Challenges for university teachers in the digital age

Desafíos y retos del docente universitario en la era digital

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ABSTRACT

In Latin America, the incorporation of information and communication technologies (ICTs) in higher education is uneven. Although more than 50% of teachers use these technologies in their personal lives, only 20% integrate them effectively in their educational practices. The objective was to analyze the knowledge of technological tools among teachers to demonstrate the need to strengthen teacher training in digital competencies, as well as to promote the use of innovative methodologies adapted to increasingly connected students. The methodology was quantitative, descriptive and cross-sectional. A convenience sampling was carried out in the teacher training school in Santiago de Huata, La Paz-Bolivia in the 2023 management of a total of 20 academics. The results reveal that although there are significant obstacles, such as the digital gap and the lack of technological infrastructure in rural areas, moving towards a more equitable digital education is essential. It is concluded that this transformation will not only contribute to improving the quality of education, but will also promote the development of skills in line with the current demands of the labor market, favoring the growth of productive sectors linked to digitalization. It is important to support policies that promote a more inclusive and technological higher education.

Keywords: Higher Education; Tics; Information Technologies; Digital Era; University; Bolivia

RESUMEN

En América Latina, la incorporación de las tecnologías de la información y la comunicación (TIC) en la educación superior muestra una realidad desigual. Aunque más del 50% de los docentes usan estas tecnologías en su vida personal, solo un 20% las integra de manera efectiva en sus prácticas educativas. El objetivo fue analizar el conocimiento de herramientas tecnológicas entre los docentes para evidenciar la necesidad de fortalecer la formación docente en competencias digitales, así como fomentar el uso de metodologías innovadoras adaptadas a estudiantes cada vez más conectados. La metodología fue cuantitativa, tipo descriptivo de corte transversal. Se realizó un muestreo por conveniencia en la escuela de formación de Maestros de Santiago de Huata, La Paz-Bolivia en la gestión 2023 de un total de 20 académicos. Los resultados develan que si bien existen obstáculos significativos, como la brecha digital y la falta de infraestructura tecnológica en zonas rurales, avanzar hacia una educación digital más equitativa es esencial. Se concluye que esta transformación no solo contribuirá a mejorar la calidad educativa, sino que también impulsará el desarrollo de habilidades acordes con las demandas actuales del mercado laboral, favoreciendo el crecimiento de sectores productivos vinculados con la digitalización. Es clave, por tanto, apoyar políticas que promuevan una educación superior más inclusiva y tecnológica.

Palabras clave: Educación Superior; Tics; Tecnologias de la información; Era digital; Universidad; Bolivia.

INTRODUCTION

In the 21st century, thanks to the digital revolution, society has witnessed a profound change in how we access and interact with information, beyond the global health emergency caused by COVID-19. In this context, education was one of the most affected sectors, and higher education was no exception. University professors worldwide, including Europe, Latin America, and Bolivia, face various challenges in this digital modernity that require continuous adaptation of all kinds to provide quality education that meets the evolving needs of students and society in general.

Autonomous learning depends on teachers and students. To achieve this, freedom must be provided in decision-making, in their way of learning, in their independence when developing activities, and in their goals; additionally, platforms for work should be provided, good communication between teachers and students must be maintained, both in individual and collaborative work of students. It is also important to have autonomous teachers, flipped classrooms, virtual learning environments, and teacher support during the transition from dependence on teachers to self-reliance for students. All these factors enable students' autonomous learning (Caballero-Cantu et al., 2023, p. 15).

In this sense, Europe is considered the cradle of great academic institutions and the benchmark of higher education worldwide.

Teachers find themselves at a critical point where they need to successfully incorporate new technologies into the classroom and learning platforms. The use of digital resources and interaction with students from different countries and cultures are just some of the aspects shaping this new educational landscape in their practice. The challenge for European educators is to find a balance between traditional pedagogical practices and the use of technical tools to enrich teaching and learning, promote creativity, critical thinking, and collaboration among students through dynamic and innovative strategies.

