Self-perception of digital competences in Higher Education Teachers

Autopercepción de las competencias digitales en Profesores de Educación Superior

PREZA-MEDINA, Sergio Roberto*†

Universidad Tecnológica de Cancún. Carretera Cancún-Aeropuerto, Km. 11.5 S.M. 299, Mz. 5, Lt 1, 77565 Cancùn, Q.R.

ID 1st Author: *Sergio Roberto, Preza-Medina* / **ORC ID**: 0000-0001-5010-0585, **CVU CONAHCYT ID**: 505691

Abstract

The present study had two research objectives: (a) Analyze the self-perception that higher-level teachers have about the mastery of digital skills in relation to the areas of information, communication, content creation, security and problem solving; and (b) Identify the level of mastery of digital skills presented by higher level teachers in relation to the areas of information, communication, content creation, security and problem solving. The methodological design had a quantitative approach, which allowed the collection of information required to achieve the objectives set. With this study, we contribute to the frontier of knowledge regarding the gaps between the use and application of digital skills, by the teaching staff of public institutions of higher level.

Digital competences, Teacher self-perception, Higher education

Resumen

El presente estudio tuvo dos objetivos de investigación: (a) Analizar la autopercepción que tienen los docentes de nivel superior sobre el dominio de las competencias digitales en relación con las áreas de la información, comunicación, creación de contenido, seguridad y resolución de problemas; y (b) Identificar el nivel de dominio de competencias digitales que presentan los docentes de nivel superior en relación con las áreas de la información, comunicación, creación de contenido, seguridad y resolución de problemas. El diseño metodológico tuvo enfoque cuantitativo lo que permitió la recolección de información requerida para alcanzar los objetivos planteados. Con este estudio, se contribuye a la frontera del conocimiento respecto a las brechas existentes entre el uso y aplicación de las competencias digitales, por parte del cuerpo docente de las instituciones públicas de nivel superior.

Competencias digitales, Autopercepción docente, Educación de nivel superior

---

Citation: PREZA-MEDINA, Sergio Roberto. Self-perception of Digital Competences in Higher Education Teachers. ECORFAN Journal-Republic of Colombia. 2023. 9-16: 12-18

---

* Correspondence to Author (e-mail: spreza@utcancun.edu.mx)
† Researcher contributing as first author.

Introducction

The focus of this study is on the analysis of the self-perception of higher education teachers on the degree of mastery of digital skills in their teaching practice.

Currently, the degree of knowledge that educators possess in relation to digital skills is not known. This study will highlight the urgent need for training in this area. The circumstances derived from the pandemic have required teachers to strengthen these competencies. In relation to this issue, Pérez and Rodríguez (2016) have raised the importance of learning by teachers to meet the technological demands of students. Therefore, it is necessary to incorporate digital tools in teaching methods, in order to complement and develop teachers' digital skills (Cabero & Ruiz, 2014).

During the last decade, the technological society affirms that digital competencies have been transformed from a recommended training stage to a degree of unavoidable necessity (Pérez & Rodríguez, 2016). In this sense, the development of digital competencies in the educational process has become indispensable for the development and improvement of teaching practice.

According to Pozos and Tejada (2018), technology is indispensable from the professional field, both in the transformation of personnel, as well as the updating of teachers. In the case of teachers, existing competencies should be initiated with technological innovation and explore new professional competencies (Cabero, 2013).

Research trends aimed at a modality that has evolved that is distance education seek to develop skills in the use and management of technological tools in the teacher (Pérez and Rodríguez, 2016). These skills expose the teacher to develop and grow professionally on digital competencies in the pedagogical scenario. On the other hand, the need for teacher training must be determined specifically with the level of mastery of digital competencies in the pedagogical area (Pozos and Tejada 2018).

It is worth highlighting, that there is a diversity of teachers who are described as digital immigrants, where they indicate that they do not know the procedure for the integration of technological applications or tools in the classroom (Ruiz and Belén, 2010). In addition, the authors argued that some teachers do not have technical knowledge to handle technological devices and do not have content that demonstrates the advantages or benefits that these digital tools can offer in the educational process. According to the above, this situation deserves immediate attention, since technological tools should be used in support to complement the pedagogical skills in the classroom, in fact, it is recommended to integrate technology in both face-to-face and distance modalities (Cabero, 2013).

Problem statement

Generally in Higher Education Institutions (HEI) the existing gaps between professional profiles and psycho-pedagogical profiles in new teachers at this level are large, which represents in the educational praxis pedagogical biases and teaching practices lacking strategies, techniques and adequate use of digital tools available for such work And it is there, in this gap where the objectives of this research are framed:

– O1: To analyze the self-perception that higher level teachers have about the mastery of digital competencies in relation to the areas of information, communication, content creation, security and problem solving.

