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Digital Competency and University Curricula. In Search of the Missing Link

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Abstract
This article presents some results of the research project entitled "University and Knowledge Society: The Place of ICTs in Curricular Determination Processes". Funded by AECID and conducted in the context of the UNISIC network, the five-year study investigates teaching changes that are emerging in Ibero-American universities as a result of the demands of society today.

The following levels of a series of documents and in-depth interviews were analysed: general policy, the institution, curricula and subject programmes.

The specific results presented here concern the approach taken to digital competency in curricula of the Faculty of Mathematics at the University of Santiago de Compostela. In new degrees, this approach may be considered as an indicator of the way in which universities are facing up to the challenge of training new professionals that knowledge economies need.

The analysis reveals discrepancies in the attention paid to cross-curricular competencies that are representative of the demands of the knowledge society, and that little attention is paid to digital competency.

Keywords

cross-curricular competencies, digital competency, university curricula, knowledge economy

Competencia digital y planes de estudio universitarios. En busca del eslabón perdido

Resumen

Se presentan algunos resultados de una investigación denominada Universidad y sociedad del conocimiento: el lugar de las TIC en los procesos de determinación curricular. *Financiado por la AECID,*[1] *el estudio profundiza en una línea de cinco años de duración, desarrollada en el contexto de la red UNISIC,*[2] *que indaga acerca de los cambios en la enseñanza que se están gestando en las universidades iberoamericanas a raíz de las demandas provenientes de la sociedad contemporánea.*[3]

Se utilizaron documentos y entrevistas en profundidad, analizados en función de los siguientes niveles: política global, la institución, planes de estudios y programas de las materias.

En este artículo, se exponen algunos de los resultados del estudio, relativos al tratamiento de la competencia digital en el plan de estudios de la Facultad de Matemáticas de la Universidad de Santiago de Compostela. Se entiende que el tratamiento de este aspecto en las nuevas titulaciones puede considerarse como un indicador de la manera en que las universidades están afrontando la formación de los nuevos profesionales que demandan las economías del conocimiento.

El análisis revela discrepancias en la atención prestada a las competencias transversales representativas de las demandas inscritas en la sociedad del conocimiento y la escasa atención a la competencia digital.

Palabras clave

competencias transversales, competencia digital, planes de estudio universitarios, economía del conocimiento

1. Agencia Española de Cooperación Internacional para el Desarrollo.
2. Universidad para la Sociedad de la Información y el Conocimiento.
3. Véase http://unisic.usc.es/index.php?option=com_content&view=article&id=39&Itemid=5.

1. Introduction

This article presents some results of the research project entitled "University and Knowledge Society: The Place of ICTs in Curricular Determination Processes". Funded by AECID (Spanish Agency for International Development Cooperation)[4] and conducted in the context of the UNISIC (University for the Information and Knowledge Society) network, the five-year study investigates teaching changes that are emerging in Ibero-American universities as a result of the demands of society today.[5]

For some time now, the universities forming part of the UNISIC network have been studying the changes taking place within them as a result of the social, political and economic demands of today. These studies have identified social, institutional and training problems that condition the working practices of teaching staff and their ability to ensure that the necessary changes actually take place (Gewerc, 2009; 2010). At different times, various authors (Castells, 1997; Duderstadt, 2000; Duderstadt et al., 2002; GUNI[6], 2008) have stated that the extraordinary advances made in the field of information and communication technologies (ICTs) have deep-rooted implications for universities. Technologies are radically changing the way information is obtained, handled and conveyed, and this strikes directly at the heart of the traditional paradigms of universities as institutions. It therefore seems very clear that 21st-century universities require new blueprints to meet and lead these new needs.

It is for this reason that the reports and decisions issued by European bodies in recent years have placed considerable emphasis on changes referring to knowledge generation spaces and times, and on the engagement of a variety of sectors and stakeholders (García Aretio & Ruíz Corbella, 2008). And the true *leitmotiv* for all of this is the economy because, following the Lisbon European Council of March 2000, the objective of the European Union was to become the most competitive knowledge-based economy by 2010, a fact that should not be overlooked. Among many other consequences of this objective is the implementation of the Bologna Process, which gives rise to the European Higher Education Area (EHEA).[7]

In this context, institutions are bound up in curricular changes to facilitate a creative adaptation to new demands. Basically, the following aspects are being discussed: 1) The link between universities and the productive apparatus and 2) a restructuring of university curricula in accordance with advances in the fields of science and technology. Hence the emergence, among others issues, of the need to develop digital competency.

