Key ICT Competencies within the European Higher Education Area

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Abstract. The recent incorporation of Spanish universities in the European Higher Education Area (EHEA) has produced fundamental changes. In a short period of time, universities have moved from a system focused on the professor and accumulating knowledge to one focused on the student and acquiring competencies. This new setting presents a challenge to educational managers about how to effectively organize the development of these types of competencies. One of the most important competencies for students' preparation to enter the job market is the use of Information and Communications Technology (ICT). This paper examines the key competencies in university education and their relationship with competencies in the use of ICT. To do so, first, two European studies are outlined, followed by one study at the national level, and finally a more local study is described. The results show that the socio-economic context determines to a certain degree which educational competencies must be developed in university education. Moreover, the ICT competencies are acquired more effectively if they are combined with other educational competencies valued by the job market. The study ends with a section on implications for the educational management of ICT.

Keywords: Competencies, ICT competencies, EHEA

1 Introduction

The implementation of the European Higher Education Area (EHEA) has produced a significant transformation in the teaching-learning approaches used in Spanish public universities. In a relatively short period of time, university education has gone from being based on memorizing contents to being based on developing skills and competencies. It has evolved from instruction focused on the figure of the professor as the source of knowledge to a system where the student becomes the protagonist in his/her learning process, while the professor takes on a secondary role of support or guidance. Some tension has been experienced by professors and students during this transition. Both collectives have had to adapt to a new environment, in many cases after being accustomed to other methodologies or work methods for many years. The natural inertia often reflected in resistance to change became evident in Spanish universities. At times, both professors and students have tacitly limited themselves to

merely transforming the terminology, while maintaining the essence of the old teaching-learning systems [1].

One of the main changes imposed by the new situation involves assimilating and understanding the concept of competencies. The term competency has been widely addressed in the educational literature [2, 3]. A competency can be defined as the skills or knowledge acquired in a certain area [4]. The EHEA framework has developed qualification guidelines for developing homogeneous competencies in the universities of the different member countries. The purpose was to adopt a common terminology and establish a set of competencies that can be considered general, and that, in the current socio-economic context, must be developed by all students in higher education.

One of the most frequently mentioned competencies in the different reports elaborated for higher education is the one related to the use of information and communications technology (ICT). There is widespread agreement that students in higher education must show that they have skills in this domain. However, although they highlight the importance of this competence, relatively few studies have addressed which specific ICT skills should be developed in higher education, beyond merely knowing the main steps in operating an electronic device for a certain purpose.

The different actors in the educational process often have a vision of ICT competencies that is limited to their use, without considering aspects related to their link to other educational competencies. ICT has a transversal nature; that is, its existence makes sense as far as it supports and facilitates a more efficient or competitive way of performing activities and processes that lead to value generation. ICT competencies should, at the same time, make it possible to develop other competencies, so that the students reinforce their capacity to develop skills in certain specific areas, such as team work, leadership, problem-solving, etc., using the potential that ICT offers [5].

Therefore, within Spanish universities' process of incorporation into the EHEA framework, this paper analyzes the competencies that internal and external agents to the university consider fundamental in guaranteeing the success of the educational process. For this purpose, it reviews recommendations and studies of a general nature in the European setting, as well as a specific study in the Spanish context. Finally, the paper examines a medium-sized Spanish public university, showing the results of a questionnaire completed by business management students on the use of ICT tools. The objective was to find out whether there was a relationship between students' rating of ICT and the development of other educational competencies. The results, although not generalizable, can offer a sort of guide to managing the development of key ICT competencies in the educational setting.

The paper begins with a review of the EHEA. Next, it presents a summary of some topics related to competencies in the educational setting, followed by a description of different studies related to the competencies that should be developed in higher education. Then the results are presented from a 2013 study about the perceptions of business management students from a Spanish university about the interest in the use of ICT in their knowledge field. Finally, some recommendations are proposed for making ICT competencies compatible with other educational competencies.

2 Conceptual Framework

2.1 The European Higher Education Area

The June 1999 Bologna Declaration opted for the creation, by 2010, of a European higher education area that would be compatible among all the signing countries. At the same time, it was supposed to be competitive, offering a high level of attraction for European students and those from other continents. The European education ministers determined six lines of action in Bologna, and three more were added in May 2001 in Prague:

1. Adoption of a system of easily readable and comparable degrees.
2. Adoption of a system essentially based on two main cycles (undergraduate and postgraduate studies).
3. Establishment of a system of credits.
4. Promotion of mobility.
5. Promotion of European cooperation in quality assurance.
6. Promotion of the European dimensions in higher education.
7. Promotion of lifelong learning.
8. Support to higher education institutions and students.
9. Promotion of the attractiveness of the European Higher Education Area.

