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Doctoral studies in Spain: Changes to converge with Europe in the internationalisation of the doctorate

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In Spain, the organisation of doctoral studies has been substantially modified to come into line with the changes introduced by the agenda of the Bologna process. These changes have been specified in a number of statements by European Ministers of Education, and have required alterations to Spanish doctoral regulations. The aim of these changes has been to focus doctoral training more on the development of competency as better preparation for research tasks, linking the doctoral candidate with the job market outside university and allowing for the transfer of knowledge within the European context. To this end, Doctoral schools have been set up as a space in which to manage doctoral training, introducing specialisation in research through the design of new doctoral programmes, and means to provide doctoral candidates with mobility for their international training.

Key words: Doctoral legislation, doctoral schools, international mobility, R&D training, transfer of knowledge, funding.

INTRODUCTION

Doctoral studies in Spain and their links with Europe

Several changes have taken place in Spanish universities in order to adapt to the premises of the European Higher Education Area (EHEA) with the aim of coordinating policies and harmonising converging guidelines in an international and European context of excellence. The Bologna Declaration (1999) established two cycles of university teaching, undergraduate and graduate, where the Doctorate was not initially to be found as a basic objective (Castro et al., 2010, 18), but was merely part of graduate study, with more extensive training and no separate identity. This European structure for higher education was later completed with the doctoral level as the Third Cycle of the Bologna Process (Berlin Declaration, 2003), which emphasised "the importance of research and research training and the promotion of interdisciplinarity in maintaining and improving the quality of higher education and in enhancing the competitiveness of European higher education more generally" (ibid. 5), defining it as the first stage of a research career.

The Doctorate and the University were given a fundamental role relating and connecting the EHEA and the European Research Area (ERA) as the basis on which to construct a knowledge society in the European setting. In this context, research should be considered the distinctive element in doctoral and post-doctoral training (Fidalgo and García, 2007), allowing for

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international mobility for the research training of doctoral candidates in a clear attempt to provide for a research career that resulted in an international attraction for research and exchange of knowledge.

This harmonisation of guidelines for doctoral studies at a European level has been designed on the basis of several communiqués (Berlin, 2003; Bergen, 2005; London, 2007; Leuven, 2009; Budapest-Vienna, 2010; Bucharest, 2012), in which the European ministers responsible for Higher Education defined the basic conditions for the Doctorate in this context of the knowledge society. In addition, the European University Association (EUA) (2003, 2005a, 2007) has contributed to this delimitation on the basis of several studies and reports containing explicit recommendations for Doctoral Programmes.

The Berlin Communiqué (2003) analyses the function of the Doctorate in a transnational context, and, in its report titled "Doctoral Programmes for the European Knowledge Society", the EUA (2005b) defines Doctoral studies as Third Cycle studies. This EUA report assisted in the adoption of ten basic principles (the Salzburg Decalogue) for the development of Doctoral studies: The advancement of knowledge through original research; the embedding of doctoral studies in the institutional strategies and policies of universities and governments; the diversity of doctoral programmes in Europe; Doctoral candidates as early stage researchers, who make a key contribution to new knowledge; the crucial role of supervision and assessment of the doctoral candidate; the need for critical mass in Doctoral Programmes; the limitation of Doctoral Programmes to a duration of three or four years; innovative organisational structures for interdisciplinary training and the development of transferable skills; the geographical mobility of doctoral candidates and teachers within a framework of international cooperation; the assurance of appropriate, sustainable funding as a guarantee of quality in Doctoral Programmes.

The Bergen Communiqué (2005) takes as its starting point the EUA report setting the Doctorate as the highest level of studies in Europe. It also underlines the importance of establishing doctoral training for research, extolling doctoral candidates as researchers vital to the reinforcement of original, quality scientific knowledge, uniting higher education and research. The London Communiqué (2007) describes the relevance of the role of higher education institutions in the development of knowledge societies based on research and innovation, involving transfer of knowledge. It refers to doctoral candidates (points 2.15, 2.16 and 2.17) and establishes the value of developing Doctoral Programmes linked to the European framework of qualifications, and specifies that "enhancing provision in the third cycle and improving the status, career prospects and funding for early stage researchers are essential preconditions for […] strengthening research capacity and improving the quality and competitiveness of European higher education."

