ACCESS TO THE LABOUR MARKET OF THE PH.D. GRADUATES OF THE CATALAN UNIVERSITIES

A study commissioned by the social councils of the seven Catalan public universities

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INTRODUCTION

The studies on access to the labour market of the Catalan universities, coordinated by AQU Catalunya, are the result of the interest of the social councils of the Catalan public universities in obtaining data and references on the quality of the access of students. In 2008, coinciding with the third edition of the study on the access to the labour market of graduates, it was decided to analyse, for the first time, the access to the labour market of the Ph.D. graduates belonging to the Catalan universities' cohorts of the years 2003 and 2004.

The Ph.D. is a research qualification which seeks to prepare future researchers and academics, that is to say, to see that the Ph.D. candidates carry out research autonomously in their respective spheres. The Carnegie Foundation defines the objectives of Ph.D. training in the following way:

> The purpose of doctoral education, taken broadly, is to educate and prepare those to whom we can entrust the vigour, quality and integrity of the field. This person is a scholar first and foremost, in the fullest sense of the term - someone who will creatively generate new knowledge, critically conserve valuable and useful ideas, and responsibly transform those understandings through writing, teaching and application. We call such a person "steward of the discipline".
> (GOLDE et al., 2006, 5).

The professional experience acquired during the management of an original research project in a high quality scientific field, not only capacitates Ph.D. graduates to work in the academic sphere, but also makes them excellent professionals in companies immersed in the knowledge society (CHAMBAZ et al., 2007). There are few reliable data on which to assess how many Ph.D. graduates are needed to foster a knowledge economy (SCHREITERER, 2008). The analysis of the access of Ph.D. graduates to the labour market can serve as an approximation for the assessment of the degree of acceptance which they find in the academic as well as non-academic labour markets, and they also form an indicator of the degree to which our economy is oriented towards the knowledge economy.

Characteristics of the Ph.D. training programmes

The Ph.D. programmes prior to the Bologna Process are formed by two periods:

1. Training period

This period comprises the first two academic years, in which training is provided on research techniques and methods by means of classes and seminars in a specific area of knowledge. In the second academic year, the Ph.D. candidates usually carry out research projects which, in some cases, may already be linked to the future doctoral thesis.

In order to pass this period, one must defend before a jury a dissertation on the learning achieved or else the doctoral thesis project. Once the test has been passed, the student receives the Diploma d'Estudis Avançats (DEA) or Advanced Studies Diploma, an official certificate which allows the start of the preparation of the thesis under the academic tutorship of one or more supervisors.

2. Preparation and defence of the thesis (research period)

Once the two academic years have been completed and the DEA has been approved, the Ph.D. candidate begins to prepare the doctoral thesis. The thesis is a research project on an original unpublished subject which deals with a specific aspect of a certain area of knowledge. The thesis may be developed within a research group or else individually. In any case, until the thesis is read, the doctoral candidate is under the academic tutorship of one or more thesis supervisors who direct and supervise the development of the thesis.

Once the thesis has been reviewed and authorised by its supervisor and by the department, a public reading and defence must be made of it before a jury (in accordance with the rules established in Royal Decree 778/1998).[1] The doctoral qualification is obtained on passing the defence of the thesis.

Overall, Ph.D. programmes usually have an average duration of six or seven years.

Population and sample

Following the same criterion as that of the studies on the employment integration of graduates, national Ph.D. graduates were chosen who had obtained their qualification three or four years before doing the survey (that is to say, in 2003 or 2004) in order to allow time for the Ph.D.

[1] The restructuring of teaching in order to adapt it to the European Higher Education Area has changed the structure of Ph.D. studies. In accordance with the rules of law in force (Royal Decree 1393/2007 on the planning and development of official university studies), Ph.D. studies consist of the preparation of the thesis (research period), and in order to accede to it, it is necessary to prove that one has completed the training period (by means of an academic master's degree, the possession of a graduate degree of 300 credits or more, etc..).

graduates to obtain a job appropriate to their training, a job which would allow the impact of their studies to be assessed with full knowledge of the facts.[2]

Table 1 contains data on the final population (national Ph.D. graduates), the sample obtained, the percentage of replies and the sample error per university. Over all, we succeeded in surveying 57.97% of the Ph.D. graduates who had obtained their degree between 2003 and 2004, among the population of 1,611[3] national Ph.D. graduates.

Table 1. Population and sample, by universities

	Population	Final sample	Percentage replies vs. population	Sample error
University of Barcelona (UB)	775	451	58.19%	3.05%
Autonomous University of Barcelona (UAB)	383	208	54.31%	4.69%
Polytechnic University of Catalunya (UPC)	197	112	56.85%	6.22%
Pompeu Fabra University (UPF)	56	38	67.86%	9.28%
University of Girona (UdG)	75	49	65.33%	8.47%
University of Lleida (UdL)	56	38	67.86%	9.28%
Rovira i Virgili University (URV)	69	38	55.07%	10.95%
Total	**1,611**	**934**	**57.98%**	**2.12%**

As may be observed, the UB trains 48% of the Ph.D. graduates, followed by the UAB with 24%, the UPC with 12% and, at a greater distance, the other four universities, which each train between 3 and 4% of the Ph.D. graduates.

Three quarters of the Ph.D. graduates have obtained their Ph.D. at the same university where they obtained their access degree. Accordingly, the mobility of students is low, a fact which may be attributed to the students' satisfaction with the university where they have carried out their previous studies, although it may also indicate a lack of competitiveness in attracting third-cycle students.

