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Analysis of the acquisition of ICT competence in the area of graphic design at the university of santiago (Spain)

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Abstract

The entry into the European Higher Education Area meant a great revolution for the Spanish university. One of the biggest challenges was to professionalize the imposition of learning in order to integrate students into the working market. This aspect is particularly important in the field of Graphic Design, where it is essential that students acquire, among others, ICT. The sample is all the technical degrees of the University of Santiago -Spain-. The results indicate that although the objectives include the acquisition of ICT skills, 100% of the sample does not include methodologies or strategies of evaluation aimed at its acquisition.

Keywords: Graphic Expression; ICT Competence; Engineering; Architecture; University of Santiago

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1. Introduction

The entry into the European Higher Education Area (EHEA) meant a great revolution for the Spanish university, being forced to make the biggest transformation in decades, which affected the entire educational process. One of the biggest challenges was to professionalize the imposition of learning in order to integrate students into the working market, for which the university should ensure that students will get specific competences in each subject (Brodeur, Young & Blair, 2002). This forced the transformation of teaching methods and activities, which must be realistic as possible and with a similar degree of difficulty that students will face in the employment context, thus ensuring that the learning will help them become competent subjects (Denayer, Thaels, Vander & Gobin, 2003). This aspect is particularly important in the field of Graphic Design, where it is essential that students acquire, among others, ICT skills for proper integration into the labour market.

2. ICT skills acquisition in Graphic Expression

Throughout these years our society has witnessed the birth of several technologies that have revolutionized many areas within it. However, the educational scenario has been slow to react to the strong impact of technological advances, although we live in a new society where a large percentage of the world's workers work in the field of ICT (Lozano, 2014). Obviously, the University can not remain indifferent to the social changes that are causing these technological innovations (Yasak & Alias, 2015).

In parallel, the entry into the European Higher Education Area caused numerous transformations that primarily promote training based on skills acquisition. The introduction of skills in the university system prompted major changes in relation to the applied methodologies, evaluation techniques and the role played by teachers, who must guide you in acquiring the skills required (Perez et al. 2008).

Acquiring competences involved a change in the thinking, feeling and acting of the student, forcing teachers to change the educational approach, which should be geared to whoever learns with more participation and responding to the growing demands of society (Mingorance & Calvo, 2013). The teacher guides, in order for students to build their knowledge, their expertise and know-how to be (Fernandez March, 2011). That is, university teachers, especially those who are teaching in technical careers, should adapt and renew the methodologies of learning for the students to achieve a set of skills that will prepare them for the arrival to the work world (Vargas, 2010).

The choice of educational paradigm is a priority in Graphic Expression, as the ability to graphically communicate is key to other areas of technical degrees, where the development of spatial vision and the need for mastery of different techniques of representation is a prerequisite when it comes to developing projects and construction management expertise. And the best way to achieve this is through new technologies, since they allow better spatial understanding. In order to participate in this union of distances, it is all about finding a different way, both environment-wise as a working platform that improves the quality of teaching in the field of Graphic Expression, more in line with current legislation and expectations and contemporary social situation.

The way to achieve this is to address the postfordist education, and integrating ICT competence acquiring and changing the teacher-student roles to foster a collaborative learning mainly based on projects (Laval, cited in Rodríguez Romero, 2012).

3. Objective

The main objective of this research is to find out what degrees of the University of Santiago (USC) contain any related materials to Graphic Expression that provide teaching for the acquisition of ICT skills and if it indeed obtained.

4. Method

In order to carry out this research, we have made an analysis of the educational guides of all courses related to the construct under study, used by teachers to develop their teaching, and downloaded from the various websites of the faculties of the University of Santiago.

5. Sample

We have begun conducting a survey of existing centres where any degrees in Engineering or Architecture are taught, within the University of Santiago.

The sample is 12 courses belonging to 7 degrees at the University of Santiago (USC) of the different engineering degrees that contain courses related to Visual Graphic Expression. Said degrees are the following, which make up the sample and are listed and described in Table 1.

Table 1. Degrees in engineering or architecture in the University of Santiago of Compostela

	Degree	Campus
1.	Degree in Chemistry	Santiago
2.	Degree in Industrial Chemical Processes	Lugo
3.	Degree in Agricultural and Rural Engineering	Lugo
4.	Engineering Degree in Agro-Food Industries	Lugo
5.	Degree in Forestry and Natural Environment	Lugo
6.	Degree in Civil Engineering	Lugo
7.	Degree in Geomatics and Topography	Lugo

Within the 7 degrees object of study at the University of Santiago, 12 courses are related to Visual Graphic Expression, including 7 basic training courses and 5 electives courses, all of which are contemplated in this study. The duration of all of them is a semester, and they are each 6 ECTS of basic training (except Graphic Expression in Engineering, part of the Degree in Civil Engineering, which has 9 ECTS and is an annual course), and the elective courses are 4.5 ECTS each. (Table 2)

Table 2. Subjects of degrees in engineering or Architecture in the University of Santiago of Compostela

