Development of digital competencies and higher education in Mexico

Desarrollo de competencias digitales y la educación superior en México

GÓMEZ-CAMPOS, Sinahí Gabriela†, GRANADOS-MAGAÑA, Javier Alejandro, MALDONADO-BERNAL, Ignacio and VIZCAÍNO-MONROY, Oscar Gabriel

Universidad Autónoma de Nayarit, Unidad Académica de Contaduría y Administración.

ID 1st Author: *Sinahí Gabriela, Gómez-Campos* / **ORC ID**: 0000-0002-4580-6230

ID 1st Co-author: *Javier Alejandro, Granados-Magaña* / **ORC ID**: 0000-0002-2940-4573

ID 2nd Co-author: *Ignacio, Maldonado-Bernal* / **ORC ID**: 0000-0002-4472-273X

ID 3rd Co-author: *Oscar Gabriel, Vizcaíno-Monroy* / **ORC ID**: 0000-0003-0587-0008, **Researcher ID Thomson**: JPX-6145-2023

Abstract

This article analyzes the current landscape of digital skills from a scientific and up-to-date perspective in 2023. The constant advancement of technologies and their impact on society has generated significant repercussions in all areas, especially in higher education, where the demands for digital competencies are increasingly relevant. Firstly, the theoretical framework that encompasses the different definitions and concepts related to digital skills is explored, providing key information on this topic. Additionally, data is presented that offers new perspectives, highlighting the importance and implications of these skills, as well as identifying the digital competencies that university professors must possess to meet the current needs of higher education. Finally, various expectations are raised regarding the directions that these digital skills could take, considering their relevance in the current context.

Resumen

Este artículo analiza el panorama actual de las habilidades digitales desde una perspectiva científica y actualizada al año 2023. El constante avance de las tecnologías y su impacto en la sociedad ha generado repercusiones significativas en todos los ámbitos, especialmente en la educación superior, donde las demandas de competencias digitales son cada vez más relevantes. En primer lugar, se explora el marco teórico que engloba las distintas definiciones y conceptos relacionados con las habilidades digitales, proporcionando información clave sobre este tema. Además, se presentan datos que ofrecen nuevas perspectivas, resaltando la importancia y las implicaciones de estas habilidades, así como identificando las competencias digitales que los profesores universitarios deben poseer para satisfacer las necesidades actuales de la educación superior. Finalmente, se plantean diversas expectativas sobre las direcciones que podrían tomar estas habilidades digitales, considerando su relevancia en el contexto actual.

Digital competencies, Digital literacy, ICTs, Inclusion

Competencias digitales, Alfabetización digital, TICs, Inclusión

† Researcher contributing as first author.

Introduction

Today, the unstoppable advance of digital technologies has brought about a significant transformation in multiple aspects of human life. The widespread use of the internet has revolutionised interactivity and the availability of information, generating profound changes in social perspective and triggering continuous impacts that accelerate ongoing trends. Researchers point out that society is immersed in a technological revolution that redefines the use of digital resources and the virtualisation of information, altering previous conceptions of the capabilities and potential consequences of these new technologies.

The increasing integration of emerging technologies in educational and everyday environments has led to the development of digital media and e-learning environments, where Open Educational Resources and Learning Objects are at their best (Mezarina, Páez, Terán, & & Toscano, 2015).

The current complexity of society, in the midst of the fourth industrial revolution, implies inevitable challenges that go hand in hand with the increasing use of technologies. This situation has created a gap between those who possess digital skills and those who are unaware of their impact on the current environment (Galindo, Ruiz, & & Ruiz, 2017). The massive use of these technologies has been fundamental to digitise processes and solve needs, but it has also evidenced significant levels of ignorance in a considerable part of the population (Sicilia, *et al*., 2018).

The lack of technological knowledge in a considerable percentage of the population generates a disconnection with the current reality, which represents a worrying challenge. Data from the Organisation for Economic Co-operation and Development (OECD., 2016) reveal that almost a quarter of the adults studied completely lack basic skills to work with computers, due to a variety of reasons ranging from lack of access to these devices to difficulty in handling them. In addition, 75% of this group has limited skills in using computers and modern IT tools, showing a considerable gap in the mastery of these digital skills.

This picture underlines the need to urgently address the existing digital divide and the importance of empowering society with digital skills to adapt and actively participate in today's technological era.

About digital skills

In the 21st century, digitalisation has triggered profound transformations in society, which have not yet been fully assimilated. This ever-expanding digital environment calls for a reorientation of paradigms towards these radical changes, especially in terms of digital competences. From academia to governmental and social spheres, these skills have changed human interactions and the perception of immediate reality.

Recent studies, such as those by (Lissitsa, Chachashvili, & & Bokek, 2017), point to the impact on the skills required, indicating that current competences could quickly become obsolete in the academic and productive landscape. The growing influence of technological changes in higher education is also highlighted, as mentioned by (Rangel & & Peñalosa, 2013).

