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Artículos Científicos

Competencias digitales y necesidades formativas de e-estudiantes de la Universidad Autónoma de Chihuahua

Digital Competences and Formative Needs of University E-Students of Autonomous University of Chihuahua

Habilidades digitais e necessidades de treinamento de e-estudantes da Universidade Autônoma de Chihuahua

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Resumen

Este artículo expone un estudio cuyo objetivo fue cotejar las percepciones de un grupo de estudiantes sobre las competencias que tienen en tecnologías de información y comunicación con las de sus docentes. Los alumnos participantes pertenecen a la licenciatura en línea de la Facultad de Contaduría y Administración de la Universidad Autónoma de Chihuahua. El instrumento de medición comprendió seis tipos de competencias: básicas, de aplicación, profundización, trabajo en equipo, aprendizaje permanente y éticas. Metodológicamente, se planteó como un estudio de caso, cuantitativo; se desarrolló por procedimientos analítico-sintético y teórico-deductivo. Entre los resultados destaca la disparidad entre las valoraciones de estudiantes y docentes, con la tendencia de los primeros a asignarse evaluaciones superiores a las asignadas por los maestros, aun en competencias complejas. La indagación muestra que los alumnos, aunque tienen competencias digitales básicas, requieren reforzar las de aplicación y profundización, que remiten al uso de bases científicas informativas, de análisis, trabajo colectivo y conciencia ética.

Palabras clave: brechas digitales, competencia, percepción, TIC.

Abstract

This article presents a study whose objective was to compare the perceptions of a group of students about the competences they have in information and communication technologies with those of their teachers. The participating students belong to the online degree from the Facultad de Contaduría y Administración of the Universidad Autónoma de Chihuahua. The measurement instrument comprised six types of competences: basic, application, deepening, teamwork, lifelong learning and ethics. Methodologically, it was proposed as a quantitative case study; it was developed by analytic-synthetic and theoretical-deductive procedures. Among the results, the disparity between the valuations of students and teachers stands out, with the tendency of the former to assign higher evaluations to those assigned by the teachers, even in complex competitions. The investigation shows that the students, although they have basic digital competences, need to reinforce those of application and deepening, which refer to the use of informative scientific bases, analysis, collective work and ethical conscience.

Keywords: digital gaps, competence, perception, ICT.

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Resumo

Este artigo apresenta um estudo cujo objetivo foi comparar as percepções de um grupo de estudantes sobre as competências que eles têm em tecnologias da informação e comunicação com as de seus professores. Os alunos participantes pertencem ao grau on-line da Faculdade de Contabilidade e Administração da Universidade Autônoma de Chihuahua. O instrumento de medição incluía seis tipos de competências: básica, aplicável, aprofundamento, trabalho em equipe, aprendizado ao longo da vida e ética. Metodologicamente, foi apresentado como um estudo de caso quantitativo; foi desenvolvido por procedimentos analítico-sintéticos e teórico-dedutivos. Entre os resultados, destaca-se a disparidade entre as avaliações de alunos e professores, com a tendência dos primeiros de atribuir avaliações mais altas às atribuídas pelos professores, mesmo em competições complexas. A investigação mostra que, embora possuam habilidades digitais básicas, precisam reforçar as de aplicação e aprofundamento, que se referem ao uso de bases de informação científica, análise, trabalho coletivo e consciência ética.

Palavras-chave: lacunas digitais, competição, percepção, TIC.

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Introduction

The social uses of new information and communication technologies (ICT) are transforming the culture and knowledge of human beings (Velarde, Bernete and Franco, 2015, p. 347). The last years of the 20th century and the dawn of the 21st show the sign of a third great revolution, that of the digital age (Bozna, 2017, p. 224). ICTs are involved in almost all people's activities, both in developed societies of the so-called first world and in emerging societies.

The involvement of information and communication technology in people's vital spaces, in family, social, educational and work environments, among others, has given it a fundamental role in contemporary society, so that it is already part of the collective imagination . But this social and cultural assumption of ICT occurred in correlation with a modification in the perception of the general user public, who had to adjust their ideas and economic, labor and social habits according to the new technological devices until they came to see the ICT as a daily fact, especially young users, who unconditionally assume this new reality that they know as digital since they have reason (Ling and Bertel, 2013, p. 1). ICTs, then, have changed the way relationships are constituted, be they interpersonal, intergroup or interinstitutional.