The EUA later presented another report (2007) titled "Doctoral Programmes in Europe's Universities: Achievements and Challenges", which describes some approaches to Doctoral Programmes and was to be a reference for the following ministerial meeting. In London (2007), the ministers emphasised the relevance of promoting structures of coordination and collaboration with the participation of business. They likewise defended the need for funding of Doctoral studies in order to guarantee reasonable conditions for doctoral candidates, the flexibility of Doctoral Programmes, and the development of training combined with innovation.

The Leuven communiqué (2009) continued to put forward the main themes of mobility, international openness, research and innovation, while also recognising the potential of Doctoral Programmes to provide training for research, complemented by interdisciplinary and stakeholder programmes. The Bucharest Communiqué (2012) focuses on an analysis of the achievements of the Bologna Process and the need to agree on the future priorities of the EHEA, including investment in higher education for the future, providing quality higher education, improving employability and progressing in the field of qualifications. Together with the foregoing, the Communiqué proposes diversity in Doctoral Programmes supporting research in the learning process for third cycle studies and strengthening training and research mobility.

This description of doctoral studies is completed by the contribution of the European University Association (2016), which publishes *Taking Salzburg Forward* through its Doctoral Education Council. This document provides recommendations for the continued application of reforms in doctoral education and further challenges. In essence, it suggests the development of institutional structures for doctoral studies, focusing on the importance of original, innovative research as the hallmark of doctoral training. This requires structures backed up by institutional leadership, integrated into a global strategy of doctoral education and supported with resources and personnel. Moreover, the structure should be open to discussion and debate with a view to reaching a consensus, where the predominant research attitude is one of continuous, communicative dialogue in which discussion and criticism are basic elements of the doctoral candidates' research training. In addition, the document stresses the importance of training the candidates' research capacities by providing finance for research that is not exclusively influenced by research impact indicators, undermining the aim of research with quantifiable aims and products. This would help to give incentive and retain doctoral candidates in the Universities, recruiting talented researchers for the advancement of knowledge and the growth of a research culture characterised by high standards, originality, critical thought and the ability to

create new knowledge.

Some of the challenges mentioned include the need to train candidates in the ethics of and for research, developing them with meticulous methods and taking into consideration the privacy and management of data. Digitalization also represents a challenge in as much as it permits the development of interactive, communicative and participative research through social networks and the Internet. The potential to share information is changing the way research is conducted and creating new opportunities for research and academic dialogue. All of this is taking place in an increasingly global context, in which doctoral candidates participate in international research projects in collaboration with other institutions for the development of intellectual and research careers.

As a member of the EHEA and ERA, Spain has progressively introduced the legislative reforms necessary for the specification and consolidation of university teaching following the principles established in the European context of education and research. In particular, a training model is foreseen for the Doctorate in universities that places the doctoral candidate at the centre of research in R&D projects, allowing for quality, innovation, mobility and internationalisation of researchers in training (European Commission, 2015).

Moreover, links must be established between universities and their Doctoral Programmes with both national and international industry and business, where Doctoral Schools will have a fundamental role. Above all, because these very important transformations in the doctoral stage represent “a methodical training in research in an interdisciplinary, cooperative and international context” (Nebot, 2009), where the Doctorate is ratified as “the distinctive, exclusive trademark of the research university” (ibid.).

Characterisation of the doctorate in Spain: Convergence with Europe

One of the aims of the EHEA is the setting up of a research training network among the member states to permit the development of joint actions of quality in a context of internationalisation. This goal requires the reordering of university studies and, in particular, of doctoral studies. As the highest academic grade, Doctoral studies fulfil a fundamental role, because they represent an essential link between teaching and research, as well as being a basic toll of connection between the university and society (Castro et al., 2010).

In order to meet this challenge, a process of regulatory modification has been carried out on doctoral studies in Spain, leading to the present structure. This transformation has been complex on both the bureaucratic and administrative levels (Jiménez and Sevilla, 2016), with difficulties that have led to it being called a tortuous process (González García, 2009), and inasmuch as four successive sets of regulations have taken place for the doctorate.

Royal Decree (RD) 99/2011 is at present in force, regulating the basic requisites for doctoral studies to converge in research training and stipulating a type of organisation that has been put into effect in university statutes.[1] The Doctorate “is understood as the third cycle of official university studies, leading to the acquiring of skills and competency related to quality scientific research” (ibid., art. 2.1.). For the knowledge society, highly qualified doctors in research and in scientific and technological production represent a first-class strategic value for introduction into the productive sector (Benito et al., 2014). For this reason, the basic premises of the ministerial order are aimed at training researchers in the universities to generate highly qualified human capital, since the universities are responsible for the creation of Ph.D. holders. The basic premises of doctoral studies are described as follows.