On the basis of the above, the questions guiding the research are: How has this problem been solved by the various institutions included in the study? How is this mirrored in curricula and programmes? In the curricula as a whole, what is the place of ICTs in the processes of searching for, storing and disseminating knowledge? How is training designed to meet the needs of the information

4. Project ref. PCI A/017272/08A/017272/08.
5. For further information, see: http://unisic.usc.es/index.php?option=com_content&view=article&id=39&Itemid=5.
6. Global University Network for Innovation.
7. Most of the documents and reports on the process of European convergence are available on the Bologna Process official website: http://www.bologna2009benelux.org.

and knowledge society? Regarding the integration of ICTs into curricula in different knowledge areas, what micropolitical forces are helping to shape those curricula? This integration alters curricular spaces and imposes new rules and codes. How does this happen in different knowledge areas? With what content are they introduced? With what sequence and level of depth? Analysing the guiding principles of this decision making and establishing how teaching staff resignify the proposals are substantive issues for understanding the way in which universities are adapting to these new demands.

The basis for any curriculum is that there are principles underlying it, such as codes, which structure the selection, organisation and methods for transmission. These codes come from political and social choices, from epistemological conceptions and from psychological, pedagogical and organisational principles (De Alba, 1995). A detailed analysis of these offers an understanding of how training is being approached in different contexts.

To carry out that task, documents and in-depth interviews were analysed. Each university participating in the UNISIC network8 selected a case that allowed answers to the questions posed to be explored. The University of Santiago de Compostela (USC) selected the Faculty of Mathematics because it leads the way in the elaboration of undergraduate studies and the application of conditions imposed by the EHEA.

The specific results presented here were obtained from a relative analysis of the approach taken to digital competency in the context of its curriculum, through an exhaustive review of the documents. In new degrees, the approach to this aspect may be considered an indicator of the way in which universities are facing up to the challenge of training new professionals that the knowledge economy needs.

2. Curricula

The definition and the elaboration of university curricula tend to follow a number of prioritised processual steps, although this apparent linearity in decision making may conceal a complexity of movements that may require a theorisation that goes beyond the description and interpretation of what it means to make the most visible decisions. In the realm of European universities, it was the movement triggered by the Bologna Declaration of 1999 that gave rise to the need for curricular change to ensure the availability of comparable and equivalent curricula, thus creating an EHEA in which student and lecturer mobility – and labour mobility – would become a reality. What, at that time, was a kind of programmatic agreement of intentions has now become an action plan through laws, decrees, political stances, approvals and rejections that each university institution needs to interpret within the framework of its political autonomy and, above all, its economic autonomy.[9]

8. The following universities form part of the UNISIC network: Juan Misael Saracho, de Tarija (Bolivia); S. Francisco Xavier, de Sucre (Bolivia); La Frontera, de Temuco (Chile); Santiago de Compostela (Spain); National of Córdoba (Argentina).

9. According to Zabalza (2009: 19), Bologna is a challenge for those who believe in a United Europe, a fantasy for sceptics and a battle field for those against it.

The curricular determination process[10] in universities does not, therefore, appear to begin with laws and decrees. Rather, these are testimonials of some of the prior agreements among large groups of power, of European strategies for education and training (2015 and 2020),[11] and they fulfil the role of making the common normative framework of reference explicit, a framework with which universities in the Spanish context are required to comply. These are the universities that, making use of their autonomy, will have the mission of reorganising their current curriculum to meet the explicit and implicit needs imposed by this normative framework, which is simple, or so it would seem. This framework triggers a series of curricular determination processes and procedures in university institutions that, in turn, replicates the struggles and tensions coming from various ideological views in the field of higher education. In most Spanish universities, the curricular design culminates in the approval of a curriculum by a faculty board. It is then subject to analysis by the Spanish National Agency for Quality Assessment and Accreditation (ANECA) and the official bodies of some of Spain's autonomous communities. All of this obviously originates from the established legal framework. After this long and complex process is complete, the approved plan is rolled out by university lecturers, with their own interpretations, in programmes and in classrooms.

The USC is currently adapting to the approaches originating from EHEA convergence or harmonisation. These directives establish operational guidelines for the inclusion of the new demands of the knowledge economy. One of the documents elaborated for the Spanish Presidency of the European Union [12] stipulated that, in this context, education, training, innovation and knowledge generation and transfer would be fundamental in achieving a new knowledge-based economy throughout Europe.