The guidelines would have to be refined to offer universities and higher education institutions in the signing countries a set of well-defined rules to assure homogeneity in the structure of higher education programs. The Bologna Declaration was an important landmark because it represented the will of the signing countries to advance in the construction of a common educational framework that would facilitate the free circulation of professionals through all the European Union countries. Thus, based on this framework, employers could know and compare the competencies acquired by the professionals they wanted to hire, regardless of their country of origin. However, although agreement on higher education was reached by the European Union and other neighboring areas, it has not yet been possible to create a common structure for primary and secondary education.

In order to develop the strategic lines established in the Bologna Declaration, a pilot study was carried out called "Tuning educational structures in Europe", launched in the year 2000, through the joint work of representatives from a large group of European universities [6]. Some of the objectives proposed were the establishment of a system of homogeneous and comparable degrees, the adoption of a system based on two cycles (undergraduate and postgraduate studies), with another one for specializing in research, and the establishment of a credit system as a reference to measure and compare the student's personal work during his/her training process. The project was designed to determine the generic and specific competencies students should acquire in different first and second cycle disciplines in a series of thematic areas: business studies, educational sciences, geology, history, mathematics, physics and chemistry. In sum, the competencies describe the learning results, that is, what a student knows or can demonstrate after completing a stage in his/her learning process. The competencies act as frames of reference for elaborating and evaluating study plans. Their purpose is to allow flexibility and autonomy in the elaboration of

curricula, while introducing a common language to describe the study plans of the diverse higher education degree programmes. To draw conclusions from the Tuning project, questionnaires were elaborated that were filled out by 7,125 graduates, professors and business owners in 16 European countries.

2.2 Dublin descriptors

After the publication of the first conclusions of the Tuning Project, the Dublin descriptors were published. They consist of a set of generic competencies that make it possible to differentiate the skills and knowledge the students should have developed at the end of each cycle in the framework of studies adapted to the EHEA. They were defined by a group of international experts who called themselves the Joint Quality Initiative (JQI) and published their conclusions in 2004 [7]. Five sets of criteria were established that would develop in different ways depending on the study cycle considered:

1. Acquiring knowledge and understanding.
2. Applying knowledge and understanding.
3. Making informed judgements and choices.
4. Communicating knowledge and understanding.
5. Capacities to continue learning.

The sets of criteria are not exhaustive; instead, they are skills that must be developed at each higher education level, but to different degrees. They include: (i) the most basic, which is called the short cycle within the first cycle and refers to studies that take about 2 years; (ii) first-cycle studies, also called bachelor's degrees, with a duration of 3 to 4 years; (iii) second-cycle studies, which take 1 to 2 years and correspond to the master's degree; and, finally, (iv) third-cycle studies, or doctorates, with an estimated duration of 3 years. The Dublin descriptors are compatible with the agreements reached in the Tuning project. They complement and develop the definition of the competencies established in this project.

3 The Role of ICT Competencies in the EHEA

As explained above, the competencies represent a dynamic combination of knowledge, understanding, skills and abilities. In the area of ICT, the development of competencies is the key to establishing standards that make it possible to measure the degree of adaptation to educational objectives. Clearly and coherently defining competencies is extremely important for facilitating the educators' task. The ICT field is constantly evolving, with technologies that emerge and then become outdated in very short periods of time. The life cycle of all the ICT-related products is, on average, shorter than that of any other technology [8]. For this reason, the students' acquisition of fundamental knowledge and skills that are not dependent on the ICT available at any given time becomes a continual challenge for educators in this field.

