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EDITORIAL

Digital Transformation in Educational Research: Competencies, Resources and Challenges in the Context of ICT

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In the educational context, the integration of information and communication technologies (ICT) has revolutionized education by providing access to open educational resources (Nipa & Kermanshachi, 2020), collaborative learning resources or knowledge management platforms (Sharifov & Mustafa, 2020). Furthermore, thanks to technological advances, education as it is known today has also been transformed into virtual or blended learning (Cigdem & Oncu, 2024) or mobile learning (Dahal et al., 2022), allowing access to be democratized mainly to higher education.

But the integration of ICT in educational processes has facilitated greater benefits than those described so far. The use of ICT has also revolutionized the field of research in all its disciplines, providing researchers with unprecedented tools and resources that have transformed the way they conduct their research, collaborate with other scientists and disseminate their results (George & Salado, 2014). Furthermore, the integration of ICT in the

teacher's research process has allowed not only access to more information, but also to improve the efficiency of the research itself, facilitating collaboration with other researchers, and facilitating broader and faster communication in the transfer of scientific results found (Molano-Bernal et al., 2022)

Firstly, the integration of ICT by teachers in their research work makes it possible to democratize access to an immense amount of research resources (Alvarado-Vélezi et al., 2023), where researchers have the opportunity to access digital databases, scientific journals, digital libraries from anywhere in the world (Ocholla & Ocholla, 2020). Secondly, the expansion of ICT has allowed the creation of new data analysis and processing software (Candraningrat et al., 2021). Thirdly, the integration of ICT has allowed the publication and dissemination of scientific findings to be much faster and broader (Molano-Bernal, et al., 2022). Fourthly, the use of digital resources in the management of bibliographic references in the field of research has strongly emerged (Ram & Paul, 2014). Last but not least, Generative AI tools represent new digital applications that can support and improve the scientific world (Al-Zahrani, 2023), such as the academic writing service with ChatGPT (Alenezi et al., 2023) as long as it is used ethically (Barros et al., 2023).

For all these reasons, the integration of ICT in teachers' research processes is vital in all areas of knowledge. If a researcher uses ICT in their research work, they can accelerate the scientific process and contribute in a relevant way to the generation of new knowledge. However, in order to use them, a teacher is required trained not only in digital competencies, but also and more specifically, in digital competencies oriented towards research and transfer of scientific knowledge. As stated by Guillén-Gámez & Mayorga-Fernández (2021), a teacher must develop three main dimensions in his/her academic tasks (teach, evaluate and research). Therefore, teachers must not only integrate educational technology into the curricular plans of their institution (Pozos, 2015), but also promote research and participation in innovation and research projects supported by digital resources (Twalib, 2012), with the purpose of being able to communicate the scientific results of their good pedagogical practices to the rest of the teaching community (Padilla-Hernández et al., 2020).

However, the scientific literature has generally shown that there is a difficulty on the part of teachers, since many of them have not received solid digital training, to be able to face the technopedagogical demands that are posed to them in their profession (Adetimirin, 2019). The studies carried out on teaching digital competence in higher education highlight that the majority of them have a low level (Dzikite et al., 2017), or at best intermediate (Cabero-Almenara et al., 2021), regardless of the area of knowledge to which the teaching staff belongs (Guillén-Gámez et al., 2020). What's more, most studies on digital competence have focused on one of the previously mentioned dimensions of the academic tasks of teachers, teaching, leaving aside the in-depth analysis of research work.

This special issue seeks to fill that gap. The collected studies not only seek to inspire teachers in their digital development, but also to create tools and good practices that help strengthen their technological skills in an increasingly digitalized world due to the emergence of artificial intelligence (AI). The findings of the studies that make up this special issue could encourage educational institutions to create educational policies that strengthen the research capacities of teachers, improving their digital skills and facilitating access to advanced technological resources in the context of educational research. There was great interest and an excellent response to this call for papers for the special issue, in which the research questions focused on:

- Are teachers digitally trained in research skills?
- What skills do teachers have to use digital resources developed for the research context?
- What factors influence the digital competencies of teachers in their research work?
- How do AI tools impact the digital skills of teachers in research work?