Degree in	Name	Credits	Cours/Semester	Character
1. Chemistry	Graphic Expression	6	2º/2º	Basic
2. Industrial Chemical Processes	Graphic Expression and DAO	6	1º/1º	Basic
3. Agricultural and Rural Engineering	Graphic Expression in Engineering	6	1º/1º	Basic
	CAD. Applied Graphic Expression	4,5	2º/2º	Optative
4. Agro-Food Industries	Graphic Expression in Engineering	6	1º/1º	Basic
	CAD. Applied Graphic Expression	4,5	3º/2º	Optative
5. Forestry and Natural Environment	Graphic Expression in Engineering	6	1º/2º	Basic
	CAD. Applied Graphic Expression	4,5	4º/2º	Optative

6. Civil Engineering	Graphic Expression in Engineering	9	1º/Annual	Basic
	Computer-Aided Technical Drawing	4,5	1º/2º	Optative
7.Geomatics and Topography	Representation systems	6	1º/1º	Basic
	Computer-Aided Technical Drawing	4,5	2º/2º	Optative

6. Results and analysis

As identified in the analysis of the teaching guides, the teachers of the USC (Table 3), contemplate the acquisition of ICT skills competences in only four of the twelve subjects related to this matter, representing 33.3% of the sample. However, none of the teachers of the twelve subjects of Graphic Expression (100% of the sample) taught at said seven degrees use any methodology aimed at the acquisition of ICT competence. Consequently, the evaluation does not contain either anything conducted to evaluate whether the student has achieved this competence.

Table 3. Acquisition of ICT Competences in Degrees in Engineering within USC

Degree in	Name	ITC Competence	ITC Metodology	Evaluation
1. Chemistry	Graphic Expression	YES	NO	NO
2.Industrial Chemical Processes	Graphic Expression and DAO	YES	NO	NO
	Graphic Expression in Engineering	NO	NO	NO
3.Agricultural and Rural Engineering	CAD. Applied Graphic Expression	NO	NO	NO
	Graphic Expression in Engineering	NO	NO	NO
4.Agro-Food Industries	CAD. Applied Graphic Expression	NO	NO	NO
	Graphic Expression in Engineering	NO	NO	NO
5.Forestry and Natural Environment	CAD. Applied Graphic Expression	NO	NO	NO
	Graphic Expression in Engineering	NO	NO	NO
6.Civil Engineering	Computer-Aided Technical Drawing	YES	NO	NO
7.Geomatics and Topography	Representation systems	NO	NO	NO
	Computer-Aided Technical Drawing	YES	NO	NO

The entry into the new EHEA should involve performing "reflection, not only individually, but also together in what refers to the three fundamental tasks and interlinked educational intervention: planning, execution of the instruction and assessment" (Garcia & Morillas, 2011:114). However it seems that the teachers in charge of the courses analysed from the University of Santiago are not really adapted to the new situation, despite the new curriculum being implanted for a few years already.

This situation is particularly worrying in the field of Graphic-Visual Expression, where the current labour market requires the practitioner to have gained this competition, which makes it essential to renew the teaching of this discipline (which deals with the representation of three-dimensional space on a flat surface, enabling the resolution of spatial problems through two-dimensional techniques) which has traditionally been developed by two-dimensional methods based on paper and board.

However, in recent years, new technologies are greatly easing three-dimensional modelling and visualization, so that the 2D drawing has given way to the combined 2D / 3D computer support, which features have prompted a new teaching approach (Monedero in Natividad, Calvo Garcia & Sanz, 2011).

7. Conclusions

The information and communications technology has virtually covered all professions and education fields, generating an impact in recent years that has led to reorganize the methodologies employed in the universities, as now new skills and competencies are required, and they affect educators (Kolloffel, Eysink & Jong, 2011). ICT contributes to improving teaching providing creativity and innovation, because through them we move from a process of learning that is a routine and even monotonous to a process full of novelty and dynamism. They have become powerful teaching tools that contribute to the achievement of educational purposes. (Chao, Mato & Ferreiro, 2014; Vergara & Rubio, 2013).

The introduction of computers in the world of Graphic Expression represents a different approach when it comes to facing knowledge and a new approach as well to the professional in the industrial sector, as the need to possess certain qualities or abilities in the work world has not gone unnoticed in the European Higher Education Area (EHEA), since thanks to the beginning of the new curriculum, teachers have been pushed to adapt their learning methods for students to achieve those skills, which are catalogued in generic, transversal and specific skills, that will prepare them for entry into the labour market (Vargas, 2010).

We believe that Visual Graphic Expression being a fundamental and basic material in the teaching and learning of technical careers, it is inevitable to include the use of new technologies into it. We agree with Lopez, Lopez & Mato (2014, a & b) when they say that their management is essential in mastering subjects whose contents involve knowledge of a language other than the usual: the graphic-visual that allows spatial understanding.

It is therefore surprising that in an area such as Graphic Expression the use of ITCT is not covered unanimously and meaningfully, as teaching methodology. It is especially inexplicable that 66.7% of the sample does not even contemplate in their programs the need to acquire these skills, and those are not present in methodologies nor in the evaluation of these courses.

And therefore our commitment to seek the best ways to give a boost to this area, while we hope these results can help professionals improve and address differently their educational action.

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