so that students can take full advantage of their benefits.

The introduction of technological tools and solutions in education according to Rockcontent (2019) presents challenges that need to be addressed appropriately.

- ✓ While the benefits of the use of technology are evident, they also bring with them responsibilities that must be assumed. Adapting to change becomes a fundamental task for any educational institution.
- ✓ The teaching methodology has undergone a significant change, as students now focus on searching, analyzing and interpreting information rather than simply memorizing it.
- ✓ The integration of technology in the classroom promotes collaborative work between teachers and students.
- ✓ It is essential to provide training to educators in the use of new technologies so that they can effectively integrate them into their pedagogical practices. Teachers must keep abreast of technological advances in order to provide quality education.
- ✓ It is important to recognize that the digital age requires a paradigm shift, where students are prepared for a world dominated by technology rather than one based on industry.
- ✓ Assignment and assessment systems must be adapted to the technologies available to enable learners to meet the challenges of today's world.

For UNIR (2021), despite the notable recent advances in the integration of technology in higher education, challenges persist that require attention and overcoming:

- ✓ It is crucial to eliminate barriers in digital education related to gender, socioeconomic status and migration, in order to ensure that no one is left behind and to reach those in the most vulnerable situations.
- ✓ The ethical use of digital tools must be ensured to avoid excessive surveillance of people's digital lives, especially those of children.
- ✓ It is essential to provide technologies that are accessible and free for students and teachers, ensuring the availability of computers and other electronic devices, as well as connectivity.

- ✓ Teaching must be aligned with the pace of technological evolution, which will allow students to become familiar with tools that will be in high demand by future workers.

Although the introduction of technology in the classroom offers exciting opportunities, for Magro (2024) it is often carried out without adequate reflection and in a hasty manner, without critically evaluating its educational impacts and benefits. This impulsive incorporation has generated extreme positions, from fervent advocates to vehement detractors, which has stalled progress toward the fundamental goal: improving learning through effective integration of technology in the classroom. It is crucial to address the paradox of educational technology by questioning its suitability to align with educational purposes and values. This implies an in-depth and ongoing analysis of the relationship between pedagogy and technology. However, this interconnection is intrinsic and complex, and we must overcome the simplistic dichotomy that separates them. It is not a matter of establishing a hierarchy between the two, but of recognizing their constant mutual influence.

MATERIALS AND METHODS

The present research "Impact of Technology in Higher Education: Challenges and Opportunities" adopts a quantitative approach by analyzing numerical and statistical data to understand the impact of technology in higher education. This approach allows for an objective and rigorous assessment by quantifying the study variables. In addition, the descriptive nature of the research is evident in the detailed presentation of the results obtained, offering a broad and detailed view of how technology is being used in the university context, the challenges it faces and the opportunities it offers to improve teaching and learning processes. The study dimensions employed are derived from the variables and are detailed below:

Table 1. Study dimensions

Dimensions	Description
Access and equity	Challenges related to the digital divide and lack of access to technological resources. Opportunities to democratize education and provide access to higher education to a wider audience.
Quality and Personalization of Learning	Challenges in effectively integrating technology to improve the quality of learning. Opportunities to personalize the educational experience and tailor it to the individual needs of students.
Changing Educational Models and the Role of the Teacher	Challenges related to resistance to change and the need to update traditional educational models. Opportunities to transform the role of the teacher into a facilitator of learning and promoter of critical thinking and collaboration.

Note: Prepared by the research team.

The study sample comprised 400 people distributed in two groups of interest, 200 students and 200 teachers of the higher education system, as detailed below:

Table 2 Study sample

Category	Subcategory	Students	Teachers
Sex	Man	108	95
	Woman	92	105
Age group	From 17 to 26	103	29
	27 a 36	82	48
	37 a 46	15	62
	47 a 56	0	36
	57 a 66	0	21
	67 or more	0	4
Geographical location	Urban	86	124
	Rural	114	76

Note: Prepared by the research team.

The data collection technique was the survey. The chi-square test was used to identify trends in diagnostic responses.