Furthermore, most studies (Castells, 1997; Echeverría, 2001; Olivé, 2007) show that ICTs are a necessary yet insufficient condition for the knowledge society's development. If emphasis is placed on them, it would seem that it is being done in the belief that the knowledge society rests on an increase in the use of artefacts such as mobile phones, computers and Internet connections rather than on the education of people and the establishment of the right conditions for them to generate new knowledge to allow their capacities to be developed and their problems to be solved. We should not forget that ICTs have helped to increase the rate of creation, accumulation, distribution and use of information and of knowledge in a way that could be described as spectacular. How is this conceived in the curricular designs we are analysing?

Document analysis has allowed us to become aware of some aspects of curricular determinations experienced during the process of constructing Mathematics curricula at the USC. Documents are a very rich source of information that helps us to understand the prevailing discourses and the shaping of educational policies. They are a clear component through which the state 'stakes its claim' and aims to normalise and regulate practices at different levels.

10. The curriculum is not just an 'object', although its materialisation in curricula and programmes leads us to consider it as such, but rather a process implemented at different times by various bodies and stakeholders, a 'coming together of practices', as stressed by some of its scholars (Beltrán, 1994; Bolívar, 2008a; Gimeno, 1988).

11. The website of the Conference of Spanish University Rectors (CRUE) (http://www.crue.org/) contains a considerable amount of information on the process of convergence with Europe already implemented, as well as future movements.

12. See: http://www.aecid.es/web/es/

Some fundamental official documents for the development of university curricula in the Spanish context were selected, as shown in the table below:

Table 1. Official documents selected for the research

Level	Source	Year	Location
State legislation	*LOU-LOM Consolidated text of the Organic Law of Universities*	Act 6/2001, of 21 December (BOE [Spanish Official State Gazette] 24/12/2001), modified by Organic Law 4/2007, of 4 April (BOE 13/4/2007)	http://www.uco.es/ugt/archivo/2007/070503_LOMLOU_refundido.pdf
	ROYAL DECREE 1393/2007, of 29 October, establishing the structure of official university teaching	Royal Decree 1393/2007, of 29 October (BOE 30/10/2007)	http://usc.es/eees
ANECA	*Mathematics bachelor's degree white paper*	March 2004	http://www.usc.es/export/sites/default/gl/centros/matematicas/descargas/libro_blanco_aneca.pdf
USC documents	*USC quality plan*	Approved by the Governing Council of 29/09/04	http://www.usc.es/export/sites/default/gl/normativa/descargas/PlanCalidade_galego.pdf
	Report on the verification of official USC degrees	(No date) Accessed 19/01/10	http://www.usc.es/estaticos/servizos/sxopra/modmemoverificagraodef.doc
	Report on the verification of official USC masters' degrees	(No date) Accessed 19/01/10	http://www.usc.es/estaticos/servizos/sxopra/modmemoverificamaster.doc
EHEA section of the USC website	*General USC guidelines for the elaboration of new official degrees regulated by Royal Decree 1393/2007*	05/06/2008	http://www.usc.es/export/sites/default/gl/goberno/vrodoces/eees/descargas/linasxeraisnovastitulacofic.pdf
	Regulation of official postgraduate studies	05/06/2008	http://www.usc.es/export/sites/default/gl/goberno/vrodoces/eees/descargas/rglestudosoficiaisposgrao.pdf
	EHEA in classrooms	(No date) Accessed 08/02/10	http://www.usc.es/gl/goberno/vrodoces/eees/aulas.html
Faculty of Mathematics reports and guides	*Mathematics bachelor's degree report*	22/04/2008	http://www.usc.es/export/sites/default/gl/centros/matematicas/descargas/Memoria_Final_Corregida_Grado_Mate_USC.pdf
	Faculty guide 2009/2010	2010	http://www.usc.es/export/sites/default/gl/centros/matematicas/descargas/guia_matematicas_09_10.pdf
Mathematics bachelor's degree subject programmes	*Mathematics bachelor's degree subject programmes*	2010	http://www.usc.es/gl/centros/matematicas/titulacions.jsp?plan=12330&estudio=12331&codEstudio=11930&valor=9

3. Cross-Curricular Competencies and the Curriculum: Training for the Knowledge Society

We selected the 'competency' concept as one of the fundamental determinants of the shaping of new curricula. One of the characteristics of the term 'competency' is its polysemy and abundance of definitions. Hence the difficulties for unifying criteria, in relation to both the definition and the type of competency.[13] In this paper, neither do we intend to discuss what an appropriate definition is, what the underlying issues are, nor what the different types are. Without ignoring these issues (De Pablos, 2010; Gimeno, 2008), we shall focus specifically on cross-curricular competencies, in which digital competency can be located, and analyse the approach to these in the overall context of the bachelor's degree curriculum in the Faculty of Mathematics at the USC.