In this sense, reports like the Tuning project or the Dublin descriptors do not shed much light on which competencies must be developed in the specific area of ICT. The

Tuning project explicitly establishes the development of skills in the use of information and communications technologies as a generic competence. That is, the importance of this tool is recognized, leaving more precise description for a second level the specific ICT competencies that must be acquired depending on the students' degree programme. In the first phase of the Tuning project, specific competencies were identified for each subject, reaching certain areas that were later broadened in new phases. The specific ICT competencies identified were the following:

- Art History: No specific competencies in ICT use.
- Business: (a) identify and operate adequate software; (b) design and implement information systems.
- Chemistry: Skill at using modern computer and communication techniques applied to chemistry.
- Earth Sciences: No specific competencies in ICT use.
- Education: Ability to make use of e-learning and to integrate it into the learning environment.
- History: Ability to use computer and Internet resources and techniques for elaborating historical or related data (using, for example, statistical or cartographic methods, or creating databases).
- Linguistics: No specific competencies in ICT use.
- Mathematics: (a) ability to use computational tools of numerical and symbolic calculations for posing and solving problems; (b) knowledge of specific programming languages or software.
- Nursing: Demonstrate the ability to use modern technologies to assess and respond appropriately to patient/client need (for example through telenursing, multimedia and web resources).
- Physics: Be able to perform calculations independently, even when a small [personal computer] PC or a large computer is needed, including capacity to utilize or develop computation systems or programmes for information processing, numerical calculus, simulation of physical processes, or control of experiments.

As can be observed, some subjects do not have specific associated competencies in the use of ICT, and others are quite generic, in spite of being specific competencies. This information, although limited, offers a certain guide about what skills should be developed by the students. In order to examine the relative importance awarded by different agents to acquiring competencies in the use of ICT, reference will be made to two studies at the national and local levels. These studies, although reflecting the situation of only one country and area, can be quite useful.

4 Importance given to ICT Competencies

Coinciding with the beginning of the implementation of the EHEA in Spain, a report by Accenture was published on the professional competencies of Spanish university graduates [9]. The purpose of this study was to find out the perceptions of the three most important agents in professional training and development, that is, companies, professors and students. The objective was to contrast the competencies that

companies' human resources departments valued most in hiring professionals with what the professors thought the graduates should have. The students were the third element to be contrasted, through the identification of the competencies they value most. In all, 398 questionnaires were evaluated. Table 1 organizes the 16 most valued competencies the three types of agents were asked to rate, regarding their importance in the professional realm. Few significant differences can be seen in the ratings of some of the competencies, while in others the differences are noteworthy. This is the case with knowledge of a second language, which the students rated in last place for their professional activity compared to the opinion of the professors (8th place) and the human resources managers (5th place).

However, regarding the importance given to ICT competencies, the gap between graduates and firms was smaller (7th and 6th places, respectively), compared to the opinions of the professors, who rated it in 10th place.

Table 1: Competencies defined by the Tuning Project according to the priority given to them by different agents in a national study. Source: adapted from Accenture [9]

	ACADEMIC	COMPANIES	GRADUATES
1	Determination and perseverance in the tasks given and responsibilities taken	Determination and perseverance in the tasks given and responsibilities taken	Ability to evaluate and maintain the quality of work produced
2	Ability to adapt to and act in new situations	Ability to adapt to and act in new situations	Ability to plan and manage time
3	Ability to communicate both orally and through the written word in first language	Interpersonal and interaction skills	Interpersonal and interaction skills
4	Ability to evaluate and maintain the quality of work produced	Ability to evaluate and maintain the quality of work produced	Ability to adapt to and act in new situations
5	Ability to plan and manage time	Ability to communicate in a second language	Ability to identify, pose and resolve problems
6	Ability for abstract thinking, analysis and synthesis	Skills in the use of information and communications technologies	Determination and perseverance in the tasks given and responsibilities taken
7	Interpersonal and interaction skills	Spirit of enterprise, ability to take initiative	Skills in the use of information and communications technologies
8	Ability to communicate in a second language	Ability to communicate both orally and through the written word in first language	Ability to work autonomously

	ACADEMIC	COMPANIES	GRADUATES
9	Capacity to generate new ideas (creativity)	Ability to plan and manage time	Ability to communicate both orally and through the written word in first language
10	Skills in the use of information and communications technologies	Ability to search for, process and analyse information from a variety of sources	Ability to search for, process and analyse information from a variety of sources
11	Ability to work in a team	Ability for abstract thinking, analysis and synthesis	Ability to work in a team
12	Ability to work autonomously	Capacity to generate new ideas (creativity)	Ability for abstract thinking, analysis and synthesis
13	Ability to identify, pose and resolve problems	Ability to identify, pose and resolve problems	Capacity to generate new ideas (creativity)
14	Ability to search for, process and analyse information from a variety of sources	Ability to work autonomously	Ability to motivate people and move toward common goals
15	Spirit of enterprise, ability to take initiative	Ability to motivate people and move toward common goals	Spirit of enterprise, ability to take initiative
16	Ability to motivate people and move toward common goals	Ability to work in a team	Ability to communicate in a second language

This report was limited to indicating that ICT is considered a necessary requisite for obtaining a job with a university degree and that the perception of firms' human resources departments is that computer use has improved considerably in recent years.

