Electronic teaching: Cutting-edge devices that revolutionize pedagogy

Enseñanza electrónica: Dispositivos de vanguardia que revolucionan la pedagogía

MEJÍA-SALAZAR, Gilberto†, CARRILLO-BELTRÁN, Julio César Cuauhtémoc*, LLANOS-RAMÍREZ, María del Carmen and RAMÍREZ-JIMÉNEZ, Armando

Universidad Autónoma de Nayarit, Unidad Académica de Contaduría y Administración

ID 1st Author: *Gilberto, Mejía-Salazar* / **ORC ID**: 0000-0002-1879-1299, **Researcher ID Thomson**: S-1140-2019, **CVU CONAHCYT ID**: 871489

ID 1st Co-author: *Julio César, Carrillo-Beltrán* / **ORC ID**: 0000-0002-7932-8273, **CVU CONAHCYT ID**: 1298974

ID 2nd Co-author: *María del Carmen, Llanos-Ramírez* / **ORC ID**: 0000-0003-0885-2817, **Researcher ID Thomson**: IUO-4762-2023

ID 3rd Co-author: *Armando, Ramírez-Jiménez* / **ORC ID**: 0000-0001-9903-3846, **Researcher ID Thomson**: U-2935-2018, **arXiv Author ID**: armandor7

Abstract

This work was carried out with a transversal quantitative descriptive approach, the objective being to know the effective integration of technological tools in the educational process in the dynamics of teaching and learning. In this way, build a more dynamic educational environment that allows educators and students to make the most of digital technologies and improve the quality and accessibility of the learning process. It was found that the majority of the students surveyed (99%) make frequent use of technological tools, such as the computer, Internet, computer programs, email, social networks, etc., as well as the services offered by the Internet, 43% are Chat sites, followed by web page services (42%). This technological innovation includes tools that allow students and teachers to improve their school activities. It is emphasized that this innovative inclusion is being consciously accepted by the vast majority of students, who consider it as a productive support within academic activities. In conclusion, technological innovation emerges in an insightful way, revolutionizing and projecting higher education in a positive way, having an impact on academic societies, and innovative inclusion allowing students and teachers alike to accept these tools as support in activities linked to school.

Learning, Teaching, Educational innovation, ICT

Resumen

Este trabajo se realizó con un enfoque descriptivo cuantitativo de tipo transversal, el objetivo conocer la integración efectiva de herramientas tecnológicas en el proceso educativo en las dinámicas de enseñanza y aprendizaje. De esta manera, construir un entorno educativo más dinámico que permita a los educadores y estudiantes aprovechar al máximo las tecnologías digitales y mejorar la calidad y accesibilidad del proceso de aprendizaje. Se encontró que la mayoría de los estudiantes encuestados (99%), hacen uso frecuente de las herramientas tecnológicas, tales como, la computadora, internet, programas informáticos, email, redes sociales, etc., asimismo, de los servicios que ofrece Internet, el 43% son los sitios de Chats, seguido de los servicios de páginas web (42%). Esta innovación tecnológica incluye herramientas que permiten a estudiantes y profesores mejorar sus actividades escolares. Se enfatiza que esta inclusión innovadora está siendo aceptada conscientemente por la gran mayoría de los estudiantes, quienes la consideran como un apoyo productivo dentro de las actividades académicas. En conclusión, la innovación tecnológica surge de manera perspicaz revolucionando y proyectando la educación superior de manera positiva, teniendo un impacto en las sociedades académicas, y una inclusión innovadora permitiendo a estudiantes y profesores por igual aceptar estas herramientas como apoyo en las actividades vinculadas con la escuela.

Aprendizaje, Enseñanza, Innovación educativa, TIC

* Correspondence to Author (e-mail: doctorjuliocesarcarrillobeltran@uan.edu.mx)
† Researcher contributing first author.

Introduction

Today, technological tools have emerged as major players in the educational revolution, significantly transforming the traditional academic landscape. By enabling active participation, facilitating personalised learning and offering enriching educational experiences, these tools have transcended the conventional boundaries of teaching. This radical change has not only redesigned the way we access knowledge, but has also redefined the very nature of education.

Collaboration, in turn, goes beyond physical and temporal boundaries, connecting students and educators in a virtual space that transcends the traditional limitations of the classroom. In this new educational era, the impact of technological tools is not only limited to the acquisition of knowledge, but extends to the formation of critical skills and the development of fundamental attitudes. Thus, education is transformed into an experience beyond the memorisation of facts, becoming a dynamic process that nurtures curiosity, creativity and critical thinking.

