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Articles scientists

Perfiles de Competencia Digital Docente (CDD) de los profesores universitarios por áreas de conocimiento

Profiles of Digital Teaching Competence (CDD) of university professors by areas of knowledge

Perfis de Competências Docentes Digitais (CDD) de professores universitários por áreas de conhecimento

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Resumen

La transformación digital en la Educación Superior demanda que los profesores universitarios desarrollen competencias digitales que les permitan innovar y adaptarse a las modalidades educativas actuales y futuras. Este artículo establece los siguientes objetivos: identificar los perfiles de Competencia Digital Docente (CDD) de los profesores universitarios a través del modelo de progresión por áreas de conocimiento y por área competencial, definir el perfil global de CDD de los profesores universitarios por área de conocimiento e identificar su perfil global de la planta docente. El método implementado es cuantitativo, de alcance no experimental, transeccional y descriptivo. La técnica para la recolección de datos fue a través del Cuestionario *"DigCompEdu Chek-in"* (Cuestionario del Marco Común Europeo para la Competencia Digital de los Educadores). El estudio se aplicó a 1,107 profesores de una universidad ubicada al noreste de México de distintas áreas de conocimiento. Los resultados destacan que áreas de Salud y Ciencias Sociales, Administración y Derecho poseen el Perfil Innovador y con respecto al perfil de CDD global, la mayoría de los profesores se perfilan como Líderes. Se concluye que los perfiles docentes evolucionan, se reinventan y se renuevan para adaptarse a las nuevas características que

demanda esta era digital, es momento de modificar el perfil docente convencional y transitar a un perfil docente digital que pueda desempeñarse en cualquier modalidad educativa.

Palabras clave: Competencia Digital Docente; Profesores Universitarios; áreas de conocimiento; perfiles docentes.

Abstract

The digital transformation in Higher Education demands that university professors develop digital skills that allow them to innovate and adapt to current and future educational modalities. This article establishes the following objectives: to identify the profiles of Digital Teaching Competence (DTC) of university professors through the progression model by areas of knowledge and by competency area, to define the global DTC profile of university professors by area of expertise, and to identify the global DTC profile of university professors. The implemented method is quantitative, non-experimental in scope, cross-sectional, and descriptive. The technique for data collection was through the "DigCompEdu Check-in" Questionnaire. The study was applied to 1,107 college professors from different areas of knowledge at a University located in the northeast of Mexico. The results highlight that areas such as Health and Social Sciences, Administration, and Law are the areas of knowledge that possess the Innovative Profile. Concerning the global DTC profile, most of the teachers have the Leader Profile. In conclusion, teaching profiles must evolve, reinvent, and renew themselves to make way for the new characteristics that this digital era demands; it is time to modify the conventional teaching profile and move on to a digital teaching profile that can perform in any educational modality.

Keywords: Digital Competence for Teachers; University Professors; areas of knowledge; teaching profiles.

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Resumo

A transformação digital no Ensino Superior exige que os professores universitários desenvolvam competências digitais que lhes permitam inovar e adaptar-se às modalidades educacionais atuais e futuras. Este artigo estabelece os seguintes objetivos: identificar os perfis de Competência Docente Digital (CDD) dos professores universitários através do modelo de progressão por áreas de conhecimento e por área de competência, definir o perfil global de CDD dos professores universitários por área de conhecimento e identificar o seu perfil global do corpo docente. O método implementado é quantitativo, de escopo não experimental, transversal e descritivo. A técnica de coleta de dados foi por meio do Questionário "DigCompEdu Check-in" (Questionário do Quadro Europeu Comum para a Competência Digital dos Educadores). O estudo foi aplicado a 1.107 professores de uma universidade localizada no nordeste do México de diferentes áreas do conhecimento. Os resultados destacam que as áreas de Ciências da Saúde e Sociais, Administração e Direito apresentam o Perfil Inovador e em relação ao perfil global de DDC, a maioria dos docentes se caracterizam como Líderes. Conclui-se que os perfis docentes evoluem, reinventam-se e renovam-se para se adaptarem às novas características que esta era digital exige. É hora de modificar o perfil docente convencional e avançar para um perfil docente digital que possa atuar em qualquer modalidade educacional.

Palavras-chave: Competência Digital para Professores; Professores Universitários; áreas do conhecimento; perfis de ensino.

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Introduction

Theoretical framework

It cannot be lost sight of that, being in the digital age, university professors of the future must possess a set of skills and knowledge, among them, according to Cabero and Palacios (2020a), are collaboration and teamwork, resilient character to respond to the new challenges that arise in education, assuming constant and permanent updating as a principle, valuing their academic profession and developing digital skills for the effective use of technologies.

Ocaña et al. (2020) agree with this position when pointing out that higher education currently demands that teachers manage and master digital skills, because they have a positive impact on the acquisition of knowledge and facilitate innovation in the teaching-learning process, in order to develop high-level digital skills in students for their insertion in the workplace. The above forces us to rethink how digitally competent university professors are in teaching practice in the current context.

Given this, it is evident that teachers require constant updating, given that technologies contribute to improving teaching practice; however, teachers must know how to use them effectively for their own benefit and that of their students (Amaya et al., 2020).

Nowadays, Higher Education Institutions (HEIs) need to undertake new actions to have teachers with a digital profile to meet the demands of higher education. In this regard, Marmolejo, F., (2020) points out that the recent crisis of the COVID-19 pandemic has shown that HEIs lack flexible school systems and structures to respond to exceptional situations such as the health crisis of the pandemic that has left great impacts, remembering that teachers made a great effort to find the appropriate digital ways and means to meet the needs and demands of their students; in this educational context, teachers modified their educational praxis with the intention of developing skills to work and teach through digital media.

Therefore, it is essential for university professors to master digital skills in order to respond effectively to the current demands of higher education, where it is not only necessary to be an expert in the content of the subject being taught and to have pedagogical and instructional knowledge, but it is also necessary to adopt technologies and innovate teaching strategies to empower teachers in their teaching work regardless of the educational setting in which they work (Amaya et al., 2021).

In short, it is essential that university professors integrate technologies into their educational practice, using these technological tools to their advantage and that of their students to strengthen the teaching-learning process, demonstrating to their institution that they are competent in the digital area in order to evolve in the way they teach.

Definition of key concepts

It is essential that, when addressing digital teaching competences as a central theme in this article, the definition of this key concept is presented. In this regard, the CDD are limited to referring to the set of technological competences that teaching staff use for their professional practice. In this regard, the concept of digital teaching competences “was born

at the end of the 20th century with the aim of integrating technological and digital developments into teaching activities with the objective of generating professional training alternatives" (Zavala et al., 2016).

Digital teaching skills, defined as transversal by authors such as Zavala et al. (2016), imply that all teachers, regardless of their area of knowledge, must develop skills to integrate technologies into their teaching practices. Likewise, Durán (2019, p. 27) defines CDD as a "set of knowledge, skills and attitudes necessary for a teacher to make effective use of ICTs from their different aspects (technological, informational, multimedia, communicative, collaborative and ethical) assuming pedagogical-didactic criteria for an effective integration of ICTs in their teaching experience and in general in any formal or non-formal educational situation."