In the field of education, it must take advantage of all the functions that ICTs provide (Mañas and Roig, 2019, p. 80), mainly those essential to enrich the teaching and learning processes, as well as diversify the ways of learning from the students (López, Gónzalez, Aguiar and Artiles, 2017, p. 1304). Precisely one aspect favored and evidenced by ICT was the plurality of ways to collect information and transmit it; Hence, it is a priority that students acquire and develop competencies to convert mere information into knowledge, and learn to learn throughout life, so that they are able to overcome the challenges of a changing reality (Mañas and Roig, 2019, p. 80). In this changeable reality, there are gaps, barriers that impede the development of ICT skills. Not having such competencies is truly equivalent to not being able to access technology, administrative structures, available resources or better performance of time (Sing, 2010, p. 387). The challenge of higher education institutions is to reduce such gaps and foster the development of digital skills of students and teachers.

Here it is worth pointing out our notion of competition. Competences are the result of directing knowledge towards a practical and defined activity (Llamas and Macías, 2016, p. 578) and, as concrete praxis, comprises feasible processes to develop based on the internal motivations of each individual (Hinojosa, González and Castillo, 2017, p. 4). To speak of competences is to refer to the capacities that an individual uses to act, dispose or mobilize a set of cognitive resources, perception and evaluation schemes in order to solve complex scenarios (Guzmán, Marín and Inciarte, 2014, p. 25). In the field of ICT, digital competences are conceived as follows: “The ability to develop and generate knowledge in the face of the different possibilities associated with technologies and the different challenges that arise in a society where it is increasingly necessary to participate meaningfully and active ” (Llamas y Macías, 2016, p. 1).

> [ParticipaciónSuch participation is posible] and implies the safe, critical and responsible use of digital technologies for learning, at work and for participation in society, as well as the interaction with them, from obtaining, evaluating, producing , storage, information exchange, communication and participation in collaboration networks (Consejo de la Unión Europea [CUE], 4 de junio de 2018, p. 9).

The foregoing "means that people have abilities, skills, knowledge and attitudes that they can apply when using information and communication systems" (Arras, Torres and García, 2011, p. 3).

Following the work on ICT skills and academic performance carried out during 2009 at the University of Salamanca (Spain), the Veracruzana University and the Autonomous University of Chihuahua (UACH) (Mexico) (García and Arras, 2011), the skills were classified as follows: basic, applicable, in-depth and ethical. Subsequently, in order to advance in the knowledge of various academic programs and in virtual education environments, said classification was complemented and the categories of basic competences were developed, which refer to the management of technologies, and those of application, referring to the use productive of the programs and obtaining information (García and Arras, 2011, p. 5).

Regarding deepening competencies, they are those that allow people to solve problems, create original works, plan and organize activities related to a given project and communicate the knowledge obtained through the effective use of digital tools (García and Arras, 2011, p. 5). These actions involve analysis and decision-making on the content of the messages obtained via ICT. This means that information is used effectively to fulfill a specific purpose, such as the construction of sustained knowledge (Jaramillo, Henning and Rincón, 2011, p. 142), which assumes that the person chooses the information, then analyzes it from a position reflective, to later reconstruct it from the personal perspective of knowledge (Mañas and Roig, 2019, p. 82).

Collaborative work skills involve the individual and social dimensions of training. The latter includes learning in community and being able to interact and collaborate to build knowledge (Cabero, 2016, p. 3) through processes of exchange and construction of knowledge, while developing lifelong learning skills with the use of ICT. (Arras, Bordas and Gutiérrez, 2017).

For their part, lifelong learning skills involve:

> The ability to start learning and persist in it, organize it, manage time and information, either individually or in groups. (…) Acquire, process and assimilate new knowledge and skills, as well as use previous life and learning experiences to apply new knowledge and skills in various contexts (Comunidades Europeas, 2007, p. 8)

These skills, together with digital skills, information management, networking and ethics, are configured as important tools at all educational levels (García, 2017). Digital skills are key to today's education. However, recent research has shown that ICTs are little used for academic purposes, since, for the most part, university students use them during their leisure time; in such a way that the greatest challenge is to make the jump to the next level of student learning

(Paredes, 2019, p. 1): that they acquire skills to build knowledge and that this process forges throughout life.