[2] The studies on access to the labour market of graduates are conducted three years after the participants have obtained their qualification. In the case of Ph.D. graduates, in order to achieve a solid sample and inasmuch as an average of 1,200 persons obtain a Ph.D. degree each year, it was decided to include Ph.D. graduates from a previous cohort, that is to say, the population of Ph.D. graduates from the year 2003.

[3] Of the 1,710 national Ph.D. graduates, 99 were classified as unlocatable, with wrong telephone, etc. Consequently, we began with a base of 1,611 contactable national Ph.D. graduates, from whom the sample was extracted.

Table 2. Percentage of Ph.D. graduates who carried out their studies at the same university where they obtained their access degree

	N	Access degree university is same as Ph.D. university		
		No	Yes	Total
UB	451	15.3%	84.7%	100%
UAB	208	28.4%	71.6%	100%
UPC	112	29.5%	70.5%	100%
UPF	38	81.6%	18.4%	100%
UdG	49	32.7%	67.3%	100%
UdL	38	47.4%	52.6%	100%
URV	38	34.2%	65.8%	100%
Total	**934**	**25.6%**	**74.4%**	**100%**

Table 3 shows that the proportions of the sample by disciplinary spheres are similar to those of the population, a fact which assures the good representativity of the sample. It should be noted that the sample error is not over 5.5% in any disciplinary area.

Table 3. Population and sample, by disciplinary spheres

	Population	Final sample	Percentage replies vs. population	Sample error
Humanities	208	130	62.50%	5.38%
Social Sciences	255	159	63.10%	4.79%
Experimental Sciences	519	306	58.90%	3.67%
Health Sciences	409	205	50.10%	4.94%
Technical Area	220	134	60.00%	5.52%
Total	**1.611**	**934**	**57.97%**	**2.12%**

There are two interesting changes to be noted in relation to the population of first- and second-cycle graduates:

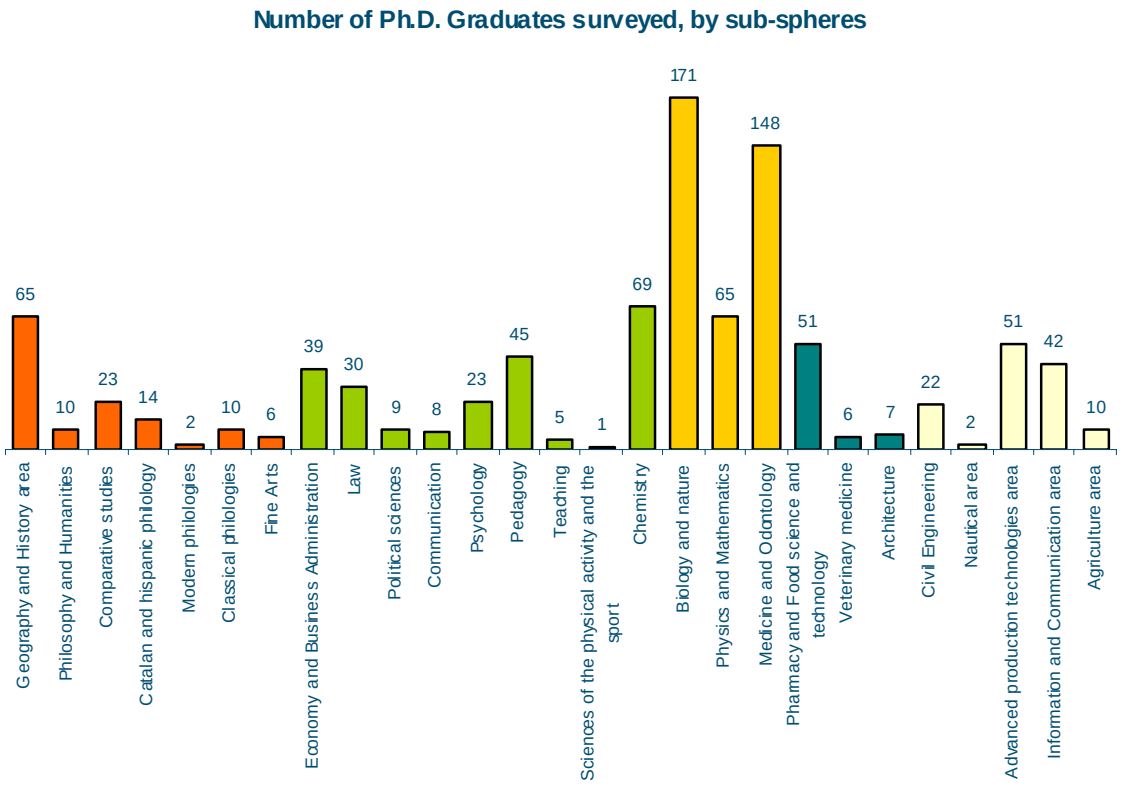
- **The distribution of Ph.D. graduates by disciplinary spheres** is considerably different from that of first- and second-cycle degree graduates. Accordingly, while the population of first- and second-cycle degree-holders (class of 2004)[4] in Social Sciences represents 45% of the total graduates, only 25% of the Ph.D. graduates belong to this field. On the other hand, Experimental Sciences show 32% Ph.D. graduates versus 8% graduates. Likewise, Health Sciences show 25% Ph.D. graduates versus 10.5% first- and second-cycle degree

[4] Data on the graduates of the class of 2004: *Third Study on the Access of Ph.D. Graduates to the Labour Market* (2008).

holders. Consequently, the distribution of Ph.D. graduates by spheres is much more balanced than that of graduates.

