

# ALFABETIZAÇÃO DIGITAL DE PROFESSORES UNIVERSITÁRIOS ORIENTADA PARA NOVAS TECNOLOGIAS

## DIGITAL LITERACY IN UNIVERSITY TEACHERS ORIENTED TOWARDS NEW TECHNOLOGIES

## ALFABETIZACIÓN DIGITAL EN DOCENTES UNIVERSITARIOS ORIENTADOS A NUEVAS TECNOLOGÍAS

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**RESUMO:** As mudanças radicais pelas quais a humanidade está passando deram lugar a transformações, entre as quais se destaca o ensino de nível superior, e neste aspecto é necessário contemplar a diversidade de situações próprias da alfabetização digital. Este aspecto é o que catalisa o desenvolvimento deste trabalho em que se dão a conhecer os diversos posicionamentos e expectativas em relação à literacia digital na perspectiva das novas tecnologias de forma a dar um panorama mais consistente em relação às constantes mudanças, que continuam a evoluir e que apontam inexoravelmente para a sugestão inelutável de mudanças de cargos no ensino superior, aspecto que, pelas suas nuances, conjuga uma série de aspectos que este trabalho dá a conhecer.

**PALAVRAS-CHAVE:** literacia digital, competências digitais, tecnologia digital, ensino universitário.

### Introduction

Since the beginning of this century, there have been disruptive changes linked to the intensive application of new technologies in education. According to Aeni, Hanifah, Sunaengsih (2019), the digital era is a period marked by the existence of digital technology, specifically the Internet. The global network is stronger and affects the daily lives of individuals and society. We are witnessing the emergence of a new phenomenon: the global virtual educational community that comprises more than one billion people, this number continues to increase rigorously (LIU, TRETYAKOVA, FEDOROV, KHARAKHORDINA, 2020). For their part, Mercader, Gairín (2020) stated that studies to date continue to show that there is a lack of use of new technologies and digital resources by university teachers, despite the fact that digital technologies are currently the most widespread and popular resources in the world.

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The references expressed by Rizal, Setiawan, Rusdiana (2019) have shown that one of the main priorities of the member countries of the European Commission for 2020 has been focused on digital literacy (DL) since, according to the aforementioned researchers, the aforementioned commission demands that the members of their community develop capacities to learn, participate and create using digital media, all with a view to generating the human resources required to face the global challenge; In other words, to seek among this group an elite that can make the most of current and future digital resources in order to maintain their status and supremacy in this area and the activities that, by default, are subject to these technologies.

According to Hobbs, Coiro (2019), DL can be defined as an expanded conceptualization of literacy that responds to the ongoing changes in the information and communication technologies that are part of everyday life and that also comprise a range of competencies that the individual possesses in order to use them adequately in digital devices characteristic of the digital age, taking into account aspects such as adequate access, application, evaluation, analysis and fusion of data, as well as the creation of new knowledge. Something different is the idea proposed by Watt (2019) who stated that the conceptions on DL also cover a wide and changing range of issues and problems related to the use and abuse of the Internet. According to Yildiz (2020), AD can be defined as the ability to produce information using digital technologies since, according to the researcher, the spectrum of AD skills are the most important skills that individuals should possess in the current era. A slightly different idea of DL is given by Durán, Ozen (2018) who conceive it as the capacity to access and reveal information by means of digital tools so the authors assume that, in order to be digitally literate, individuals must have developed high-level critical thinking skills such as research, inquiry, problem solving and decision making.

As mentioned by Spante, Sofkova, Lundin, Algiers (2018), digital competence and SD are concepts that are increasingly used in public discourse; but it has not yet been clarified or elucidated how these concepts are used and furthermore how they are defined. Therefore, it is necessary to know the current state of DL, as well as to look for and introduce this precept towards the approach of new technologies in order to be able to take advantage of the new environments and learning models based on the use of modern and innovative technologies and digital learning methods. On the other hand, LIST, Brante, Klee (2020) mentioned that DL stands as the critical competence for teachers and students subject to the challenges produced continuously by the demand and the technological, informative, cognitive and

socio-emotional development of the digital age. According to what has been established, the objective is to know the current state of DL and its relationship with university teaching in relation to the use of new technologies in order to take advantage of new environments and learning models based on the use of digital environments.

