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The digital competence as a cross-cutting axis of higher education teachers' pedagogical competences in the european higher education area

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Abstract

The European Higher Education Area (EHEA) establishes a new educational paradigm centered on student and learning. It involves fundamental changes in university professor's professional tasks, therefore, they should adapt their professional profile according to the new context demands, specially those derived from the impact of ICT over it. Fruit of the convergence of two research projects that combined diverse research tools and techniques in real HE contexts, we have reflected on our findings and conclusions to build a pedagogical competences profile for HE teachers, more adequate to the current context and new training scenarios, incorporating a set of digital competences that we found as cross-cutting axis, not only for the teaching role, but for the rest of the professional roles that rise up as relevant in the recent educational context drawn by the EHEA and the Knowledge Society (KS).

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1. Problem statement

Knowledge Society has made a profound impact in all societies, making a deep effect on Higher Education (HE) systems in the world (GUNI, 2009), its agents, educational processes, and especially on HE teachers profile. In the case of Europe, the establishment of the EHEA in this global scenario represents a great challenge, becoming necessary to re-think the HE teacher's figure, taking into account their main dimensions as teachers: individual, social and professional. Therefore, the HE teacher's figure is considered in this study as a key element: as an agent of change, research and innovation that develops a critical-reflexive practice, oriented to collaboration, evaluation and continuous improvement along their professional development (Pozos, 2010).

As ICT has become the new paradigm of this society (Castells, 2005; 2008), its expansion is also deeply affecting education, and in consequence, teachers profile of all educational levels. ICTs then are being considered as key

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transversal aspects making impact, not only on teachers' professional scenarios, but on teachers' educational roles, functions and pedagogical competences (Hargreaves, 2011; Johnson et al., 2011; Tedesco, 2011).

2. Purpose of study

Our main focus in this paper is on the need of the development of an updated and more socially relevant framework of pedagogical competences for HE teachers, at the time that a development of a framework of digital competences is also needed to be transversally integrated with this one, as part of a same structure.

3. Methodology

In the integration process of the HE teacher profile we followed a reflexive methodology through confrontation of results and conclusions from two research projects carried out in parallel (Mas, 2009; Pozos, 2010); the first one dedicated its research purposes to find out and validate an updated and socially relevant pedagogical competences profile within the EHEA scenario, and the other one dedicated to analyze, develop and validate an integration model of digital competences into HE teachers' professional development in the knowledge society. The confrontation of findings and conclusions lead us to build up a single teacher profile, as we found that both profiles and scientifically validated competences shared the same foundations and constructs as well as a common philosophy and vision of what a HE teacher should represents in nowadays changing society.

3.1. Methodology used to develop the pedagogical competences profile

1. Document review to depict the state-of-the-art of teachers' competences profile.
2. Design and development of an initial list of pedagogical competences and units of competence for HE teachers, built from analysis and reflection of all gathered data.
3. Definition of an experts' discussion group applying aspects of Delphi technique (with the collaboration of the Research Group in Vocational Education and Training - CIFO -, from *Universidad Autónoma de Barcelona*). The discussion was organized in three sessions-rounds that followed the agreements from each previous round (with suggestions for improving the list), until a second list was finally agreed in a consensual manner.
4. This latter list of competences and units of competence was submitted to validation by 11 experts in the field, obtaining a final teacher's competences profile for its teaching function.

3.2. Methodology used to develop the digital competences profile

1. Document review to depict the state-of-the-art of HE teachers' digital competences needed in the KS and in HE systems in the world (social, professional and individual needs).
2. Conceptual delimitation and critical analysis to define Digital Competence in the KS.
3. Analysis of impact and transversality of ICTs over HE teachers' professional scenarios, functions and roles in order to identify an initial digital competences profile for HE teachers in the KS.
4. Development of a Model of Integration of Digital Competence into HE Teachers' Professional Development to identify their own needs of continuing education and training with respect to their digital competences, based on competence units in the social, intellectual and organizational fields, and oriented to innovation and knowledge construction that meet the present and future needs required in the KS.
5. Based on the proposed model, a matrix of 78 units of Digital Competences was developed, together with a questionnaire for training needs assessment on Digital Competence.
6. Validation of the model and the units of competence (depicted in the questionnaire) by 10 international experts in the fields of education and technology; validity and reliability were strengthened through pilot testing carried out on a real HE scenario.