RESULTS AND DISCUSSION

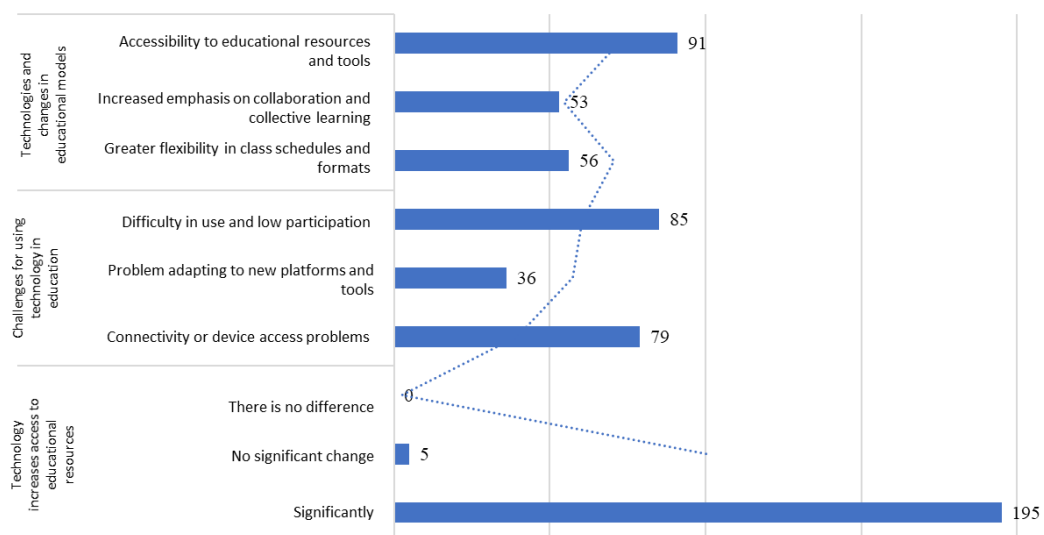
Students

The majority of students (195) recognize that technology significantly increases their access to educational resources. This suggests a positive perception towards the role of technology in expanding learning opportunities. The main challenges reported by students include problems with connectivity or access to devices (79), difficulties adapting to new platforms and tools (36), and lack of training (85). These challenges indicate that while students recognize the value of technology, they also face significant obstacles in its effective implementation.

Students show interest in the potential changes in educational models that technology can facilitate. Most value the possibility of greater flexibility in class schedules and formats (56), as well as more emphasis on collaboration and active learning (53). In addition, highlights the importance of accessibility to educational resources and tools (91). These responses suggest a desire to tailor higher education to individual student needs and preferences through the use of technology.

Students definitely recognize the value of technology in accessing educational resources and show interest in its potential to drive changes in educational models. However, they also face significant challenges, such as connectivity issues, difficulties adapting to new tools, and the need for training. This analysis highlights the importance of addressing these challenges to maximize the positive impact of technology in higher education.

Figure 4 Technology and access to educational resources, challenges and changes in educational models



Note: Prepared by the research team.

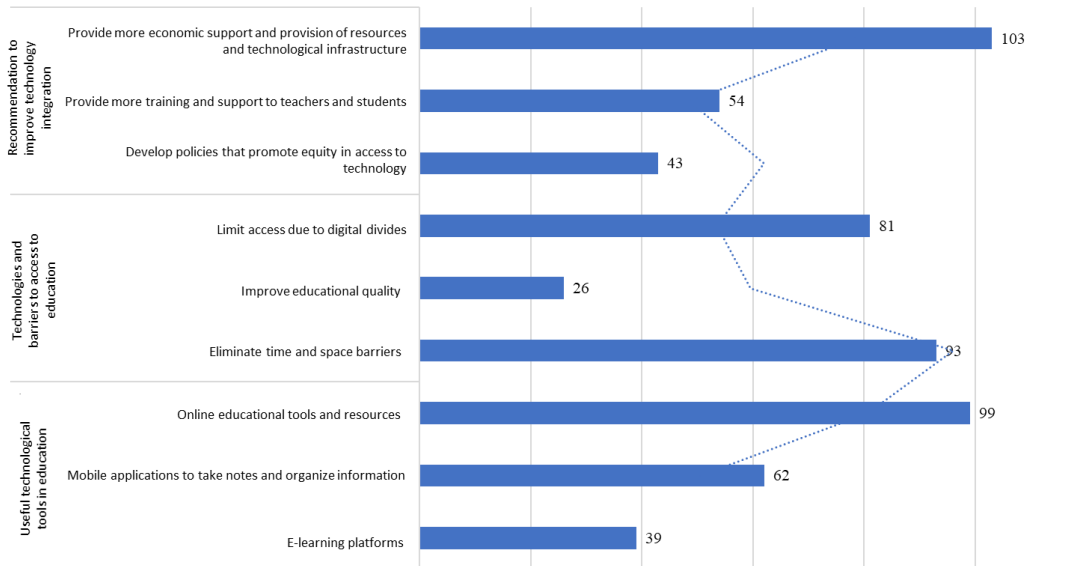
Students show a preference for online educational resources and tools (99), followed by mobile applications for taking notes and organizing information (62) and online learning platforms (39). This suggests a recognition of the usefulness of various technological tools to enhance the educational experience.