The term 'cross-curricular' does not refer to common elements of different, specific competencies of the subjects, but to complementary and independent aspects that can be used in other fields (EURIDYCE, 2002). In this sense, for Bolívar (2008b) it is important to develop cross-curricular competencies to drive educational policy forward and to ensure that citizens have active lives by, for example, allowing them to master tools for learning and training and to have skills for appropriate social relations and for the management of all their actions (leadership, creativity, project management, etc.). To some extent, it could be said that competencies and skills for training individuals to contribute to the development of these new, contemporary social conditions reside in the curriculum's cross-curricular competencies. We are referring to basic social skills for lifelong learning such as: working collaboratively, being responsible for constructing shared knowledge, contributing to local and global communities, working with multidisciplinary groups, etc. (Collis & Moonen, 2006).

However, if we take into account that, besides the aforementioned cross-curricular competencies (shared by multiple degrees), each bachelor's degree includes specific competencies (affiliated to the professional area or the knowledge area particular to them), then the problem of how and where to approach them arises. And this is so because, according to Lalueza (2008: 2), in a scenario where the number of subjects in bachelors' degrees is being reduced, it is hardly feasible to incorporate new subjects devoted exclusively to the acquisition of cross-curricular competencies into curricula.

A challenge which, as we shall see, is not always satisfactorily met.

Tables 2 and 3 contain a list of the competencies included in the white paper and the bachelor's degree report, and we identify the cross-curricular competencies contained in each document.

13. The OECD's *Definition and Selection of Competencies (DeSeCo)* study defines a competency is "the ability to meet individual or social demands successfully, or to carry out an activity or task. [...] Each competence is built on a combination of interrelated cognitive and practical skills, knowledge (including tacit knowledge), motivation, value orientation, attitudes, emotions, and other social and behavioural components that together can be mobilized for effective action."

Table 2. Cross-curricular competencies included in the Mathematics bachelor's degree white paper

	Instrumental competencies	Systemic competencies	Personal competencies
Mathematics bachelor's degree white paper	Capacity to analyse and synthesise Capacity to organise and plan Oral and written communication in a native language Knowledge of a foreign language Knowledge of information technology related to the study area Capacity to manage information Problem solving Decision making	Independent learning Adaptation to new situations Creativity Leadership Knowledge of other cultures and customs Initiative and entrepreneurial spirit Motivated by quality Sensitivity towards environmental issues	Teamwork Work in an interdisciplinary team Work in an international context Interpersonal relations skills Recognition of diversity and multiculturality Critical reasoning Ethical commitment

Table 3. Cross-curricular competencies included in the Mathematics bachelor's degree report

	Cross-curricular competencies
Mathematics bachelor's degree report	Using bibliographies and search tools for general and specific mathematics-related bibliographical resources, including Internet access. Optimally managing work time and organising available resources, establishing priorities and alternative paths, and identifying logical errors in decision making. Checking or reasonably contesting other people's arguments. Working in interdisciplinary teams, contributing order, abstraction and logical reasoning Reading scientific texts in a student's own language and in other important languages in the field of science, especially English.

There does not seem to be any agreement on the definition of competencies between the documents. While the need for digital literacy appears in the white paper, it does not appear in the bachelor's degree report. However, the latter does indeed refer to information management, which alludes to the use of search tools for bibliographical resources.

How are cross-curricular competencies considered in the Mathematics bachelor's degree subject programmes?

- Out of the 19 programmes examined, only two – for the subjects *Continuity and derivability of real variable functions* and *Basic chemistry* – explicitly included a cross-curricular competencies section (or, to be precise, the competencies mentioned in the Mathematics bachelor's degree guide).
- Three of the programmes (*Introduction to mathematical analysis*; *Differentiation of functions of several real variables and function series*; and *Riemann integration in several real variables*) use a rider saying *besides contributing to the attainment of general and cross-curricular competencies included in the USC's Mathematics bachelor's degree report* to refer to such competencies.