Rapid technological evolution has forced the knowledge society to adapt, and those immersed in this environment must understand increasingly complex codes, as pointed out by (Ocaña-Fernández, Valenzuela-Fernández, & & Garro-Aburto, 2019). This transformation implies the emergence of new profiles of digital citizens, whose interactivity defines their integration in a new globalised era. The digital skills paradigm is linked to an unprecedented generational shift, where interactivity and connectivity define a new form of citizenship. The emergence of economies such as cryptocurrencies and the creation of a new type of citizen mark this change.

The debate on the need for and dissemination of these digital competences, according to (Galindo, Ruiz, & & Ruiz, 2017), may become obsolete in the coming years. The urgency lies in their development in order to adapt to emerging employment proposals, as these authors point out. This poses an educational challenge in higher education, where digital literacy becomes an essential requirement to avoid the extinction of jobs and professions in an ever-changing digital landscape.

In this context, the importance of conceiving digital competences in terms of technological applications and real-time interactivity platforms is highlighted, as endorsed by (Ocaña-Fernández, Valenzuela-Fernández, & Garro-Aburto, 2019). These competences are becoming essential requirements in today's world, requiring constant adaptation and objective digital literacy in the university environment.

What are digital competences?

Digital competences, considered as a constantly evolving concept, have been the subject of multiple research in response to the continuous technological advances in the field of ICT. Their broad impact extends to the field of Educational Technology, with diverse applications in learning, research, leisure and socialisation, among other aspects. (Marza, 2018) highlight how these skills can empower citizens in social aspects such as politics, economics and employability, as well as influencing new cultural and entertainment trends in the current century.

From an educational perspective, (Marza, 2018) consider competences as key tools that mobilise attitudes, knowledge and processes, enabling students to acquire skills to facilitate knowledge transfer and foster innovation. On the other hand, (Iordache, Mariën, & & Baelden, 2017) propose that digital competences are seen as the most tangible and measurable outcomes of training processes in the era of digital literacy.

Digital literacy, according to (Rangel & & Peñalosa, 2013), focuses on cognitive processes that enable the use of ICTs and information management. However, (Durán, Gutiérrez, & & Prendes, 2017), citing Ferrari, 2012) suggest that digital competences go beyond technical training, being a right that involves aspects of knowledge management, such as information and humanistic qualities such as collaboration, responsibility and ethics.

Summarising this research, it is evident that digital competences encompass different components such as technological, communicative, information management and multimedia literacy.

(Ocaña-Fernández, Valenzuela-Fernández, & & Garro-Aburto, 2019) and Krumsvik (2011, cited by (Durán, Gutiérrez, & & Prendes, 2017) suggest a holistic view of digital competences, which encompasses technological knowledge, and underline their importance in higher education, supported by a functional and complex technological literacy. (Rangel & & Peñalosa, 2013) emphasise the need for new competences, skills and attitudes, linked to a digital literacy process in line with the current context.

Importance of digital competences

In the current context of the year 2023, the importance of digital competences stands out as a crucial factor for interaction in a globalised society and the growing application of new technologies. Furthermore, (Álvarez, Núñez, & & & Rodríguez, 2017) underlined the urgency of training skills adapted to technological innovation, crucial not only in the professional sphere but in a general sense, in accordance with the evolution of information and globalisation.

Likewise, historical studies, such as those of (Álvarez, Núñez, & & Rodríguez, 2017), point out that before 2008, programmes to globalise information were promoted, aligned with European Union strategies. Today, these changes are structurally embedded, with an even greater influence of new technologies. For example, in Spain, the e-skills campaign was developed, seeking to foster interest in the digital world, with the aim of reintegrating unemployed people into the labour market through ICT skills.

The university environment is also influenced: (Mezarina, Páez, Terán, & & & Toscano, 2015) stress that the strengthening of digital competences in higher education must adapt to the changing demands of society. Furthermore, (Sicilia, *et al.*, 2018) consider these skills as essential for jobs that require digital tools, adapting to the constantly evolving environment.

However, the implementation of these competences is not uniform. (Álvarez, Núñez, & & & Rodríguez, 2017) identify a lack of digital skills among university students, which limits their digital interactivity, affects their creativity and innovation, and diminishes their impact on the digital economy, affecting employability.

In addition, studies such as that of (Galindo, Ruiz, & & Ruiz, 2017) show that so-called digital natives lack the preparation to compete in the digital labour market. Although they are immersed in technology, the limited exploitation of digital tools reflects a lack of competitiveness and an inclination towards complacency in the use of these platforms, distancing them from their productive potential. However, trends towards 2020, according to (Gil Serra & & Roca-Piera, 2015), indicated an increase in labour demand to adapt and innovate, which highlights the need to cover these qualification requirements. In summary, the current scenario of 2023 highlights the urgency of developing digital competences adapted to technological innovation, not only in the professional sphere but also in higher education, to ensure labour insertion and economic impact in an increasingly digitised society.

Digital competences in teachers

The vision for addressing the most relevant positions on the digital competences that teachers must master is closely linked to the premise that these skills are fundamental in their professional training and must be adapted according to the educational level at which they work (Álvarez, Núñez, & & Rodríguez, 2017); (Durán, Gutiérrez, & & Prendes, 2017).