Doctoral schools

The main innovation is the creation of Doctoral Schools, defined as: “An unit created by one or more universities and in possible collaboration with other Spanish or international organisms, schools, institutions and entities with R&D activities, with the basic aim of organising the Doctorate within its sphere of management in one or several branches of knowledge or with an interdisciplinary character” (RD 99/2011, art. 2.4.).

As a specific structure of doctoral training, the Doctoral School is set up as an independent unit competent in research matters, with leadership in its structure to organise and manage the offer of activities inherent to scientific research training in a field of knowledge (ibid. art. 9). In addition, its priority is to build collaborative links with R&D centres on a national level, but particularly on an international level. It carries out training procedures for doctoral candidates and establishes the lines of research for doctoral theses, giving priority to the research capabilities of candidates in order to contribute to society through the transfer of research results, insofar as students under research training “must lead and cooperate in the transfer of knowledge to further the welfare of society” (ibid., p. 13911).

The doctoral schools are presided by a Management Committee and an Academic Committee, which can organize their activities in one or more specialised or interdisciplinary fields. The Management Committee (ibid., art. 9.6) consists of, at least, the Director of the School, the coordinators of the Doctoral Programmes and representatives of collaborating bodies. The Director, appointed by the University Vice-Chancellor, must be a researcher of recognised prestige as demonstrated by his

being awarded at least three periods of research activity as defined by RD 1086/1989 on university staff wages, also known as six-year research awards[2]. This Committee is entrusted with the organization and management of the Doctoral School.

The Academic Committee is responsible for programming doctoral studies in training and research. It must be made up of Ph.D. holders designated by the university, and who can also be members of other national or international public research bodies (RD 99/2011, art. 8). Its functions include assigning a tutor to each doctoral candidate, the assigning a supervisor for each doctoral thesis, the annual evaluation of the doctoral candidate's research plan, and the authorisation for presentation of doctoral theses.

Universities can set up Doctoral Schools according to the provisions of their statutes and the regulations of their respective Autonomous Communities, in order to organise the teaching and activities appropriate to the Doctorate. Notification must be given to the Ministry of Education, Culture and Sport for inclusion of a new Doctoral School in the Register of Universities, Centres and Degrees.[3]

Doctoral programmes

Specialisation in research training involves a very significant restructuring of third cycle studies in Spain. Previously, there were numerous Doctoral Programmes managed exclusively by university departments, with research centred on their respective fields of knowledge and directed towards the training of university teaching staff, with no common comparative framework. Later, interdepartmental, interdisciplinary and interuniversity doctorates were wet up with the aim of strengthening lines of research based on a Doctorate. This process meant that Doctoral Programmes could apply for the Mention of Quality, which gave those programmes gaining the award better funding, better recognition of the participating teaching staff and the possibility to invite prestigious international instructors (Sevilla, 2012). On this question of the Mention of Quality, a survey of the participants in the XI ANECA Forum[4] showed that "the national or international Mention of Quality was chosen by over half the respondents as the most suitable manner of ensuring quality in Doctorates" (ANECA, 2009:109).

The present structure of doctoral teaching resides in the Doctoral Programmes, which must be verified by the Universities Council, accredited by ANECA evaluation (Annexe II, RD 99/2011) and have a Coordinator, who must have supervised at least two doctoral theses and be a recognised researcher with at least two six-year research awards. If this last criterion is not possible, similar merits may be authorised.

The Programmes are defined as "a set of activities leading to the acquisition of the skills and expertise necessary to obtain the title of Doctor" (RD 99/2011, art. 2.2). Their goal is to give doctoral candidates the training required to become competent researchers, setting up lines of research for doctoral theses in Doctoral studies independent from the teaching appropriate to other cycles. This training is linked to and supported by competitive groups and research projects, despite the fact that in Spain research groups have "a poorly defined or undefined status" (Nebot, 2009).

This new approach reduces the variety of departmental Doctoral Programmes to a smaller number that can be carried out by a single university or several in collaboration, with the basic goal of training doctoral candidates in scientific research and the possibility of the participation of other bodies with R&D activities. The Ph. D. no longer fulfils merely the training function for university teaching. It has been restructured to contribute, on the one hand, to the preparation of researchers that can join the job market outside the academic sphere, and, on the other, to a reorientation of the professional, social and labour prospects of doctoral candidates.