- One programme (*Numerical matrix analysis*) has two cross-curricular competencies similar to those contained in the bachelor's degree report, but they are not quoted from that document. They refer to the use of bibliographies and search tools, to contributions to abstraction and logical reasoning, and to reading and working on important texts in the field of science. They appear as follows: *Developing strategies to analyse and solve problems, and thorough, clear writing of texts with mathematical content*.
- The following cross-curricular competencies contained in the Mathematics bachelor's degree report are not mentioned in any of the programmes: "Optimally managing work time and organising available resources, establishing priorities and alternative paths, and identifying logical errors in decision making" and "Checking or reasonably contesting other people's arguments".
- The following cross-curricular competencies contained in the Mathematics bachelor's degree white paper are not mentioned in any of the programmes:
    - Capacity to organise and plan
    - Knowledge of a foreign language (though it could be considered included by alluding to the reading of scientific texts in other languages, especially English)
    - Capacity to manage information
    - Decision making
    - Interpersonal relations skills (competencies of a social type are not defined, unlike those proposed in the white paper).
    - Recognition of diversity and multiculturality
    - Ethical commitment
    - Work in an international context
    - Adaptation to new situations
    - Creativity
    - Leadership
    - Knowledge of other cultures and customs
    - Initiative and entrepreneurial spirit
    - Motivated by quality
    - Sensitivity towards environmental issues

Nor is there any many mention of the approach to cross-curricular competencies in the section devoted to subject programme methodology. The methodological proposals are very general and focus mainly on two aspects: theoretically presenting content and solving problems posed or exercises set (in practical lessons).

Worthy of note is the lack of specification of cross-curricular competencies in subject programmes, which may mean that minimal value is attached to them, unlike disciplinary content or specific competencies involved in the Mathematics bachelor's degree. In this context, we shall specifically analyse digital competency as one of the training indicators demanded by 21st-century universities (De Pablos, 2010; Pasadas Ureña, 2010).

4. From Cross-Curricular Competencies to Digital Competency

The working paper of the CRUE-TIC-REBIUM[14] Mixed Committee (2009) sets out distinctions between digital competency and information competency; to the former it attributes characteristics that enable individuals to make an appropriate use of ICTs (in relation to computers, software and the Web) and to the latter it attributes characteristics that enable individuals to look for, select, assess and convey information. We believe that the training needs of the hyper-technologised world we live in go much further and require a version that extends to multiple literacies (Lankshear & Knobel, 2008; Jenkins, 2008, 2009). Even so, the Mixed Committee's approach seems ambitious in the context of the document analysis we have performed, as we shall see from the following:

a) Regarding **state legislation**:

- In the Organic Law of Universities (LOU-LOM), neither is there any mention of any aspect relating to the information society or to the knowledge society, nor any reference to ICTs or to a competency focus.
- In Royal Decree 1393/2007, of 29 October, establishing the structure of official university teaching (BOE [Spanish Official State Gazette], 30 October), the need for change is mentioned in the preamble, mainly in relation to teaching methodologies, alluding to the need for a student-centred learning process. In the knowledge society, this process is lifelong learning. Explicit reference is made to ICTs as a resource (Appendix II. 7: Material resources and services).

b) Regarding **USC documentation**:

- In the quality plan, we find issues relating to the incorporation of ICTs, as well as their promotion and integration into the teaching function due to their importance for social, cultural and economic development.
- In the General USC guidelines for the elaboration of new official degrees regulated by Royal Decree 1393/2007, three cross-curricular competencies are considered for all bachelor's degrees: an instrumental knowledge of (i) foreign languages, (ii) the Galician language and (iii) information and communication technologies.
- In the document on the EHEA in classrooms, the importance of a student's independent learning is highlighted, for which an intensive use of learning tools such as ICTs is considered to be of great value.
- In the Report on the verification of official USC degrees, there is a statement of the importance of and need for ICTs to do managerial and administrative tasks via the Web and software applications.

14. Conference of Spanish University Rectors. Information and Communication Technology. University Library Network.

c) Regarding **documents particular** to the Mathematics bachelor's degree:

- In the white paper, enumerated among the instrumental competencies are: using software applications for statistical analysis, numerical calculus, symbolic calculus, graphic representation, optimisation and so on for mathematical experimentation and problem solving; developing programs to solve mathematical problems by using an appropriate computational environment in each case; using search tools for mathematics-related bibliographical resources; and conveying, in writing and orally, knowledge, procedures, results and mathematical ideas.
- It is in the Mathematics bachelor's degree report where general, specific and cross-curricular competencies are formulated for each degree; ICT-related competencies at this level are transformed into specific competencies. And they are also considered as potentially accredited cross-curricular competencies by making it explicit that, in accordance with the General USC guidelines for the elaboration of new official degrees regulated by Royal Decree 1393/2007, students may obtain academic recognition for a maximum of nine optional credits by the accreditation of cross-curricular competencies for all USC bachelor's degrees:
    - Competencies acquired in area of ICTs related to degree training.
    - Competencies acquired in the knowledge of and proficiency in foreign languages in the field of science.
    - Competencies acquired in the knowledge of the Galician language.