The majority of students (93) perceive that technology eliminates barriers of time and space in higher education, indicating an appreciation for the flexibility that technology offers in terms of access to learning. However, they also recognize that technology can limit access due to digital divides (81). This highlights the importance of addressing these inequalities to ensure equitable access to higher education in Ecuador.

Students suggest providing more financial support and resources and technological infrastructure (103), followed by providing more training and support to teachers and students (54) and developing policies that promote equity in access to technology (43). These recommendations reflect the need to invest in resources and training to facilitate the effective integration of technology in education.

Students value online technology tools and recognize both the benefits and challenges associated with technology in Ecuadorian higher education. In addition, they offer practical recommendations to improve technology integration, highlighting the importance of addressing access barriers and providing adequate support to professors and students.

Figure 5. Educational technology tools, access barriers, student recommendations for technology integration.



Note: Prepared by the research team.

Teachers

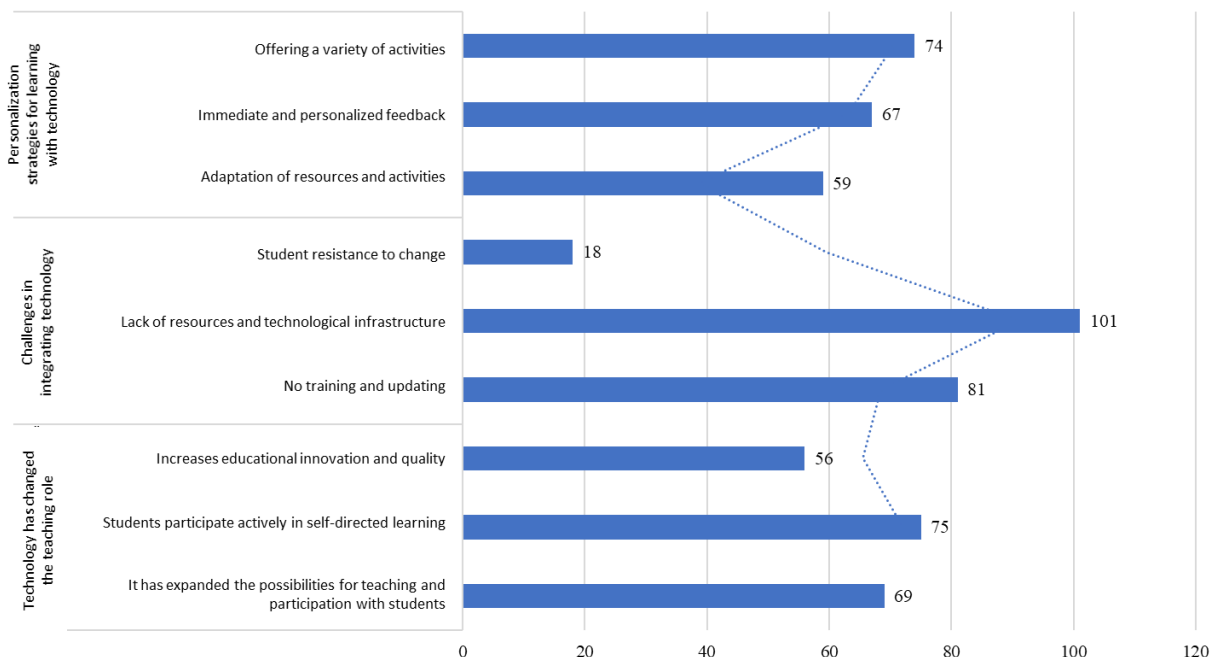
The majority of teachers (69) perceive that technology has expanded the possibilities for teaching and communicating with students. This indicates an appreciation for the transformative role of technology in the way teachers interact with their students.