In the reorganisation of Doctoral Programmes, therefore, universities must count on "external allies", that is, the collaboration of institutions, bodies and entities to promote synergies and R&D strategies, allowing them to create potentialities for research and funding in order to consolidate quality and excellence in research training to go beyond the academic sphere. This means that the orientation of Doctoral Programmes must promote the mobility of doctoral candidates and the internationalisation of teaching, whether by receiving students from other countries, promoting visits by doctoral candidates in foreign universities, incorporating foreign teaching staff and doctoral candidates, or by promoting the "International Mention" of the doctoral theses produced by the Programmes.

To this, we might add that the Doctoral Programmes can apply annually for the "Doctorate of Excellence"[5], awarded annually to Doctoral Programmes for outstanding achievements in results and a high level of internationalisation. This allows for the internationalisation of visiting teaching staff and greater support for resources, in particular, more research scholarships (Sevilla, 2012).

It has, therefore, become possible for Doctoral Programmes to train candidates to lead the transfer of knowledge with the aim of contributing to society's welfare and development, to become integrated into the social, productive and business sector depending on their research capabilities. It is important to establish links between doctoral training, research careers and the transfer of knowledge. This is a significant challenge, inasmuch as only 19.8% of Ph. D. holders active on December 31st 2006 were employed in the sector of businesses and non-profit making private institutions,

44.4% had jobs in higher education, and 35.8% in public administration (Cortina and González, 2009: 27).

A more recent study by Benito et al. (2014) also found that "the number of doctors employed in the private sector in Spain in 2009 was less than 16% of the total, which give an indication of the breach existing in terms of innovation," insofar as "Spain has as much as 50% less Ph.D. holders employed in the productive sector than the average of other OECD member countries. Spain, 43% of R&D funding comes from private sources, whereas the average for OECD countries is 61%" (ibid., 9-10).

Doctoral competencies

Doctoral Programmes should be put into effect with emphasis on training of doctoral candidates for research and on the acquisition of a set of basic competencies that are transferrable to institutions in the social setting in pursuit of a sustainable economy. The competencies are defined by the "Dublin Descriptors" (MECD, 2005) and are included in the Spanish Framework of Qualifications for Higher Education (MECES) of Royal Decree 1027/2011.

The specific competencies included in the doctoral regulations (RD 99/2011, art. 5.1) are as follows: The systematic understanding of a field of study and command of its research skills and methods; the capacity to conceive, design or create, put into practice and adopt a substantial process of research or creation; the capacity to contribute to the broadening of the frontiers of knowledge through original research; the capacity to undertake the critical analysis and evaluation and synthesis of new and complex ideas; the capacity to communicate with the academic and scientific community and with society in general about specific fields of knowledge in the manner and languages commonly used in the international scientific community; the capacity to promote scientific, technological, social, artistic or cultural progress in academic or professional contexts within a society based on knowledge.

In addition, Doctoral Programmes should also provide professional training for fields requiring creativity and innovation, with the candidate acquiring personal capacities and skills for the following tasks: coping in contexts with little specific information; finding key questions to be asked in order to solve a complex problem; designing, creating, developing and undertaking new and innovative projects in their field of knowledge; working both as part of a team and independently in an international or multidisciplinary context; integrating knowledge, confronting complexity ad formulating judgements with restricted information; the intellectual criticism and defence of solutions (ibid., art. 5.2).

As Nebot (2009) stated, the essential competencies to be acquired by the doctoral candidate must be disciplinary (demonstrating understanding in a field of study), methodological (demonstrating command of research methods), and instrumental (demonstrating command of research techniques), as well as generic or transferrable. The disciplinary and methodological competencies are acquired during training in the doctoral programme, and the methodological during the development of the doctoral thesis, but the most difficult step is found in the transferrable competencies, to be acquired institutionally and through Doctoral Schools. This latter difficulty is also suggested in the survey carried out at the XI ANECA Forum, inasmuch as those surveyed thought that "job opportunities offered by a Ph.D. are more useful in the university than in business" (ANECA, 2009).

Teaching staff: Tutoring and supervision

The present regulations have brought changes to teaching staff through the introduction of the figure of the thesis tutor, which is yet to be consolidated. The tutor is the person responsible for choosing suitable training activities for the candidate among those on offer in the Doctoral Programme (RD 99/2011, art. 2.7). The activities are recorded by the tutor for monitoring and evaluation in the candidate's Activities Document.

The supervisor is the more important figure, having maximum responsibility for the doctoral candidate's research tasks (ibid. art. 2.6), considering the coherence and suitability of the training activities and the impact and novelty of the doctoral thesis in its field of knowledge (ibid., art. 12.1). The functions of both tutor and supervisor of a doctoral candidate must be recognised as part of the staff's teaching and research activity (ibid., art. 12.3).