Therefore, it is highlighted that the development of CDD is transversal and multidimensional in educational practice, that is, teachers from any area of knowledge have the possibility of relying on technologies to generate meaningful and innovative learning for their students. The teacher, by possessing the knowledge of the subject he teaches, as well as a pedagogy for teaching, through CDD has the opportunity to enhance and transform his skills to teach in any educational setting with the purpose of empowering and facilitating digital skills to his students (Nieto et al., 2017; Flores and Roig, 2016).

Furthermore, CDDs are currently a requirement of the professional teaching profile, especially if we take into account the application of emerging or advanced technologies in the educational field, such as robotics, computational thinking, artificial intelligence and augmented reality, among others (Pérez, 2023). Therefore, university professors require constant training to remain current in the digital field, even more so if they participate in the training process of the new generations that will soon be inserted in the work context.

In this regard, from the perspective of Gutiérrez (2019), today technologies and digitalization are the central axis of HEIs to carry out management, direction and administration processes, with educational systems that operate through digital means being more efficient, in addition to these, the teaching-learning processes that allow students to have the possibility of personalized learning, without geographical and time limits, as well as scope and flexibility.

Therefore, after what happened during the pandemic, ICTs are considered essential digital tools to be used in any educational setting with the intention of generating meaningful learning. However, technologies do not act on their own; their adequate integration into the

teaching-learning process will depend largely on the technological capacity demonstrated by university professors in virtual learning environments (Rojas et al., 2019; Rodríguez, 2019).

According to the above idea, a university professor is considered digitally competent when he or she demonstrates that he or she has knowledge in the use and management of ICT, articulating the disciplinary, didactic and pedagogical competencies to successfully carry out his or her academic work, seeking to diversify the teaching-learning options and strategies using technologies to provide students with the opportunity to build new knowledge through the use of digital tools and methodological strategies (Orozco- Cazco) . et.al ., 2020).

In short, the current educational context demands that teachers be digitally competent in order to incorporate emerging technologies required by the different areas of knowledge. Therefore, CDD, when considered transversal, are added as a valuable element to enhance learning in students.

Context and relevance of the study

Regarding the relevance of the study, CDDs are considered a topic of great interest and impact in the modern academic field (Fernández, et al. 2024), in addition to the fact that there is limited scientific production associated with CDDs in Latin America (Salazar et al., 2022), which is why it generates great expectations to address this line of research to contribute to the generation of knowledge and demonstrate the results obtained to the scientific community.

Another contribution to the scientific community is to identify the digital competence profiles of university professors from a university located in the northeast of Mexico, with the support of the European *DigCompEdu Framework.* (Redecker and Punie , 2017) through the instrument called *“ DigCompEdu Check -in* ” (Common European Framework Questionnaire for Digital Competence of Educators) . This European Framework invites adoption and adaptation according to the characteristics of the context in which the study is applied (Cabero and Palacios, 2020), therefore, taking into consideration that in the context of Mexican Universities it is different, in terms of the perception and association that is had with digital competences, this study will provide an overview of the profiles in digital competences of teachers.

It is important to mention that, in the literature review process for the construction of this theoretical framework, different digital profiles were identified in other research, such

as the research carried out by Gewerc and Montero (2013) who identified two types of profiles: teachers enthusiastic about ICT and novice teachers in ICT, as well as Sosa and Valverde (2020) who identified four profiles: reluctant, learner, manager and e-innovator, for their part, Tondeur et al. (2019) identified two profiles: low ICT profile and high ICT profile, as well as Mama and Hennssey (2013) identified four profiles: inclusive, potential, accidental and hostile, the most recent study being the one carried out by Hidalgo-Cajo and Gisbert-Cervera (2022) categorizing five profiles: resistant, confused, adopter, persuaded and innovative.

However, for this research, the DipCompEdu Framework was selected , given the relevance of the instrument and the advanced development that the European Commission's Joint Research Centre has in the digital area. In addition, it has been identified that among its main advantages is that it invites and encourages adaptation and modification of the context, as well as specific purposes, providing digital profiles from initial to advanced levels (Redecker and Punie , 2017). This Framework is aimed at teachers at all educational levels from early childhood education to higher and adult education, including general and vocational training, education for students with special needs and non-formal learning contexts (Redecker and Punie , 2017).

Research objectives

Finally, with regard to the research objectives, efforts are focused on achieving the following three objectives:

- Identify the CDD profiles of university professors through the progression model by areas of knowledge and by area of competence,
- Defining the overall CDD profile of university professors by area of knowledge through the progression model
- Identify the overall profile of the teaching staff

Research design

This study used a quantitative approach, aimed at identifying the CDD profiles of the professors of the Autonomous University of Tamaulipas (UAT). The use of an instrument based on a Likert scale allowed collecting and analyzing numerical data through statistical techniques, representing the results accurately . According to McMillan et al. (2005), the

quantitative research approach highlights the objectivity and quantification of phenomena through the use of statistics.

Regarding the scope of this research, it has been defined as non-experimental, cross-sectional and descriptive, considering elements and characteristics explained below.

This research was designed as non-experimental, since none of the variables in this study were manipulated. In this regard, McMillan et al. (2005) point out that the non-experimental design describes a circumstance that has occurred or examines the relationship between aspects without direct manipulation of the conditions that are experienced.

Furthermore, this research was considered cross-sectional because data collection was carried out at a single time, particularly during a school term. According to Hernández et al. (2014), in research with a cross-sectional design *"data is collected at a single time, in a single period of time."*

Likewise, this research was designed as descriptive since it seeks to specify the particular characteristics of UAT teachers in the digital area. Descriptive studies, "seek to specify important properties and characteristics of any phenomenon being analyzed, as well as describe trends in a group or population" (Hernández et al., 2014); descriptive studies are useful to accurately show the angles or dimensions of a phenomenon, event, community, context or situation.

Data collection methods

Since this is a quantitative research, the technique selected for data collection was the instrument called the *" DigCompEdu " Questionnaire. "Chek -in",* which is an analysis instrument of the European Framework of Digital Competence for Teachers *DigCompEdu* (Redecker and Punie , 2017).

Scope of the investigation

Population

Based on the statistical data of the 1st Rectoral Report of the Autonomous University of Tamaulipas, in the fall 2022-3 period the teaching staff rose to a total of 2,889 professors (UAT, 2022). Of which 937 are Full-Time Professors (PTC), representing 32.4% and 1,952 Free Hours Professors (PHL), representing 67.6% of the UAT teaching staff.

Sample

For this reason, to calculate the probabilistic sample, the one indicated by the authors Münch and Ángeles (2007) was applied, which considers 5% error and 95% confidence level. Obtaining for this case, the result of the representative sample of 384 University Professors.

It is worth noting that a total of 1,107 university professors participated in the study, far exceeding the representative sample. Regarding participation by gender, 53% are male and 47% female. In addition, according to the composition of the teaching staff, 59% of participants are PHL and only 41% are PTC.