Research by Posso, Cóndor, Mora, and Segundo (2023) shows that methodological strategies and practices must be implemented starting from university education, where teachers must assume different roles for application. These include mastery of active methodologies, dedication to planning, creativity and initiative in designing questions and ideal challenges, and the capacity to establish and align methodology with topics chosen according to their importance and relevance to professional practice. Additionally, a student-centered approach should facilitate learning development through research structures and alternative solutions.

In this context, Bolivian teachers play a key role as agents of change due to their social responsibility. Educational authorities must work with the government to improve

equipment in educational institutions, thus promoting the effective integration of technology into the classroom and designing curricula suited to their social environment and societal demands. This requires training in digital skills and teacher development to prepare educators to use technological tools effectively and to design innovative pedagogical strategies that motivate and engage students in their learning.

The review by Mollo-Torrico, Lázaro, and Crespo (2023) shows that training processes in the use and implementation of information and communication technologies in teachers and students are part of the teaching and learning process. Furthermore, the key aspect is the implementation of virtual tools and proper digital competencies training for their use in the virtual classroom. The demand for updated teachers with the necessary skills and knowledge to ensure their proper performance, along with the commitment required to educate future generations, is especially relevant in higher education.

Students, in one way or another, are developing autonomy in their learning processes. They employ strategies and learning styles that favor the achievement of meaningful learning, as they are not limited to consuming information circulating in digital learning environments. Instead, they process information, construct knowledge, and apply it according to their contexts and needs (Limachi, 2023, p. 81).

Higher education teachers focus on a partial, merely instrumental digital vision centered on the teaching role. Due to this situation, it is necessary to continue studying transversal integration, also focusing on developing students' digital competencies and expanding teaching actions beyond the classroom. All of this should be situated within a context characterized by information processing, knowledge generation, and questioning traditional pedagogical and institutional structures established in the university environment (Mon, et al., 2022, p. 142).

Four approaches are particularly relevant: the impact of changes in political economy, the challenges of international student and academic exchange, implicit biases in the dominant academic culture, and organizational reform processes. Despite their differences, these approaches share two fundamental ideas: first, that academic culture can be socially empowering or restrictive depending on whether its members share its premises; and second, that it has a systemic nature that exceeds its interpretation by one or more groups within universities (Pedraja-Rejas et al., 2022).

METHOD

This is a quantitative, descriptive, cross-sectional study aimed at evaluating the magnitude of a specific problem at a given moment. Initially, a convenience sampling was conducted at the Santiago de Huata Teacher Training School in La Paz, Bolivia, during

2023. Out of a total of 20 academics belonging to this institution, 16 participated in the study sample. For data collection, a Google Forms questionnaire was used, distributed via WhatsApp to gather the information. The instrument used to measure the use and appropriation of ICTs was developed by Taquez et al. (2017), focusing on educational institutions.

The sample consisted of 17 teachers from the Santiago de Huata higher school, located in the department of La Paz, Bolivia. Of these teachers, 37% are women (6), and 62.5% are men (10), ranging in age from 22 to 57 years. Regarding their distribution by educational level, 56.3% teach secondary education, 25% primary education, and 18.8% are professionals who teach in other areas. The departments with the highest frequency are La Paz (34.6%) and the lowest participation is from Oruro (3.3%). Lastly, 50% work in a public secondary school, 18.8% in public primary schools, 12.5% in alternative education, 12.5% in other institutions, and 6.3% in private primary schools. Finally, 62.2% work in rural areas, and 37.5% work in urban areas.

RESULTS

The findings regarding teachers' knowledge of technological tools reveal varying levels of awareness and use. Regarding email, it was found that 56.3% use it for their teaching work, while 43.8% use it for personal use. Regarding learning

management platforms, such as Moodle, Blackboard, Sakai, and Google Classroom, 56.3% of teachers use them in their teaching practice, 25% use them for personal purposes, and 18% are aware of them but do not use them. On the other hand, WhatsApp shows a preference for personal use at 50%, although 43% also use it in education, and 6.3% are aware of the tools but do not use them.

In the case of video conferencing via Skype, Hangouts, Zoom, and Google Meet, 43% of respondents use them for personal purposes, 31.3% integrate them into their teaching work and 25% are aware of these tools but choose not to use them.