– O2: To identify the level of mastery of digital competencies presented by higher level teachers in relation to the areas of information, communication, content creation, security and problem solving.

The questions that direct the research study are the following:

– Q1: What is the self-perception of higher level teachers' mastery of digital competencies in relation to the areas of information, communication, content creation, security, and problem solving?

– Q2: What is the level of mastery of digital competencies presented by higher level teachers in relation to the areas of information, communication, content creation, security and problem solving?

Justification

There are several research studies that show that teachers should develop a basic level of digital competencies to improve the teaching and learning process. If the teacher intends to develop digital competencies in the area of education, a complete and correct integration is required when using technology in the classroom and technological training (Cabero, 2013).

Based on the above, for university institutions it is essential to analyze and evaluate the teacher's self-perception on the level of mastery of digital competencies in order to improve or reevaluate the procedures currently used by teachers towards the annexation of technology in the teaching and learning process (Cabero & Ruiz, 2014).

Theoretical framework

Competence

The term competence originated in the 1960s. In the work context, David McClelland in 1969 raised the motivation theory, focused on three needs. The first is the need for achievement, the second is the need for quality at work and the third is the need for power/influence. This theory emphasizes that through motivation people achieve their competencies in the areas of expertise favoring competitive power, leadership and knowledge.

On the other hand, Cameron and Quinn developed a competing values model to specify indicators of organizational effectiveness. This model is subdivided into four criteria, which are: clan (collaborative), adhocracy (creative), hierarchy (control) and market (competent), these values allow to identify and classify organizations by the type of dominant culture. Thus, Cameron and Quinn contributed to the competence approach.

The term competence from the didactic context is based on a series of elements such as; abilities, attitudes, knowledge, and capacities, skills possessed by the teacher to execute and concretize the learning process effectively (Rivadeneira, 2017). On the other hand, Perez (2015) expressed that an individual who presents pertinent knowledge in particular situations, who performs procedures that demonstrate know-how and who knows how to act demonstrating values and positive attitudes is classified as a competent person.

Competency-based learning

Higher Education has educational trends based on including technology and developing learning by competencies in teachers throughout their academic life (Fernández, 2017). This is why learning is related to the development of recent knowledge that the teacher can and should acquire. Therefore, learning by competence develops and evolves according to learning styles in the integration to knowledge to current conflicts. An example of these conflicts is the integration of attitudes, values and the incorporation of techniques, in the way of performing when facing educational situations (Villa and Poblete, 2011). On the other hand, learning by competencies is directed with significant changes in the structure of the contents of what is traditionally taught, however, it is also necessary to educate about the contents that demonstrate the best technological skills (Monereoad a,).

Zabala and Arnau (2007) expressed that when speaking of learning by competency, it implies a complexity analyzed in a triple dimension: (1) learning by competency is aimed at an intense change where the contents of traditional education are highlighted through a structure that also teaches skills and values, (2) at the end of the 20th century, the international community began to explore the requirements of establishing competencies that were essential to effectively reintegrate the 21st century society, (European Commission,), ( ) as a third dimension, it is suggested to approve, that competencies are essential for teachers to demonstrate the ability to educate in the digital era and that competencies are essential to apply to students for the 21st century, (Perez 2015. p 106).

On the other hand, the particular learning processes and the stimulation to know, favor learning by competencies. However, the source of connection between its elements related to conceptual support knowledge ("knowledge") is not obtained distant from use or "know-how". (Perez, 2016).

Zabala and Arnau (2007) analyzed 11 key ideas aimed at how to learn and educate about competencies. There are ways to understand competencies by transforming ideas that are periodically disseminated in teaching. Therefore, teachers must explore alternatives that help them improve how to teach and implement competencies. The 11 key ideas are presented below:

– Key idea 1.- Competency should be taught in educational settings to dominate rote learning of knowledge.

– Key idea 2.- Competencies should be identified according to the needs of the individual who experiences diverse situations in daily life in order to offer answers that integrate concepts, attitudes and procedures.

– Key idea 3.- Competencies go hand in hand with knowledge, since they integrate elements such as skills, knowledge and attitudes.

– Key idea 4.- Competencies should be taught taking into account the progress of the personality in the totality of current life scenarios.

– Key idea 5.- When teaching school competencies, the management of professional, personal, interpersonal and social scenarios should be included.

– Key idea 6.- The learning of a competence implies equality at a maximum level of functionality and significance.

– Key Idea 7.- Teaching competencies should incorporate safe teaching strategies that provide solutions to conflicts and problems of daily life.

– Key idea 8.- The basis of competencies is undoubtedly the disciplinary goal.

– Key Idea 9.- To teach all the components in specific areas in correspondence with the disciplinary goal and then the systematic learning in the areas.

– Key idea 10.- To teach competencies requires elements of globalization.