Instrument Features

It is important to highlight that the development of the instrument was carried out from a process of expert consultations, tests prior to the pilot phase and review of elements (Ghomi and Redecker , 2018). The first version of *" DigCompEdu "Check -In"* was published in English during March 2018, and was completed by 160 independent teachers from the European Union (Benali et al., 2018). The data analysis showed excellent internal consistency for the entire instrument, with a Cronbach's alpha of .91 (Cabero and Palacios, 2020b, p. 228).

In addition to the above, in October 2018, an updated version of the instrument in question was published, available in English and German, which presented improvements in the competency levels of the competency framework. According to Ghomi and Redecker (2018), the updated version of the instrument, validated with 335 German teachers, obtained a Cronbach alpha coefficient of .934, which indicates high reliability (Cabero and Palacios, 2020b, p.228). The instrument *DigCompEdu* has been validated in previous research (Ghomi and Redecker , 2018, Benali et al., 2018, Joint Research Centre, 2019, as cited in Cabero and Palacios, 2020b).

Instrument Description

DigCompEdu Questionnaire *includes* 22 digital competencies organized into six competency areas, which are shown below in the following Table:

Table 1. Areas of competence

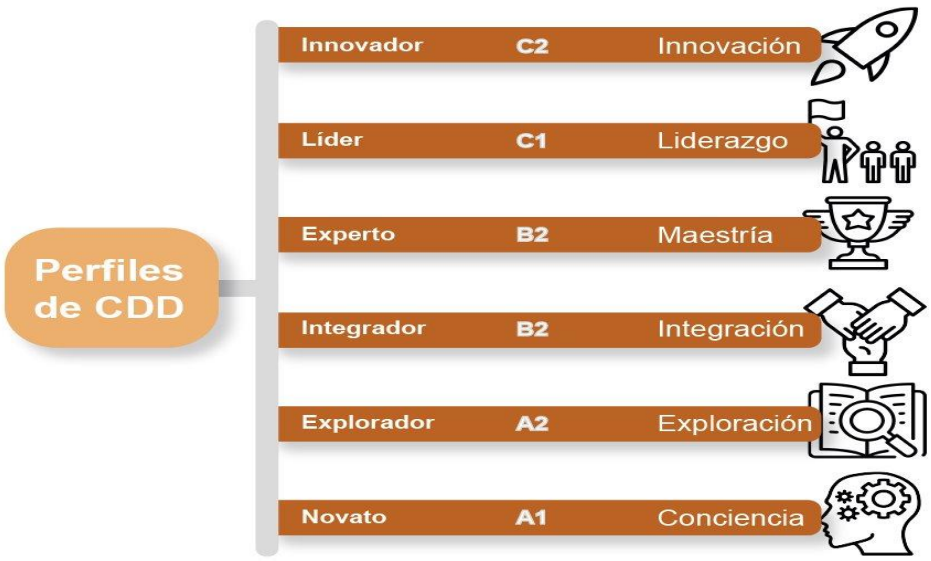
Areas competencies	Items
1.- Commitment Professional	4
2.- Resources Digital	3
3.- Digital Pedagogy	4
4.- Digital Assessment	3
5.- Empower the Students	3
6.- Facilitate Digital Competence for Students	5
Total items	22

Source: Redecker and Punie (2017)

Regarding the measurement of the instrument, it was carried out as follows (Cabero and Palacios, 2020b, p. 226):

1. "Each item considers its measurement through a five-interval Likert scale."
2. "When participants select an item, they reflect their technological mastery according to the five-interval Likert scale."
3. "The instrument *DigCompEdu* has an internal scoring system, which follows a linear progression logic."
4. "The linear progression considers the following scale: 0 points: "no commitment", 1 point: "partial knowledge", 2 points: "occasional use", 3 points: "increasing use" and 4 points: "systematic and comprehensive use".
5. "The maximum points per question is 4 points and the maximum points to obtain in the entire test is 88."
6. The progression model outlines six levels, these being: A1 "Novice", A2 "Explorer", B1 "Integrator", B2 "Expert", C1 "Leader" and C2 "Innovator".
7. The progression model provides an overall classification of Digital Teaching Competence, placing profiles with the following scores: A1 "Novice from 0 to 20 points", A2 "Explorer from 20 to 33 points", B1 "Integrator from 34 to 49 points", B2 "Expert from 50 to 65 points", C1 "Leader from 66 to 80 points" and C2 "Innovator from 80 to 88 points".
8. In addition, the progression model provides a classification by area of competence. *DigCompEdu*) described in the previous points is presented as an example :

Figure 1. Digital Competence Progression Model for Teachers *(DigCompEdu)*



Source: own elaboration.

Figure 1 shows the progression of digital levels and profiles in which teachers can be positioned, according to the mastery of digital technologies that they have in their teaching practice. Therefore, a brief description of the different digital profiles is presented (Cabero and Palacios, 2020, p.220):

- Novice Profile (A1): has very little experience and contact with educational technology; requires ongoing guidance.
- Explorer Profile (A2): little contact with educational technology; does not develop strategies to include them in the teaching-learning process; requires additional guidance.
- Integrative Profile (B1): experiments with educational technology and reflects on its suitability for application in different educational contexts.
- Expert Profile (B2): uses a wide range of educational technologies to apply them with confidence, security and creativity; seeks continuous improvement of their teaching practice.
- Leader Profile (C1): has the ability to adapt educational technology to his/her needs; is a source of inspiration for other teachers.
- Innovative Profile (C2): They lead innovation with technologies and are a role model for all teachers.

Validation of the instrument

It is worth mentioning that for this research the instrument called *DigCompEdu* was validated through Cronbach's Alpha, obtaining a result of .956; which shows that it has consistency and high levels of reliability (Bisquerra, 2009; Hernández et al., 2014).

Application of the instrument

The instrument was distributed during the 2023-1 period via institutional email and the Microsoft Teams platform, where it was available in the General Class Channel for each teacher.

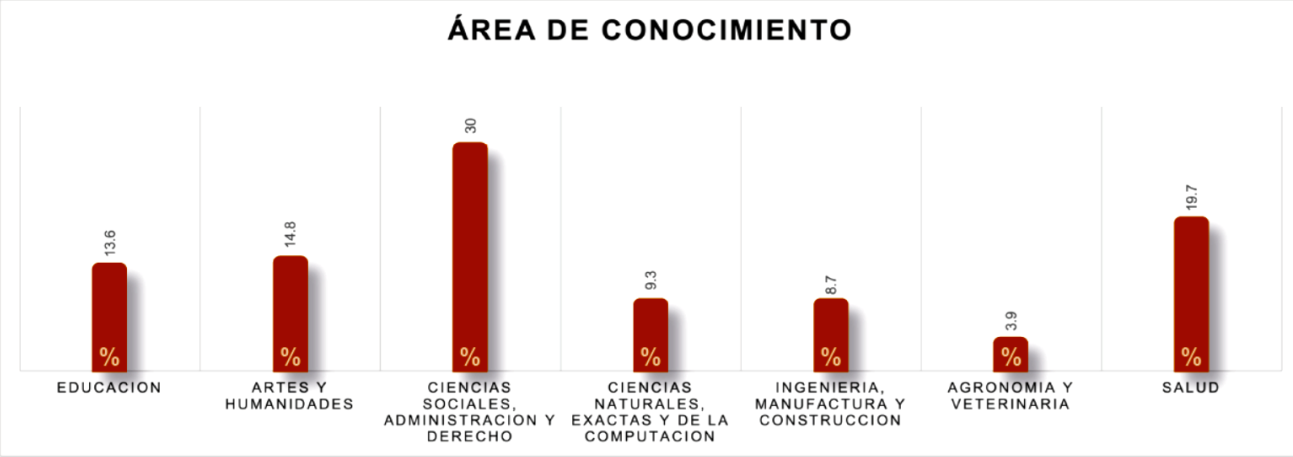
It is worth mentioning that the *DigCompEdu Instrument* It was selected as the most appropriate for the objectives of this research, since it integrates a broad set of digital skills for teachers of any educational level. In addition, it allows for classifying the level of competence and therefore defining digital profiles, with the aim of taking advantage of the potential of digital technologies to improve and innovate in the teaching-learning process.

