

Digital Competences and Education

Competencias digitales y educación

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Summary

This article provides an analysis of digital competences in the current context. The growing expectation of new technologies and their multiple applications have produced important repercussions in all spheres of society, and, specifically, in the aspect of higher education where the demands are more than significant seeking to cover their implications. In the first place, the theoretical panorama about the different meanings and concepts in relation to digital competences is made known. This approach provides information on aspects that relate to digital s. Next, below there are some data that allow to give new perspectives, such as the importance and repercussions, as well as what should be the digital competences in professors according to the current demand in higher education. Finally, a variety of expectations are presented in relation to the aspects that could be developed based on such a relevant topic.

Keywords: Digital Competences; Digital Literacy; ICTs; Inclusion

Resumen

El presente artículo brinda un análisis de las competencias digitales en el contexto actual. La creciente expectativa de las nuevas tecnologías y sus múltiples aplicaciones han producido trascendentes repercusiones en todas las esferas de la sociedad, y que, en concreto, en el aspecto de la educación superior donde las demandas son más que significativas buscando que cubrir sus implicancias. En primer lugar, se da a conocer el panorama teórico sobre las diferentes acepciones y conceptos en relación con las competencias digitales. Dicho enfoque brinda información sobre aspectos que atañen a lo relacionado a las competencias digitales. Seguidamente, se presentan algunos datos que permiten dar nuevas perspectivas, tales como la importancia y repercusiones, así como cuáles deberían ser las competencias digitales en los docentes universitarios en función de la demanda actual en la educación superior. Finalmente se dan a conocer una variedad de expectativas con relación a las vertientes que podrían desarrollarse en función de tan relevante tema.

Palabras clave: Competencias digitales; Alfabetización digital; TICs; Inclusión.

Introduction

There is no doubt that the unstoppable advance of digital technologies has transformed many of the fields of human endeavor. The use of the Internet has revolutionized the concepts of interactivity; the empowerment of information has inevitably led to changes in the perspective of the society that, beyond being significant, have had, and will continue to have, a great impact and, with it, changes in increasingly accelerated trends.

As stated by various researchers about technological changes, the society as a whole is witnessing a revolution in the ways and forms of using the so-called digital resources, and the virtualization of information, the impacts of which in the current context seek to rethink what was previously conceived about the possibilities of new technologies and their possible consequences. (Álvarez, Núñez & Rodríguez, 2017; Mezarina, Páez, Terán & Toscano, 2015)

The integration of emerging technologies into educational environments and everyday life has allowed the development of digital media and e-learning environments where Open Educational Resources and Learning Objects express their best educational potentialities (Mezarina *et. al.*, 2015, p. 90).

According to Galindo, Ruiz, and Ruiz (2017), the complexity of today's society immersed in the fourth industrial revolution will have to face a series of challenges and diatribes that are irreversibly combined and, with it, the consent of changes takes shape, where technologies and

their growing use lead to differentiate the members of this context between those who possess certain digital competences and those who are shamefully unaware of the impact of their magnitude in the current context (Galindo, Ruiz & Ruiz, 2017), but aware, one way or another, of their relevance in many aspects of their environment since the only application of the enormous potentiality of this field of knowledge settled in technological productivity is addressing a number of needs through process digitalization (Sicilia et al., 2018). If another position is taken, account can be taken of the existence of different levels of ignorance in a considerable portion of the population that faces the complexity of this scenario, and, therefore, finds it to be a situation unrelated to its reality, like a very absent problem (Bartolomé, Martínez & Tellado 2014; Vera, Torres & Martínez, 2014). This is not encouraging in the current context since according to the research conducted by the OECD (2016) on the overview of digital competences among adults, it was found that almost a quarter of the interviewees (24.3%) are completely unaware of how to work with a computer due to various factors ranging from the absence of a computer in their work or the way of operation, which they find to be extremely complex. But this already worrying figure is a long way off in this study, where it was found that within the remaining group of interviewees (75%), only 5% of them had certain skills to use the computer properly as well as knowledge of current appropriate computer tools. This research mentioned, by way of an addendum, that two-thirds of the interviewees were almost or completely incapable of evidencing the effectiveness of computer resources.