Figure 1 shows that the production of Ph.D. graduates is concentrated in a few sub-spheres. Accordingly, standing out within Experimental Sciences are the sub-areas of Biology and Nature, Chemistry, and Physics and Mathematics; standing out within Health Sciences are Medicine and Odontology; and lastly, within Humanities, Geography and History stand out. The rest show a total number of less than 50 Ph.D. graduates.

Figure 1. Distribution of Ph.D. graduates surveyed, by sub-spheres (*n*)



- **The distribution by gender** between the population of Ph.D. graduates and that of first- and second-cycle graduates also shows a clearly distinct situation: women form the majority on all post-compulsory educational levels, except the third cycle of higher education. Consequently, while 60% of the persons who graduated in the first and second cycle in the academic year 2003-2004 are women[5], the percentage drops to 44% in Ph.D. training in the same academic year.

[5] Source: AQU Catalunya (2007).

Table 4. Distribution of Ph.D. graduates, by gender and disciplinary spheres

Population	Men		Women	
	%	*n*	%	*n*
Humanities	51.8	159	48.2	148
Social Sciences	53.0	289	47.0	256
Experimental Sciences	51.6	252	48.4	236
Health Sciences	49.1	228	50.9	236
Technical Area	79.0	308	21.0	82
Total	**56,3**	**1.236**	**43.7**	**958**

The same as occurs on the other levels of higher education, the distribution by gender according to disciplinary sphere is clearly asymmetrical. It may thus be seen that the percentage of male Ph.D. graduates ranges from 79% in the Technical Area to 49% in Health Sciences.

Distribution of the population of Ph.D. graduates by nationality

The analysis of the provenance of the persons who obtain a Ph.D. qualification at the Catalan universities can serve as an approximation for the assessment of the drawing power of our university system abroad, allowing in this way the design of suitable policies of attraction and reception.

22% of the Ph.D. graduates who obtained their degree in the years 2003 and 2004 are foreigners. The Technical Area (see Table 5) is the field which attracts the most foreign Ph.D. graduates (41%) and Health Sciences is that which attracts the least (9%).

Table 5. Population, by disciplinary spheres and nationality

	Nationality				Population
	Spanish	%	Foreign	%	
Humanities	235	76.5	72	23.5	307
Social Sciences	432	79.3	113	20.7	545
Experimental Sciences	390	79.9	98	20.1	488
Health Sciences	423	91.2	41	8.8	464
Technical Area	230	59.0	160	41.0	390
Total	**1,710**	**77.9**	**484**	**22.1**	**2,194**

70% of the foreign Ph.D. graduates are from the Americas (99% are from the countries of South America and Central America).

Table 6. Nationality of foreign Ph.D. graduates

	Population	%
Americas	338	69.8
South America 63% (213)		
Central America & Caribbean 36,1% (122)		
North America 1% (3)		
Africa	30	6.2
Asia	13	2.7
Europe	81	16.7
Foreign (no nationality data)	22	4.5
Total foreigners	484	100%
Spain	1,710	
Total	2,194	

The ten countries which export the largest number of students to Catalunya are: Mexico (97 Ph.D. graduates), Brazil (54), Chile (38), Colombia (38), Venezuela (31), Argentina (23), Italy (21), Portugal (12), Morocco (11) and France (11). Overall, these ten countries represent 69.4% of the foreign Ph.D. graduates who obtained their qualification in Catalunya in the years 2003 and 2004.

Table 7 shows the distribution of the 2,194 Ph.D. graduates by university and nationality.

Table 7. Population of Ph.D. graduates, by universities and nationality

	Nationality				Population
	Spanish	%	Foreign	%	
University of Barcelona	801	84.8	144	15.2	945
Autonomous University of Barcelona	399	76.0	126	24.0	525
Polytechnic University of Catalunya	205	59.6	139	40.4	344
Pompeu Fabra University	64	74.4	22	25.6	86
University of Girona	77	90.6	8	9.4	85
Universitat de Lleida	63	73.3	23	26.7	86
Universitat Rovira i Virgili	101	82.1	22	17.9	123
Total	**1,710**	**77.9**	**484**	**22.1**	**2,194**

The UB is also the university which awards the most Ph.D. qualifications to persons who are from outside Spain (144), although it is followed closely by the UPC (139) and the UAB (126).

The most multicultural universities, that is to say, those with the highest percentage of foreign Ph.D. students, are the UPC (with 40% of the foreign students), the UdL (with 27%, where it is notable that 74.4% of the foreign students are from southern Europe), the UPF (26%) and the UAB (24%).

PART A: EMPLOYMENT SITUATION

97% of the Ph.D. graduates hold a job three years after obtaining their qualification. The percentage ranges from 99% in Social Sciences and the Technical Area, to 95% in Experimental Sciences. The percentage of employed Ph.D. graduates in the year 2008 is three points higher than the percentage of graduates in the same year (97% vs. 93.5%).[6]

2.5% of the Ph.D. graduates are unemployed. Experimental Sciences, which is also the area with the largest production of Ph.D. graduates (33%), presents the highest percentage (4.5%), while unemployment does not reach 1% in the Technical Area. 85% of the unemployed Ph.D. graduates have been seeking employment for less than six months (only two cases had been looking for a job for a longer time).

Table 8. Employment situation, by disciplinary spheres

	N	Current situation			Total
		Employed	Unemployed	Inactive	
Humanities	130	96.2%	2.3%	1.5%	100%
Social Sciences	159	99.4%	0%	0.6%	100%
Experimental Sciences	306	94.8%	4.6%	0.7%	100%
Health Sciences	205	96.6%	2.4%	1%	100%
Technical Area	134	99.3%	0.7%	0%	100%
Total	**934**	**96.8%**	**2.5%**	**0.7%**	**100%**

93% of the employed Ph.D. graduates work full time (ranging from 96% in the Technical Area to 86% in Humanities). This indicator is also more positive than that registered in the survey conducted in the same year on first- and second-cycle degree holders (in which 88% worked full time). Two indicators (employment rate and full-time working day) seem to indicate a more solid employment integration among Ph.D. graduates, which is not necessarily linked to the higher degree but rather to the fact that they are persons with a longer professional career.