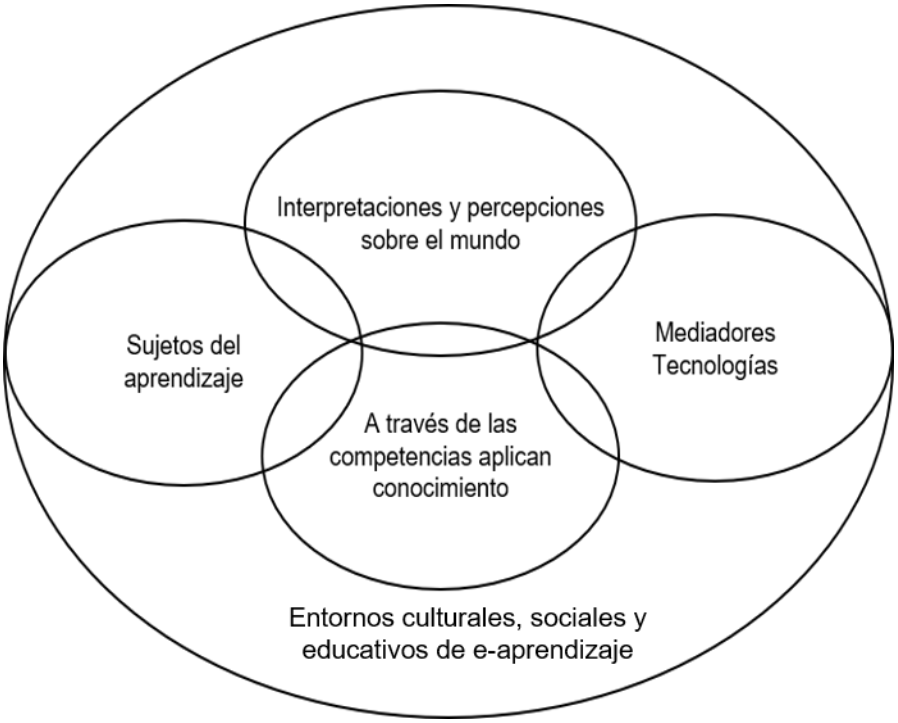
Ethical competencies refer to actions guided by moral principles and values such as respect, responsibility, honesty, professional and personal ethics. The use of ICT must be responsible and adhere to legality (Hirsch, 2005; United Nations Educational, Scientific and Cultural Organization [Unesco], 2008). This is: using information sources correctly; recognize copyright, avoid piracy and plagiarism (Marcial, 2017).

The process of learning and acquiring skills involves the interpretation of the subjects from their own experiences. Hence the importance of the concept of perception. This, in addition to being a cognitive process, is a way of knowing the world. It is a complex process; In it, the information that the world delivers, physiological aspects and the experiences of those who perceive converge (Moreno, Nelly and García, 2013, p. 445). Judgments, a basic characteristic of perception, constitute interactive psychic-cognitive processes in which an experiential component intervenes (Villarruel, 2015, p. 41), a condition that, from certain educational contexts, places perceptions as derivations of experiences. In this sense, students self-assess their ICT skills, self-assessments that are then contrasted with the opinion of teachers, who are the facilitators of training in the virtual environment and have criteria to compare the self-perception of students with the results of their learning, which are the evidence of their knowledge and domains (Cruz and Quiñonez, 2012).

The work presented here compares student perceptions against teacher evaluations; the results of this comparison constitute relevant information to establish the aspects that need to be reinforced in the training courses, in order to achieve progress in mastering the competences that will allow students to develop better in their professional lives.

Figure 1 shows the learning subjects — teachers and students — who perceive and interpret the world. In this, they apply and generate knowledge; they improve their competences through reinterpretations and interconnections between cognitive objects and cognitive subjects. Such a process is mediated by the technologies of the various environments; in the case studied here, the ICT environment.

Figura 1. Entornos de e-aprendizaje



Fuente: Elaboración propia

Justification

This research derives from previous studies that have established the importance of learning in the digital age, as well as the value of the manifestation of ICT competences by students. For educational institutions, it is necessary to have sustained information on the real mastery that students have of said competitions. This research crosses two evaluative universes: that of the students, who consider having digital competence; and that of teachers, who know the work of their students and the results obtained. So that the investigation has reached certain results and conclusions, it has generated certain information, moving between those two evaluations that revolve around the same theme: the digital competences of the students. Although students declare themselves competent in ICT, it is very likely that this competence lacks greater mastery and depth (López et al., 2017), as well as a focus in the academic area, since it is well known that students use the ICT for entertainment purposes (Paredes, 2019, p. 2). Hence the importance of comparing their perception with that of teachers and finding possible gaps that need to be filled. The fact is that the present investigation fulfills the task of revealing a specific problem, and in that revealing action lies its value and justification.

In short, analyzing the importance of the use of ICT to deepen the construction of permanent, collaborative and connective knowledge is essential for higher education institutions, since they play a central role in the training of cognitive subjects, who will have the responsibility for the future of humanity and the need to participate in the world economy. Thus, it is essential to reflect and be critical of academic processes; consider them as areas of opportunity to improve environments where human beings connect with themselves and with the world. Furthermore, the information generated by this study allows the educational institution and teachers to have data that can promote reflection on their practice, as well as attend to those aspects that are considered as areas of opportunity for virtual university training programs.

Objective

Compare the perception that teachers and students of e-learning have about the ICT skills of students.