In addition, continuing within the Spanish territory, in 2009 a study was conducted on the most valued competencies in the specific socio-economic setting of Gran Canaria Island [10]. This study was sponsored by the Social Council of Las Palmas de Gran Canaria University. The Social Council is an organization that controls the university's functioning, and it is made up of a representation of social collectives and public institutions. The purpose of the study was to identify the priorities in the professional competencies of the graduates of this university, to find out whether they differed from those included in the Accenture report. The justification for the study was the possibility that the priorities regarding the most valued competencies for the professional activity would be different in these specific environmental conditions. Gran Canaria Island is located 1,300 kilometres from the Spanish coast; it has a population of 850,391 inhabitants [11] and a surface area of 1,560 square kilometres. It has a specific socio-economic situation stemming from its distance from the European continent and the fact that its economy is mainly based on the services sector and more specifically, on tourism. The study was carried out using questionnaires sent to firms and local trade unions. The questionnaire was responded

to by 45 human resources managers with people with university degrees as members of their staff and by 44 trade union representatives with jobs in firms and public organizations on the island. The questionnaire was sent to the trade union representatives due to the vision this collective could have of the professional setting, given that, although forming part of it, they might value the competencies differently from the way the human resources managers would. As in the Accenture report, the initial references were the 32 competencies identified in the Tuning project. Of these 32 competencies, the 16 most-valued ones were selected. Table 2 shows the results obtained, organized by priorities given to the different competencies evaluated. This table identifies those competencies for which there is agreement between the national and local reports on the responses to the questionnaires filled out by the firms (local trade unions representatives' responses are also compared with national managers' ones).

Table 2: Competencies defined by the Tuning project according to the priority assigned by different agents in a study on Gran Canaria [10]

	COMPANIES	Coincidence	UNIONS	Coincidence
1	Determination and perseverance in the tasks given and responsibilities taken	Yes	Ability to apply knowledge in practical situations	No
2	Ability to apply knowledge in practical situations	No	Knowledge and understanding of the subject area and understanding of the profession	No
3	Spirit of enterprise, ability to take initiative	Yes	Ability to communicate both orally and through the written word in first language	Yes
4	Capacity to generate new ideas (creativity)	Yes	Capacity to learn and stay up-to-date with learning	No
5	Interpersonal and interaction skills	Yes	Ability to identify, pose and resolve problems	Yes
6	Capacity to learn and stay up-to-date with learning	No	Ability to work in a team	Yes
7	Ability to work in an international context	No	Ability to plan and manage time	Yes
8	Ability to be critical and self-critical	No	Skills in the use of information and communications technologies	Yes

	COMPANIES	Coincidence	UNIONS	Coincidence
9	Ability to make reasoned decisions	No	Ability for abstract thinking, analysis and synthesis	Yes
10	Knowledge and understanding of the subject area and understanding of the profession	No	Ability to adapt to and act in new situations	Yes
11	Skills in the use of information and communications technologies	Yes	Ability to evaluate and maintain the quality of work produced	Yes
12	Ability to act on the basis of ethical reasoning	No	Ability to design and manage projects	
13	Ability to work in a team	Yes	Determination and perseverance in the tasks given and responsibilities taken	Yes
14	Appreciation of and respect for diversity and multiculturality	No	Ability to make reasoned decisions	No
15	Ability to adapt to and act in new situations	Yes	Ability to act on the basis of ethical reasoning	No
16	Ability to identify, pose and resolve problems	Yes	Capacity to generate new ideas (creativity)	Yes

The table shows that the similarity between the 16 most-valued competencies in the two reports was about 50% in the case of the firms and 63% for the trade unions, which implies certain variations in the different perceptions on a national report compared to a local one. Regarding the position occupied by competence in handling ICT, the respondents from the firms put it in 11th place, while those belonging to trade unions put it in 8th place. For this competency, the differences between the three agents interviewed was not significant.