In summary, the research design allowed us to meet the objectives that were defined with the intention of identifying the diversity of profiles, recognizing the digital skills of university teachers by area of knowledge.

Results

This section presents the research results derived from the participation of 1,107 university professors, distributed as follows: 13.6% (151) Education, 14.8% (164) Arts and Humanities, 30% (332) Social Sciences, Administration and Law, 9.3% (103) Natural Sciences, Exact Sciences and Computing, 8.7% (96) Engineering, Manufacturing and Construction, 3.9% (43) Agronomy and Veterinary Medicine and 19.7% (218) Health, as shown in Figure 2:

Figure 2. Distribution of participation of university professors by area of knowledge



Source: own elaboration.

The participation of professors of Social Sciences, Administration and Law stands out, with 332 professors participating (30%) and Health registering a participation of 218 professors (19.7%); in these areas there are grouped professors who teach in undergraduate educational programs such as Public Accountant, Bachelor of Administration, Foreign Trade, Economics, Law, Communication and Marketing, as well as in Bachelor of Nursing, Medical Surgeon, Dental Surgeon, Pharmaceutical Chemist Biologist, Psychology, and Nutrition and Integral Health programs, respectively.

Continuing with the presentation of results, in Table 2, you can see the average scores and the standard deviation of each of the proposed items.

Table 2. Results of mean scores and standard deviation of " *DigCompEdu* "

Competence Area 1: Professional Commitment (A)	$\bar{x}$	σ
	14.01	2.483
A1. "I systematically use different digital channels to improve communication with students and my colleagues. For example: emails, messaging applications such as WhatsApp , blogs, the faculty website…"	3.60	.728
A2. "I use digital technologies to work with my colleagues inside and outside my educational organization."	3.56	.742
A3. "I actively develop my digital teaching competence."	3.47	.686
A4. "I participate in online training courses. For example: online university courses, MOOCs , webinars ...".	3.38	.747
Competence Area 2: Digital Resources (B)	10.14	1.996
B1. "I use different websites and search strategies to find and select a wide range of digital resources."	3.51	.741
B2. "I create my own digital resources and modify existing ones to adapt them to my needs as a teacher."	3.21	.871
B3. "I protect sensitive content securely. For example: exams, grades, personal data."	3.42	.821
Competence Area 3: Digital Pedagogy (C)	13.46	2.572
C1. "I carefully consider how, when and why to use digital technologies in class, to ensure their added value is realised."	3.47	.714
C2. "I monitor my students' activities and interactions in the online collaborative environments we use."	3.36	.745
C3. "When my students work in groups or teams, they use digital technologies to acquire and document knowledge."	3.41	.718
C4. "I use digital technologies to enable students to plan, document and assess their learning themselves. For example : self-assessment tests , digital portfolio , blogs, forums …"	3.22	.865
Competency Area 4: Evaluation and Feedback (D)	9.87	2.036
D1. "I use digital assessment strategies to monitor student progress."	3.32	.767
D2. "I analyze all available data to identify students who need additional support. "Data" includes: student engagement, performance, grades, attendance, activities, and social interactions in online environments… "Students who need additional support" are: those at risk of dropping out of school, underachievement, learning disorders, specific learning needs, or who lack transversal skills (social, verbal, or study skills)."	3.26	.797
D3. "I use digital technologies to provide effective feedback . "	3.29	.801
Competency Area 5. Empowering students in CD (E)	9.77	2.182
E1. "When I propose digital tasks, I consider and address potential issues such as equal access to digital devices and resources; compatibility issues or low level of digital competence of students."	3.27	.804
E2. "I use digital technologies to offer students personalized learning opportunities. For example: assigning different digital tasks to	3.11	.934

address individual learning needs, taking into account preferences and interests…"		
E3. "I use digital technologies to ensure that students participate actively in class."	3.38	.754
Competence Area 6: Facilitate competencies to students (F)	16.22	3.519
F1. "I teach students how to evaluate the reliability of information searched online and how to identify erroneous and/or biased information."	3.16	.860
F2. "I propose tasks that require students to use digital media to communicate and collaborate with each other or with an external audience."	3.26	.829
F3. "I propose tasks that require students to create digital content. For example : videos, audios, photos , presentations , blogs, wikis... ".	3.24	.888
F4. "I teach students how to behave safely and responsibly online."	3.23	.907
F5. "I encourage students to use digital technologies creatively to solve specific problems. For example, to overcome obstacles or emerging challenges in their learning process."	3.33	.811

Source: own elaboration.

Table 2, which presents the mean scores and standard deviation, shows the results by competency areas and competencies measured in the questionnaire, thereby revealing the teachers' self-perception of their technological and digital mastery. The scale on which each of the competencies is measured is presented on a scale between 0 and 4 points.

The results show that the technological and digital mastery of university professors is favorable, with the items located around the values 3.11 to 3.60, denoting a high digital teaching competence domain.

Below, from Table 3 to Table 8, the analyses of each of the digital teaching competencies by area of knowledge are presented, in line with the first objective of this research, which is to identify the CDD profiles of university professors through the progression model by areas of knowledge and by competency area. This shows us how university professors are positioned with respect to each of the competencies assessed by the *DigCompEdu Model* .

Table 3 . CDD: Professional Commitment

	A. Commitment Professional					
	Rookie (A1)	Explorer (A2)	Integrator (B1)	Expert (B2)	Leader (C1)	Innovative (C2)
Education	2.6%	1.3%	3.3%	29.1%	27.2%	36.4%
Arts and Humanities	1.2%	0.0%	1.8%	31.1%	33.5%	32.3%
Social Sciences, Administration and Law	1.5%	0.0%	1.5%	26.2%	34.9%	35.8%
Natural, Exact and Computer Sciences	0.0%	0.0%	0.0%	34.0%	35.0%	31.1%
Engineering, Manufacturing and Construction	1.0%	0.0%	3.1%	39.6%	25.0%	31.3%
Agronomy and Veterinary Medicine	23%	0.0%	7.0%	25.6%	37.2%	27.9%
Health	2.8%	.5%	3.2%	27.5%	29.8%	36.2%

Source: own elaboration.