About Digital Competences

There is no doubt that the 21st century is the century of the digitalization of information, an aspect that encompasses the most radical changes in paradigms that, as always, still do not adapt to such severe changes, both qualitative and quantitative. In one-to-one correspondence with this enormous ecosystem of information that corresponds to digital environments is the need to open mechanisms that re-direct to such changes. The aspects that encompass everything related to digital competences are reflected in this new approach. It is worth mentioning that this aspect encompasses many spheres of human action, both high-level academic, as well as governmental and social (Lissitsa, Chachashvili & Bokek 2017), and has even modified human interactions and the way of perceiving immediate reality. Based on such perspective, Álvarez, Núñez, and Rodríguez (2017) mentioned regarding the academic aspect that what is related to the world of digital competences under the framework of "impact on the productive sector as a whole favors the rapid obsolescence of the competences contemplated by the degrees" (p.2). 541). Rangel and Peñaloza (2013) also stated on this aspect that the "changes that humanity is witnessing today are not only being felt in the economic, political or social spheres, but also - and increasingly - in the educational sphere, especially in Higher Education Institutions" (p. 9).

Due to the overwhelming advance in technologies, the knowledge society inevitably converges with technological advances and their continuous development, which is why it is forced to adapt, so that all those participants who orient themselves toward this world will have to handle the increasingly complex but very necessary codes, as explained by Ocaña, Valenzuela, and Garro (2019). Assuming this matter from another point of view, much account needs to be taken of the profiles of the new citizens of this universal information ecosystem, which, like a natural one, establishes and develops their links (sometimes evident and other times not so much) leading to a series of levels of succession in this process. Assuming this aspect of achievement of possibilities that are born within the development of ICTs, artificial intelligence, among others, we are on the verge of a generational change never seen before, where interactivity is the essence and fuel of its implementation in societies globally since it not only covers part of the emerging economy (take for example the already famous bitcoins), but it is also sculpting a new prototype of citizen that, through his imminent and ineluctable adaptation, becomes ready to this new scheme of connectivity. What does he need to take into account at this time for this new world of digital competences?

Because of the changing and necessary digital environment, the polemics regarding its need for dissemination of its potentialities can be ignored, as mentioned by Galindo, Ruiz, and

Ruiz (2017), in the coming years, the urgency of developing digital competences may face a dilemma in higher education because these proposals are oriented according to the new labor proposals since, as mentioned by these authors, we are facing the inevitable extinction of jobs and professions that are not framed under this new scenario, as they suggestively demand that this issue be resolved under mechanisms of objective digital literacy at university level with a permanent updating scheme. Likewise, Ocaña, Valenzuela, and Garro (2018) confirm a similar scenario by correctly outlining that they assume that digital competences are those required in the current context and that need to be conceived under ICT applications and real-time interactivity platforms.

What are the Digital Competences?

The so-called digital competences are understood as a concept that has generated several lines of research in light of the new technological advances in the field of ICTs. Its vast significance in the area of its application to Educational Technology, which spectrum of action covers various repercussions, both learning, research, recreational and social, among others. For Marzal and Cruz (2018), the digital competences in the training of citizens will provide perspectives of empowerment with respect to intrinsic social aspects such as politics, economy, employability, as well as aspects of new cultural trends and entertainment in this century.

The competences understood from the educational sphere, as manifested by Marza and Cruz (2018), are assumed as very useful instruments that allow the mobilization of attitudes, knowledge, and processes, by which students acquire s to facilitate the transfer of knowledge and create innovation. For their part, Iordache, Mariën, and Baelden (2017) propose that digital competences be assumed as the most practical and measurable results of the training processes with respect to the new digital literacy.

For Rangel and Peñalosa (2013), the meaning of digital literacy, understood as a construct, is limited evidently to cognitive processes that allow the acquisition of certain abilities to use ICTs and handle information, although to be precise they assume that these processes are the product of training in the management of resources based on technologies of the computer world.

Durán, Gutiérrez, and Prendes, (2016, citing Ferrari, 2012) assume a somewhat different scheme with respect to digital competences by establishing that this aspect is a right, which spectrum surpasses the classic limits of technical training, and, to round off the idea, the parameters of knowledge management such as information management mechanisms need to be assumed, and, among other things, it moves more toward a more humanistic approach by affirming that qualities such as collaboration, responsibility, ethics, among others, are also required. As a summary of the research conducted by the above-mentioned authors, they show the following overview of the digital competences, which, in their opinion, comprise various components, such as technological, communicative, uses of information, and multimedia literacy.