Both the tutor and the supervisor are charged with a number of functions that are key to the candidate's training. Together with the priority on research, the present regulations lay particular emphasis on stimulating the transition of doctoral candidates to the job market and facilitating the publication of their research results. These functions underline the need for doctoral training to go beyond the traditional orientation towards university teaching and connect it with society as a whole and incorporation into the job market, as well as the dissemination of the products of research.

All teaching staff on a Doctoral Programme must themselves be Doctors, which is only reasonable, notwithstanding possible collaboration in activities that qualify in the respective field of knowledge. In addition, accredited research experience is required for both tutor and supervisor of a doctoral thesis in the form of at least one six-year research award or equivalent merits to be evaluated by the Academic Committee. This is the most highly valued question in some research (Castro et al., 2012), inasmuch as participating staff's accredited

research experience is considered highly relevant, although in practice this has led to the exclusion of some staff formerly involved in this level of training.

Access to doctoral studies, research plan, international doctoral thesis and examining board

Doctoral studies are defined as autonomous and independent of teaching in other cycles, inasmuch as there is a clear distinction between the second cycle (Master's Degree) and the third (Doctorate), oriented towards the development of training specialised in research. Access to the Doctorate is therefore only available after prior postgraduate training (Master's Degree), although the regulations also set out other cases of temporary transitory adaptation according to the previous degree structure (RD 99/2011, art. 6.2). The Doctoral School establishes the requirements and the process for admission of candidates.

On being accepted to a Doctoral Programme, candidates must present a research plan (ibid., art. 11.6), which is evaluated by the Academic committee and must include, at least, the methodology to be used, the goals to be achieved, as well as the means and timescale for the research. This plan must be carried out with the aim of presenting a doctoral thesis recognised as an original piece of research that advances knowledge and capacitates the candidate for unsupervised activity in the field of R&D (ibid. art. 13.1).

In Spain, a doctoral candidate's training and preparation of the doctoral thesis are linked with the possibility of the award of a scholarship contract permitting exclusive dedication to the preparation of a quality thesis. The most prestigious scholarships are those awarded through national public competitions and are known as University Teacher Training and Research Personnel Training grants. These awards are reserved for a few students with good curricula and, above all, an outstanding academic record (Jiménez and Sevilla, 2016). The study by Cortina and González (2009), covering the period from 1990 to 2006, found that grants are the main source of funding for doctoral studies, where 41.2% of candidates recognised having received funding from Spanish institutions (p. 25). Nebot (2009) also considered the priority of "ensuring suitable funding for doctoral training and not as a by-product of general funding" (p. 12).

The new guidelines also include several changes regarding the defence of the doctoral thesis (RD 99/2011, art. 14). Both tutor and supervisor must give favourable reports and there must be authorisation from the Academic Committee of the Doctoral Programme, together with the proposal for the examining board. Another requisite is that the board must be made up exclusively of Doctors, with one six-year research award or equivalent, and that the majority of members of the board should be external to the University where the thesis has been prepared and is defended, and should not be active on the Doctoral Programme. Examining board members are appointed by the Management Committee of the Doctoral School at the proposal of the programme's Academic Committee.[6] Grading of the doctoral thesis has also been modified by RD 534/2013, which establishes that an examining board shall make public its report and the overall grading for the thesis according to the following scale: not suitable, pass, outstanding and excellent. The board may also award a distinction if the overall grade is excellent and this award is agreed unanimously by secret vote.[7]

In addition, it should be noted that some universities required the doctoral candidate to be the author of a publication related to the thesis in a journal included in the JCR Science Citation Index, or the Scimago Journal Rank (SJR), and holding a relevant position among those of its category, to be defined by the Academic Committee. However, this criterion is not upheld in all Doctoral Programmes because of the difficulty of publishing in certain fields of knowledge in this type of journals. For these areas, the publications must fulfil the requirements set out by the CNEAI and specified by the Academic Committee, where the articles published meet other relevant quality criteria (indexed, journals, peer reviews, international referees, scientific committee, editorial committee, and editorial council) and on occasion are in process of being published. This approach favours "(…) the need for universities to achieve high levels of research productivity, a goal assisted by the publications that doctoral candidates must achieve prior to being awarded their Ph. D." (Badley, 2009; cited in Ortega, 2014, 6).