That is, generating new knowledge tools for various fields of society, called education, business, the use of these technological tools in the educational process has aroused much interest in the educational community because it can bring good results among teachers and students (Sanchez at al., 2022). Therefore, critical thinking, which is fundamental for intellectual development, will be strengthened as students use technology to analyse, evaluate and synthesise information more actively. Teachers, for their part, will have the opportunity to design educational experiences that encourage reflection and critical thinking, taking advantage of the interactive and multimedia capabilities offered by technology (Vargas-Murillo, 2020).

Technology-based learning

Digital technology is the factor that has the greatest impact on today's education system due to the effectiveness, efficiency and attractiveness of digital technology-based learning. Future needs are not only competitive, but also closely related to various developments in technology and information.

The quality of the developed learning system should enable rapid improvement of existing weaknesses (Naibaho, 2022). Therefore, learning is directly linked to technology enabling the development of learning strategies and methods designed for student understanding, resulting in optimal achievement.

It is important to remember that the understanding of technologies offers paths towards digital literacy, since the present education is associated with learning in a systematic way, providing knowledge that somehow impact on the development and work of human beings, as they are tools that provide teaching, activate self-learning skills, collective work, communication between academic communities, establishing a critical sense in thoughts and ideas that transform conventional environments into automated environments in all fields of science and education, thus registering significant advances in pedagogical research.

Within this context, it is known that traditional classroom instructions fail to provide an instant learning environment, i.e. with the support of technology teaching emerges in a more fluid way without establishing boundaries between educators and students, it is considered that these tools are becoming popular within societies, being common for educational centres to rely on them to achieve benefits and complete with the objectives set out within the academic programmes.

In other words, digital learning tools and technology meet these objectives. As some of the efficiencies offered by these technologies become increasingly popular among the public, it makes sense for schools and educational institutions to make effective use of them by introducing technology into the classroom (Haleem *et al.*, 2022).

Likewise, access to the Internet can be another way to engage students in the learning process, just as a group learning environment can generate a positive learning environment through peer feedback, knowledge sharing and discussion, leading to deeper learning (Haleem *et al.*, 2022), while mobile devices become an advocacy tool (Rodríguez-Cardoso *et al.*, 2020).

ICTs also provide more information and educational resources. Students can explore a wide range of online content, access digital libraries, take online courses and use interactive tools to enrich their learning experience. This not only diversifies educational material, but also fosters autonomy and self-direction in the knowledge acquisition process (Amaya, 2021).

Digital technology

The reality is that all of this is changing the way we think, communicate, coexist and, ultimately, this technology is an essential part of human interaction. The result in the field of education is that everyone can play an active role as a user and producer, the so-called prosumer. The concept of tools is bringing about fundamental changes in the way we understand education and its design (García-Gutiérrez and Ruiz-Corbella, 2020). Likewise, this vast ecosystem of information corresponding to the digital environment requires open mechanisms to redirect this change. It is in this novel approach that transcripts are generated corresponding to various aspects encompassing everything related to digital skills (Levano-Francia et al., 2019).

Learning and knowledge technologies are therefore fundamental components of virtual environments, reflecting in their development, content and products, and have pedagogical elements that provide learners with opportunities to acquire new knowledge and develop skills and attitudes. Thus, counsellors find numerous materials that can be incorporated into the design of didactic resources and student learning activities (Sardi et al., 2021). Digital devices are tools through which students, with the guidance of teachers, use these technological tools in specific contexts to develop their qualifications, skills and abilities. Academics offer grants to improve teaching and learning processes (Betancurt-Loaiza and Cadena-Martínez, 2022).

These tools provide opportunities for the development of active participation, personalised learning and enriching educational experiences. In academia, interactive learning and collaboration are key factors in building a dynamic and enriching educational climate (Mejía and Kurita, 2023).

The integration of digital technology in education will not only facilitate communication between teachers and students, but will also transform the way academic concepts are approached. By leveraging digital tools, more interactive and personalised learning environments can be created (Vargas-Murillo, 2020).

Because of this, technology has the power to expand access to knowledge in ways previously unimaginable. However, this quote warns that this knowledge can be appropriate or inappropriate. In other words, technology facilitates access to large amounts of information, but it does not guarantee the quality or accuracy of that information. On the one hand, technology provides access to large amounts of data and educational resources, which can enhance the acquisition of knowledge in various fields. It promotes research, online learning and information sharing worldwide (Suárez-Álvarez et al., 2022).