4. Findings and results

4.1. Pedagogical competences

The definition of a HE teachers' competences profile cannot be separated from its three main professional functions (teaching, research and management), neither its professional scenarios (society, institution and classroom). First findings lead us to make a proposal of a competences profile described below (Table 1), that invites to keep reflecting on it and its subsequent developments (Mas, 2009; Mas, Ruiz, Tejada & Navío, 2006; Ruiz, Mas, Tejada & Navío, 2008; Ruiz, Mas & Tejada, 2008):

Table 1. Pedagogical competences associated to the teaching functions

Pedagogical Competences (PC)	Competence Units (CU)
1. <i>Designing</i> the Teaching Guide according to students' needs, context and professional profile, in coordination with other professionals	1.1. Characterizing the learning group.
	1.2. Assessing student needs.
	1.3. Defining learning objectives according to the competences defined in the professional profile.
	1.4. Describing and arranging disciplinary contents in sequence.
	1.5. Designing of methodological strategies to meet student diversity and specificity of context.
	1.6. Selecting and designing didactical media and resources according to learning strategies.
	1.7. Developing content into didactical units.
	1.8. Designing the learning evaluation plan and the necessary assessment tools.
2. <i>Conducting</i> the learning process fostering individual and collaborative learning opportunities	2.1. Applying a variety of methodological strategies according to the learning outcomes.
	2.2. Using diverse didactical media and resources in the learning process.
	2.3. Managing the didactical interaction and the relations with students.
	2.4. Establishing the optimal conditions to generate a positive social climate in the learning and communication processes.
	2.5. Using ICT to combine face to face and distance learning.
	2.6. Managing resources and infrastructure provided by the institution.
	2.7. Managing virtual learning environments.
3 <i>Tutoring</i> student's learning process promoting activities to achieve more autonomy	3.1. Planning tutoring activities, considering learning outcomes and student characteristics, to improve the learning process.
	3.2. Creating a favorable climate to foster a positive communication and interaction with students.
	3.3. Guiding student's knowledge construction processes (individually or collaboratively) providing guidelines, information, resources,... to foster the development of professional competences.
	3.4. Using virtual tutoring strategies.
4. <i>Evaluating</i> the learning process	4.1. Applying the evaluation device according to the established evaluation plan.
	4.2. Reviewing students learning achievement.
	4.3. Evaluating the components of the learning process.
	4.4. Using and fostering self evaluation techniques and instruments among students.
	4.5. Making decisions based on the obtained information.
	4.6. Getting involved in co-evaluation processes.
	4.7. Tackling duties and ethical dilemmas of the evaluation process.
5. <i>Contributing</i> actively for the improvement of teaching	5.1. Participating with other professionals in the conceptual definition and development of new instruments, materials and didactical resources to improve professional competences.
	5.2. Keeping relationships with the socio-professional environment in a systemic and periodical way for teacher updating and improvement.
	5.3. Participating actively in innovation activities oriented to optimization of the learning process.
	5.4. Applying techniques and instruments for teacher's self-assessment.
	5.5. Self-assessment of training needs for teaching improvement.
6. <i>Participating</i> actively in the academic and organizational dynamics of the institution (University, Faculty, Area, Department, program...)	6.1. Participating in working groups.
	6.2. Participating in multi-disciplinary teaching commissions.
	6.3. Fostering and participating in working groups regarding course planning.
	6.4. Participating in the planning of training actions and modules.
	6.5. Promoting the organization and participation of academic seminars, debates, round tables,...
	6.6. Participating in the development of the new curricula following the directions, descriptors,... provided by the competent bodies.

4.2. Digital competences

Throughout the research process we arrived to a broader conceptualization of technology itself, and therefore on a digital competence conceptualization more appropriate to nowadays changes and new educational paradigms, in which the key literacies of the Knowledge Society were integrated. These led us to a concept of multi-literacies ‘of the digital’: informational, audiovisual and technological. The integration is achieved through a key element that we considered it provides coherence and meaning: a critical reflection over new media and technologies in the moment of putting them into scene in the educational processes. Then, a model of integration of digital competence into HE teachers’ professional development was developed and validated. From the model, it was built a framework of 7 digital competences (DC), that we found coherent ‘in and for’ the Knowledge Society we live in, with 78 digital competence units distributed in three competence development levels: Basic Knowledge, Knowledge Deepening and Knowledge Generation (Pozos, 2010; UNESCO, 2008) (Table 2). Likewise, a questionnaire of training needs assessment on teachers’ digital competence was built and administered to HE teachers for validation testing. Results obtained on validity and reliability analysis provided the questionnaire with high confidence levels (Pozos, 2010) from which we concluded that theoretical assumptions of the model are appropriate, relevant and useful for HE teachers’ professional development in these times of change.