5 ICT Competencies: What Are They?

As can be observed, both the reports and the agents participating in the aforementioned studies coincide in highlighting the importance of acquiring competencies in ICT. Traditionally, ICT competencies have been defined as the ability to use the computer, peripheral equipment, operating system and software [12].

Among the set of skills mentioned, it is understood that handling software refers to the use of applications related to basic tasks (e.g. office automation and browsers), as well as specific applications depending on the user's professional field. This vision of the ICT competencies has possibly become one of the most widely extended in the area of higher education. Currently, in the majority of the higher education institutions, when students begin their university studies, it is assumed that they have competencies in the use of the computer, peripheral equipment and the operating system. Based on this premise, it is common practice for university professors to require the students to know how to use the specific software related to the subject they teach. This type of learning has the obvious advantage of bringing the students closer to knowing and handling tools that they will probably use in their professional lives. On the other hand, from the point of view of the professors, they can argue that they collaborate to develop a skill, the use of ICT, which is considered important in studies on higher education [13].

However, this approach reiterates the model frequently repeated in higher education, according to which the teaching of a discipline is fragmented in subjects that are taught in an unconnected way. This means that the students acquire very specific knowledge and skills, but they do not develop the capacity to understand the interactions among them, losing the global view. Teaching specific software applications for each subject in an isolated way from other subjects can only strengthen the effect of fragmentation of knowledge.

As an alternative to this teaching approach, there is an argument for the usefulness of developing competence in using ICT by relating it to other learning competencies. This proposal would involve developing competencies in a combined way, that is, by promoting the development of ICT skills together with one or more of the other competencies proposed in international studies such as the Tuning project. This approach would facilitate the ability to use specific software, which, in turn, would lead to developing competencies such as teamwork, problem-solving, organizing and planning, initiative and entrepreneurship or the capacity to generate new ideas, among others. Obviously, combining capacities is not a simple process, given that certain types of software do not facilitate the development of capacities like those mentioned. However, this limitation can be overcome by integrating the software as part of a broader activity where the objective is not limited to the use of specific software, but rather includes the parallel development of other generic competencies. This proposal undoubtedly involves greater effort on the part of the professor and the students, who would probably have to dedicate more time to performing these types of tasks. The time these two agents have available, as well as other subjects that need the students' attention, can be an important inhibitor of this type of proposal. However, the present study proposes that the students, as leading actors in their own educational process, positively value learning based on competencies that are valued in the job market. Therefore, this paper establishes the following research hypothesis:

University students will more positively rate activities involving the combination of ICT competencies with others of a more generic nature than activities that require the development of competencies focused exclusively on ICT use.

6 Method

To contrast the proposed hypothesis, a questionnaire was given to students in the fourth and last year of the business management study plan. The study plan followed by the students is characterized by the traditional approach of fragmenting knowledge into subjects in the form of isolated compartments. The questionnaire was responded to in May 2013 by the 41 students present in the classroom on the last day of instruction. The subject they were enrolled in was called 'Decision and Simulation Models', an optional subject with a transversal nature. The course highlighted the importance of contemplating a firm's decision-making as a coherent set of decisions that can affect all the functional areas, at the same time that both the short and medium term are considered in the temporal horizon of decision-making. There is an intensive use of simulation models and tools, with the computer playing a key role, which means that all the sessions are carried out in the computer room.

During the 2013 course, the teaching was structured with a competitive business game as the main thread. The students were grouped in teams of 3. The teams competed with each other to obtain the best result on an indicator of the performance of the company they managed. The teams' incentives on this activity were the desire to win and become the best decision-makers in the class, and the chance to obtain up to 5% of the final grade for the best positioned team at the end of the competitive game. Moreover, using the setting proposed by the business game as a reference, as well as the characteristics of the company the students had to manage, the groups were asked to elaborate other activities, all of them based on the use of ICT. All of the activities were related to modelling and decision-making. In summary, the activities requested from the students consisted of:

- Assignment 1: Create a conceptual model, using software for representing conceptual maps, of the functioning pattern and structure of the business game in which the group participates.
- Assignment 2: Construct, using a spreadsheet, a quantitative decision-making support tool that would be useful for making decisions in the company managed by the group in the business game.
- Assignment 3: Diagnose the competitive situation of the company being managed in the business game and make a strategic plan for it using software for strategic planning.
- Assignment 4: Model and simulate, using systems dynamics software, the results forecast in any variable (e.g. benefits, personnel, savings, etc.) of one of the strategies proposed by the students for the company in the business game.
- Assignment 5: Manage a virtual company using competitive business game software.