According to Ocaña, Valenzuela, and Garro (2019), and Krumsvik (2011, cited by Durán, Gutiérrez, and Prendes, 2016), digital competences must be understood under a holistic perspective that encompasses technological knowledge and abilities which must be developed firstly at higher education level, and which, moreover, must be supported by a network of high complexity in the technological but functional literacy. This aspect has already been pointed out by Rangel and Peñalosa (2013) who already strongly affirm that new competences, competences, and attitudes are required in the current context, and its consistency with this approach is linked to the implementation of a new process of digital literacy.

Significance of the Digital Competences

Are digital competences really important? On this point, Álvarez, Núñez, and Rodríguez (2017) referred to the complexity of the issue, assuming that for the forms of interaction in the world of globalization and the inevitable transition to the application of new technologies in the current context of information, there is an urgent "need to train in new skills adapted to the impact of technological innovation on the economic activity, an impact that manifests itself not only in the professional sphere, but also in a general sense" (p. 559). On this aspect, Aguirre *et al.* (2015) mentioned that the field of competences is the development of related skills that are "required in both teachers and students. They can promote the use of innovative teaching - learning strategies mediated by Information and Communication Technologies - ICT" (p. 90).

Regarding the historical development of the process related to digital competences, the researchers Álvarez, Núñez, and Rodríguez (2017) mentioned to us as a fact that prior to 2008, programs aimed at information globalization had been promoted. According to these authors, this aspect is related to certain strategies of the European Union in its Digital Agenda of Growth Strategies for Europe 2020. According to the perceptions of that environment, there were already important qualitative changes in the ICTs universe, changes that were structurally sustained for today since the changes that have taken place and will take place point much more to the enormous repercussion of new technologies. For example, according to the aforementioned authors, a campaign called *e-skills* has been developed in Spain which sought to attract public attention to the digital world in order to broaden the horizon of affinity for new technologies and the security on the Internet, with which certain economic and social changes would be achieved as a certain critical mass unemployed was sought to be reincorporated into the labor market under the parameter of the ICTs.

The strengthening of digital competences in higher education, as mentioned by Mezarina *et al.* (2015), must be observed by the society in order to ensure the qualification level of digital qualities and skills the society demands in a given environment and time. Sicilia *et al.* (2018) take a position on digital competences by assuming them as essential facilitators, which range of action is required in tasks that need the development and implementation of digital tools according to the requirements of the environment where they are requested. Furthermore, it should be mentioned that there is no agreement with regard to the implementation of digital competences, not even in the European Community, since the work conducted by Álvarez, Núñez, and Rodríguez (2017) discusses and evidences that there is an asynchronous distance between this aspect and university students, finding that there is a patent lack of digital competences that has restricted their digital interactivity, thus losing opportunities for development, as well as a sensitive weakness in the use and exploitation of digital resources and similar technologies that would have allowed them to produce new knowledge more in line with the moment, and, with it, the restriction of creativity and innovation, which translated into the current context would transcend as not developing digital competences, has had an effect on their level of impact on the digital economy, and, therefore, on their level of employability, so that "young people do not exploit to the fullest the possibilities offered by the new technologies. (Álvarez, Núñez & Rodríguez, 2017, p. 554).

The research conducted by Álvarez, Núñez, and Rodríguez (2017) on the significance of digital competences in university students both in Mexico and Spain is not on par with the labor demands, evidencing a notorious deficiency in the professional training aspect with regard to such competences since "the tendency of a deficit in terms of digital literacy with which it can limit the employment opportunities of the students" (p. 3). 554), evidencing a great deficiency that, according to the mentioned researchers, would include the totality of their university education, an aspect that would have an effect on their level of labor insertion according to the current context, with which many opportunities would be wasted with respect to their economic impact.