Information and Communication Technologies (ICT) in educational settings

The implementation of technologies such as computers, tablets, digital whiteboards, among others, can generate enthusiasm and expectations of improvements in the educational process. However, the risk associated with this perception is that attention is diverted from the educational content itself.

It is important to realise that ICT is not an end in itself but a tool and a means to achieve educational goals. Their successful integration into educational settings requires careful consideration of the educational content conveyed through them (Valverde et al., 2010). It is sometimes tempting to adopt these technologies, believing that their presence will automatically improve the quality of learning. However, this approach can lead to an underestimation of the important role that educational content plays (Valverde et al., 2010). The central idea is that ICT, especially through Internet connectivity, can create a more flexible and personalised learning environment. Teachers can use online tools to tailor instruction to the individual needs of their students while constantly monitoring their progress to continuously adjust and improve the educational experience (Molina, 2012).

The importance of the Internet as a widely used technology in the field of education justifies an analysis of its relevance in terms of its impact on education. Here are some key interpretations:

–   Importance of the Internet in education: The statement recognises the internet as one of the most prominent and commonly used technologies in education. This demonstrates that the global connectivity provided by the Internet is fundamental to the way information is accessed, shared and distributed in educational settings (Pariente, 2006).

–   Possibilities for impact analysis: The Internet is a technology that offers a wide range of possibilities for analysing how it impacts on education. Because its applications are so widespread, it is a ripe area for research and evaluation in terms of how it affects teaching methods, access to information, collaboration among students and other aspects of education (Pariente, 2006).

–   The 'network of networks' metaphor: Referring to the Internet as a 'network of networks' emphasises the interconnected and global nature of this technology. This metaphor highlights how the Internet connects people, resources and knowledge in a global network that has significant implications for the way education is conducted worldwide (Pariente, 2006).

From the above, it is explained that the Internet has an impact on both students and teachers, thus, having the opportunity to enhance the teaching and learning of each person, experiencing changes that improve the integration of technology. Likewise, the Internet appears as a tool that provides options for the improvement of the quality of education, through online classes, interactive platforms, access to information through different media.

It is crucial to highlight that the internet not only has an impact on students and teachers, but also stands as an inexhaustible source of information. It also acts as a channel and medium for real-time communication.

Both of these facets are not only highlights of the digital age, but also assume significant relevance as educational objectives to be considered and consciously integrated into the learning environment (Peñalva, n.d.).

Acknowledging these features of the Internet as educational goals means not only recognising their impact but also consciously using these tools to improve the quality of teaching. By strategically integrating rich information and real-time communication in the classroom, we create a more dynamic, interactive and adaptive educational environment that meets the needs of contemporary society.

Main objective

To understand the effective integration of technological tools in the educational process in the dynamics of teaching and learning. In this way, to build a more dynamic educational environment that allows educators and students to make the most of digital technologies and improve the quality and accessibility of the learning process.

Research question

The following question arises from the above: What is the impact of the effective integration of technological tools in the educational process in terms of teaching and learning for university students?

Methodology

This work was carried out with a cross-sectional quantitative descriptive approach, a method that attempts to collect quantifiable information to be used in the statistical analysis of the sample population. In other words, it aims to describe the nature of a demographic segment, without focusing on the reasons why a certain phenomenon occurs (Muguira, 2023).

To determine the sample, the non-probability convenience sampling technique was used, i.e. it allows for the selection of accessible cases that agree to be included (Otzen and Manterola, 2017). To better illustrate convenience sampling, it is the one with which the sampling units are selected according to the convenience or accessibility of the researcher (Tamayo, 2001).

Taking the above into consideration, a sample of 100 students was determined. The information obtained was processed under the Statistical Package for the Social Sciences (SPSS) version 19. It is worth mentioning that for the treatment and analysis of the information, frequency tables were created, where the results are presented together with their respective graphs.

Results

It is observed that 68% of the students surveyed are female and 32% are male, which shows that female students are more immersed in the frequent use of technological tools, which in some way allows them to have a better performance and knowledge about technologies, which allows them to have a support with the subjects (Graph 1).
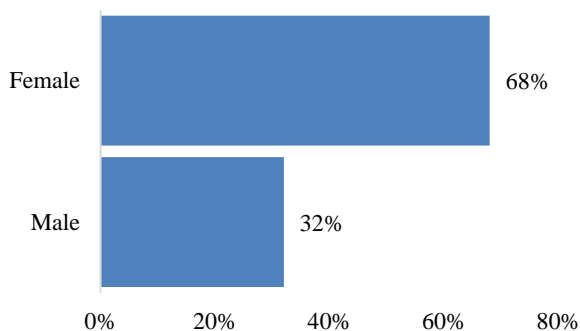

Graph 1 Female and male students

From the above, a positive relationship is perceived between women's participation in the use of technologies and their academic performance, highlighting the importance of considering this data when designing educational and technological strategies.