Problem Statement

Are there differences between the teachers 'and the students' perception regarding the ICT skills of the students?

Hypothesis

There is a difference between the perception that students have of their ICT skills and those that they demonstrate in their work; There is a contrast between teachers 'and students' perceptions of the ICT skills of the latter. The trainers' considerations are based on certain premises that are listed below:

- Students do not support their documents with images or videos (Jaramillo et al., 2011, p. 141).
- They use the general Google search engine more than the Google Scholar when collecting information (Jaramillo et al., 2011, p. 140).
- Students lack the essential knowledge to solve conceptual problems and contribute to the creation of knowledge (Álvarez, Núñez and Rodríguez, 2017; Jaramillo et al., 2011, p. 140).

- Young people show digital deficiencies to collaboratively share and discuss with other people through social networks and platforms (Álvarez et al., 2017).
- Students do not use bibliographic references or cite the sources consulted (Jaramillo *et al.*, 2011, p. 142).

Materials and method

This research was carried out based on a case study, "which contributes to broadening and deepening the knowledge regarding individuals and groups, as well as organizations and related phenomena" (Yin, 2003, p. 4). The methods used were analytical-synthetic and theoretical-deductive. Likewise, the research was of a quantitative nature, since it collects data through scales. It is descriptive, applied in the field and supported by bibliographic sources.

Techniques

Documentation (bibliography) and statistics were used as information gathering techniques, as well as the survey by network or mobile devices. Through bibliographic techniques, the information was collected to build the theoretical framework and discuss the results. The survey consisted of items related to the perception of students and teachers about the development of ICT competence indicators, through a scale where 0 = Not at all competent, 1 = Little competent, 2 = Very competent and 3 = Very competent . When designing the questionnaire, the one used in the study of ICT competencies at the universities of Salamanca (Spain), Veracruzana and UACH (Mexico) was retaken (García and Arras, 2011). However, aspects whose presence was underlying questions were operated, so that 24 items were worked on, which especially show aspects related to application and deepening skills, while those of lifelong learning and collaborative work are analyzed separately. The measurement instrument was applied via email, WhatsApp and Facebook; It was answered interactively through the electronic device of preference for the person who answered it.

Regarding the statistical analysis of the data, the Statistical Package for the Social Sciences (SPSS version 20.0), a predictive analytical software, was used. (International Business Machines [IBM], 2016).

Study Universes

The present investigation was carried out at the Faculty of Accounting and Administration (FCA) of the Autonomous University of Chihuahua (UACH). The university was founded on December 8, 1954 and in 1968 it achieved its autonomy (Universidad Autónoma de Chihuahua, 2018). The UACH is made up of 16 academic units, among which is the FCA, established on December 18, 1958. Currently, it offers five professional careers, of which one is offered in its entirety both in virtual and face-to-face mode; The other races can be studied in a mixed way, depending on the subjects. Furthermore, the FCA offers ten postgraduate courses; Of these, six are taught, entirely, both face-to-face and virtually; This allows a global presence.

The study universes were made up of 389 students and 103 virtual degree teachers in 2017. The following formula was used to obtain the samples:

$$\boldsymbol{n = \frac{z^2 pqN}{E^2 N + z^2 pq}}$$

n = Sample

z = 1.96 Error (E) = .05

p = Variable probability of success

q = The category called failure

N = Population size

The sample of students was 151 (70.19% women and 29.80% men), from a population of 389; likewise, of 103 teachers (61.64% women and 38.35% men), the resulting sample was 73 (see table 1).

Tabla 1. Tamaño de las muestras

Año	**Muestra estudiantes**	**Muestra docentes**
2017	151	73

Fuente: Elaboración propia

Instrument reliability

One of the most used tests to measure the degree of reliability of a scale is the Cronbach's alpha coefficient (Landero and González, 2006, p. 156). In this work, he provided the value of 0.918 for teachers and 0.919 for students, which denotes that the results are reliable, since 0.7 is acceptable, 0.8 good and 0.9 excellent (Frías, 2014) (see table 2).

Tabla 2. Estadísticos de fiabilidad del instrumento

Competencias	Alfa de Cronbach	Número de ítems en el cuestionario
Básicas	0.734	3
Aplicación	0.803	6
Profundización	0.916	7
Trabajo Colaborativo	0.816	4
Aprendizaje Permanente	0.754	2
Ética	0.873	2

Fuente: Elaboración propia

Results

Below is a comparison of the perception that students and teachers have about their ICT skills, represented by means, calculating in each case the value of x^2 from observable data and experimental data; thus the value was obtained in each case; a risk of error of 0.05% is assumed ($p < 0.05$). Finally, a comparative graph was generated between all the competences and how the perception of their development was in each of the universes.