The main challenges reported by teachers include lack of training and updating (81) and lack of resources and technological infrastructure (101). These challenges reflect the need for adequate support and sufficient resources to facilitate effective integration of technology in teaching.

Teachers show interest in strategies for personalizing learning with technology, such as adapting resources and activities (59), providing immediate and personalized feedback (67), and offering a variety of activities (74). These strategies suggest a learner-centered approach and tailoring learning to individual needs.

In general, it can be said that teachers recognize the positive impact of technology on teaching, but they also face significant challenges, especially in terms of training and access to technological resources. In addition, they show interest in learning personalization strategies that take advantage of technology to improve the educational experience of students.

Figure 6. Technology and the changing role of teachers, challenges and strategies for personalization of learning.



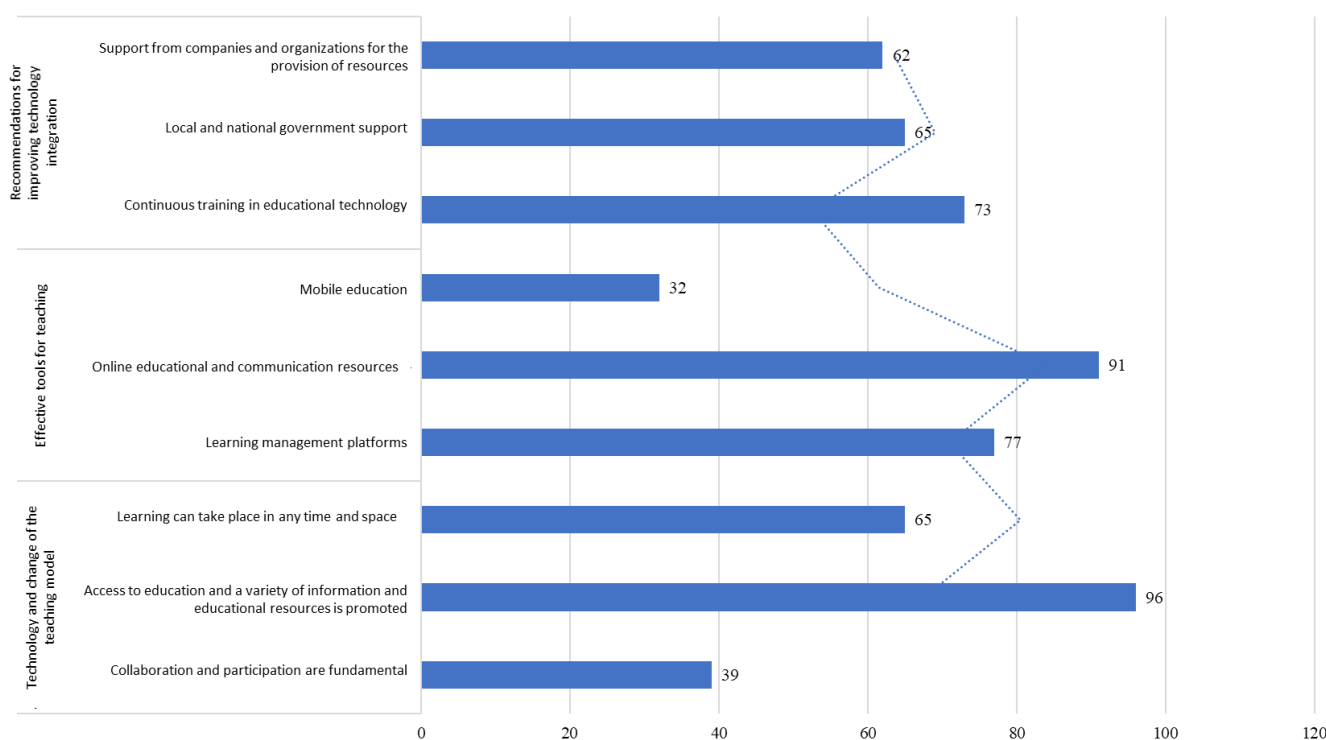
Note: Prepared by the research team.