Table 2. Digital Competences associated to the teaching, research, management and social responsibility functions (Pozos, 2010:161p.)

Digital Competences (DC)	Basic Knowledge	Knowledge Deepening	Knowledge Generation
	78 Competence Units (<i>Instrumental, methodological, personal and participative competences...</i>)		
1. <i>Planning and designing</i> of learning experiences in face-to-face, blended and virtual environments.	Basic digital competences in the knowledge and use of ICT for:	Digital competences for knowledge deepening and integration of ICT in all teachers’ professional activities for:	Advanced digital competences in the integration and use of ICT for:
2. <i>Developing and conducting</i> collaborative learning experiences in face-to-face, blended and virtual environments.	✓ Solving problems in basic learning situations in face-to-face environments with the use of ICT,	✓ Solving problems in complex learning situations, in face-to-face, blended and virtual environments,	✓ Building broader capacities and abilities for new knowledge construction, knowledge management and innovation,
3. <i>Tutoring and assessment</i> of knowledge construction processes in face-to-face, blended and virtual environments.	✓ Managing of the basic professional activities in teachers’ development with the support of ICT,	✓ Managing, communicating and collaborating through networks for improving professional development,	✓ Developing a strong commitment for applying new knowledge in the continuous improvement of the teaching profession and the society, ...allowing teachers to GENERATE, APPLY AND SHARE new knowledge in a critical and responsible way in multiple contexts within the Knowledge Society.
4. <i>Managing</i> of growth and professional development with the support of ICT.	✓ Socially participating in immediate contexts, ...allowing teachers to be INTEGRATED in the Knowledge Society as citizen and teaching professionals.	✓ Participating and demonstrating social commitment through the creation of improvement proposals for community and society development, ...allowing teachers to adequately DEVELOP themselves and socially CONTRIBUTE as teaching professionals in the Knowledge Society in a reflexive and critical way.	
5. <i>Pedagogical research, development and innovation</i> with/for ICT in education.			
6. <i>Diversity, ethics and responsible use of ICTs</i> in teachers’ professional development.			
7. <i>Environmental concerns, labour health and safety</i> in the use of ICT in the teaching profession.			

5. Discussion and conclusions

The importance of the implementation of the EHEA and the steps forward towards a knowledge-based Europe, made us to consider the urgent need to meet together both teachers’ competences profiles (pedagogical and digital) previously described. Therefore, after research and reflection, we arrived to the conclusion that HE teachers should provide an adequate professional response to the current and future social needs, integrating, in a greater or lesser degree, all the necessary digital competences in order to develop and improve its profession, given the transversal nature and impact of ICTs in each one of their professional roles and professional activities.

With this integration, we aim to leave apart a merely instrumental vision of ICTs; it is required a more complex vision of educational realities. Therefore, we consider ICTs as symbolic and cultural technological systems needed to create, manage, analyze, communicate and transform information into new relevant knowledge. This opens an opportunity for the person-the professional to be the one who, from a critical reflection, properly uses and integrates ICTs, not only into its teaching functions, but into the rest of its professional roles and scenarios, according to the best of its knowledge and professional experience in each moment. This way, the main focus will not be on technology, but on the teacher's reflective competences and decisions to use an integrate technology in a more strategic and didactical way.

Before concluding this paper, we want to remark on the importance that the confluence of both profiles is founded not only on the need that HE teachers should know and use technology, but else, on the need to make two steps forward into their professional development:

- A first step in order to integrate technologies in all their daily professional activities, as cross-cutting axis of their professional development and new training scenarios;
- And a second step in order to become a digital competent teacher, that requires more than an instrumental use of technology; it is required a didactical and reflexive use of a diversity of resources and technological systems at his disposal, which makes also necessary newer framings of multi-literacies pedagogies.

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