Basic skills

Three items related to program management and the presentations made by the students in their academic work integrated the set of basic competences.

Tabla 3. Tabla comparativa del desarrollo de competencias básicas percibidas por alumnos versus docentes

	Alumnos	**Docentes**	**x^2**
1) Manejo efectivamente el Word, Excel, PowerPoint y otros programas.	2.14	1.81	0.003
2) Utilizo herramientas digitales para mis presentaciones académicas.	2.03	1.74	0.004
3) Utilizo videos en mis presentaciones.	1.38	1.01	0.017

Fuente: Elaboración propia

Table 3 shows that the students considered themselves quite competent in the use of Word, Excel, PowerPoint and other programs, as well as in the use of digital tools for their academic presentations. When comparing the teachers' responses with those of the students in these items, a significant difference (x2 = 0.003 and 0.004) was observed in favor of the latter.

The item related to the use of videos in the presentations was the lowest valued; Likewise, it presented a significance value of 0.017 in favor of the students, who considered having such competence.

Application skills

Six items made up the application competencies. These reflect the use of scientific databases and specific Word applications for their academic work.

Tabla 4. Tabla comparativa del desarrollo de competencias de aplicación percibidas por alumnos versus docentes

	Alumnos	**Docentes**	**x^2**
4) Uso modelos y simulaciones para explorar temas complejos.	1.37	0.86	0.000
5) Para estar mejor informado/a utilizo bases de datos científicas en la búsqueda de respuestas a las preguntas que surgen de las materias que curso.	1.75	0.86	0.000
6) Para entregar trabajos académicos realizo búsquedas de información con las bases de datos científicas con las que cuenta la UACH.	1.25	0.74	0.000
7) Para entregar trabajos académicos realizo búsquedas de información con Google.	2.41	2.41	0.256
8) Para entregar trabajos académicos realizo búsquedas de información con Google Académico.	1.75	1.33	0.004
9) Integro las referencias y bibliografía en una tarea académica en automático utilizando el Word.	1.95	1.12	0.000

Fuente: Elaboración propia

As can be seen in Table 4, when comparing the evaluations of students and teachers, five of these presented a significant difference (x2), which reflects a gap between the perception of students and teachers, except for item seven. In relation to the use of Google to search for information and deliver academic papers, both groups assigned a rating of “Fairly competent”, with an average of 2.41.

Deepening skills

The deepening competences were integrated into seven items that refer to analytical, synthetic, and problem-building and knowledge-building capacities.

Tabla 5. Tabla comparativa del desarrollo de competencias de profundización percibidas por alumnos versus docentes

	Alumnos	**Docentes**	**x^2**
10) Leo cuando menos cinco artículos científicos, utilizando las TIC, para realizar una tarea.	1.75	0.76	0.000
11) Desgloso los elementos del artículo y hago comentarios para enriquecer mi trabajo académico.	1.74	0.99	0.000
12) Creo trabajos originales como medio de expresión personal, utilizando las TIC.	2.03	1.12	0.000
13) Tengo habilidad para resolver problemas utilizando las TIC.	2.04	1.49	0.000
14) Tengo la capacidad de construir conceptos propios a partir de las definiciones de otros autores.	1.95	1.28	0.000
15) Tengo las habilidades y el conocimiento que me permiten realizar un proyecto de investigación utilizando las TIC.	1.98	1.34	0.000
16) Tengo habilidades para generar preguntas clave y problemas, formulándolos con claridad y precisión.	1.85	1.23	0.000

Fuente: Elaboración propia

The items on reading scientific articles and consultation in scientific databases that appear in the application competencies were evaluated in the same way by the students (1.75), which would provide consistency in their responses. In item 10, a rating close to "Fairly competent" was assigned, while teachers established 0.76, that is, "Little competent" (See Table 5).

Collaborative work skills

Collaborative work competencies are made up of four items related to this type of responsibility among virtual undergraduate students.

Tabla 6. Tabla comparativa del desarrollo de competencias de trabajo colaborativo percibidas por alumnos versus docentes

	Alumnos	**Docentes**	**x^2**
17) Realizo trabajos académicos en equipo empleando variedad de recursos digitales.	1.98	1.50	0.000
18) Participo en grupos que desarrollan proyectos para la producción de trabajos o resolución de problemas.	1.41	1.28	0.088
19) Realizo trabajo colaborativo con mis compañeros por medios de las TIC	1.88	1.54	0.004
20) Considero que es importante trabajar en equipo utilizando las TIC	2.29	1.68	0.000

Fuente: Elaboración propia

The results in Table 6 show that the academics considered that the students were not very competent to participate in groups and to carry out collaborative work (item 17). For their part, the students were evaluated, especially in collaborative work (item 19), as quite competent. Although the question is very similar, the answer varies. In addition, the students pondered teamwork using ICT, and the difference with respect to the teachers was significant, with a x^2 of 0.000.