– Key Idea 11.- To classify the level of student proficiency is hard work; assessment for each element of the competency must be considered.

Digital Competencies in the Teacher The teacher who promotes true learning is considered digitally competent when he/she provides a digitally competent digitally competent when he/she provides an enriched enriched environment using technological technological tools by demonstrating essential elements such as knowledge, skills, attitudes.

In order for the teacher to be competent, he/she must enrich their professional self-development and identity by demonstrating the ability to make use of digital educational technology. Demonstrating a transformation in the classroom where digital content is integrated giving the student the opportunity to perform technological activities (Hall *et al.*, 2014).

On the other hand, the Commission of the European Communities (2006) requested an approval on the requirements to establish indispensable digital competences to solve efficiently and effectively in a digital society. When talking about teachers' competencies, it means that they must be able to educate and have the responsibility to educate and use their competencies are required in the digital era of the 21st century.

It should be noted that the Common Framework for Digital Competence in Teaching (DIGCOMP) is used as a reference framework to determine and improve teachers' digital competencies. By using the DIGCOMP framework as a reference tool, it makes it easier to explore the areas and levels in more depth, taking into account the formative and summative plans. The DIGCOMP framework is structured in twenty-one digital competencies and subdivided into five dimensions that will be described in this study, presented in Table 1. The digital competency areas are summarized below:

Description	Digital Competence
Information	Determines digital data by searching, analyzing, organizing, storing for the necessary purpose.
Communication	Communicates with networks through technological scenarios, shares materials through digital strategies, connects and collaborates with others using technological tools.
Content creation	Creates and edits new information using photos, and video conferencing to incorporate prior knowledge.
Security	Demonstrates safety and security in digital personal identification
Problems troubleshooting	Identifies the requirements of digital digital material for decision making to select appropriate virtual strategies

Table 1 Description of digital competencies

These areas of digital competencies are the variables included in the instrument of this study. These competencies were created and presented in February 2014 by the National Institute of Educational Technologies and Teacher Training (INTEF) for a comprehensive research to the Common Framework of digital competence of the teacher.

These five digital competencies mentioned in Table 1 and are pillars for teachers and training should be considered at a personal and professional level when offering classes both in a face-to-face and virtual modality.

Following are the activities to be performed in each competency: (a) when we talk about information literacy and information literacy, activities such as being able to classify, locate, store and analyze digital documentation, taking into account the relevance and relevance of the data, (b) communication here is directed to the teacher must share information and interact with students through networking and digital tools, (c) the competence of digital content creation involves knowing how to create and edit new university information on the level of mastery of digital skills. The instrument that was applied in this research was a questionnaire, which answered the research questions (Hernández *et al*., 2014).

The questionnaire that was used in this research was developed and designed by Perez (2015) was described in Table 2. It consisted of five blocks with different indicators that collected information and answered the research questions.

Blocks	Indicators	Questions
Block I	Indicator 1. Context Information Context Indicator 2. Teacher training	9 3
Block II	Indicator 3. Teacher's self-perception of digital competence	21
Block III	Indicator 4. Degree of mastery of digital competence in the role of the teacher.	7
Block IV	Indicator 5. Evaluates the learning in digital competence of primary school students with the current curriculum.	8
Block V	Indicator 6. Perceived need for formal digital alphatization.	9

Table 2 Description of the blocks and indicators of the questionnaire

Teacher training and integrate with previous contents where multimedia tools are integrated by applying the intellectual property regulation, (d) security competence is key, here is included protecting digital identity and securely using personal data, (e) and last we have the problem solving competence is focused on identifying digital needs selecting appropriate digital tools, solving technical problems, making technological decisions and updating the competence itself.

Methodological design

The methodology with a quantitative approach allowed the collection of the required information. The research was descriptive since the data obtained from the variables of the study are detailed. The methodology used in this study allowed the collection of data.

Validation. The validity of the instrument was carried out through a process of review by experts and empirical validation. For content validity, a questionnaire-type instrument was submitted for validation by 15 experts in the area of educational technologies.

Table 3 shows the results obtained from the interpretation of the relevance and clarity indexes for each block.

Pertinence index (pi)		Clarity index (ci)	
pi ≥ 0.80	Stayed in its original form: Block I (1 and 2), Block III, Block V (1 and 3)	ci ≥ 0.80	Stayed in its original form: Block I (1 and 2), Bloque II (2 and 5), Block V
0.60≤ip<80	Redaction was modified Block II (1), Block IV and Block V (1) and (3)	0.60 ≤ic≤0.80	Redaction was modified Block II(1),Block III and Block IV
ci<0.60	No block was eliminated	ci<0.60	No block was eliminated

Table 3 Interpretation criteria for the indices of relevance (ip) and clarity (ic)

Reliability. The consistency of the instrument was analyzed and Cronbach's alpha coefficient was calculated for the total sample.