Finally, regarding social media platforms such as Facebook, Twitter, Google, TikTok, and Instagram, 50% of teachers use them for personal purposes, while 25% use them for teaching purposes and another 25% are familiar with these platforms but choose not to use them.

These findings show diversity in the use and adoption of digital technologies among teachers, reflecting both their integration into educational practice and personal lives.

In Table 1 we present different tools that are used in teaching work, and in personal use.

**Table 1.** *Use of ICTs in teaching and personal use*

Tools	Use in teaching work	Personal use %	Knows, but does not use	He doesn't know, but he doesn't use it either.
Google, Yahoo, Academic Databases.				
Photoshop, Canva, Gimp...				
Audacity, Wavepad				
Prezi, Office Mix, Powtoon, Genially.				
Moodle, Blackboard, Sakai, Google Classroom...)				
Google Sites, Wix, Wordpress, Blogger, Joomla...				
(Mendeley, Endnote, Zotero.				
Camtasia, Screencastomatic...)				
Google Keep, Onenote, Evernote				
youtube, TED, Vimeo, Soundcloud				
Google Forms, Surveymonkey, PollDaddy...				

Regarding the use of ICTs in the classroom, the main reasons for adoption include, first and foremost, recommendations from friends or colleagues, representing 37.5%. Another significant reason, at 37.5%, is reviewing studies or experiences presented in other academic contexts. Furthermore, 12.5% are due to recommendations from the students themselves, and the remaining 12.5% are based on the teacher's own experience and knowledge.

Figure 1. *Use of ICTs*
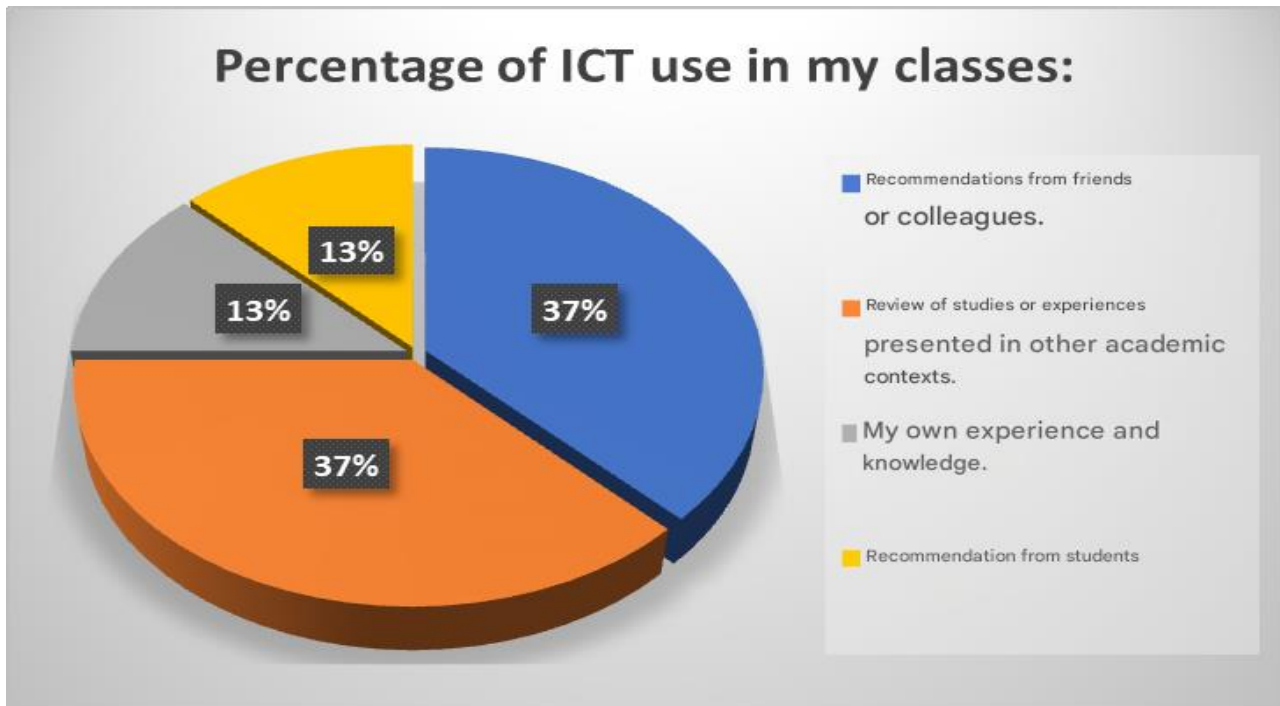
The data show that teachers use ICTs primarily to search for information or resources for their classes (31.3%), to make their classes more engaging, and to expand the possibilities of the classroom (25%). 21.5% use them to share and organize large amounts of information, and another 12.5% use them to facilitate communication with their students.