## **Methodology**

The theoretical review and, at the same time, a comparative synthesis of works related to digital literacy (DL) from different latitudes have been used, for which information from certified databases (EBSCO, Scopus, Web of Science, Pro Quest, Scielo, Redalyc and LatinDex) has been gathered. As inclusion criteria, they were assumed in relation to key words, verified by Thesaurus, such as digital literacy, university or higher education, digital technology and digital environments. Research articles and conferences from the last four years were taken as criteria for exclusion in order to maintain the current relevance of the reference framework for DL.

## **Digital Literacy In The Current Conjuncture**

According to YILDIS (2020), the concept of literacy is divided into certain sub-branches such as information literacy, network literacy, visual literacy, digital literacy (DL), among others; from which the concept of DL comes to the fore in terms of information and communication technologies (ICTs), so its alignment with new technologies is undeniable. According to Liu et al. (2020), the concepts of computer, media and digital literacy are based on the imperative need to use the new technologies of the digital age.

According to Spante et al. (2018), in the last two decades, the concepts referred to DL have been employed with a greater frequency and are increasingly discussed in policy documents focused on what kind of skills and knowledge people should have in a knowledge society (REIS, PESSOA, GALLEGO, 2019; LIST, 2019). The SD practices required to fully interact in today's world are continually expanding as new digital technologies advance (Watt, 2019). According to Mercader, Gairín (2020), digital technologies include all types of hardware and software devices that assist in the communication, access, transmission and storage of information in digital environments.

AD has become the set of key competences of the 21st century (TOMCZYK 2020; YILDIS, 2020; COPPARI, BAGNOLI, 2020); but according to the position of Jiménez, Miguel, Fernández, Díaz (2017), questions and diatribes persist about whether university teachers possess those digital competences required to adequately develop the teaching-

learning processes in today's digital environments. Along the same lines, it is worth mentioning the assessments made by García, Villarreal, Ortega, Cuellar, Henao (2020), whose research on university teachers' attitudes towards new technologies revealed a lack of specialized profiles in relation to ICTs, an issue that, from their perspective, could be mitigated by substantive teacher training focused on increasing the levels of DL in order to reduce the aforementioned gap.

It is clear that the transcript of DL is at the mercy of time, and while in the past it changed slowly, it is now changing rapidly under the influence of the rapid development of digital technologies (ZÁHOREC, HAŠKOVÁ, MUNK, 2019; LIST, 2019). According to the estimates of Liu et al. (2020), an efficient organization of the educational process, together with a rapid acceleration of the digitalization of society, would be impossible if the AD is not increased, if the latter is really estimated and new models of didactics of digital learning are developed respectively. Such processes become even more forceful when they are aligned in relation to the burdensome complexity of the problems in the educational field, especially in Latin America, in which teachers are currently involved.

A fact that has sometimes gone unnoticed, in spite of its clear evidence, is the one referred to by Liu et al. (2020) about the essence of the contents referring to the competences of the digital framework, which were subordinated to their time; from which it can be rescued that, although the changes in technologies in previous decades passed with certain parsimony, today, the growing influx of changes caused by the irrepressible advance of digital technologies is taking place at a dizzying rate. Therefore, depending on the new digital technologies, the technological didactic competences of the teacher can be defined as their professional AD skills oriented to the use of digital learning tools and their application in the practice of teaching a subject. The research developed by Gnawali (2020) concluded that DL training for teachers is a crucial mechanism to ensure that DL is integrated into the classroom. Therefore, bringing critical DL practices into the classroom involves challenging teachers' attitudes and beliefs towards multi-modal literacies (WATT, 2019).

On the other hand, the ways in which students adopt a set of new technologies at the institutional level do not always reflect the intentions of the investment made or the objectives of curriculum development; those who are likely to evaluate their use will do so with some bias because they tend to define DL by categorically classifying something students have (or do not have) rather than something they do (HÄMÄLÄINEN, DE WEVER, NISSINEN, CINCINNATO, 2019; ALT, 2018). In order to simplify the process of DL, Durriyah, Zuhdi

(2018) suggested that priority should be given to categorical aspects such as finding and using digital content, as well as producing and disseminating digital content, all supported by the development of specific complex skills such as creativity, innovation, understanding, critical thinking and value judgment.

A particular appreciation of SD was suggested by Spiers (2018), who mentioned that, at present, there is no consensus on a framework to concretely define all aspects related to SD mechanisms that can adequately meet demands on a contemporary global scale. On the other hand, Watt (2019) assumed that the issue of SD is configured and defined in terms of the socio-cultural contexts in which they occur and develop continuously as new technologies are generated and introduced.