To understand the degree of reliability of Cronbach's alpha, the result obtained for the block entitled: Self-perception of teachers' digital competence, presented a value of 0.93, which indicated a high degree of internal consistency.

Data Collection Procedures

In data collection, the participants were offered instructions on the topic to be investigated virtually by means of the "Goog e orm" form. In this way, teachers had access to the questionnaire at any time and in any place.

Procedures for data analysis. This study used a questionnaire and assessed teachers' self-perception of their mastery of digital competencies.

For the purposes of this research, data were collected through the questionnaire and then analyzed, tabulated and submitted directly to the statistical program Statistical Package for the Social Sciences (SPSS) in order to answer the study questions.

The first descriptive research question evaluated the variable of interest, which was the teacher's self-perception, and was analyzed by measures of central tendency and dispersion such as mean and standard deviation.

Conclusions

The conclusions derived from the results and the literature review of this study are presented below:

The self-perception of the teachers participating in the study, presents considerable variability with respect to the mastery of competencies and the use in their teaching practice. Teachers with professional profiles in educational technologies feel more confident and competent than those with engineering profiles. However, the latter recognize the importance of mastering digital competencies for the correct use in their educational practice. Subsequently, the self-perception of digital competencies can influence the confidence and skills of teachers to implement new technologies, as well as pedagogical approaches. Therefore, it is essential that HEIs offer continuous training opportunities in digital competencies for teachers, ensuring an environment of continuous monitoring and job security.

Finally, it should be considered that the scenarios linked to the pandemic have shown the need to strengthen digital competencies in higher education teachers, particularly in the field of distance education and the use of learning management systems.

References

Cabero, J. (2013). *La formación en la era digital: ambientes enriquecidos por la tecnología.* Revista de Gestión de la Innovación en Educación Superior REGIES, 2, p.p.34-53. ISSN 0719-742X.; E-ISSN: 0719-7624

Cabero, J., y Ruiz, J. (2014). *Las Tecnologías de la Información y Comunicación para la inclusión: reformulando la brecha digital.* International Journal of Educational Research and Innovation. IJERI, (9), 16-30

Comision de las Comunidades Europeas. (   ). Comunicacion de la c omision arguamento Europea, a   onse o, a   omit Econ mico Socia Europeo a   omit de las Regiones de 20 de diciembre. *Un planteamiento europeo de la alfabetización mediática en el entorno digital*: http://eur-   lex.europa.eu/legal-content/ES/TXT/PDF/?uri=CELEX:52007DC 0833&from=ES

Fernández Medina, C. R. (2017). *Desarrollo de Competencias Digitales de Docentes y Estudiantes en Procesos de Evaluación Formativa con TIC*. Revista Atlante: Cuadernos de Educación y Desarrollo (agosto 2017). En línea: http://www.eumed.net/rev/atlante/2017/08/competencias-digitales-tic.html.

Hall, R. y Atkins, L. Freser, J. (2014). *Defining a self-evaluation digital literacy framework for secondary educators: the DigiLit Leicester project*. DOI: https://doi.org/10.3402/rlt.v22.21440

Monereo, C. y Bad a A. (   ). a competencia informacional desde una perspectiva psicoeducativa: enseñanza basada en la resolución de problemas y emergentes. *Revista española de documentación científica*. No monográfico. Recuperado de: http://redc.revistas.csic.es/index.php/redc/article/view/745

Pérez Escoda, A. y Rodríguez Conde, M. J. (2016). Evaluación de las competencias digitales auto percibidas de profesorado de educación primaria en Castilla y León. *Revista de Investigación Educativa, 34*(2), 399-415. DOI: http://dx.doi.org/10.6018/rie.34.2.215121

Pérez Escoda, A. (2015). Alfabetización y competencias digitales en el marco de la evaluación educativa: Estudios en docentes y alumnos de Educación primaria en Castilla y León. Tesis doctoral. Universidad de Salamanca. Recuperada: https://doi.org/10.6018/rie.34.2.215121.

Pozos, K., & Tejada, J. (2018). Competencias digitales en docentes de Educación Superior: Niveles de Dominio y Necesidades Formativas. *Revista Digital de Investigación en Docencia Universitaria, 12*(2), 59-87. Recuperado de: htps://dx.doi.org/10.19083/ridu.2018.712t

Villa Sánchez, A. y Poblete Ruiz, M. (2011). Evaluación de competencias genéricas, oportunidades y limitaciones. En *Revista Bordón 63*, pp. 147-170. Recuperado de: http://www.innova.deusto.es/images/archivos/evaluaci%C3%B3n_competencias_aurelio_bordon.pdf

Zabala, A. y Arnau, L. (2007). *11 ideas clave: cómo aprender y enseñar por competencias*. o . Ideas a earce ona Gra .