Continuing with the results, it was found that the majority of the students surveyed (99%) make frequent use of technological tools, such as the computer, internet, software, email, social networks, etc.

Also, students have a variety of electronic equipment, including desktop computers (31%), Laptop (31%), Tablet (5%), Smartphone (23%), and other electronic equipment (4%), only a minority do not have any computer equipment (6%) (Graph 2).
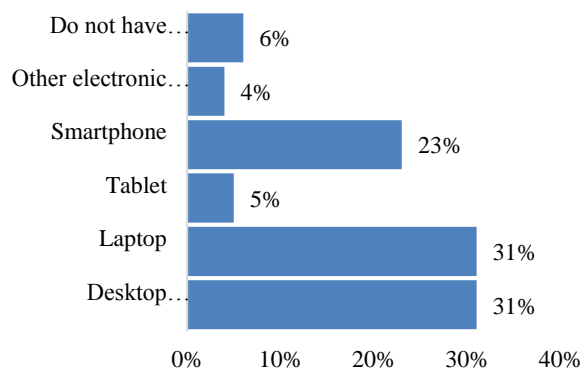
Graph 2 Use of technological tools

Thus, this information highlights the importance of understanding the diversity of technologies that students use, which can be fundamental to designing educational strategies that adapt to different platforms and devices.

Furthermore, students were asked what kind of electronic devices they have associated with their computer equipment, 80% of students had USB, 5% had a printer, 3% a webcam, 1% a DVD recorder, 1% a microphone, 10% said they had no associated devices (Graph 3).
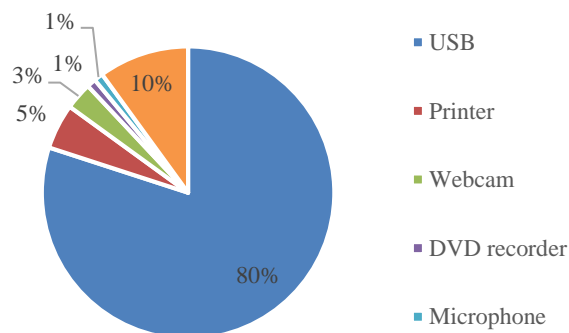
Graph 3 Electronic devices associated with their computer equipment

The above provides a detailed overview of the electronic devices associated with students' computer equipment, which can be useful for understanding technological needs and guiding educational strategies that take advantage of the availability of these devices.

Similarly, when asked what type of operating system they use, 66% use Windows, 21% use Android, 2% use Mac OS, and 11% do not know what type of operating system they use (Graph 4).
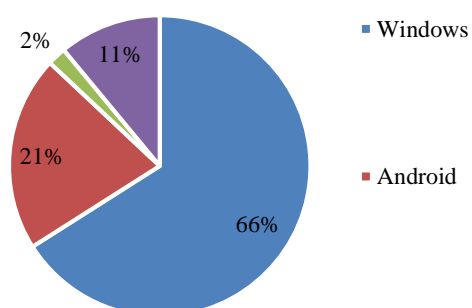
Graph 4 Different operating systems used by the students

It is worth noting that most of the students are familiar with the Windows operating system, which demonstrates their knowledge and mastery of the applications available in this system, facilitating the way they work.

Of the services offered by the Internet, which one do you use frequently? 12% use e-mail services, 43% use chat sites, 42% use web page services, 3% use download services (Graph 5).
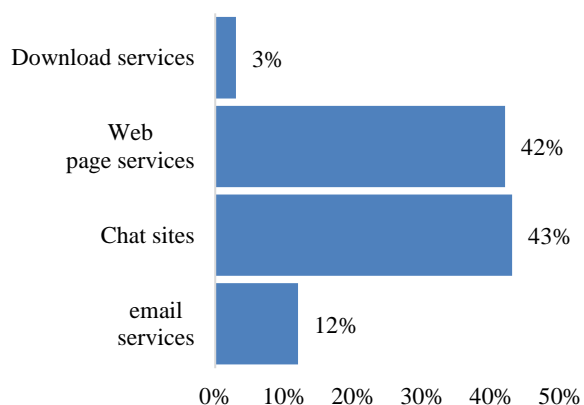
Graph 5 Use of Internet services

The interpretation of this data underscores the importance of understanding students' specific preferences in relation to Internet services. This allows educators and programme designers to tailor their approaches to take advantage of the online tools and platforms that are most relevant and effective according to students' needs and preferences.