Based on the descriptive analysis in Table 3., the profiles that teachers have in digital competence A. Professional Commitment by area of knowledge are evident, highlighting the following findings:

In the Innovator profile (C2), Education (36.4%), Social Sciences, Administration and Law (35.8%) and Health (36.2%) predominate, while Arts and Humanities (33.5%), Natural Sciences, Exact Sciences and Computing (35.0%) as well as Agronomy and Veterinary Medicine (37.2%) predominate in the Leader profile (C1). On the other hand, in the Expert profile (B2) there are professors belonging to the knowledge area Engineering, Manufacturing and Construction (39.6%).

Based on the above, the characteristics of the Professional Commitment competency area with respect to the identified profiles are presented below:

- Innovative Profile: They tend to reflect and redesign communication strategies, make use of technologies to promote innovative practice, evaluate digital methods and policies with a view to developing innovative methods and use opportunities for their continuous professional development in digital.
- Leader Profile: They evaluate and reflect on communication strategies, use digital technologies to reflect on and improve practices and competencies, reflect on and

improve general pedagogical practice through collaboration, and make critical and strategic use of the Internet for their ongoing professional development.

- Expert Profile: They use digital technologies for structured and repetitive communication, as well as for the collaborative construction of knowledge. They also use a series of resources to develop their own individual digital and pedagogical practices and seek opportunities for their continuous professional development online.

Table 4. CDD: Digital Resources

	B. Resources Digital					
	Rookie (A1)	Explorer (A2)	Integrator (B1)	Expert (B2)	Leader (C1)	Innovative (C2)
Education	1.3%	2.0%	6.0%	26.5%	27.2%	37.1%
Arts and Humanities	.6%	0.0%	6.1%	22.0%	37.2%	34.1%
Social Sciences, Administration and Law	1.2%	.6%	4.8%	26.2%	28.9%	38.3%
Natural, Exact and Computer Sciences	0.0%	0.0%	3.9%	28.2%	37.9%	30.1%
Engineering, Manufacturing and Construction	1.0%	1.0%	7.3%	35.4%	32.3%	22.9%
Agronomy and Veterinary Medicine	23%	0.0%	7.0%	23.3%	37.2%	30.2%
Health	23%	1.4%	6.0%	29.4%	27.1%	33.9%

Source: own elaboration.

Table 4 presents the descriptive analysis of the CDD: Digital Resources by area of knowledge. These analyses show the different profiles of university teachers, highlighting the following results:

The Innovator profile (C2) highlights the areas of knowledge of Education (37.1%), Social Sciences, Administration and Law (38.3%) and Health (33.9%). On the other hand, in the Leader profile (C1), the areas of knowledge of Arts and Humanities (37.2%), Natural Sciences, Exact Sciences and Computing (37.9%) as well as Agronomy and Veterinary Medicine (37.2%) predominate. Meanwhile, in the Expert profile (B2), the area of knowledge of Engineering, Manufacturing and Construction is located (35.4%).

It is highlighted that the digital competence “Digital Resources” is one of the competences in which teachers must know how to: modify, create and share digital resources,

adjusting them to their objectives and teaching styles, as well as to their students. In addition, they must know how to use and manage digital content responsibly in order to respect copyright and personal data protection regulations. Below is a more specific description of the "Digital Resources" competence aligned with the profiles obtained:

- Innovative Profile: promotes the use of digital resources, creates complex and interactive digital resources and produces professional publications of digital resources of own creation.
- Profile : Thoroughly locates and evaluates appropriate digital resources, creates individually or collaboratively with others, and modifies according to the learning context using a variety of advanced strategies, as well as makes digital publications of self-created resources.
- Expert profile: locates and evaluates appropriate digital resources using complex criteria, adapts advanced digital resources to a learning context, using various advanced strategies, and carries out professional content sharing.

Table 5. CCD: Digital Pedagogy

	C. Digital Pedagogy					
	Rookie (A1)	Explorer (A2)	Integrator (B1)	Expert (B2)	Leader (C1)	Innovative (C2)
Education	2.6%	0.0%	6.0%	37.1%	21.2%	33.1%
Arts and Humanities	.6%	.6%	6.7%	36.6%	23.2%	32.3%
Social Sciences, Administration and Law	.6%	.3%	7.2%	37.0%	19.0%	35.8%
Natural, Exact and Computer Sciences	0.0%	0.0%	14.6%	39.8%	21.4%	24.3%
Engineering, Manufacturing and Construction	0.0%	0.0%	7.3%	47.9%	18.8%	26.0%
Agronomy and Veterinary Medicine	23%	0.0%	16.3%	39.5%	20.9%	20.9%
Health	23%	.5%	5.0%	39.0%	19.7%	33.5%

Source: own elaboration

According to the descriptive analysis in Table 5, it is evident that all the areas of knowledge analyzed obtained the Expert level (B2) in the Digital Pedagogy competency area, which indicates that the mastery of said competency is moderate, with respect to other competencies where they are at a higher level.

The frequencies of the percentage obtained by area of knowledge in said competence were the following: Education (37.1%), Arts and Humanities (36.6%), Social Sciences, Administration and Law (37.0%), Natural Sciences, Exact Sciences and Computing (39.8%), Engineering, Manufacturing and Construction (47.9%), Agronomy and Veterinary Medicine (39.5%) and Health (39.0%).

It is worth mentioning that the "Digital Pedagogy" competence consists of designing, planning and implementing the use of digital technologies in the different stages of the teaching-learning process with approaches and methodologies focused on students. It is highlighted that the Expert profile in this type of competence uses digital technologies with the purpose of improving pedagogical strategies, as well as improving monitoring and guidance, uses digital environments to support collaborative learning and encourages students to use digital technologies in self-regulatory learning activities.

Table 6. CDD: Evaluation and feedback

	D4. Evaluation and feedback					
	Rookie (A1)	Explorer (A2)	Integrator (B1)	Expert (B2)	Leader (C1)	Innovative (C2)
Education	2.0%	1.3%	9.3%	33.1%	31.1%	23.2%
Arts and Humanities	1.2%	1.2%	6.1%	35.4%	23.2%	32.9%
Social Sciences, Administration and Law	.6	.3%	7.2%	31.6%	26.8%	33.4%
Natural, Exact and Computer Sciences	0.0%	0.0%	13.6%	39.8%	24.3%	22.3%
Engineering, Manufacturing and Construction	0.0%	3.1%	6.3%	45.8%	21.9%	22.9%
Agronomy and Veterinary Medicine	23%	0.0%	20.9%	20.9%	39.5%	16.3%
Health	23%	.9%	8.7%	30.7%	19.3%	38.1%

Source: own elaboration

Table 6 shows the different profiles of the competency area D. Evaluation and feedback held by teachers by area of knowledge, highlighting the following results:

In the Innovative Profile (C2), Health (38.1%) and Social Sciences, Administration and Law (33.4%) stand out. Meanwhile, at the Leader level (C1), the most prominent are Agronomy and Veterinary Medicine (39.5%). As regards the Expert profile (B2), the most

prominent are Arts and Humanities (35.4%), Natural Sciences, Exact Sciences and Computing (39.8%) and Engineering, Manufacturing and Construction (45.8%).