Figure 2. *Use of ICT in teaching activities*
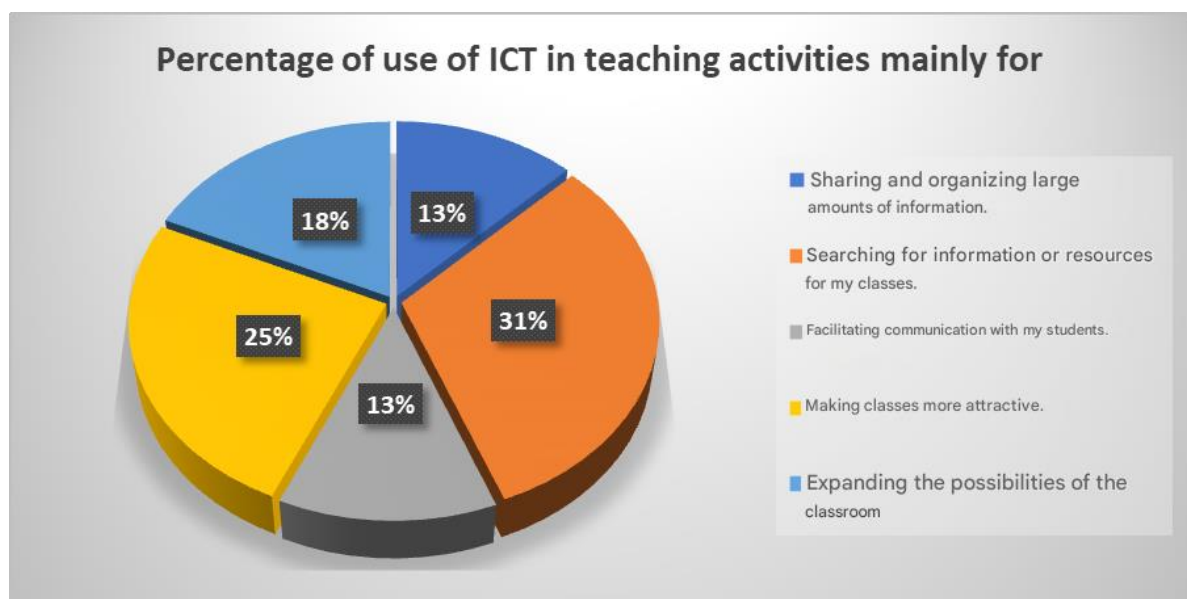
Areas in the classroom

When planning lessons, teachers search for information on how the use of ICTs can improve them, doing so occasionally 43.8% of the time, always 18.8%, and almost always 37.5%. The results show that learning objectives and students' needs and expectations are identified to decide which ICTs are the most appropriate for use in class. This assessment is done occasionally 43.8% of the time, always 12.5%, almost always 37.5%, and rarely 6.3%.

When necessary, ICTs resources are adapted to achieve class objectives and meet students' needs and expectations, with 50% making this adjustment occasionally, 6.3% always, and 43.8% almost always. Before using any ICTs resource in the classroom, research and testing are carried out to ensure its usefulness, with 31.3% doing so occasionally, 12.5% always, 50% almost always, and 6.3% rarely.

ICTs are used in various learning process activities in the courses, with 43.8% using them occasionally, 31.3% almost always, 18.8% always, and 6.3% rarely. Regarding assessment process activities, ICTs are used occasionally by 31.3%, almost always by 50%, always by 12.5%, and rarely by 6.3%.