It is also possible for the doctoral candidate to present a thesis consisting of articles or a "compendium of publications" (Ortega, 2014) rather than by means of the procedure described above. This is not a novel procedure in Spain, although "it is not known when it first appeared and how common it now is" (ibid., p. 5), "it is not state regulated" (ibid.), but "it has appeared as a result of university autonomy" (ibid.) and is now accepted by most Spanish universities.

The student who successfully completes the doctoral courses is entitled to the degree of Doctor of the University U, where U indicates the name of the University in question, as recorded in the RUCT. The award of the Ph.D. shall include information on the Doctoral Programme attended (RD 99/2011, art. 11). The doctoral degree may include the mention of International Doctorate (ibid., art.15), meaning that the doctoral candidates must have spent at least three months in other research centres and/or foreign universities, in the EU or elsewhere; have presented and defended part of the doctoral thesis (summary and conclusions) in the

customary language for scientific communication; have presented two favourable reports by international experts and Doctors who may not have sat on the examining board of the thesis; and that at least one international expert Doctor other than the person responsible for the candidate's activity outside the home university, has been a member of the examining board.

STATISTICAL DATA

We here describe some statistical data on the implementation of RD 99/2011, based on the available university statistics (MECD, 2015; Hernández and Pérez, 2015; University Register of Catalogue of Degrees, RUCT). Regarding the *Doctoral Schools*, there are 1042 university centres distributed over a total of 82 universities (Hernández and Pérez, 2015). Not all universities have founded Doctoral Schools. Those that have been set up are 55 Doctoral Schools, 1 School for Doctoral and Postgraduate Studies, 1 School for Postgraduate and Doctorate, 2 Schools of Master and Doctorate, 1 International Postgraduate Centre, and 1 School of Doctorate and Research, all belonging to (private and public) attendance universities (RUCT).

Regarding the denominations, Doctoral School has been chosen for the majority, only 6 universities have brought together Master and Doctorate, or Postgraduate, including doctoral training in the latter, 16 universities include the adjective “international” in the name of the school, and one other university chose the name “International Postgraduate Centre.” Most of the Doctoral Schools have been set up in public universities (48), although there are also some private universities (13). The trend has also been to set up one Doctoral School per university, with the exception of the University of Granada, which has created three Doctoral Schools.

In distribution by Autonomous Community, Andalusia has the most with 13 Doctoral Schools, Catalonia has 10 and 1 School for Postgraduate and Doctorate, the Community of Madrid has 8 and 1 School of Doctorate and Research, the Community of Valencia has 6, Castile and Leon has 5, the Region of Murcia and Galicia have 3 each, the Foral Community of Navarre has 2 and the Canary Islands have 1 Doctoral School and 1 School for Doctoral and Postgraduate Studies, the remaining Autonomous Communities have 1 Doctoral School each, except for Extremadura, for which there are no records, and the Principality of Asturias, although the latter has an International Postgraduate Centre. Most of the Doctoral Schools are in public universities. There are Doctoral Schools in private universities in Catalonia (4 Doctoral Schools and 1 School for Postgraduate and Doctorate), Madrid (3), Andalusia (2), and Castile and Leon, the Community of Valencia and the Region of Murcia have 1 Doctoral School each.

The Doctoral Schools of each university offer different *Doctoral Programmes* evaluated and verified by the ANECA. The RUCT records a total of 1267 Doctoral Programmes, of which 659 are Programmes adapted to the EHEA and are at present regulated by RD 99/2011. The remaining 608 Programmes are Masters degrees and Official Doctoral Programmes and Official University Postgraduate Degrees regulated by the previous legislation and due to be discontinued. Although the Doctoral Schools are registered with the RUCT, not all their Doctoral Programmes have been registered, although their web pages show that they do offer Doctoral Programmes adapted to the new regulations.

It should also be noted that of all the Doctoral Programmes regulated by RD 99/2011 and registered in the RUCT, only a few are shared by more than one university. The Doctoral Programmes can be grouped under their respective Doctoral Schools, as in the University of Granada, for example, or they can be classified by fields of knowledge (Arts and Humanities, Health Sciences, Natural Sciences, Engineering and Architecture, Social and Legal Sciences). Depending on the university, Doctoral Programmes can also be offered that deal exclusively with a single theme, such as at the University of Cadiz, whose International Doctoral School on Marine Studies (EIDEMAR) has Doctoral Programmes specifically on this question.