[6] The study on the graduates of the class of 2004 was conducted in the year 2008. The Ph.D. graduates surveyed in that same year had obtained their degrees in 2003 and 2004.

Table 9. Type of working day, by disciplinary spheres

	N	Full-time employment		Total
		Yes	No (part-time or other)	
Humanities	128	87.5%	12.5%	100%
Social Sciences	158	92.4%	7.6%	100%
Experimental Sciences	304	93.4%	6.6%	100%
Health Sciences	203	93.6%	6.4%	100%
Technical Area	134	96.3%	3.7%	100%
Total	**927**	**92.9%**	**7.1%**	**100%**

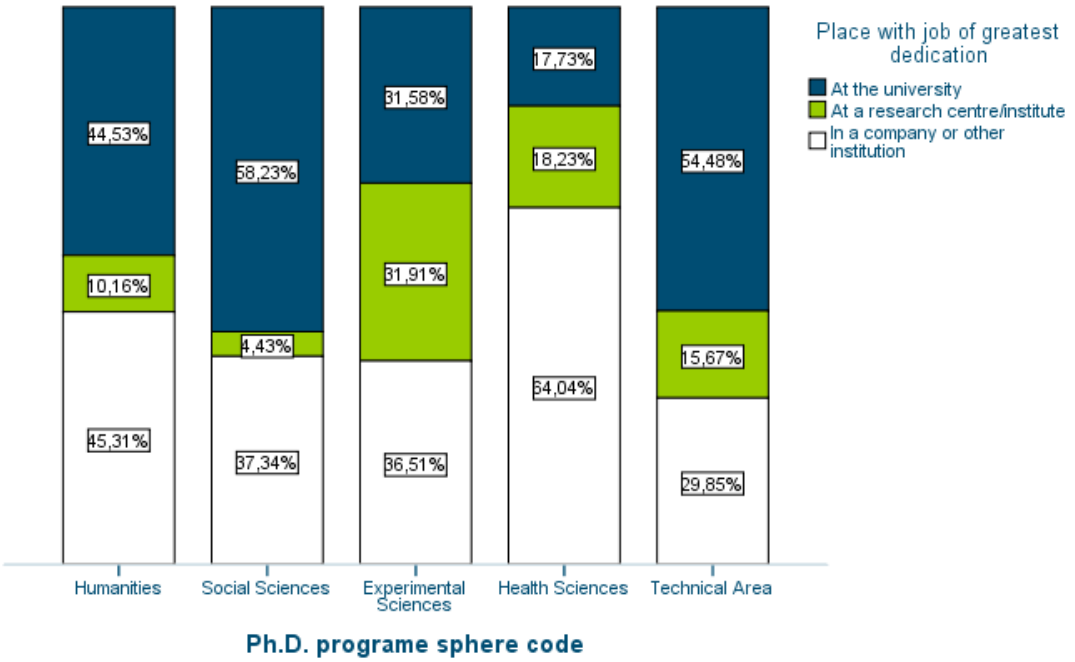
Where do Ph.D. graduates work?

Three main possibilities have been distinguished in the professional career of Ph.D. graduates: employment at the university, employment at a research centre or institute, or employment in a company or some other institution.

While the quality of integration with respect to the qualification and the skills which it entails is practically assured in the first two cases, in the third case it depends on the functions which are carried out at the company where the Ph.D. graduate works.

Figure 2 shows where the Ph.D. graduates work, by disciplinary spheres.

Figure 2. Place of employment of Ph.D. graduates, by disciplinary spheres



Overall:

- 38% of the Catalan Ph.D. graduates are employed at the **university**, with percentages ranging from 58% in Social Sciences to 18% in Health Sciences.
- 19% of the Ph.D. graduates are employed at **research centres**, with percentages ranging from 32% in Experimental Sciences to 4% in Social Sciences.
- 43% are employed in **companies or other institutions**, with percentages ranging from 64% in Health Sciences (probably in hospitals or other medical centres) to 30% in the Technical Area.

The percentage of Ph.D. graduates who work in companies is an indicator of the degree to which researchers are transferred to the labour market. It is evident, however, that R+D in companies is more closely associated with the fields of Experimental Sciences and the Technical Area than with Humanities and Social Sciences. Consequently, the key element is whether the Ph.D. graduates carry out Ph.D. functions within the company. The Health Sciences is a special case because the high number of Ph.D. graduates who work in companies involves mainly persons who work at medical centres.

Public or private sphere

70% of the Ph.D. graduates are employed in the public sphere. This percentage is due to the large number of Ph.D. graduates who work at the university or at research centres (see Table 10). The data show that research is carried out basically in the public sphere, either at the universities or at research centres.