Lifelong learning skills

Lifelong learning competencies were configured into two items that enunciate these capacities.

Tabla 7. Tabla comparativa del desarrollo de competencias de aprendizaje permanente percibidas por alumnos versus docentes

	Alumnos	**Docentes**	**x^2**
21) Estoy abierta/o a formas de pensamiento diferentes a la mía que me permitan enriquecer el conocimiento.	2.61	1.86	0.000
22) Utilizo las TIC para aprender de manera permanente.	2.25	1.82	0.000

Fuente: Elaboración propia

Regarding lifelong learning competencies, an evaluation was obtained with a significant difference in favor of the students in both items; however, both grades are close to "Fairly competent" and with a tendency for students to score "Very competent" (see table 7).

Ethical competences

Ethical competences were integrated into two items that raise respect and recognition of the work of others and imply notions of copyright.

Tabla 8. Tabla comparativa del desarrollo de competencias éticas percibidas por alumnos versus docentes

	Alumnos	**Docentes**	**x^2**
23) Al realizar una tarea académica siempre cito al autor o autores que escribieron los documentos que utilizo como referencia, ya sea de manera textual o de parafraseo.	1.93	1.11	0.000
24) Utilizo las TIC para aprender de otros y reconocerles su trabajo al citarles.	1.96	1.11	0.000

Fuente: Elaboración propia

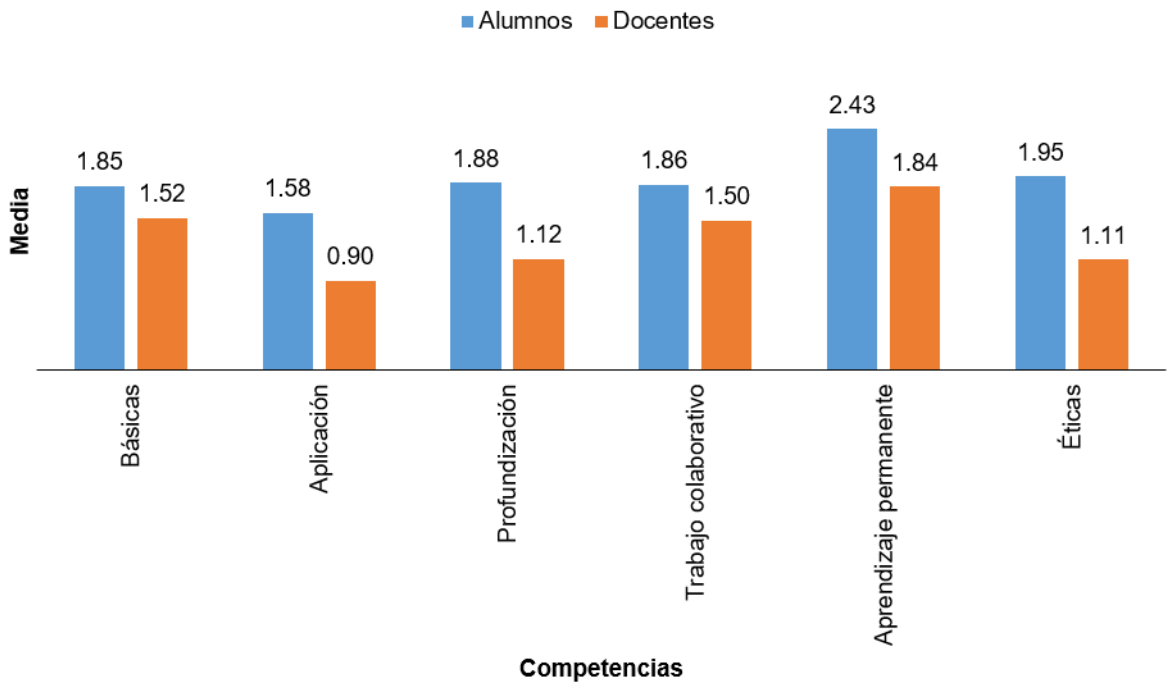
Table 8 reflects that the students perceived themselves to be quite competent in ethical capacities. For their part, the academics, despite the significant difference of x2 of 0.000 in favor of the students, awarded them the rating of "Little competent". Such an estimate means that students do not always cite their sources or offer bibliographic references in their work. Two

visions, two positions between those who consider that they carry out the action and those who are in charge of evaluating performance.