According to Fallon (2020), current studies have converged in demanding a reconceptualization of the results of teacher training programs, emphasizing the suggestion of abandoning the current emphasis on DE, which gravitates around skills, in favor of broader digital competency models that recognize the most appropriate knowledge, skills, and dispositions that fit the needs of future university teachers according to their context.

According to watt (2019), in the case of Canada, teachers, teacher trainers, and researchers in the field of DL are struggling to keep up with innovations; but this process has proven to be tedious; Despite the fact that the Canadian government has made AD processes mandatory, the changes and modifications obtained in the field of education have not generated the expected results. This is due to the process of rapid changes that are generated in the field of new technologies, since although some are implemented with relative success, they tend to become obsolete due to the changes that have occurred, not only in the use of programs, but also in all the media support used.

### **Digital Literacy (DI) In The Context Of University Teaching**

According to Rizal, Setiawan, Rusdiana (2019), the University has a great influence in equipping teachers with various skills so that they are prepared to carry out their duties as educators. According to Phoenix, Trang (2019), DL is a skill that must be taught and developed, especially in the academic field, since the so-called digital divide is a systemic social problem, beyond what educators could solve in one semester. Currently, Diaz et al. (2020) stated that the problem of DL around university teachers is perceived at a global level. According to De Sousa et al. (2020), SD cannot be separated from digital competence, since, according to the point of view of the cited authors, the latter is inevitably subordinated to the former, despite the fact that both terms have been exposed from different perspectives, many

of them divergent from each other due to academic or political planning, or both facts that can be corroborated in ambiguities and incompatibilities resulting from crossed references.

The standards in academic qualification and teaching competence have assimilated and combined the AD in the competences of professional teachers; assuming also that the university is the entity that has a great influence in equipping teachers with diverse competences so that they are prepared to develop their functions as educators (RIZAL, et al., 2019). The urgency in the training of qualified teachers who have the possibility of an efficient use of digital environments according to the objectives (specific and general) set by the curriculum, for an adequate use of ICT and new technologies is what, according to Diaz et al. (2020), is known as teaching AD. On the other hand, a transcendental aspect of the professional competence of higher level teachers is their level of relevance in the use of the most up-to-date ICTs, which have been successfully incorporated into their pedagogical and professional activity, since this process is a central part of teaching AD (ILINA, GRIGORYEVA, KOKOREV, IBRAYEVA, BIZHANOVA, 2019; PÉREZ, MARTÍNEZ, PATIÑO, 2018).

The idea of teaching AD proposed by Hobbs, Coiro (2019) contemplates the process of projection on the needs of educators through the design, implementation and evaluation of professional development programs that motivate the incorporation of tools and digital technologies according to the curricula. For example, in the cases of Ukraine, Poland and the Czech Republic, Chmura, Malach, Vicherková (2019) reported that university teachers encouraged their students to use available electronic information resources, which contributed to the improvement of the level of AD of university students, the same ones that are necessary for their future professional life. Therefore, it is more than necessary to study the current state of DL, as well as to seek and introduce new learning models in the educational system based on the use of modern and innovative technologies and digital learning methods (LIU, et al., 2020; TOMCZYK, 2020).

As stated by Campbell, Kapp (2020), recent research has recognized the limitations of conceptualizing digital as a discrete set of skills that could be taught or provided to teachers and that, consequently, would lead to better technological integration by teachers. The above is exposed with the results presented by the aforementioned researchers who stated that when the specific devices or programs with which teachers were familiar were not used in their practice contexts, they struggled to conceptualize how they would integrate SD into their teaching. This finding highlighted that teachers focused much more on their digital

competencies and insecurities about their digital technical skills than on using digital possibilities for student learning.

The essential point made by Eryansyah, Erlina, Fiftinova, Nurweni (2019) is that DL is becoming a necessary skill for everyone (including senior teachers as a priority) in this century. According to the previous precept, these authors recognize the importance of university teachers being digitally literate; assuming that before proceeding to develop any AD program it is a requirement to know at what level of AD educators are in order to satisfy their demands according to the field in which they work. According to Cote, Milliner (2018), if the level of DL in university teachers is to be considered, this process must be resolved in the context in which they work, all with the aim of being able to assimilate the various factors on which they work, such as technological support, connectivity, accessibility, among others.