Table 10. Public or private sphere, by place of most employment dedication of current job and disciplinary spheres

Place where job of most dedication is/was held		*N*	Sphere of company		Total
			Public	Private	
At the university	Humanities		91.2%	8.8%	100%
	Social Sciences		84.8%	15.2%	100%
	Experimental Sciences		91.7%	8.3%	100%
	Health Sciences		100%		100%
	Technical Area		94.5%	5.5%	100%
	Total		**91.2%**	**8.8%**	**100%**
At a research centre or institute	Humanities		69.2%	30.8%	100%
	Social Sciences		85.7%	14.3%	100%
	Experimental Sciences		83.5%	16.5%	100%
	Health Sciences		86.5%	13.5%	100%
	Technical Area		57.1%	42.9%	100%
	Total		**80.0%**	**20%**	**100%**
At a company or other institution	Humanities		55.2%	44.8%	100%
	Social Sciences		61.0%	39.0%	100%
	Experimental Sciences		28.8%	71.2%	100%
	Health Sciences		53.1%	46.9%	100%
	Technical Area		20.0%	80.0%	100%
	Total		**44.5%**	**55.5%**	**100%**
TOTAL	Humanities	128	72.7%	27.3%	100%
	Social Sciences	158	75.9%	24.1%	100%
	Experimental Sciences	304	66.1%	33.9%	100%
	Health Sciences	203	67.5%	32.5%	100%
	Technical Area	134	66.4%	33.6%	100%
	Total	**927**	**69.0%**	**31.0%**	**100%**

At the university, 91% of the Ph.D. graduates work in the public sphere, ranging from 100% in Health Sciences to 85% in Social Sciences (probably due to the disciplinary composition of the private universities).

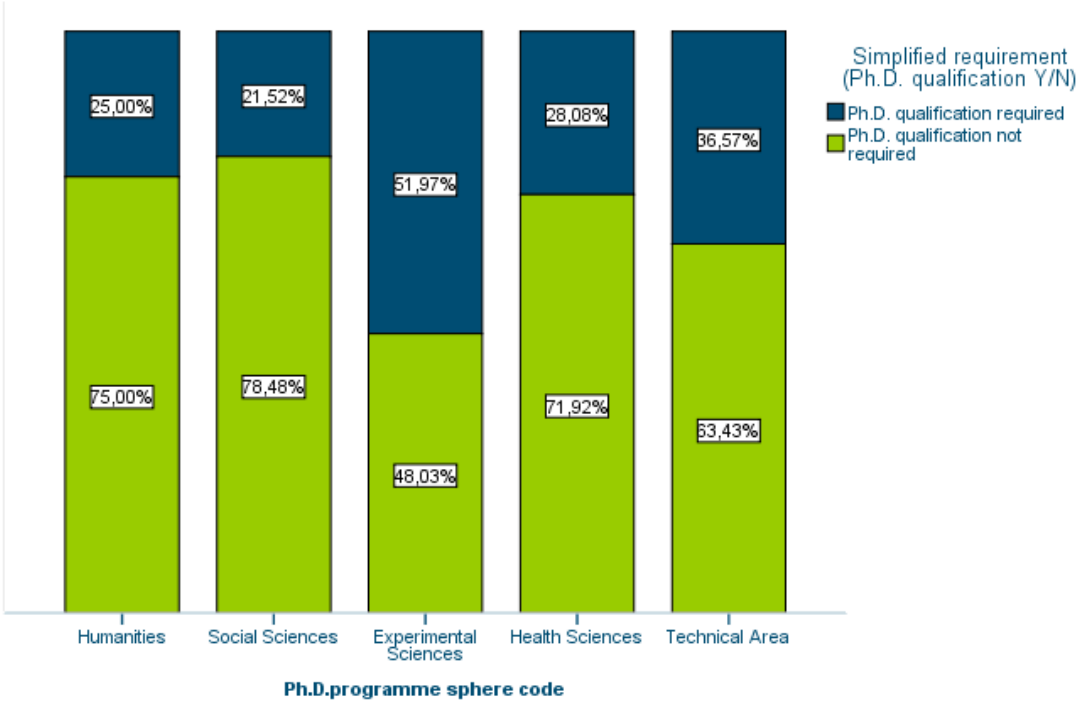
At the research centres, 80% of the Ph.D. graduates work in the public sphere, ranging from 87% in Health Sciences to 57% in the Technical Area.

Lastly, with respect to the Ph.D. graduates who work in companies or other institutions (the health-care network, for example), the percentage who are employed in the public sphere ranges from 61% in Social Sciences to 20% in the Technical Area.

Suitability

The holding of a Ph.D. qualification is a requirement for only a little over one-third of the Ph.D. graduates. This percentage ranges from 52% in Experimental Sciences to 22% in Social Sciences (see Figure 3).

Figure 3. Ph.D. qualification as a requirement for the current or last job (percent distribution by disciplinary spheres)



The holding of a Ph.D. qualification as a requirement varies greatly depending on the place where one works. Accordingly, a Ph.D. is required in 60% of the cases of Ph.D. graduates who work at research centres, but in only 14% of the cases of those who work in companies. Lastly, in relation to the Ph.D. graduates who work at the university, the requirement of holding a Ph.D. depends on the contractual category (for example, a Ph.D. is not a requirement in the case of associate lecturer or collaborating lecturer).

Functions performed

Of the 330 Ph.D. graduates who were required to hold a Ph.D. degree, 90% state that they perform relevant functions. All told, only 32% of the Ph.D. graduates were required to hold a Ph.D. qualification and they perform Ph.D. functions.

Nevertheless, university functions are performed by 96.7% of the Ph.D. graduates – a higher percentage than that of the first- and second-cycle degree holders (85%) –, and only 24 persons among the 927 who are employed state that they carry out jobs which do not require the university level.

As may be observed in Figure 4, the percentage of persons who were required to hold a Ph.D. degree and who perform Ph.D. functions, ranges according to disciplinary sphere from 48% in Experimental Sciences to 20% in Social Sciences.