Overview of ICT skills development

The disparity between student and teacher perception raises several questions, for example, what should be the academic strategies to train people to act ethically, specifically against copyright? What weight will it have in the qualification of Does each job cite or not the sources? Ultimately, the issue transcends the fundamental meaning of education, how to deepen the training processes of honest citizens, with values, through education, in any of its modalities, face-to-face and virtual. Figure 2 shows an overview of the perception that both students and teachers have regarding the development of their ICT skills.

Figura 2. Gráfico comparativo de competencias en TIC entre alumnos y docentes



Fuente: Elaboración propia

Discussion

The study analyzes the perception that students have about the perception of their ICT skills and compares them with the teachers' vision of the skills that they claim to have; the common thread of this research are the hypotheses that are taken up again immediately:

- Students do not support their documents with images or videos (Jaramillo *et al.*, 2011, p. 141).

Regarding the basic competences, the fact that the students value these with a distance between being “Pretty competent” and “Very competent” stands out, and the teachers perceive a greater space for the improvement of the schoolchildren, for which reason consider the importance of emphasizing more in their ICT management skills and linking them with the learning objectives (Ramírez and Barragán, 2018, p. 94), which is relevant because they are studying for a degree in a virtual way. Students, says Falco (2017, p. 64), from a very young age, freely access information that gives priority to images, from which they obtain knowledge by processing discontinuous and non-linear information; therefore, teachers can demand more in order for students to learn taking advantage of the different techniques offered by computers (Plaza de la Hoz, 2018). This assessment differs with the perception of teachers and leads to partial testing of the hypothesis.

- They use general Google more than Google Scholar as an information search engine (Jaramillo *et al.*, 2011, p. 140).

Regarding the application competencies, the students, on average, evaluated them above the assessment assigned by the professors; Even so, they did not exceed the rating of two, which means "Fairly competent." This fact highlights the need to reinforce application capabilities, including the use of Word to insert bibliographic references and bibliography, in addition to emphasizing searches in scientific databases to support academic work. This depends, to a large extent, on the demands and objectives established by the person who guides the process, since recent research has found that the self-perception of the use of digital technologies by students depends on the purposes for which they are used (Ramírez and Barragán, 2018, p. 98) and those who guide the process must establish greater requirements (Plaza de la Hoz, 2018, p. 498), including searches in Google Scholar and in scientific databases, in order to sustain knowledge with reliable sources. The results of the analysis of this competence agree with the hypothesis presented. These results also agree with those of Prendes, Solano, Serrano, González and Román

(2018, p. 128), who found that students, when they want to find something, use the Google search engine, blogs and web pages.

- Students lack the essential knowledge to solve conceptual problems and contribute to the creation of knowledge (Álvarez *et al.*, 2017; Jaramillo *et al.*, 2011, p. 140).

Regarding the deepening skills, the results show asymmetric evaluations between students and teachers, which forces to rethink the teacher's task, because "to achieve the necessary validity of the training design, the evaluation must be consistent with the objectives of teaching and the competences to develop through an adequate didactic methodology "(Olmos and Rodríguez, 2010, p. 1). If teachers consider that students are not acquiring the skills of analysis, synthesis, conceptual construction and generation of research, they must assume co-responsibility in the training process so that their students can acquire and develop these skills. This result of the deepening competencies leads us to consider that the hypothesis is not rejected, since the grade assigned by the students and the one given by the teachers reflects an assessment of poor competence.

- Young people show digital deficiencies to collaboratively share and discuss with other people through social networks and platforms (Álvarez *et al.*, 2017).

In this same sense, the requirements of collaborative work that the current conditions of education demand appear, and students need to improve their skills to participate in the construction of knowledge with the other or others and, for this, the teaching processes- Learning must foresee and provide, from the design of the material and the activities to be carried out, the construction of interactive knowledge (Santos and Tirado, 2019, p. 26); Along with this practice, it will be necessary to evaluate the processes to feedback the design of the learning methods and cause attitudinal changes among the students, so that they accept to collaborate more adequately with their peers, in work teams and through ICT (Hernández, Muñoz and González , 2018, p. 24). Likewise, teachers will have to design processes in which teamwork is required to advance in the learning and construction of knowledge together. In reality, although students value teamwork (item 20), according to the results little is done and it can be said, following the hypothesis raised, that young people show digital deficiencies to share and discuss in collaboration with other people. through social networks and platforms.

Regarding lifelong learning competencies, the teachers 'evaluations are located in "Pretty competent", while the students' in "Very competent" to start learning, organize it, acquire knowledge and apply it in different contexts (Communities Europeas, 2007, p. 8), which reflects

the possession of positive attitudes towards the permanent acquisition of knowledge, an important tool in education (García, 2017) and also speaks of a positive attitude towards the process of building knowledge in the future. throughout life.