The assessment and feedback competence consists of the use of digital tools and strategies in the assessment and feedback of teaching- learning processes. The use of these digital strategies and tools gives rise to new and better assessment methods ; therefore, the profiles in this type of competence are described as follows:

- Innovative Profile: considers the development of innovative assessment formats using digital technologies, generates and evaluates data to evaluate and improve teaching.
- Leader Profile: Provides effective assessment and feedback through digital media, which allows implementing a series of new personalized strategies with students, providing feedback and support on a constant basis.
- Expert Profile: Strategically uses various digital assessment formats, also strategically uses digital tools for data generation and uses them to improve the effectiveness of feedback and support.

Table 7 CDD: Empowering students in CD

	E5. Empowering students in the CD					
	Rookie (A1)	Explorer (A2)	Integrator (B1)	Expert (B2)	Leader (C1)	Innovative (C2)
Education	2.6%	1.3%	8.6%	34.4%	24.5%	28.5%
Arts and Humanities	1.8%	1.2%	6.1%	31.7%	23.8%	35.4%
Social Sciences, Administration and Law	1.2%	1.2%	8.7%	32.2%	20.2%	36.4%
Natural, Exact and Computer Sciences	0.0%	2.9%	13.6%	37.9%	22.3%	23.3%
Engineering, Manufacturing and Construction	0.0%	2.1%	12.5%	43.8%	25.0%	16.7%
Agronomy and Veterinary Medicine	23%	0.0%	11.6%	37.2%	25.6%	23.3%
Health	2.8%	23%	5.5%	32.1%	23.4%	33.9%

Source: own elaboration

Table 7 presents the descriptive analyses of the digital competence E. Empowering students in digital competences, evidencing the profile that teachers have in said competence by area of knowledge, highlighting the following results:

The Innovative profile (C2) predominates in Arts and Humanities (35.4%), Social Sciences, Administration and Law (36.4%) and Health (33.9%). In contrast, the Expert profile (B2) is observed in Education (34.4%), Natural Sciences, Exact Sciences and Computing (37.9%), Engineering, Manufacturing and Construction (43.8%) and Agronomy and Veterinary Medicine (37.2%). Therefore, this competence is described in relation to the profiles achieved:

- Innovative Profile: promotes innovation in accessibility and inclusion strategies and personalization strategies using digital technologies, as well as digital strategies for active learning.
- Expert Profile: enables accessibility and inclusion, makes strategic use of various digital technologies for personalization, and for active student engagement with the subject.

In short, the competence to empower students in digital skills encourages student participation and autonomy to incorporate and master technologies in their learning process.

Table 8. CDD: Facilitating competencies for students

	F6. Facilitate skills for students					
	Rookie (A1)	Explorer (A2)	Integrator (B1)	Expert (B2)	Leader (C1)	Innovative (C2)
Education	3.3%	.7%	9.9%	35.1%	29.1%	21.9%
Arts and Humanities	.6%	1.2%	9.8%	32.3%	29.9%	26.2%
Social Sciences, Administration and Law	1.2%	.3%	10.2%	35.5%	26.5%	26.2%
Natural, Exact and Computer Sciences	0.0%	1.9%	10.7%	45.6%	16.5%	25.2%
Engineering, Manufacturing and Construction	0.0%	3.1%	16.7%	41.7%	24.0%	14.6%
Agronomy and Veterinary Medicine	23%	0.0%	16.3%	46.5%	23.3%	11.6%
Health	2.8%	.5%	6.0%	39.0%	22.0%	29.8%

Source: own elaboration.

Table 8 presents the descriptive analysis of the CDD: Facilitate competencies to students , showing the profile that predominates in all areas of knowledge is the Expert Profile (B2), located with the following frequency percentages: Education (35.1%), Arts and Humanities (32.3%), Social Sciences, Administration and Law (35.5%), Natural Sciences, Exact and Computer Sciences (45.6%), Engineering, Manufacturing and Construction (41.7%), Agronomy and Veterinary Medicine (46.5%) and Health 39.0%).

In this regard, the digital competence “Facilitating digital competences for students” deals with how to develop and facilitate the digital civic competence of students, considering within these competences that students make appropriate use of information and media literacy, communicate and collaborate digitally, have the ability to create digital content, generate well-being and have the ability to solve problems by providing digital solutions.

Therefore, the digital expert profile strategically implements a series of pedagogical tools promoting in students the basic skills that they must develop in communication and collaborative work skills in digital environments, as well as developing skills to create and update digital content, and solve problems for the effective use of technologies.

Below in Table 9, the global profile by area of knowledge is presented, in compliance with the second objective of the research which consists of defining the global CDD profile of university professors by area of knowledge .

Table 9. Overall Digital Teaching Competence by area of knowledge

	CDD by area of knowledge					
	Rookie (A1)	Explorer (A2)	Integrator (B1)	Expert (B2)	Leader (C1)	Innovative (C2)
Education	1.3%	1.3%	.7%	22.5%	41.7%	32.5%
Arts and Humanities	.6%	0.0%	1.2%	22.0%	39.0%	37.2%
Social Sciences, Administration and Law	.6%	0.0%	.6%	19.6%	39.5%	39.8%
Natural, Exact and Computer Sciences	0.0%	0.0%	0.0%	25.2%	43.7%	31.1%
Engineering, Manufacturing and Construction	0.0%	0.0%	1.0%	31.3%	41.7%	26.0%
Agronomy and Veterinary Medicine	23%	0.0%	4.7%	23.3%	48.8%	20.9%
Health	23%	0.0%	.9%	21.1%	34.9%	40.8%

Source: own elaboration.

Table 9 aims to provide the results related to the profile of university professors globally by area of knowledge, highlighting the following findings:

The Innovative Profile is dominated by Health (40.8%) and Social Sciences, Administration and Law (39.8%). While the “Leader” Profile is observed in Education (41.7%), Arts and Humanities (39.0%), Natural Sciences, Exact Sciences and Computing (43.7%), Engineering, Manufacturing and Construction (41.7%), Agronomy and Veterinary Medicine (48.8%).

In addition to the above results, Table 10 shows the global competence profile, which allows us to meet the third objective of this article to identify the CDD profile and global digital competence of the teaching staff, highlighting the following results:

Table 10. Global Digital Competence Profile for Teachers

CDD Profiles	F	%
Rookie (A1)	11	1.0
Explorer (A2)	2	.2
Integrator (B1)	10	.9
Expert (B2)	247	22.3
Leader (C1)	440	39.7
Innovative (C2)	397	35.9

Source: own elaboration.

As can be seen in Table 10, the digital profiles are presented , which allow us to analyze the different categories of expertise held by university professors in the digital area. This result highlights that the teaching staff is profiled as Leader (C1) (f=440; 39.7%), which indicates that they have the skills to integrate educational technology into their teaching practice and be a reference in the technology area for their colleagues ; they are able to adapt the different resources, strategies and knowledge at their disposal to their needs.