Figure 4. Suitability of the functions performed, by disciplinary spheres

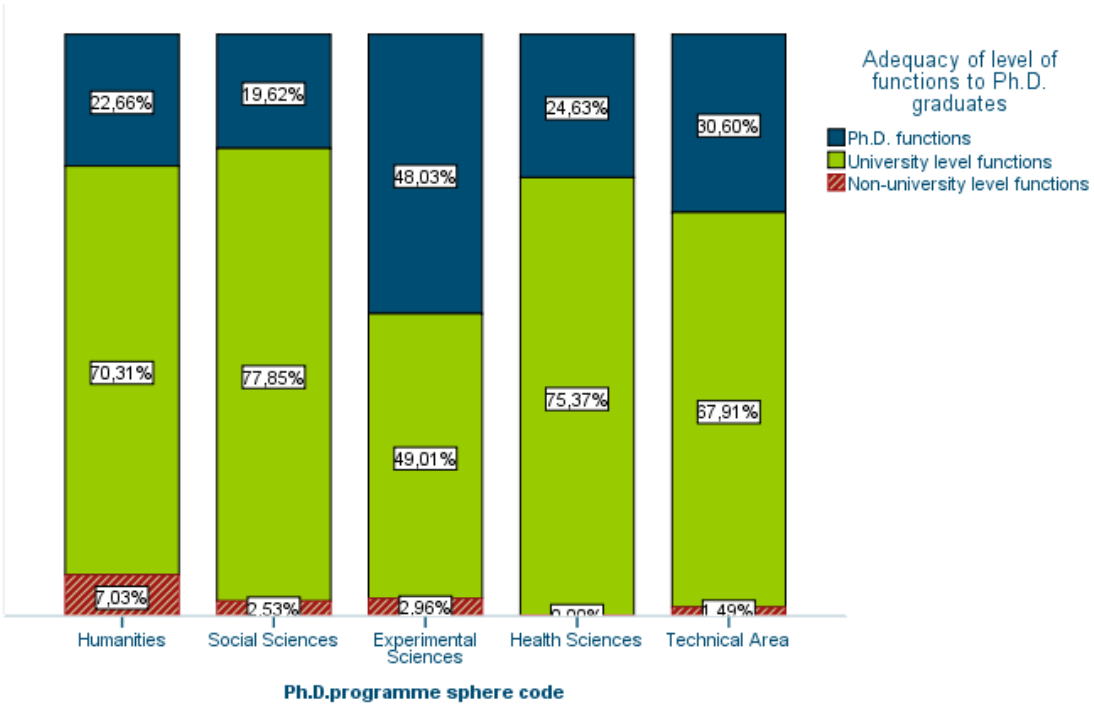


Figure 5 shows that the job also determines the degree of suitability of the functions which are finally performed. Accordingly, the percentage of those who are required to hold a Ph.D. degree and who carry out relevant functions ranges from 55% of those employed at research centres or institutes to 10% of those who are employed in companies. It should not be forgotten, however, that the job is not independent of the disciplinary sphere. Thus, for example, the percentage of Ph.D. graduates who carry out Ph.D. functions in companies ranges from 19% in Experimental Sciences to 0% in Social Sciences (see Table 11 for a detailed view of this distribution).