The question is: what would be the basic digital competencies of university teachers to approach the idea of presenting an acceptable SD? Well, an answer to such a diatribe was given by the research of Fernandez, Leiva, Lopez (2018) who, evaluating 53 teachers at the University of Malaga, reported that the most representative was the display of basic digital skills that revolve around the search, processing and production of information, an aspect that was consistent with other similar studies (DIAZ et al., 2020; FALLON, 2020). On the other hand, there is also, perhaps, a more crucial question, what is the benefit that by default is achieved when teachers reach an acceptable level of AD? A plausible approach is presented by Ilina et al. (2019) who explained that in the current and future digital context, the learning and teaching processes optimized by the introduction of new technologies should be developed in order to guarantee that future professionals trained in the university faculty not only possess high level skills but also are able to assimilate the possible ones, but evident changes at the level of their future work performance, among which it is worth highlighting a spectrum of skills that allows them to treat, compile and process information and problem solving in high technology environments, since the mentioned process is inevitably aligned to the use of digital technologies, communication tools, networks, among others (HÄMÄLÄINEN et al., 2019).

The continuous development and transformation of virtual environments and digital tools makes it necessary to evaluate aspects related to DE in the current university educational context, taking into account the diverse contexts of the diverse functions exercised by teachers (DIAZ, CRUZ, PÉREZ, 2020). Developing DL in the context of its positive implementation within the teaching and learning processes is as important as knowing the negative aspects of

the common use of new media (TOMCZYK, 2020). To advance teachers' DL skills, Hobbs, Coiro (2019) expressed the need to generate opportunities for them to reflect on their motivations for using digital media, make collaborative research a substantive component of the practical learning experience, and create opportunities to put teachers and students (rather than machines) at the center of attention. Standardized protocols on how teachers use new technologies should be critically examined and not assumed as a finished whole that is reinforced by daily practice, and research should be guided to unravel possible asymmetrical teacher AD relationships (BUDARINA, POLUPAN, 2019).

On the last aspects dealt with, it is worth highlighting an undeniable fact in relation to the DP both from its conceptions and from its practice, which links it closely to digital competences, a fact which leads to the question: what do we call digital competence? According to the analysis of a series of existing definitions made by Heinonen, Jääskelä, Häkkinen, Isomäki, Hämäläinen (2019), it could be synthesized that it is a dynamic conception whose particular feature lies in an active development, which is why it is constantly changing and being compared to the improvement of ICT, regularly. The introduction of innovations in the educational sector based on ICTs has triggered the development of the university educational system; which, with a view to enhancing the competitiveness of graduates, will lead to technological transformations necessary to materialize this effect (KVON, VAKS, KALIMULLIN, BAYANOVA, SHAIDULLINA, DOLZHIKOVA, LAPIDUS, 2019).

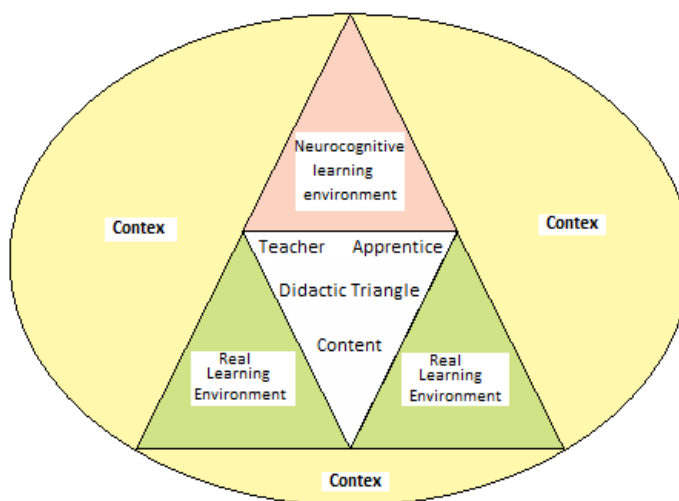
According to Cabero, Romero, Barroso, Palacios (2020), teachers at the higher level, in addition to being competitive in the field of new technologies, should feel committed to helping their students, socializing methods and procedures that will lead them to be creative, collaborative, innovative and decisive professionals. In addition, it will have to take into consideration the approach from social practice proposed by Bhatt, Mackenzie (2019) for AD which rejects a deterministic and predictive relationship between digital media and the expertise of students; bearing in mind that the social practice approach to AD should begin with a detailed exploration of AD in the lives of those who use technologies beyond the simple notion of "what works". In this sense, a social practice approach to DL will be distinguished from related perspectives such as "information literacy" and "media literacy" that conceptualize literacy as a metaphor for autonomous skills that could be assimilated and transferred from one domain to another (CAMPBELL, KAPP, 2020; KURNIAWATI, MAOLIDA, ANJANIPUTRA, 2018).