According to (Durán, Gutiérrez, & Prendes, 2017), the notion of a competent teacher in educational technology implies assuming a broader role that goes beyond mere technical mastery or specialisation in the area. On the other hand, (Rangel & & Peñalosa, 2013) point out in their research on digital competences in university teachers that there is no clear consensus in this regard, but they identify key parameters: ICT-mediated processes that require technical skills, constant updating, methodologies in line with the challenges and a proactive attitude towards technology; training dimensions that cover instrumental, cognitive, attitudinal aspects and ethical values; and a focus on knowledge management that includes basic notions, in-depth study of new technologies and knowledge generation strategies.

These authors highlight the importance of digital literacy for university teachers, focusing on the effective management of technological, pedagogical, informational, communicative and ethical values resources.

In another study, Batalla, Rimbau and Serradell (2014, cited by (Sánchez, Sánchez, & & & Ramírez, 2016) examine the case of university teachers in the field of economics in Extremadura, Spain, who, despite using computer technology in their academic work, were unable to generate significant added value due to a lack of specific digital competences.

In turn, (Fernández-Cruz, 2016) highlight the approaches established by UNESCO since 2008 on digital competences, summarised as: understanding and integration of technological skills, application of knowledge to real problems and generation of new knowledge from existing knowledge. However, they stress that there is still a considerable gap in the training of competent teachers in this area, as "a teacher cannot develop a competence that he or she does not possess in depth" (Fernández-Cruz, 2016, p. 105).

Perspectives on digital competences

The impact of the use of new technologies has triggered an evolution in the mechanisms of social interaction, transforming the traditional role of university institutions, which used to have a more static dynamic. This effect will begin to generate significant changes that will revolutionise classical approaches to interaction in society.

In the field of higher education, current perspectives on technology, according to (García & & Martín, 2016), suggest that teachers must possess digital competences to enhance their pedagogical skills in relation to new technologies. These competences are crucial for innovative curriculum design and learning assessment in digital environments, as indicated by (Rangel & & Peñalosa, 2013), underlining the urgency of confirming these skills for the effective use of ICT.

Aguirre *et al*. (2015) point out that the development of digital competences in university education must be carried out through innovative educational strategies. (Gil Serra & & & Roca-Piera, 2015) stress the importance of students acquiring digital competences to make the most of ICT resources in the emerging paradigm of digital culture (Freire & & & Brunet, 2016).

(Marza, 2018) propose a competency-based educational model that requires changes in didactic approaches, including the development of attitudes to acquire appropriate technical skills and digital competences adapted to new forms of interactivity. From a social perspective (Sabina, Svetlana and Ya'arit, 2017), digital competence should be considered a fundamental right that goes beyond technological management, having an impact on society at large.

Regarding the late acquisition of digital skills, (Bokek-Cohen, 2018) suggests that, although it may initially appear to be an obstacle, the ability to acquire digital skills at later career stages can benefit employees, improving their productivity and providing a positive vision for colleagues. This late acquisition can reverse negative perceptions and demonstrate resilience and merit for greater job rewards (Davies, 2018); (Lissitsa, Chachashvili, & & Bokek, 2017).

Conclusions

Current research, compiled from sources such as (OECD., 2016) to more recent information, emphasises the growing need for interpersonal skills, information processing competencies and other advanced cognitive abilities in professional and business contexts. These requirements extend to areas such as digital management, digital commerce and the handling of large volumes of data, where artificial intelligence is transforming the conception of technology's potential (Ocaña-Fernández, Valenzuela-Fernández, & Garro-Aburto, 2019).

The continuous development of new advances leads to the demand for university profiles that are aligned with the changing needs of society (Morán, Cardoso, Cerecedo, & & Ortíz, 2015). This implies a profound reflection on the academic offer, which must be aligned with transversal competences that correspond to the profiles demanded in the context of ICT (Ocaña-Fernández, Valenzuela-Fernández, & Garro-Aburto, 2019); (Gil Serra & & & Roca-Piera, 2015). Emerging technologies, especially artificial intelligence, continue to be of great interest globally and are generating significant changes in emerging economies, highlighting the importance of adapting education to meet these demands (Porlán, Espinosa, & & Sánchez, 2018).

In building digital skills programmes, it is essential to consider the needs and expectations of the new generations, as suggested by (Davies, 2018). The transformation towards digital education is imperative, as expressed by (Freire & & Brunet, 2016, p. 86), underlining the urgency for educational institutions to adapt to this transformation. The university faces the need for profound transformations in academic, organisational, humanistic and scientific aspects to address the challenges of the evolving digital landscape.

The emphasis on the development and application of new technologies goes beyond optimistic discourses on individual prosperity. Encouragement, appreciation and rewards aimed at promoting digital skills and building a more inclusive and cohesive society are urgently required. How this new digital education is addressed will have a significant impact on society as a whole, influencing the valuing of digital skills as a driver of inclusion and social cohesion digital skills as a driver of inclusion and social cohesion.

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