Concerning the number of *students registered* for Doctoral Studies, the preliminary statistical data of the MECD for 2014 to 2015 on university students show that, according to the regulations of RD 99/2011, the total number of students registered is 28,546. However, we should specify that there are still students registered for Doctoral studies under the previous legislation that have yet to conclude their studies. Hernández and Pérez (2015) calculate that there were 85,390 students registered for the year 2013 to 2014, representing 5.69% of the total of students registered in 1st and 2nd cycles, First Degree, Masters, Short Courses and Doctorate, mainly in public universities.

Despite the fact that Third Cycle students are a minority percentage, the data indicate that an increase is taking place in the number of students registered in all Spanish universities, both public and private. Specifically, the 74,648 Third Cycle students during the 2008-2009 academic year have grown to 88,732 Doctoral students for the year 2013 to 2014 (Hernández and Pérez, 2015). According to the numbers of students registered under the regulations of RD 99/2011, there is a rather equal split between male (50.20%) and female (49.80%) students. However, differences are to be found among students registered according to branches of knowledge and sex.

Regarding student registration by *branches of knowledge*, the Social and Legal Sciences have the highest numbers (26.72%), followed by Health Sciences

(22.99%), Engineering and Architecture (18.23%), Arts and Humanities (17.82%) and Natural Sciences (14.24%). Female students are more common in Health Sciences (14.52% vs. 8.46%), Social and Legal Sciences (13.53% vs. 13.18%) and Arts and Humanities (9.56% vs. 8.26%), although the differences in the last two branches are slight. On the other hand, male students are more common in Engineering and Architecture (12.79% vs. 5.44%) and Natural Sciences (7.50% vs. 6.73%). The most notable differences, therefore, by sex and branch of knowledge are found in the Health Sciences, where female students predominate, and in Engineering and Architecture, with a more significant presence of male students.

These data show that, despite the democratic consolidation of women's gaining access to university education, their presence continues to be unequal in some branches of knowledge and in the categories of research thought to entail greater prestige and social recognition, thus leading to an unfavourable gender bias in women's scientific careers (Villarroya et al., 2008). This question also occurs in the access to Doctoral Studies and the differentiation between the branches of knowledge chosen by male and female students, and, even, in the percentage of women with management positions, which is still low (Grifoll, 2009).

DISCUSSION AND CONCLUSIONS

The process of adjustment undertaken to come into line with the EHEA and the ERA has involved introducing modifications throughout the regulations of university studies, which have without doubt had more specific effects on doctoral training, which leads to the university's most significant academic and educational degree inasmuch as it contributes to the knowledge society. The priority is to create a network for training and research among EU member states to promote internationalisation, recognition, mobility, innovation and transfer of knowledge of doctoral candidates.

To create this structure, the main change has been to provide the Doctorate with its own identity, training candidates in competencies for research and contributing to create knowledge for scientific diffusion, as well as connecting candidates with the job market, with the aim of "seeking new sources of sustainable growth" (RD 99/2011, p. 13190). The key organisational structure are the Doctoral Schools, which manage doctoral training for research through the Doctoral Programmes, which must in turn provide a multidisciplinary culture within the framework of an internationally visible scientific project that prepares the candidate for outside employment.

Consequently, The Doctoral Programmes redirect training towards prospects of employment beyond the traditional academic career, laying emphasis on the importance of improving research skills, which reinforce Doctors as leaders in innovation, as well as training in transferrable competencies to improve employability (Nebot, 2009). However, we must not avoid the fact that Doctors' access to the job market does not only depend on their university training. What is required is "a boost in public and private R&D activity" (Benito et al., 2014:9), because "both public and private investment in research and innovation is without doubt a fundamental part of this structure" (ibid.).

The employability of Doctors is therefore key inasmuch as it contributes to reinforce the links between university and industry, increasing the chances of employing highly qualified personnel. Cortina and González (2009) state that "this segment of the working population is considered crucial for the production, application and diffusion of knowledge and it is, therefore, key to the competitive improvement of the country" (p. 23). Analysis shows that such personnel are almost fully employed (ibid., p. 27; Benito et al., 2014:9). However, the main challenge resides in bringing about change such as to dissociate the employment of Ph.D. holders from higher education and public administration, increasing the recognition and employability of Doctors in the private sphere, as to date they are a minority working on their own account or in the private sector.