One of the strengths of this special issue is the diversity of methodological approaches it offers, as it includes research presented by authors who have used a wide variety of designs. These include studies with quantitative, qualitative and even mixed design approaches, which enriches the understanding of the topics discussed from multiple perspectives.

Firstly, this monograph collects the creation of several psychometric instruments focused on digital competences for research. Both studies have verified the reliability and validity of different latent factors which make up the instrument itself. ***Perdomo***'s research (2024) includes factors such as the "use of devices and software", the "Information Literacy", the "Digital Communication", the "Content Creation", the "digital Security", and "problem solving"; while the study by ***Guillén et al.*** (2023) included factors such as "digital skills to search for information, manage it, analyze it and communicate results", "digital ethics in digital research", digital flow in research work", and "anxiety towards the use of ICT resources for research ".

Secondly, several scientific studies (with India standing out for its notable influence) have investigated how digital tools and applications are adopted and used in research tasks, using causal models. For example, ***Gupta*** (2024) has presented a study which is focused on the adoption and use of AI tools by university teachers from India. For this purpose, the PLS-SEM model with the Unified Theory of Acceptance and Use of Technology (UTAUT) was used. Among the main findings, the authors indicated that teachers' intention to adopt AI

tools for research work is positively influenced by performance expectancy, effort expectancy, social influence, computing self-efficacy, and personal innovation, as well as by their behavioral intention and facilitating conditions. In the same territorial context, ***Doddanavar et al.*** (2024) used a PLS-SEM model based on UTAUT theory and Task-Technology Fit (TTF) theories to examine how technology adoption of 1354 academics from private universities in South India influences research performance. The last study focused on this area was carried out by ***Singh et al.*** (2024) who also investigated the integration of digital resources by university professors from India in research work. However, they were not based on the UTAUT model, but on the instrument developed by Guillén-Gámez et al. (2023). Among the main findings, the authors identified that all the hypotheses of the study were accepted, except one of them, which analyzed the relationship between the quality of digital resources focused on research tasks and the integration of these tools in the research tasks of the teacher. In addition, the authors demonstrated that the model proposed by Guillén-Gámez et al. (2023) in the Spanish context is effective in other Higher Education contexts such as in India.

Third, the monograph brings together various empirical studies. ***G S et al.*** (2024) analysed the acquisition of digital research skills by university professors and researchers from India, through a longitudinal study with a five-year training course. The results revealed that modular training was effective in developing digital research skills. For their part, ***Victoria-Maldonado et al.*** (2024) analyzed the research skills of 340 researchers from Spain and Ecuador related to ICT, as well as the incidence of sex, stage of academic career development or time dedicated to research. Among the main findings, the authors did not identify differences in any of the variables analyzed, so they emphasize the need to continue to delve deeper into this topic in order to justify these results. Regarding qualitative designs, ***Kokoç*** (2024) analyzed the opinions of 14 secondary education teachers from Turkey about their digital skills in research studies using AI tools. Among the main conclusions of the teachers, the need to create training programs for teachers regarding this technology was identified, as well as to strengthen the technological infrastructure of the schools. Finally, the study by ***Behnamnia et al.*** (2024) examined the relationship between the integration of the AI-powered educational platform BrainPOP, teachers' digital competences, and the development of students' research skills in primary and secondary education in Tehran (Iran). The authors highlighted how AI tools such as BrainPOP can significantly improve the way students learn and develop their research skills.

The nine articles in this special issue offer a variety of approaches and methodologies, focusing particularly on the digital competences of higher education teachers in their research work. The diversity of analyses presented not only enriches the field of educational research, but also provides valuable practices for those teachers and researchers seeking to integrate these competences into their daily work. By highlighting how digital technologies, including generative artificial intelligence tools, can be effectively used to boost educational research and innovation, these findings invite reflection on the implementation of innovative strategies in academia. The use of artificial intelligence not only facilitates access to and analysis of large volumes of data, but also optimizes research processes, allowing teachers to explore new ways of generating knowledge. Therefore, it is proposed that the higher education environment not only responds to current needs, but also prepares researchers to face future challenges in a digital world that is increasingly advanced and automated.

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