The way teachers manifest their beliefs about knowledge and learning to teach and the beliefs they bring to their professional expertise could play a dual role: as barriers or facilitators of learning, shaping their practice, and serving as heuristics for teachers embedded in the ever-changing contexts of the classroom (BHATT, MACKENZIE, 2019; PALLADINO, GUARDADO, 2017). Thus, Budarina, Polupan (2019) stated that the challenge for higher education is to understand how particular forms of AD practices tend to pave the way for developing mechanisms that are increasingly in line and continuous with changes in new technologies. According to Diaz et al. (2020), digitally literate teachers are in full possibility of being able to communicate and work more efficiently, especially with those who possess similar knowledge and skills.

On the other hand, Liu et al. (2020), based on theoretical research, proposed a modern model of DL training based on the 'didactic triangle of learning', the mentioned model was supported by the synthesis of three learning contexts: real, virtual and neurocognitive as shown in figure 1. This scheme tries to collect the links between new technologies, the didactics of digital environments in terms of AD.

Figure 1. AD training model based on the didactic learning triangle.



Source: Liu et al. 2020.

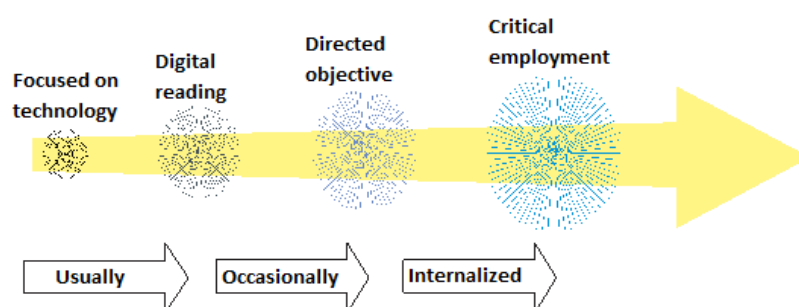
On the other hand, it should be taken into account what Rizal et al. (2019) have pointed out, who have suggested that a low level of DL in teachers is a challenge for the university, which is threatened to generate an effective program to achieve training in suitable processes of DL for all present and future teachers, either through learning based on new technologies or through special training activities on the five aspects of DL: information,

communication, content creation, security and problem solving. Through such programs, teachers will be equipped to meet the learning challenges of new technologies.

It is also important to take into account the suggestions of Marci, Vogel (2018), who suggested that activities aimed at the professionalization of university teachers in the area of DL should go beyond the mere process of transferring theoretical knowledge, as well as practical training, since this requires the integration of the increasingly constant use of modern digital technology, which represents a challenge for the current processes of teacher training for the higher level.

On the other hand, List et al. (2020) stated that university teachers' conceptions of DL-related aspects do not generally fall into a continuous sophistication, since as is the case with the implementation of DL policies led by the US government (which are developed on situations that consider that such aspect should only revolve around technology). For this reason, the aforementioned researchers exemplify a scheme, structured by official policy, to categorize conceptions of DL, as shown in Figure 2.

Figure 2. Framework for the progression of SD concepts.



**Source:** List et al. 2020.

In the context of training individuals in aspects related to DL, one of the problems that teachers involved in such processes must know about is the issue of being aware of the benefits/detriments of digital technologies; therefore, such trainers should not only propose a program focused on the potentialities of new technologies, but also the added value should focus on the risks and vulnerabilities that are likely to occur in digital environments if the trainees are to manage a solid profile of digital skills (YILDIZ, 2020).

The challenge for higher education, according to Bhatt, Mackenzie (2019), should be outlined by developing certain DL practices to pave the way for the construction of approaches based on the application of new technologies that are increasingly suitable and powerful as a reinforcement of their didactics. An undeniable fact is expressed by Aeni et al.