The work conducted by Galindo, Ruiz, and Ruiz (2017) with 1888 digitally surveyed participants determined that among the so-called digital natives there is a clear lack of preparation to be competitively immersed in the world of digital work, and, furthermore, it must be taken into

account that more than half of them spend more than three hours connected to the Internet whether by pc, laptop or smartphone. The foregoing is of concern to these researchers because, despite having a group familiar with the world of information technologies, they are not capable of making the best use of these platforms because, according to their conclusion, they feel a certain complacency with the use of limited digital tools and strategies, so certain obsolescence of digital competitiveness can be perceived in them because it is a generation very leaned toward digital emptiness that is based on social networks, personal satisfaction interactivity, activities that are very far distanced from the generation of better techniques for the use of the digital world. These conclusions, as can be seen, lightly dismiss the traditional stereotype that elevated the digital natives as empowered entities of the digital world.

However, adopting a different perspective, we can cite Gil and Roca-Piera (2015) who showed that, according to the tendency for 2020 in Europe, there is a growing tendency with respect to the labor demand in the qualification level that, among other things, 35% will have to cover the demands of adaptation and innovation.

Digital competences in teachers

The perspective for taking the most important positions about the digital competences teachers need to handle is closely related to the foundation that these competences are inherent to their professional training and qualification, which need to be adjusted according to their level of education (Álvarez, Núñez & Rodríguez, 2017; Durán, Gutiérrez & Prendes, 2016).

As stated by Durán, Gutiérrez, and Prendes (2016) regarding the conception of a competitive teacher with respect to ICTs, he needs to be taken in a position of greater importance for which it will be necessary to overcome the narrow conception that limits himself to the development of technical skills or with regard to a specialty developed by him.

According to the information collected by Rangel and Peñalosa (2013) in their research on digital competences in university teachers, they mention to us that there is no clear consensus on the matter, so they assume the following parameters: (a) Processes mediated by the use of ICTs where university teachers must develop certain skills in computer techniques, continuous professional updating, teaching methodology according to the challenges and attitude toward new technologies, (b) Dimensions of educational features that include aspects such as instrumental handling, cognitive ability, the attitudinal factor toward new technologies, and axiological strengthening according to all of the above, (c) An approach to mechanisms related to knowledge management that focus on essential aspects such as the handling of basic notions about ICTs, the increase of the level of knowledge about new technologies, and finally the implementation of knowledge production mechanisms. According to the aforementioned authors, the world of digital competences cannot be separated from parameters such as digital literacy since, for these researchers, university teachers must develop a series of competences that allow them to properly manage technological, pedagogical, informational, communicative, and axiological resources.

According to the research conducted by Batalla, Rimbau, and Serradell (2014, cited by Sánchez, Sánchez & Ramírez, 2016), university teachers in the areas of economic sciences in Extremadura, Spain who have taken on the challenge of using computer technologies in their academic work have not been able to generate added value as a knowledge-generating tool in their field of action due to the lack of awareness of appropriate digital competences that would have allowed them to have a certain approach to such results. Having said that, with respect to the previous issue, Fernandez and Fernandez (2016) mentioned that since 2008 UNESCO had established three approaches to digital competences which are summarized as: (1) understanding and integration of technological competences, (2) application of technological knowledge to the resolution of real and specific problems, and (3) production of new knowledge from that already generated. It can be said in this regard that the issue is not new, but there is still a long gap to be bridged in many countries regarding the training of teachers who are competent in the digital

competence approach since "It is evident that a teacher cannot make a student develop a competence he does not fully possess" (Fernández & Fernández, 2016, p. 105).

Perspectives of Digital Competences

The effect of the use of the new technologies has created new mechanisms of interactivity in the society which, by default, are transforming the role and functionality of universities, which relative inertia was characteristic. There is no doubt that this effect has brought and will continue to bring more mechanisms that will revolutionize the classic concepts of interaction approach in the globe.

In terms of the perspectives that are continually presented in the technological field with regard to the higher education sector, García and Martín (2016) mentioned that there is currently a consensus that covers vast sectors of the society, by which it is conceived that teachers should already possess a series of necessary digital competences with the purpose of exploiting the greatest amount of pedagogical abilities with respect to the new technologies oriented to professional training, structuring of new curricular approaches, and very new trends in the complex field of learning assessment under this aspect. However, Rangel and Peñaloza (2013) mention that in order to achieve a certain desired degree of materialization, there is a certain urgent need for digital competences to be confirmed that will facilitate the teacher's optimal use of ICTs, thus making them more effective and achieving better performance with regard to the development of digital competences.