- In the student guide, ICTs appear as the use of telematic or electronic media and information technology (IT) applications (especially for administrative and managerial tasks) and the use of basic IT tools (acquired competencies).
- However, in the faculty guide, ICTs are practically overlooked. The guide specifies general and specific competencies for the Mathematics bachelor's degree without explicitly mentioning cross-curricular competencies.
- A large number of subjects use ICTs as tools in the learning process, especially statistical or calculus packages and other IT applications such as software (MATLAB) or programming languages (Fortran).
- ICTs are presented as learning content in the programmes of just two subjects: *Elements of probability and statistics* and *Information technology*. In the *Elements of probability and statistics*, ICT content is exclusively taught in interactive laboratory lessons and focuses on the R statistical package (exploratory analysis of data and generation of probability models). In *Information technology*, the whole programme revolves around ICTs as content (worked on in theoretical lessons and in interactive laboratory lessons: symbolic calculus [Maple], numerical calculus [MATLAB], structured programming [Fortran] and operating systems [Linux Fedora Core]) and as learning tools.

The documents analysed show that the importance of cross-curricular competencies is not made explicit in EHEA-adapted curricula, nor has the concept of digital competency and information competency been incorporated as the aforementioned Mixed Committee (CRUE-TIC-REBIUM, 2009) explicitly proposed. This means that there is no guarantee that students will achieve the necessary competencies and that there may be a consequent widening of the social and cultural divides that already exist between those who have access to these cultural goods and those who do not.

From the proposals made by the Mixed Committee regarding the incorporation of digital competencies and information competencies, the USC has opted for the possibility of accrediting the mastery of these cross-curricular competencies externally. However, in the study conducted, there was no clear sign of this having become a definitive option in the case of Mathematics.

5. Conclusions

The EHEA has placed particular emphasis on the concept of competency as a basic component of curricular reformulation. The Mathematics curriculum is representative of the importance given to this concept, which has a variety of definitions and value considerations. In the review of the various documents forming part of the curricular determination process, we can see that reference to different types of competencies indicates particular moments of curricular specification using various names and definitions, which are not always clarified or concordant. The expectation of sharing the terminology expressed in the Tuning project does not appear to have been met. The basic problem is the question mark hanging over a shared knowledge of a key concept of the architecture of bachelor's degree curricula, and especially over the change in the way that students' results are assessed.

Regarding the different types of competencies, the analysis reveals discrepancies in the attention paid to cross-curricular competencies, which, in our view, are representative of the demands of the knowledge society. These discrepancies can be found among the Mathematics bachelor's degree white paper, the Mathematics bachelor's degree report and the programmes of the various subjects.

In contrast, specific competencies, which are those particular to a knowledge area and often formulated as content, are contemplated in all subject programmes. We find: a continuity of some of them in several programmes; the presence of competencies that address more than one taxonomical level like, for example, knowledge, comprehension and application; that ICTs use is included as a specific competence in a considerable number of programmes; the presence, in all programmes, of the specific competencies proposed in the Mathematics bachelor's degree guide, although formulated differently on occasions.

In short, the presence of polysemy, the absence of a continuity of classification criteria and shifts from one type of competency to another at the various levels of curricular specification lead us to hypothesise about the level of confidence over their meaning and their mastery by teaching staff. Among those who legislate, those who plan directives and those who form part of committees for elaborating curricula, the divides are clear to see. While they may actually share the concepts, these fall through the net at the next curricular level, the one at which one or more lecturers go on to programme each subject. There is indeed a common architecture for designing programmes, but a common conceptualisation does not appear to be shared.

Regarding the importance placed on ICTs and digital competency, a certain lack of harmony between the various documents is found. Little or no attention is paid to them at state legislation level; there are discrepancies between the various institutional documents and so on. For example, in the quality plan and the strategic plan, ICTs are considered as cross-curricular competencies, while in documents on the EHEA, ICTs are considered as tools for students' independent learning.

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