(2019) and is that the success of DL is related to the key role of the teacher as a facilitating agent of the teaching-learning process. On the other hand, Záhorec, Hašková, Munk (2019) stressed the importance that technological didactic competences have had as an integral part of the profile of professional teaching competence, regardless of the subject they have been teaching. These competencies can be defined as the set of skills developed by the teacher to employ, ideally, material and technical didactic means in their teaching processes, which are related to a competitive profile of AD (COPPARI, BAGNOLI, 2020; GONZÁLEZ, TARANGO, FIERRO, 2018).

## Conclusion

Today, SD has become a trend in the educational field due to the great leap in technologies, which have produced significant changes in daily life; therefore, the gap in the availability of digital devices must be reduced and it is necessary to expand access to technologies for the creation of equality (POLIZZI, 2020; LIU ET AL., 2020; LÓPEZ, POSO, MORALES, LÓPEZ, 2019; PHOENIX, TRANG, 2019). On the other hand, Chmura et al. (2019) reported that DL processes, as well as digital competences, are a professional prerequisite that is increasingly important for today's academics in all countries. There is no doubt that the development of digital technology is taking place very rapidly and has achieved a significant influence on various aspects of life and society, including education (VALENZUELA, COLLANTES, DURAND, 2020; RIVAS, GÉRTRUDIX, DE CISNEROS, 2019; LÉVANO, SÁNCHEZ, GUILLÉN, TELLO, HERRERA, COLLANTES, 2019).

There is no doubt that future university teachers must be prepared to work in environments driven by new technologies in order to guarantee the academic success of students. To this end, these teachers must include SD in their practice so that the digital divide in teacher training can be closed, an objective that will become a vital input for the profession (PHOENIX, TRANG, 2019). According to Campbell, Kapp (2019), it is imperative that educators identify, in a substantive manner, with cutting-edge digital environments, for which they must have solid references in accordance with the discipline of their specialty that allow them not only to explore significant improvements in their pedagogical level, but also, in the generated path, to reflect on how to use the possibilities of digital environments as effective tools for learning (BHATT, MACKENZIE, 2019; BLAYONE, MYKHAILENKO, VAN OOSTVEEN, GREBESHKOV, HREBESHKOVA, VOSTRYAKOV, 2017).

Tomczyk's (2020) proposal for a holistic AD concept assumes that this aspect comprises knowledge and skills about the smooth handling of digital media and tools, taking into account the aspect of digital security. As referred by Yildiz (2020), teachers and/or academics are not able to keep up with the full spectrum of digital progress of the new generation, so it is plausible, given this context, to expect senior teachers and/or academics to use digital tools effectively and to possess relevant SD skills that will enable them to keep up with the continuous digital transformation.

For their part, Phoenix, Trang (2019) mentioned that while DL can be approached in a variety of ways, it is up to university teachers and policy makers as a whole to consider the experiences of specialists in digital environments in order to understand what DL entails and

thus be able to take full advantage of its possibilities. As the concept of DL continues to evolve, its foundations are expected to remain strong, because according to Bhatt, Mackenzie (2019), for the future, it will become a fundamentally humane form of lifelong learning. It is worth mentioning the suggestion by Lévano et al. (2019), based on their review, that the universe comprising digital competencies should not be dissociated from DL. In order for future teachers to become significantly involved with digital environments and tools, it is first suggested to have authentic models and tasks in the discipline that allow them to explore and then reflect on how to use the possibilities of the digital as tools for learning (CAMPBELL, KAPP, 2019).

According to Diaz et al. (2020), if adequate processes of DE for university teachers were carried out, this advance would allow for the reduction of the existing cultural gap between many teachers trained in previous stages to the current boom of new technologies, an aspect that students have been developing during all or most of their formative stage. As for the perspectives of the new technologies, Lau, Bonilla, Gárate (2019) mentioned that under the development of the systems made viable by artificial intelligence (AI) they affect and will continue to affect more and more the forms in the decision making on the one hand and of the labor future, on the other; according to the mentioned researchers, many graduates of diverse disciplines will be affected, since according to their perspectives this effect will be increased in the following three decades, with a plus of being able to generate new labor sources. For all this, universities, especially teachers of various specialties, are the first to become involved in the process of AD in order to develop high cognitive skills specialized in handling increasingly systematized and complex information in digital environments.