Finally, in this results section, as a summary, Figure 3 presents an analysis that allows comparing the digital profile of university professors by area of knowledge and area of competence.

Figure 3. Comparative analysis of CDD level by area of knowledge

Área de conocimiento	Competencias Digitales Docentes (CDD)					
	A. Compromiso Profesional	B. Recursos Digitales	C. Pedagogía Digital	D. Evaluación y Retroalimentación	E. Empoderar a los estudiantes en las CD	F6. Facilitar las competencias a los estudiantes
Educación	Innovador (C2)	Innovador (C2)	Experto (B2)	Experto (B2)	Experto (B2)	Experto (B2)
Artes y humanidades	Líder (C1)	Líder (C1)	Experto (B2)	Experto (B2)	Innovador (C2)	Experto (B2)
Ciencias Sociales, Administración y Derecho	Innovador (C2)	Innovador (C2)	Experto (B2)	Innovador (C2)	Innovador (C2)	Experto (B2)
Ciencias Naturales, Exactas y de la Computación	Líder (C1)	Líder (C1)	Experto (B2)	Experto (B2)	Experto (B2)	Experto (B2)
Ingeniería, Manufactura y Construcción	Experto (B2)	Experto (B2)	Experto (B2)	Experto (B2)	Experto (B2)	Experto (B2)
Agronomía y Veterinaria	Líder (C1)	Líder (C1)	Experto (B2)	Líder (C1)	Experto (B2)	Experto (B2)
Salud	Innovador (C2)	Innovador (C2)	Experto (B2)	Innovador (C2)	Innovador (C2)	Experto (B2)

Novato (A1) Explorador (A2) Integrador (B1) Experto (B2) Líder (C1) Innovador (C2)

Source: own elaboration.

Figure 3 presents a comparative analysis of competency level by area of knowledge. This analysis shows the diversity that exists with respect to the combination of different digital profiles that university professors have managed to obtain over the years to incorporate digital technologies in their educational practices.

It is noteworthy that the areas of knowledge with the highest level of competence that are best evaluated are Social Sciences, Administration and Law, as well as the area of Health, positioned in four of the six areas of competence, with the Innovative profile (maximum competence level), which could be due to the interdisciplinary and dynamic nature of these areas, which demand greater integration of digital technologies. In contrast, the area of knowledge Engineering, Manufacturing and Construction is located in the six areas of competence with the Expert profile (intermediate competence level).

Although both profiles, Innovator (C2) and Leader (C1) are considered to have a high level of competence, the difference is that the first has the ability to adapt technology to their needs, interests and learning purposes and the second leads the technological innovation that the educational environment makes available to them.

It is worth mentioning that this comparative analysis is aligned with the established objective of identifying the digital profiles of university professors through the *DigCompEdu Framework progression model* by areas of knowledge and competency area, in order to offer a detailed view of the current state of CDD. These results seek to be useful for university decision-making, with the aim of strengthening the less developed digital skills through teacher training and updating.

Discussion

At the threshold of the third millennium, it is indisputable that the profile of the traditional teacher has changed rapidly thanks to the incorporation of Information and Communication Technologies (ICT) in the teaching-learning process, which has forced teachers to evolve, transform their educational practice and adopt innovative teaching models where digital technologies play a fundamental role in the interactions between teachers and students.

From the perspective of various authors such as Flores and Roing (2016), Nieto et al (2017), Cabero and Palacios (2020a), Amaya et al. (2021), Pérez (2023) agree in pointing out that the teacher of the future must assume a new role in the educational process. This role must be more active and proactive to effectively manage and master digital technologies,

thus allowing the development and implementation of new teaching-learning methodologies and strategies.

Furthermore, Rojas et al. (2019), Rodríguez (2019), Ocaña et al. (20020), Orozco-Cazco et al. (2020) agree that teachers must be constantly updating themselves to stay at the forefront of technology and transmit their knowledge through the technologies available to them to connect and interact more easily with their students.

The above, regardless of the area of knowledge in which the university professor works, he/she must develop digital skills, since according to Zavala et al. (2016) Nieto et al. (2017) and Flores and Roig (2016) agree in pointing out digital skills as a set of knowledge and technological capabilities that the university professor must use for his/her professional practice, in addition to considering CD D as transversal, that is, teachers from any area of knowledge must develop their skills and competencies for effective use of ICT in their teaching work in order to strengthen teaching methodologies and promote the learning of their students.

The results of this research show a notable diversity in the digital profiles of teachers, determined mainly by the area of knowledge in which they carry out their work and the areas of competence in which they are strengthened. In short, the high levels of digital teaching competence identified (expert, leader and innovator) are a reflection of the capacity of teachers to integrate digital technologies effectively, contributing to a more dynamic teaching adapted to current demands.

Conclusions

The profile of the university teacher has evolved to respond to the present and future challenges that higher education demands. In response to this, academic innovation has been carried out to make way for the transformation of higher education. Currently, educational institutions that wish to remain current and at the forefront have transformed their operating systems, derived from the adoption and adaptation of digital technologies in educational processes.

Therefore, teachers, today more than ever, have the commitment to improve their educational practice with the support of digital technologies to enhance the learning of their students and ensure that they acquire the digital skills that the labor market currently demands. For their part, educational institutions must commit to university professors to

revalue their teaching work through the promotion and access to digital updating and training to strengthen their professional development.

Today, educational institutions have the opportunity to make the most of the potential and experience in the digital area that university professors possess, take advantage of their digital skills and capabilities to make the curriculum more flexible , innovate in teaching, carry out teaching practice from different educational scenarios, diversify learning options and undertake hybrid modality strategies.

In short, teacher profiles must evolve, reinvent themselves and renew themselves to make way for the new characteristics that this digital age demands. It is time to modify the conventional teaching profile and move towards a digital teaching profile that can be used in any educational modality ; emphasizing that the university professor of the future must possess a series of skills so that his or her profile is transferable , flexible and versatile, capable of adapting to unknown scenarios with continuous educational changes and, above all, capable of adapting technologies to the demands and transformations of new times.

Based on the above, it is concluded that strengthening the digital profile of teachers not only impacts student learning, but also positions educational institutions as leaders in innovation and educational quality.

Limitations of the study

In this study, the main limitation identified was the lack of student perception regarding the digital teaching skills possessed by university professors, since student opinion on the performance of professors in their course incorporating digital technologies is key to assessing teaching practice, improving the educational process and proposing new and innovative teaching-learning strategies and methodologies. Student perception provides a complementary vision that allows evaluating both the effectiveness and the real impact of digital teaching skills in the learning process.

Future lines of research

This research identifies the profiles of digital competences of university professors by area of knowledge of a university located in the northeast of Mexico, finding that they have a high digital level. Therefore, to respond to the current demands of higher education, it is crucial that teachers are digitally competent and that institutions reevaluate the need to update and make their curricular plans, teaching methodologies and training processes more

flexible to promote a true transition towards educational innovation that the 21st century demands, in addition to betting on the updating, training, qualification and certification of university teachers in the digital area.