ICTs are used to provide advice and resolve situations outside of class, with 37.5% using them occasionally, 50% almost always, 6.3% always, and 6.3% rarely. To help teach how to cite sources and prevent plagiarism, ICTs are used occasionally by 25%, 56.3%

almost always, 6.3% always, 6.3% rarely, and 6.3% never. ICTs are also used in the design of strategies that promote active learning and the comprehensive development of students, with 37.5% using them occasionally, 50% almost always, 6.3% always, and 6.3% rarely.

Student suggestions regarding the use of ICTs in classes are taken into account, with 56.3% considering it occasionally and 25% almost always, along with the remaining 18.8% unspecified.

When proposing activities involving ICTs, the possibility of equitable access for students to the selected technological resources is valued, with 31.3% doing this occasionally, 50% almost always, 12.5% always, and 6.3% rarely. Students' aptitudes, attitudes, and cultural capital are assessed before implementing activities involving the use of ICTs, with 43.8% doing this occasionally, another 43.8% almost always, and 12.5% always.

When carrying out ICT-mediated activities, reflections are included to promote respectful use and avoid harmful behaviors, such as cyberbullying, with 31.3% doing so occasionally, 56.3% almost always, 6.3% always, and 6.3% rarely. Reflections are made on the benefits and/or difficulties of using ICTs in students' learning processes, with 43.6% doing so occasionally, 25% almost always, and 31.3% always.

DISCUSSION

One of the aspects to consider in this work is that more than 50% of teachers primarily use ICTs in their personal lives. Specifically, email usage is 56.3% in the personal sphere, unlike in the professional context. Regarding the use of platforms for videoconferencing, only 40% utilize Blackboard, Google Meet, or Zoom. Based on the findings, one of the key tasks is to promote ongoing professional development for teachers in the use of digital tools and the implementation of innovative methods that respond to the demands of a highly connected generation of students in this digital world.

To achieve this, many universities are offering training programs in various formats. Additionally, a pilot study conducted with teaching professionals in Bolivia indicates that knowledge of technological tools, such as email, is limited—36.7% in personal use and 50% in teaching activities. It's important to note that WhatsApp is mostly used for personal purposes (53.3%) and for educational purposes (Mollo-Torrico et al., 2022). Meanwhile, the study by Cevallos et al. (2019) on the use of technological tools in the classroom to motivate ninth-grade students in Ecuadorian schools shows that 96% of teachers consider ICTs use necessary, although only 31% use these tools frequently. This underscores the importance of recognizing the significance of ICTs usage and its practical application.

The integration of ICTs in higher education allows both teachers and students to acquire new skills, competencies, and knowledge—especially those aligned with the digital realm—beyond just innovation. This responds to societal demands and contributes to the growth of the sector oriented toward digitalization. Understanding and incorporating ICTs into the teaching-learning process as a foundation for innovation broadens the opportunities to utilize new resources, media, and methods, replacing traditional elements with alternatives that foster participation, feedback, and effective student engagement (Lozano and González, 2024).

The educational transformation caused by COVID-19 has led university professors to incorporate technology in the classroom ranging from 75% to 100%, dedicating between 76% and 100% of their time to using technology (Cervantes, 2024). A study conducted by González-Sanmamed et al. (2020) in Spain highlights that the digital resources most frequently used by teachers for professional development include email, office tools, email managers, agendas, virtual classrooms, cloud storage, digital calendars, and video tutorials. These tools are accessible and practical for promoting ongoing updating and improvement in higher education.

In Latin America, the cultural, social, and socioeconomic diversity causes significant variation in access to technology from one country or community to another. A major challenge in higher education is reducing the digital gap and ensuring all students participate

interactively and methodologically in the digital environment. This requires educational strategies adapted to local realities that utilize technology to overcome geographical and social barriers, providing equal learning opportunities.

In Bolivia, one of the main obstacles to integrating technology into education is the lack of infrastructure and equipment in much of the country. While large cities and urban centers are relatively well connected, rural areas face difficulties accessing the Internet and have limited or no technical resources. This digital gap has hindered the implementation of online learning platforms and the distribution of digital materials. To overcome these limitations, it is important for the government and educational institutions to invest in improving technical infrastructure across all regions, ensuring equitable access to digital educational opportunities.