According to De Sousa, Pessoa and Arrufat (2019), it will be more than evident that it will be necessary to compete many times and other times less to collaborate with the systems of the new technologies, especially those based on AI, machine learning and big data, which together with the branches of bioengineering will be able to equal and exceed most of the human capacities; according to Valenzuela, Collantes, Durand (2020), the processes related to AI will be inevitable in the contexts of higher education; since AI is still in the process of development and is present in everyday life, making reality the most intelligent robots and automatic learning, such as the case of bots, especially chatbots; about which it is undeniable that, in the professional or personal sphere, entertainment, augmented reality, among others, are already predetermined by AI algorithms (VALENZUELA et al., 2020; LAU et al., 2019).

While it is true that university education is the crucible for the development of new technologies, it is not immune to problems that may arise from the implementation of these technologies (GUAYARA, MILLÁN, GÓMEZ, 2019). As a complement, the suggestions made by WATT (2019) are taken on board to guide the north of research into the problems associated with AD processes, such as potential threats in the area of confidential data protection, hacking, cyber-bullying, and Internet information traffic, among others.

The work done by List et al. (2020) showed that there is a gap between university teachers in training and the policies regarding the parameters that directly correspond to the DP (such as those set by PISA, OECD EU); According to the mentioned authors, in the case of nations such as the USA, the concepts of DL in the framework of policies tend to reflect four levels (as shown in figure 2) and with this only estimate a superficial idea regarding the processes of DL, since its central axis was based on mere technological aspects; a fact that tends to increase the gap in the training programs of university teachers in such DL programs. For this reason, it is requested that teachers have access to more sophisticated concepts in their preparation up to those positions that consider that DE requires the use of the technology of continuous critical reflection.

On the other hand, Hämäläinen et al. (2019) suggested that, unlike research that focused on the links between professionals/individuals mediated by ICTs, future research should have as a point of reference the perspectives of new technologies in the field of labor development; and as mentioned by Valenzuela et al. (2020) and Ocaña et al. (2020), to assume from now on the attractive possibilities of the treatment of big data, the enormous potential of AI and machine learning with the improvement of algorithms and computational power (quantum computing) with a focus on the future pedagogical implications that will inevitably arise in the new environments of human-machine interaction.

As long as a framework of emphasis based on notions of AD, technical-pedagogical knowledge and contents that are delimited to a regular or static space-time prevails, the achievements that may occur will be insufficient in relation to higher education. Due to the dynamism with which the new technologies are continually bursting in (RIZAL, et al., 2019), this panorama can be considered a double-edged sword since, although on the one hand the new technologies offer a series of benefits, this will also demand that those that were relevant and pertinent at the time be left aside. The latter would prove to be detrimental to the regions of the world that are still technologically dependent, which shine for their meager economic actions in the development/implementation of new technologies, so that the technological gap

(if adverse positions were adopted) would be insurmountable, configuring the ideal scenario for events that could have repercussions with very pitiful indicators not only in higher education, but also in its economy.

### **DIGITAL LITERACY IN UNIVERSITY TEACHERS ORIENTED TOWARDS NEW TECHNOLOGIES**

**ABSTRACT:** The radical changes that humanity is going through have opened up transformations in higher-level education; hence, the need arises to contemplate the diversity of aspects of digital literacy. In this work, the various positions and expectations in relation to digital literacy from the perspective of new technologies are presented in order to give a more consistent panorama in relation to the constant changes that continue to take place and that inexorably point to the ineluctable suggestion of changes of positions in higher education.

**KEYWORDS:** digital literacy, digital skills, digital technology, university teaching.

### **ALFABETIZACIÓN DIGITAL EN DOCENTES UNIVERSITARIOS ORIENTADOS A NUEVAS TECNOLOGÍAS**

**RESUMEN:** Los cambios radicales por los que transita la humanidad han dado apertura a sendas transformaciones, entre las que destacan la enseñanza a nivel superior y sobre este aspecto es que cabe la necesidad de contemplar la diversidad de aspectos que son propios de la alfabetización digital. Este aspecto es lo que cataliza el desarrollo del presente trabajo en el cual se dan a conocer las diversas posturas y expectativas en relación a la alfabetización digital desde la perspectiva de las nuevas tecnologías a fin de dar un panorama más acorde en relación a los cambios constantes que se siguen gestando y que apuntan inexorablemente a la sugerencia ineluctable de cambios de posturas en la docencia superior, aspecto que por sus matices conjuga una serie de aspectos que el presente trabajo da a conocer.

**PALABRAS CLAVE:** alfabetización digital, competencias digitales, tecnología digital, docencia universitaria.

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