Teachers recognize that collaboration and participation are fundamental pieces (39) in the change of the teaching model facilitated by technology. This suggests an appreciation of the importance of interaction and collaborative work in the educational process. In addition, they perceive that technology promotes access to a variety of information and educational resources (96), as well as flexibility for learning to take place anytime, anywhere (65). This reflects a recognition of the benefits of technology to broaden and enrich access to knowledge.

Teachers identify learning management platforms (77) and online educational and communication resources (91) as effective tools for their work. This suggests a preference for tools that facilitate organization and communication in the digital educational environment. However, they also show interest in mobile education (32), indicating an openness to the integration of mobile devices in the educational process.

Teachers highlight the importance of ongoing training in educational technology (73) as a recommendation for improving technology integration in teaching. This underscores the need for support and professional development for teachers in the effective use of technology. They also value the support of local and national governments (65) and the support of companies and agencies for the provision of technological resources (62), suggesting the importance of having adequate policies and resources to facilitate technological integration in education.

Figure 7 Technology and change in the teaching model, effective tools in the teaching profession and recommendations for technology integration.



Note: Prepared by the research team.

In summary, the impact, challenges and opportunities of technology in Ecuadorian higher education are detailed below:

Table 3 Summary of impacts, challenges and opportunities identified

Group	Impact	Challenges	Opportunities
Students	Technology increases access to educational resources, which allows for greater availability of study materials and online educational resources.	Problems with connectivity or access to technological devices may hinder active participation in online educational activities.	Technology eliminates barriers of time and space, facilitating access to education at any time and place. It also offers opportunities to improve educational quality through access to interactive and personalized resources, although it should be noted that it can limit access due to digital divides among students.
Teachers	Technology has expanded the possibilities of teaching and communicating with students, allowing the implementation of more innovative and dynamic teaching methods.	Teachers may face challenges related to lack of training and updating in the effective use of educational technology. In addition, the lack of resources and adequate technological infrastructure can hinder the implementation of technology-based educational practices.	Teachers can take advantage of technology to promote more active and participatory learning, where students are more deeply involved in their own learning process. This can lead to greater autonomy and motivation in students, thus contributing to more effective learning.

Note: Prepared by the research team.

Chi-square analysis

The Chi-square test was applied and the following results were obtained:

For students, the chi-square value is 1.000 for the dimension "Access and equity", 0.597 for "Quality and personalization of learning", and 0.846 for "Change in educational models / Role of the teacher". These values indicate that the responses to question 1 do not vary significantly according to the dimension considered.

For teachers, the chi-square values are 0.881 for "Access and equity", 1.000 for "Quality and personalization of learning", and 1.000 for "Change in educational models / Role of the teacher". It also suggests that the responses to question 1 do not vary significantly according to the dimension considered.

For the two groups the chi-square values suggest that there is no significant association between question 2 and any of the dimensions, indicating that responses to question 2 also do not vary significantly according to the dimension considered.

The chi-square results indicate that there are no significant differences in the responses of students and teachers in relation to the different dimensions considered in the analysis. This suggests that the opinions and perceptions on the different dimensions of the impact of technology in Ecuadorian higher education are not influenced by the type of question asked, whether on access and equity, quality and personalization of learning, or change in educational models and the role of the teacher.

The results support the consistency in the responses of both students and teachers, regardless of the dimension considered. This can be interpreted as a sign that the opinions and perceptions on the impact of technology in higher education are uniform in both groups, suggesting a convergence in the understanding and valuation of the aspects evaluated.

Table 4 Chi-square testing

Dimensions			Access and equity	Quality and personalization of learning	Change in educational models / Role of the teacher	
Student	Question 1	C1	195	56	93	
		C2	5	53	26	
		C3	0	91	81	
	Question 2	C1	79	39	43	
		C2	36	62	54	
		C3	85	99	103	
	Teacher	Question 1	C1	69	59	77
			C2	75	67	91
			C3	56	74	32
Question 2		C1	81	39	73	
		C2	101	96	65	
		C3	18	65	62	
Chi-Square Student			1.000	0.5971	0.8465	
Chi Square Teaching			0.8818	1.000	1.000	

Note: Prepared by the research team.