Another important aspect is digital inclusion in marginalized communities. Bolivia faces socioeconomic and geographical challenges affecting certain population groups, such as indigenous communities and isolated rural areas. For digital education to be truly inclusive, strategies must be developed to address these disparities and guarantee that all students, regardless of their geographical location or socioeconomic status, have access to online learning opportunities and technological resources.

According to Romero Carbonell, Romeu Fontanillas, Guitert Catasús, and Baztán

Gutiérrez (2023), research on the different typologies of teaching-learning methodologies (T-L) has revealed a wide variety of didactic strategies. Active and collaborative strategies such as group work, problem-based learning, debates, or simulations are among the most commonly used, although more traditional strategies like exams, exercises, individual study, or lectures are also employed. To ensure quality and relevance in higher education, it is essential to update theories and procedures to shift from a transmission-based learning paradigm to a "learning by doing" approach, where students are the creators of their own knowledge through collective interaction with others (Pérez López, 2023).

For instance, the HyFlex model has proven to be viable, useful, and successful in the digital transformation of face-to-face courses. The potential to extrapolate the results of this project is immense, as it could be useful for any courses offered in person that aim to evolve towards a hybrid format. Didactic contributions include methodological strategies based on an active project-based learning process, as opposed to a lecture-based strategy of receiving topics or units. Additionally, technical contributions involve the creation of multimedia and iconic interfaces in virtual classrooms (Área Moreira, Bethencourt Aguilar, and Martín Gómez, 2023).

Study limitations

This work presents several limitations that should be considered when interpreting its findings. First, it is a pilot study, meaning the

conclusions are preliminary and not necessarily generalizable to a larger population. The results may not be representative of the entire student body or academic staff. Therefore, this work serves as a starting point for a deeper analysis of this phenomenon.

Likewise, the implementation of ICTs can vary significantly between different institutions, departments, and teachers. Standardizing tools and methodologies in future studies is necessary to obtain more consistent results. Currently, research is ongoing regarding the long-term effects of ICT use in higher education, considering both academic performance and psychological effects on students and teachers.

CONCLUSIONS

The challenges of higher education in Latin America are vast and complex, especially when it comes to meeting the diverse needs of students. University students vary in age and personal backgrounds, each representing a unique world of experiences and expectations. In Bolivian society, the introduction of technologies in education has been rapid and often disruptive, leaving significant gaps in the adoption and effective use of these tools in the classroom. Traditional lectures still predominate, highlighting the need for a deeper and more adaptive educational transformation.

One of the main challenges for teachers is to continue their professional development—

not only to acquire additional degrees but also to effectively apply the knowledge gained for the benefit of students. It is useful that teachers do not merely repeat information without considering current learning dynamics and students' specific needs. Additionally, teachers must serve as facilitators, adapting their teaching methods to classroom realities and using ICTs effectively to enhance the educational process. A common flaw among teachers is over-reliance on projectors as the primary teaching support, without integrating ICT tools effectively into the teaching-learning process. Technology should be a tool that facilitates interaction and active learning, not just a means to passively present information.

Another significant challenge is teachers' ability to motivate students to continue discussions on specific topics outside the classroom. This promotes continuous and meaningful learning, fostering not only knowledge acquisition but also the development of critical and analytical skills. It is essential for teachers to motivate students to explore and discuss topics beyond the formal learning environment, even utilizing digital tools for their roles and activities.

To address these challenges, teachers must adopt a flexible and adaptive approach, using ICTs in innovative and effective ways to meet the demands of a highly connected generation of students. Investment in continuous training and the development of educational strategies that adapt to local and global realities are essential to close the digital gap and ensure

inclusive, quality education.

Finally, it is important to explore how the use of ICTs affects students' and teachers' motivation, stress levels, and overall well-being. Research should focus on how ICTs can help reduce equity gaps in higher education, ensuring all students have equal access to these technologies. Additionally, evaluating the effectiveness of ICTs training programs for academic staff and their impact on teaching quality is essential. Investigating how ICTs can facilitate interdisciplinary approaches in higher education, promoting collaboration across different fields of study, is also relevant.

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