In addition to the above, this change in direction for the Doctorate still has other challenges. The first of these is to increase public funding of the university (Gutiérrez-Solana, 2010), which should likewise be greater for R&D projects and contribute to training in Doctoral Programmes. It would thus allow doctoral candidates to pay for their training through scholarships, as well as the mobility associate with the funding of the Programmes themselves. Nebot (2009) is firm on this point: "the research career must be clearly defined and a status defined for the doctoral candidate, which, in my view, should take the form of a temporary contract and not a grant" (p. 19). Horgué (2012) states that funding is an important challenge that universities must take on in order to offer opportunities that redirect doctoral training towards research.

Secondly, if evaluation and transparency must be in place in order to guarantee quality in doctoral training, it would also be important for evaluation to be redirected towards implementation of the doctoral regulations, to bring out their weaknesses, threats, strengths and opportunities in practice, when it comes to selecting teaching staff for the Doctoral Programmes by accreditation of their research and to obtain funding for research (Jiménez, 2017). Moreover, it is a priority to set up more R&D projects, so that the teaching staff can carry out research activity, allowing them to consolidate their research career through the accreditation of six-year awards (Jiménez and Sevilla, 2016). This would also have positive effects for the training process, and the

supervision and monitoring of the development of doctoral theses by the Doctoral students.

These challenges are important if the aim is to increase the numbers of third-cycle or post-graduate students, which are at present in the minority (Hernández and Pérez, 2015), and encourage students from other countries, thus making Doctoral Studies competitive and internationally attractive, which is yet to be achieved (Nebot, 2009). It should not be forgotten that in certain fields of knowledge, such as the Social Sciences, doctoral training must be developed specialising in the need to establish links with the job market in the fields of research and innovation.

The analysis presented here shows that, despite the increase in the number of students taking doctoral studies, training in third cycle studies is only undertaken by a minority (Hernández and Pérez, 2015), mainly in public universities. The majority of these students are mainly Spanish nationals, followed by students from Latin America and the Caribbean and, to a lesser extent, other nationalities. These data suggests that, for the moment, doctoral studies have not become internationalised, with student flows basically “from South to North and East to West” (Nebot, 2009: 14), in other words, towards countries offering better conditions for doctoral candidates and Ph.D. holders.

The data on doctoral studies show an unequal distribution by regions (Autonomous Communities), with the majority of doctoral students to be found in Madrid, Andalusia, Catalonia and Valencia. Although the total numbers are equally distributed by sex, the choice of doctoral studies by speciality shows differences, with predominantly female students in Health Sciences, but predominantly male students in Engineering and Architecture. Villarroya et al. (2008) found that natural science degrees have a gender bias, causing imbalance in the choice of specialities for doctoral studies. The findings of the Higher Council of Scientific Research (2015) were similar, detecting unequal distribution by sex of scientific personnel according to research field, thus showing that this is also a social challenge.

Notes

1. Several aspects of Royal Decree 99/2011 have been modified by Royal Decree 534/2013 (July 12): 1. The period in which official documents, including the Ph.D., must be presented for renewal of the accreditation procedure has been extended by two academic years; 2. The validity of the doctoral programmes drawn up under Royal Decree 1393/2007 (October 29) has been extended for one further academic year until their definitive expiry on September 30 2017; 3. The scope of the grades to be applied by the examining board of a doctoral thesis has been broadened.

2. Six-year research awards represent a productivity incentive for university teaching staff (with tenure) meant to encourage research activity through evaluation by the National Committee for Evaluation of Research Activity (CNEAI). University teaching staff can request such evaluation once every six years by submitting their publications to the Committees appointed to this effect. Some Spanish universities also allow staff under contract (without tenure) to request six-year research evaluation, although if granted, these do not carry any financial award.

3. The Doctoral Schools in Spanish universities and their officially registered Doctoral Programmes can be consulted on the Ministry of Education’s website at: https://www.educacion.gob.es/ruct/consultacentros?actual=centros

4. Through its various programmes, the National Agency for Quality Evaluation and Accreditation is responsible for evaluation of everything related to university quality.

5. Through the “Mention Programme” the ANECA evaluates Doctoral Programmes that apply for a Mention of Excellence, although this distinction has not been announced since the 2011-2012 academic year.

6. Despite all these novelties in the setup of the examining board, Doctors from outside the university in question are not always chosen at random from all the experts in the particular field, but are often proposed by the Thesis Supervisor, thus making up *ad hoc* boards to guarantee the “cum laude” mention for their candidates theses.

7. The change in regulations to ensure higher quality of theses has not prevented over 90% of theses defended form obtaining the highest qualification (cum laude) in the University of Granada (Jiménez and Sevilla, 2016).

Conflicts of Interests

The authors have not declared any conflict of interests.

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