Table 3 shows the link between the proposed activities and the general competencies described in the Tuning project to be developed in higher education. As can be observed, the 5th activity included a greater number of generic learning competencies. Several of these activities were those most highly rated by the students in the results of the Tuning project (see Table 1).

Table 3: Link between the proposed activities and the general competencies described in the Tuning Project to develop in higher education

ASSIGNMENT	GENERAL COMPETENCIES
Assignment 1	Ability for abstract thinking, analysis and synthesis
	Skills in the use of information and communications technologies
Assignment 2	Ability to search for, process and analyse information from a variety of sources
	Ability to make reasoned decisions
	Knowledge and understanding of the subject area and understanding of the profession
	Skills in the use of information and communications technologies
Assignment 3	Capacity to generate new ideas (creativity)
	Ability to search for, process and analyse information from a variety of sources
	Ability to make reasoned decisions
	Ability to work in a team
	Knowledge and understanding of the subject area and understanding of the profession
	Ability for abstract thinking, analysis and synthesis
	Skills in the use of information and communications technologies
Assignment 4	Ability to search for, process and analyse information from a variety of sources
	Knowledge and understanding of the subject area and understanding of the profession
	Ability for abstract thinking, analysis and synthesis
	Skills in the use of information and communications technologies
Assignment 5	Ability to plan and manage time
	Capacity to generate new ideas (creativity)
	Ability to identify, pose and resolve problems
	Ability to apply knowledge in practical situations
	Ability to make reasoned decisions
	Ability to work in a team
	Spirit of enterprise, ability to take initiative
	Interpersonal and interaction skills
	Ability to adapt to and act in new situations
	Ability to motivate people and move toward common goals
	Skills in the use of information and communications technologies

The questionnaire the students were asked to fill out presented a series of questions about the subject. They were asked to rate their level of interest in each of

the activities on a 5-point Likert scale. Table 4 shows the means and standard deviation values obtained for the different activities. All the assignments were highly valued. The table shows that the most highly rated activity was the business game (5th assignment). To find out whether the value reached was significant compared to the score obtained for the other activities, a paired t-test was carried out between the business game activity and each of the other activities. The results, shown in Table 5, yielded significant differences at 99% (p-value=0.000).

Table 4: Means and standard deviation values obtained by the different activities

DESCRIPTIVE STATISTICS			
	N	Mean	Std. Deviation
Assignment 1	39	3.5385	.75555
Assignment 2	40	3.9250	.97106
Assignment 3	39	3.8974	.75376
Assignment 4	41	3.2439	1.09042
Assignment 5	40	4.5500	.59700
Valid N (listwise)	33		

Table 5: Paired t-tests between the business game activity and each of the other assignments

PAIRED SAMPLES TEST				
		T	df	Sig. (2-tailed)
Pair 1	Assignment 1- Assignment 5	-6.812	36	.000
Pair 2	Assignment 2- Assignment 5	-3.321	37	.002
Pair 3	Assignment 3- Assignment 5	-4.789	36	.000
Pair 4	Assignment 4- Assignment 5	-7.514	38	.000

These results may well show that the students, aware of the competencies they have to develop to prepare for their entrance in the job market, positively value both the ICT applications that develop specific competencies and those that develop general ones.

7 Implications for the Educational Management of ICT

Managers of higher education face the dilemma of which ICT competencies the students have to develop. There is still some lack of definition about which ICT competencies the students need, not only in their specialized field, but also in light of new issues and requirements in the modern world and in the job market. Throughout

this paper we have proposed an approach that would relate ICT competencies with more generic ones associated with the educational process. For this purpose, based on generic competencies defined in highly respected international reports, it is advisable to identify the most relevant ones in the specific socio-economic environment in which the teaching-learning process takes place. Then, people responsible for educational management could propose that ICT competencies be taught under an integrating prism that not only develops specific competencies related to the students' future professional field, but also more general competencies that companies and organizations offering jobs consider necessary in university students' training.

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