The integration of technology in higher education in Ecuador presents a series of impacts, challenges and opportunities that influence the experience of both students and teachers. First, the positive impact that technology has on access to educational resources stands out. Most students recognize that technology provides them with the possibility of accessing a wide variety of study materials and educational resources online, which significantly expands their learning

opportunities. Similarly, teachers perceive that technology has transformed teaching and communication with students, allowing the implementation of more innovative and dynamic teaching methods.

However, this positive impact is offset by a number of challenges. Both students and teachers face significant obstacles in the effective implementation of technology in higher education in Ecuador. Among the most prominent challenges are the lack of training and updating in the use of educational technology, as well as the lack of resources and adequate technological infrastructure. In addition, problems such as poor connectivity and resistance to change also hinder the successful integration of technology in the educational environment.

Despite these challenges, both students and teachers identify numerous opportunities associated with the use of technology in education. On the one hand, technology allows the elimination of barriers of time and space, which facilitates access to learning at any time and place. In addition, it offers the possibility of customizing the learning process to suit the individual needs of each student, promoting a more learner-centered and participatory approach.

The recommendations provided by students and faculty reflect the need to address these challenges and take full advantage of the opportunities offered by technology in higher education in Ecuador. These recommendations include providing more financial support and training, developing policies that promote equity in access to technology, and encouraging government and corporate support in the provision of technological resources. In summary, the analysis highlights the importance of a comprehensive strategy to maximize the positive impact of technology in higher education, while overcoming existing challenges and capitalizing on opportunities for more accessible, personalized and collaborative learning.

The integration of technology in higher education in Ecuador represents a complex process involving various actors and aspects. While recognizing the transformative potential of technology to improve access, quality and personalization of learning, it is crucial to address the challenges identified to ensure that these benefits are fully realized. This requires a comprehensive approach that includes training and ongoing support for both students and teachers, as well as investments in technology infrastructure and policies that promote equity in access to technology. At the same time, it is critical to continue to explore and leverage the opportunities offered by technology to enrich the educational experience, fostering a collaborative, flexible and student-centered learning environment that prepares future professionals for the challenges of a digitized world.

Ultimately, the successful implementation of technology in higher education in Ecuador will depend not only on the availability of technological resources, but also on the willingness and commitment of all stakeholders. By working together to overcome obstacles and take full advantage of the opportunities offered by technology, Ecuador can move towards an education system that is more inclusive, innovative and prepared to face the challenges of the 21st century. This process will not only benefit students and teachers today, but will also lay the foundation for a more promising and equitable educational future for generations to come.

FINAL REMARKS

The integration of technology in Ecuadorian higher education represents a promising opportunity to transform the educational experience, offering students broader access to educational resources and the ability to engage in more interactive and personalized learning. This can help improve the quality of education and prepare students to face the challenges of a digitized and constantly evolving society.

However, to take full advantage of these benefits, it is critical to address identified challenges, such as lack of training and resistance to change among teachers, as well as technology gaps that limit equitable access to technology among students. These barriers can hinder the effective implementation of technology in the classroom and undermine its potential benefits, highlighting the need for investments in professional development, technology infrastructure, and inclusive education policies.

In this regard, close collaboration is required between different educational stakeholders, including governments, educational institutions, teachers, students and the technology industry. By working together, these actors can develop comprehensive strategies that promote the effective integration of technology in Ecuadorian higher education, ensuring that all students have access to quality educational opportunities and are prepared to succeed in an increasingly digital world.

Study limitations and future research

This study's theoretical limitations include a potential oversight of the relevant socio-cultural and economic factors that affect technology adoption and its impact on higher education. Methodologically, the study's reliance on quantitative and descriptive approaches restricts a deeper understanding of the subjective experiences of teachers and students. Future research should consider incorporating qualitative methods to explore individual experiences and perspectives more

systematically, expanding the sample to include diverse geographic regions for broader applicability, and conducting longitudinal studies to evaluate the long-term effects of technological integration in education. Additionally, examining the role of governmental policies and targeted training programs could provide more comprehensive insights into overcoming the challenges identified.

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B. data research and statistical analysis:	25%	25%	25%	25%
C. elaboration of figures and tables:	25%	25%	25%	25%
D. drafting, reviewing and writing of the text:	25%	25%	25%	25%
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