- Students do not use bibliographic references or cite the sources consulted (Jaramillo *et al.*, 2011, p. 142).

Regarding ethical competences in the use of ICT, it can be said that students consider themselves quite competent and this coincides with recent studies (Prendes et al., 2018), whose authors found that two out of three university students claimed to use references and respect copyright; however, according to the teachers, in the case under study, this is not the case, which refers to the need to continuously remember in academic and research practice the importance of properly citing the work of the authors who are used as support of the ideas and concepts that are raised in the documents that are presented to accredit the subjects in the university or in other settings where human beings participate. However, the hypothesis is rejected since no one has rated it with zero.

It is important that the teachers demand in the students' work deepening in the treatment of the topics, conceptual construction, analytical-synthetic skills and citation of sources; Likewise, the information obtained here can be used to develop strategies that help improve the teaching methodologies used and these are in keeping with the third millennium.

Understanding the processes of acquiring skills from the perspective of learning subjects constitutes valuable information and opens the door to new research on educational practices in e-learning settings. In addition, it poses the challenge that teachers have as actors in the training process that demands the establishment of greater demands for students in order for them to advance in the domain of ICT competences that the needs of today's world require.

This research will allow teachers, researchers, administrators and decision makers to learn about the perception that students have, of how they acquire knowledge, and if it is enough to face the working conditions they will face; In addition, it is highly relevant to determine the areas of opportunity to achieve meaningful learning through the use of ICT.

Conclusions

This research allows inferences to be reached that concern both educational processes, especially the recent emergence of ways and means of learning, as well as socio-pedagogical reflection on the skills that are effectively promoted and enriched by ICT. A reflection that should be guided by the recognition of the multiple, complex and revolutionary effects of technology, but, at the same time, nurtured by a sense of weight that allows us to notice the real limitations that specific subjects experience in the face of technological irruption.

An important general proposition that emerges from this inquiry is the incomplete, superficial and basic character of the digital competences of the students. The most disturbing thing is that to this competence limitation it is added that the learners assume a false belief: that of feeling quite competent in aspects that they are truly unaware of or do not even explore, such as scientific databases and primary sources of science discourse. . The students, learning subjects with their own interpretations and perceptions, rated the development of their ICT skills with higher scores than those attributed by their teachers. It would be inadmissible to argue that teachers perceived with little objectivity the competence development of their students, since it is worth noting that they assigned the rating of "Fairly competent" in lifelong learning, collaborative work and basic competences. It does not seem, then, that there is a lack of objectivity of teachers. Ultimately, it is the teachers who know the work carried out by the students and have those concrete products (objectives) to show the level of competence development of those. So there is a double limitation: incomplete and superficial digital competence and not being aware of that limitation (the unconsciousness of the limitation).

As evidenced by the results, students possess a good level of basic digital skills; the problem arises in complex competences, such as application, deepening, collaborative work, and ethics. This phenomenon is analogous to that experienced with the development of language skills. The vast majority of people are literate, can read and write. However, when it becomes necessary to develop original or investigative written work, the competences are limited or non-existent. Compared to writing — the founding technology of modern culture — basic literacy is insufficient. The same happens with ICT skills.

Given the above, and specifically in relation to collaborative work, teachers point out a deficit in the development of said competence among students. These, however, do not consider it that way. It will be because they do not notice that this competence is developed, effectively, without limitations in their leisure or entertainment activities, but not in academic activity. These are two different areas of competence exercise. Hence, in the academic field it is necessary to develop skills that allow them to build knowledge and deepen their knowledge through collaborative work and communication. This not only implies a cognitive advance, but a way of assuming and using informational and communicational technology. To the extent that students participate in the collective construction of knowledge and keep their perception open towards different ways of thinking, ICT will emerge as an instrument at the service of knowledge, humanization and democracy. Otherwise, they will rise up as apparatuses of devastation for human learning and culture.

Comparing the perception of the students and the teachers with respect to the development of ICT competences of those allowed to notice areas of opportunity in higher education institutions, in which strategies are generated so that, from the planning of the subjects, establish among its purposes the development of ICT skills, as a nodal part of the synergy that must exist between content and teaching methods. All this implies a great effort on the part of the actors of the teaching-learning process: academics, institutions and students; However, it is worth it, since current education requires training people capable of facing the challenges of a society whose constant is change. Hence the importance of having planted the seed of lifelong learning and the commitment of people as committed beings in and with the world. It remains as a pending task to investigate the results of the actions of the actors of the teaching-learning process in virtual environments.

It is important that higher education institutions are interested in seeking to provide a solution to the areas of opportunity detected in this research and thus capture the tacit perception of teachers and students, in order to socialize and document it strategically and make it their property.

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