According to Aguirre *et al.* (2015) with regard to their approach as a skill about digital competences in the field of university education, "it must be developed through strategies that present a degree of innovation in the educational process" (p. 89). According to Gil and Roca-Piera (2015), in order for students to make effective use of the ICT resources, they must develop certain digital competences that help to obtain the maximum or proper use under the emerging context of the digital culture paradigm. (Freire and Brunet, 2016).

Marzal and Cruz (2018) support a proposal of an educational model by competences for higher education, under which a series of changes must be structured adopting new teaching methods such as (1) predisposition to develop attitudes that make it possible to channel new skills, but in an effective and efficient manner by possessing techniques and tools according to the specialty to be developed, (2) development of digital competences inherent to new interactivity platforms and where the empowerment of the student is something tangible in the multiple forms of interactivity that are developed within the digitalization of the learning processes. Now, if the matter is seen from the social scenario, Sabina, Svetlana, and Ya'arit, (2017) state that the digital competence will have to be assumed as part of the right of the individual, that in its essence is more than a mere technical appreciation since its field of action and development in the social context goes beyond the field of technology management and administration of technologies from the academic landscape.

Depending on the adaptation to and achievement of digital competences, one could ask whether the late acquisition of digital competences would be a factor that plays against professionals. At first glance, an affirmative answer would seem so obvious, but it would be, of course, from a obstinate perspective by denying the versatility of skills acquisition in the field of digital environments since according to Bokek-Cohen (2018, p. 18) "The acquisition of digital competences and the professional literacy enable late-career employees to fully benefit from their own strengths and avoid some of their disadvantages". If the individual acquires digital competences at the end of his career, either formally or informally, he can reverse the negative stereotype and serve as a reference of consideration for employers with respect to the potential productivity of their employees, an aspect that can then lead to extrinsic rewards. (Davies & Eynon, 2018; Lissitsa, Chachashvili & Bokek, 2017). And to round off this new perspective, Bokek-Cohen (2018, p. 21) argued that "acquiring and mastering digital competences is an

important guarantee that confirms elderly workers' ability to adapt, their suitability for their current jobs, and, therefore, their merit for greater extrinsic rewards".

Conclusions

According to the studies conducted by the OECD (2016) on the current overview of interpersonal skills and abilities, the level of competence in information processing and another range of high-level cognitive skills are increasingly necessary as their range of action goes beyond the professional aspect, but rather in the business field in various highly commercial areas such as digital management and administration, digital commerce and the world of managing the sufficiency of data that are generated every second, an aspect in which artificial intelligence is called to rethink the conception of the potentialities of new technologies. (Ocaña, Valenzuela & Garro, 2019)

As new advances are developed and, with it, new profiles are changed or created within the university in the face of the demands of the society as a whole (Morán, Cardoso Cerecedo Ortiz, 2015), universities will be asked to reflect on their academic offer, which planning, with respect to the context that is being developed, will have to contain a variety of transversal skills that match the required profiles with regard to ICTs (Ocaña, Valenzuela and Garro, 2019; Gil and Roca-Piera, 2015). In this regard, Porlán, Espinosa, and Sánchez (2018) mentioned the force of the flourishing emerging technologies based on artificial intelligence (AI) in the field of education continues in a growing boom of global interest as it provides the most useful mechanisms for the demands of the sector, especially in those countries with emerging economies, where its impact is producing great changes. In order for the process to be inclusive, it is necessary to take into account what was stated by Davies and Eynon (2018) who stated that all those proposals or discourses aimed at sustaining how the focus on the development of digital competence programs should be structured and practiced should be based on the needs and the market of the new generations in such a way that all of this is a generational contribution.

To conclude with regard to the reverence and relevance of the digital competences in the society and especially universities, Freire and Brunet (2016, p. 86) clearly confirmed it when stating that "Our schools and universities can no longer remain outside of this transformation". The university urgently needs academic, organizational, humanistic, and scientific transformations, otherwise, it will not be able to face the new perspectives of the flourishing digital landscape. The way in which the new digital education is approached will bring consequences for that society in which everything related to the development and application of new technologies is underestimated. Beyond the promising discourses of prosperity, which emphasize the imperative of maximizing individual wealth, it is urgently required to find ways to generate promotion, valuation, and rewards aimed at achieving digital competences that can lead to a more inclusive and socially unified society.

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