What is the level of knowledge and use of technologies within your academic institution? 15% consider the level to be high, 62% consider it medium, 8% low, and 15% do not know the level (figure 6).
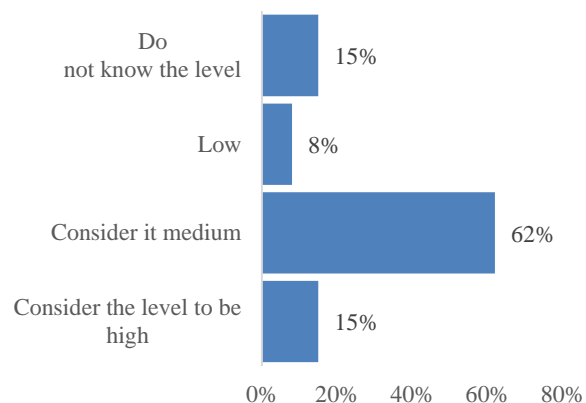
Graph 6 Level of knowledge and use of technologies

The results show a varied distribution in the respondents' perceptions of the level of knowledge and use of technologies in their academic institution. While the majority perceive a medium level, there is a diversity of opinions highlighting the importance of continually evaluating and improving technology integration in educational contexts.

Discussion

The following results show that there is a great influence and interest in technologies and digital learning on the part of female students, which highlights their participation in the academic field, with favourable results in terms of their learning and performance. Technologies are instruments that have come to favour the activities that people carry out on a daily basis.

Likewise, it is known that students in general make frequent use of the computer, Internet, office programs, social networks, etc., it is understood then, that the relationship that exists with the technology described, is a prop to the universal knowledge that allows exploration in unimaginable magnitudes.

The finding that students in general make frequent use of computers, the Internet, office software and social networks reinforces the idea that the relationship with technology is integral to the student environment. This multifaceted relationship is perceived as a fundamental building block for universal knowledge, enabling exploration on unimaginable scales.

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Technology is presented not only as an educational tool, but as a medium that expands the possibilities for exploration and understanding of the world.

That is to say, the users of these technologies use services offered such as chat sites and web pages, this with the aim of being in communication with teachers and schoolmates, having the need to resort to this type of elements, which in the end help for a better development towards technological literacy, from this results that, within the institutions, a level of understanding and use of technological tools is considered. Therefore, the future of digital education is growing rapidly to the point of having an innovative education that allows students to have a close relationship to knowledge and science, thus establishing links that allow a continuous training to higher education.

The need to use these technological elements for communication in the academic environment suggests that digital networking has become an essential component of education. This connection not only facilitates communication, but also contributes to the development of technological skills that are essential in today's digital age.

Conclusions

Thus, technological innovation emerges in an insightful way revolutionising and projecting higher education in a positive way, having an impact on academic societies, and innovative inclusion allowing students and teachers alike to embrace these tools as a support in school-related activities. Thus, with the benefit of these technologies in teaching and learning, student performance improves. In this way, it is established that the use and knowledge of the tools in conjunction with electronic devices is at a medium level, which indicates that the vast majority of students consciously adopt these tools as a productive support.

Furthermore, this technological innovation includes tools that enable students and teachers to improve their school activities. It is emphasised that this innovative inclusion is being consciously accepted by the vast majority of students, who consider it as a productive support.

Furthermore, it is indicated that the use and knowledge of these tools in conjunction with electronic devices is at a medium level, suggesting that most students are consciously adopting them to improve their academic performance.

Finally, it is established that the introduction of technologies in teaching and learning is improving student performance in higher education. The assertion that technologies are tools that support everyday activities reflects the perception that these technological resources not only have an impact in the educational sphere, but also influence various facets of everyday life.

It is suggested that technologies have become beneficial tools that facilitate and enrich people's daily tasks. In other words, the projection of digital education is constantly growing and developing. This suggests that this growth is occurring rapidly and that digital education is evolving towards an innovative approach. This innovative approach seeks not only to provide students with knowledge, but also to establish a close relationship with science and knowledge, thus generating a lifelong learning that extends into higher education.

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