Figure 5. Suitability of functions performed, by place of employment

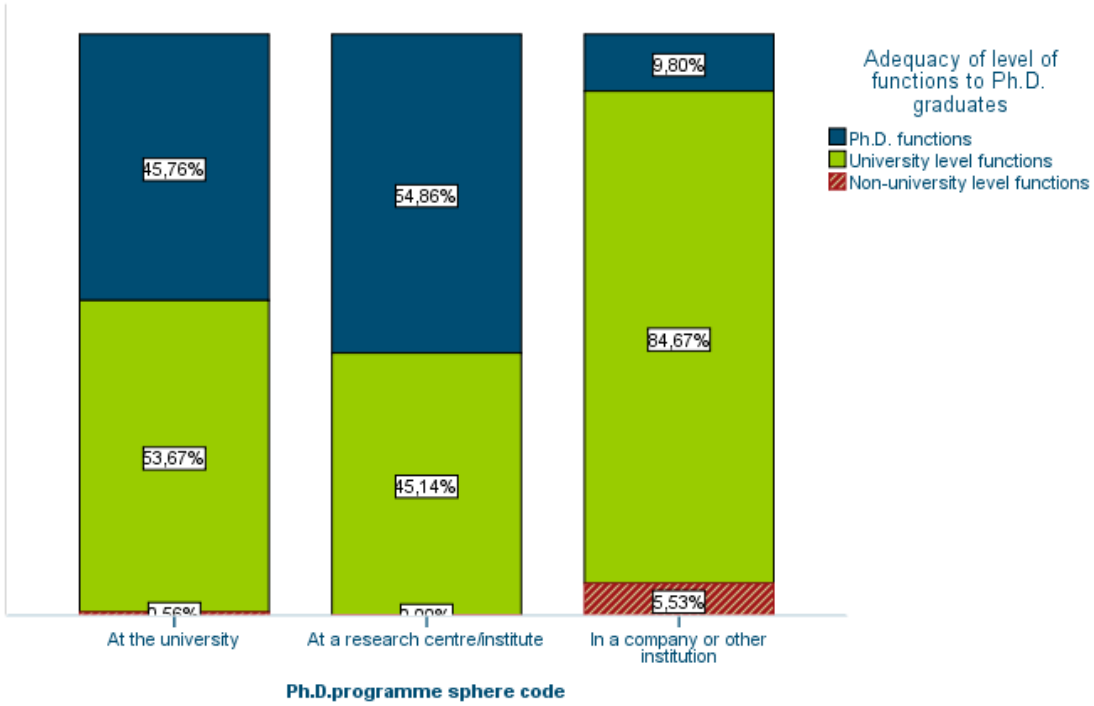


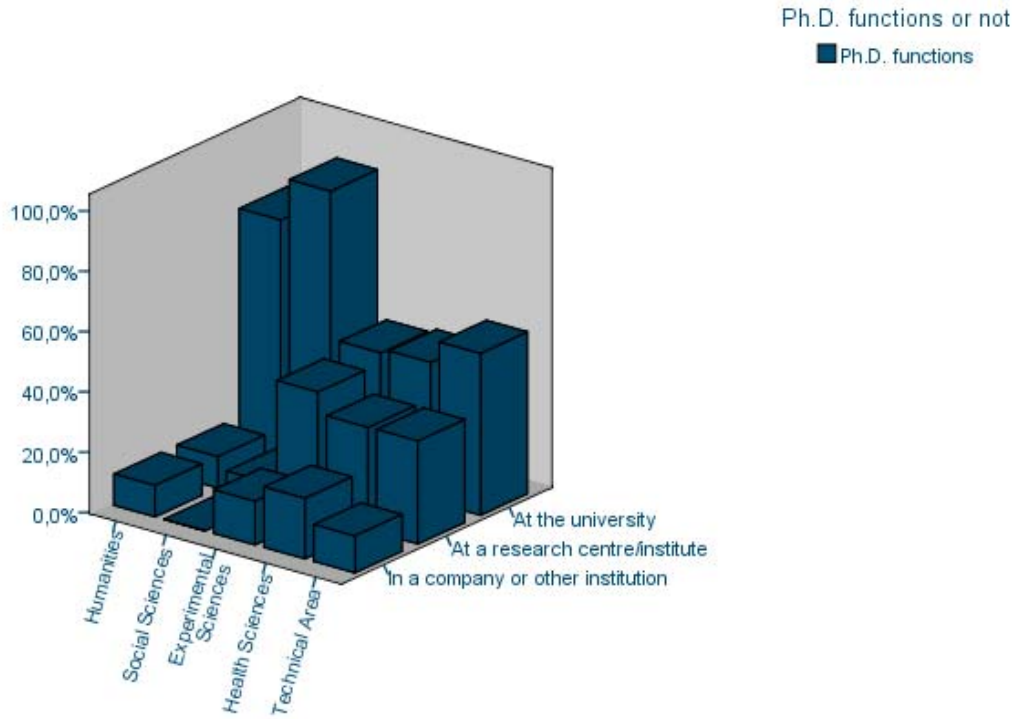
Table 11. Suitability of functions performed, by place of employment and disciplinary spheres

Place where job of most dedication is/was held		*N*	Suitability of level of functions to Ph.D. degree			Total
			Ph.D. functions	University level functions	Non-university level functions	
At the university	Humanities	57	40.4%	59.6%	0%	100%
	Social Sciences	92	31.5%	68.5%	0%	100%
	Experimental Sciences	96	67.7%	31.2%	1.0%	100%
	Health Sciences	36	63.9%	36.1%	0%	100%
	Technical Area	73	30.1%	68.5%	1.4%	100%
	Total	**354**	**45.7%**	**53.7%**	**0.6%**	**100%**
At a research centre or institute	Humanities	13	23.1%	76.9%		100%
	Social Sciences	7	28.6%	71.4%		100%
	Experimental Sciences	97	61.9%	38.1%		100%
	Health Sciences	37	45.9%	54.1%		100%
	Technical Area	21	66.7%	33.3%		100%
	Total	**175**	**54.9%**	**45.1%**		**100%**
At a company or other institution	Humanities	58	5.2%	79.3%	15.5%	100%
	Social Sciences	59	0%	93.2%	6.8%	100%
	Experimental Sciences	111	18.9%	73.9%	7.2%	100%
	Health Sciences	130	7.7%	92.3%	0%	100%
	Technical Area	40	12.5%	85.0%	2.5%	100%
	Total	**398**	**9.8%**	**84.7%**	**5.5%**	**100%**

Figure 6 shows the place of employment of those who perform Ph.D. functions, by disciplinary spheres. As may be seen, the Ph.D. graduates who perform relevant functions in Humanities and Social Sciences are concentrated in the university, whereas in the rest of the disciplinary spheres the distribution of the Ph.D. graduates who perform relevant functions is more balanced among the three typologies of place of employment.

In general, it is in companies that one finds fewer Ph.D. graduates who perform research tasks. Health Sciences stands out a little more in this respect than the Technical Area and Experimental Sciences, probably due to the number of Ph.D. graduates who carry out research at health-care centres.

Figure 6. Distribution of the Ph.D. graduates who perform Ph.D. functions, by disciplinary spheres and place of employment