References

Amaya, A., Cantú, D. y Lera, J. A. (2020). El nuevo perfil docente en la era digital: desafío en el contexto de la desigualdad, caso estudiantes UAT. En J. A. Lera Mejía, S. I. Escobar Villanueva, R. F. Ochoa García y U. A. Tamaulipas (eds.), *Precariedad juvenil y sus nexos con la desigualdad educativa: caso Argentina, Colombia, México y España* (p. 148). Colofón.

Amaya, A., Cantú, D., y Marreros, J. G. (2021). Análisis de las competencias didácticas virtuales en la impartición de clases universitarias en línea, durante la contingencia del COVID-19. *RED. Revista de Educación a Distancia, 21*(65).

Benali, M., Kaddouri, M., y Azzimani, T. (2018). Digital competence of Moroccan teachers of English. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT), 14*(2), 99–120. https://bit.ly/2sOoAfn

Bisquerra, R. (1987). *Introducción a la estadística aplicada a la investigación educativa: un enfoque informático con los paquetes BMDP y SPSSX.* Barcelona, España: Departamento de Métodos de Investigación y Diagnóstico en Educación (MIDE) de la Facultad de Pedagogía de la Universidad de Barcelona.

Cabero y Palacios. (2020b). Marco Europeo de Competencia Digital Docente «DigCompEdu» y cuestionario «DigCompEdu Check-In». *EDMETIC, Revista de Educación Mediática y TIC, 9*(1), 213-234. doi: https://doi.org/10.21071/edmetic.v9i1.12462

Cabero, y Palacios. (2020a). Formación y competencias del profesorado en la era digital. *CRÓNICA. Revista de Pedagogía y Psicopedagogía*, (5), 113-127.

Durán, M. (2019). Competencia Digital del Profesorado Universitario: Diseño y Validación de un Instrumento para la Certificación. Tesis doctoral inédita. Murcia, España. Universidad de Murcia-Escuela Internacional de Doctorado.

Fernández-Cruz, F. J., Rodríguez-Legendre, F. y Sainz, V. (2024). La competencia digital docente y el diseño de situaciones innovadoras con TIC para la mejora del aprendizaje. *Bordón. Revista de Pedagogía, 76*(2), 11-24. https://doi.org/10.13042/Bordon.2024.106342

Flores-Lueg, C., y Roig Vila, R. (2016). Diseño y validación de una escala de autoevaluación de competencias digitales para estudiantes de pedagogía. *Píxel-Bit, Revista de Medios y Educación, 12*(48), 209–224. doi: https://doi.org/10.12795/pixelbit.2016.i48.14

Gewerc, A., & Montero, L. (2013). Culturas, formación y desarrollo profesional. La integración de las TIC en las instituciones educativas. *Revista de Educación, 362*, 323-347.

Ghomi, M., y Redecker, C. (2018). Digital Competence of Educators (DigCompEdu): Development and Evaluation of a Self-Assessment Instrument for Teachers' Digital Competence. *Berlin: Joint Research Center.*

Gutiérrez. (2019). El Poder de las TIC en la Educación. *Tecnología*. *Recurso para el Desarrollo*, 24-25. http://tecnocientifica.com.mx/libros/La-Tecnolog%C3%ADa-Recurso-para-el-Desarrollo.pdf

Hernández S., Fernandez C., y Baptista L. (2014). Metodología de la investigación. México, D.F.: Mcgraw-Hill / Interamericana Editores, S.A. de C.V

Hidalgo Cajo, B. G., y Gisbert-Cervera, M. (2022). Factores determinantes que permiten establecer tipologías de profesorado en el contexto de la innovación tecnológica educativa. *Revista de Educación a Distancia (RED), 22*(69). https://doi.org/10.6018/red.499171

Joint Research Centre. [JRC]. (2019). Testing the Check-In Self-Reflection Tool. https://joint-research-centre.ec.europa.eu/digcompedu/digcompedu-self-reflection-tools_en

Mama, M., y Hennessy, S. (2013). Developing a typology of teacher beliefs and practices concerning classroom use of ICT. *Computers & Education, 68*, 380-387.

Marmolejo, F. (2020) *Repensando la universidad de la pospandemia.* Suplementos sobre Educación Superior.

McMillan, J. H., Schumacher, S., y Baides, J. S. (2005). Investigación educativa: una introducción conceptual. Madrid: Pearson.

Nieto, E., Pech, S. y Callejas, A. (2017). Evaluación de la competencia digital docente. TIC y enseñanza de idiomas. En Sumozas, R. y Nieto, E. (coords.). *Evaluación de la competencia digital docente*, 17-33.

Ocaña-Fernández, Y., Valenzuela-Fernández, L., Morillo Flores, J. (2020). La competencia digital en el docente universitario. *Propósitos y Representaciones*, *8*(1),455 http://dx.doi.org/10.20511/pyr2020.v8n1.455

Orozco-Cazco, G., Cabezas-González, M., Martínez-Abad, F., y Abaunza, G. (2020). Variables sociodemográficas que inciden en las competencias digitales del profesorado universitario. *Revista de Ciencias Sociales y Humanidades*, (12), 32 - 48. https://doi.org/10.37135/chk.002.12.02

Pérez López, E., & Yuste Tosina, R. (2023). La competencia digital del profesorado universitario durante la transición a la enseñanza remota de emergencia. *Revista de Educación a Distancia (RED)*, *23*(72). https://doi.org/10.6018/red.540121

Redecker, C., y Punie, Y. (2017). Digital Competence of Educators.

Rodríguez, Raso y Ruíz (2019) Competencia digital, educación superior y formación del profesorado: un estudio de meta-análisis en la Web of Science. *Revista de Medios y Educación,* 65-81. doi: https://doi.org/10.12795/pixelbit.2019.i54.04

Rojas, B., Salcedo, M., y Velasco, I. (2019). Beneficios de la Tecnología y su Impacto en la Docencia. *Tecnología. Recurso para el Desarrollo,* 40-41. http://tecnocientifica.com.mx/libros/La-Tecnolog%C3%ADa-Recurso-para-el-Desarrollo.pdf

Salazar, F., y Lescano, L. (2022). Competencias digitales en docentes universitarios de América Latina: Una revisión sistemática. *Alpha Centauri, 3*(2), 02-13.

Sosa D. J. M., y Berrocoso, J. V. (2020). Perfiles docentes en el contexto de la transformación digital de la escuela. *Bordón: Revista de pedagogía*, *72*(1), 151-173.

Tondeur, J., Scherer, R., Baran, E., Siddiq, F., Valtonen, T., y Sointu, E. (2019). Teacher educators as gatekeepers: Preparing the next generation of teachers for technology integration in education. *British Journal of Educational Technology, 50*(3), 1189-1209.

Universidad Autónoma de Tamaulipas [UAT]. (2022). *Primer Informe Rectorial. Universidad Autónoma de Tamaulipas.* https://dpei.uat.edu.mx/informe-rectoral-2022

Zavala, D., Muñoz, K., y Lozano, E. (2016). Un enfoque de las competencias digitales de los docentes. *Revista publicando, 3*(9), 330-340. https://dialnet.unirioja.es/servlet/articulo?codigo=5833540