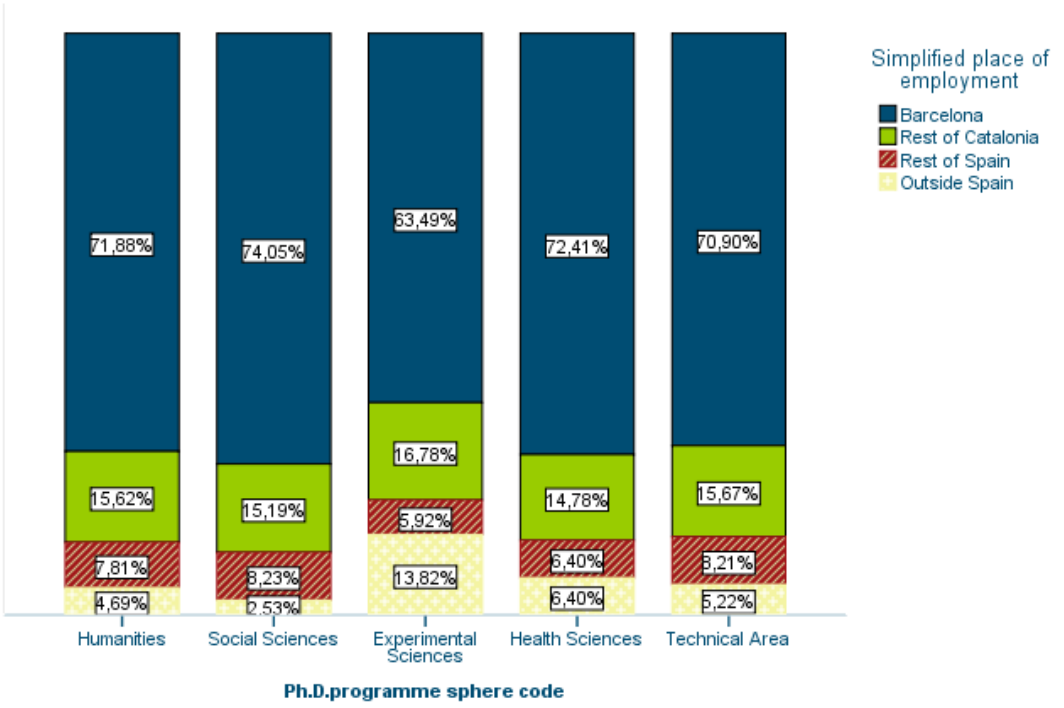


Location of place of employment

70% of the Ph.D. graduates work in Barcelona, 15% in other provinces of Catalunya, 7% in other autonomous regions and the remaining 8% is divided equally between Europe and the rest of the world.

By spheres, as may be seen in Figure 7, the only notable reference is that Experimental Sciences show the highest percentage of persons who work outside Spain (14% vs. 2.5% in Social Sciences) while, on the other hand, Experimental Sciences are the field registering the fewest Ph.D. graduates who work in Barcelona (64% vs. 74% in Social Sciences).

Figure 7. Location of places of employment, by disciplinary spheres

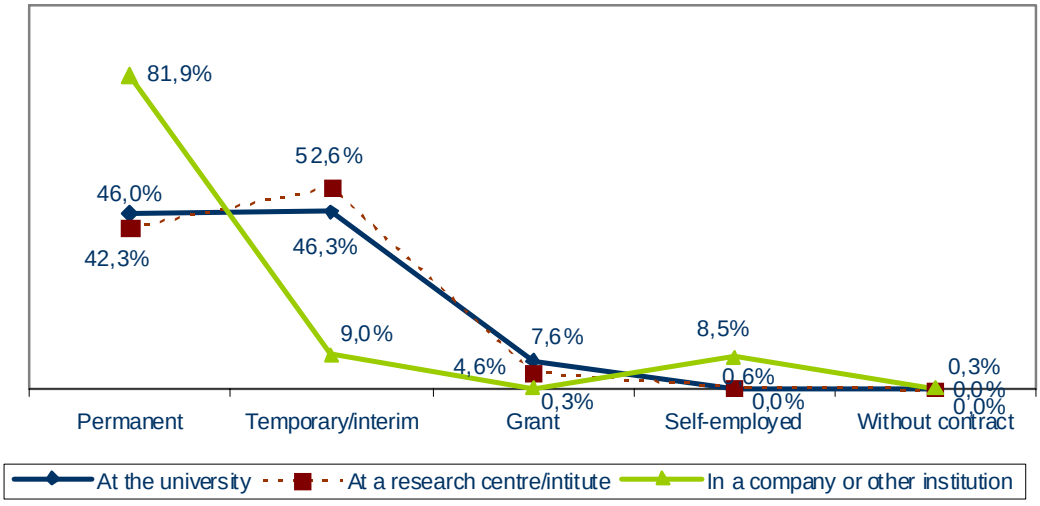


Employment stability

Ph.D. graduates do not have a greater employment stability than first- and second-cycle degree holders. Accordingly, 61% of the Ph.D. graduates have fixed employment, while this figure is 60% in the case of first- and second-cycle degree holders. It should be observed, however, that these data are equivocal, especially in relation to the collective of Ph.D. graduates employed at the university since, although the contractual pathway on obtaining a Ph.D. degree is that of tenure-track lecturer (a contract with a maximum duration of four years), the fact is that this collective will probably achieve stable jobs as tenured assistant professors or tenured professors after passing the respective tests.

The public sphere presents a greater apparent employment instability than the private sphere. Consequently, 76% of the Ph.D. graduates hold fixed contracts in the private sphere while 54% do so in the public sphere. This is due to the fact that the access processes in the public sphere often entail a period of temporariness (internships, tenure-track lecturer contracts, etc.).

Figure 8. Types of contract, by place of employment



By areas (see Figure 9), the Ph.D. graduates who have the most stable situation are those of Health Sciences, the Technical Area and Social Sciences, while temporariness is highest in Experimental Sciences and Humanities.

Contractual stability is not necessarily associated with a quality employment integration. Accordingly, Experimental Sciences is the sphere with the greatest temporariness although it is also the sphere with the highest percentage of Ph.D. graduates who perform functions appropriate to their degree. Inversely, the stability is high in Social Sciences but this is the

sphere with the lowest percentage of Ph.D. graduates who carry out functions appropriate to their degree.

Figure 9. Types of contract, by disciplinary spheres

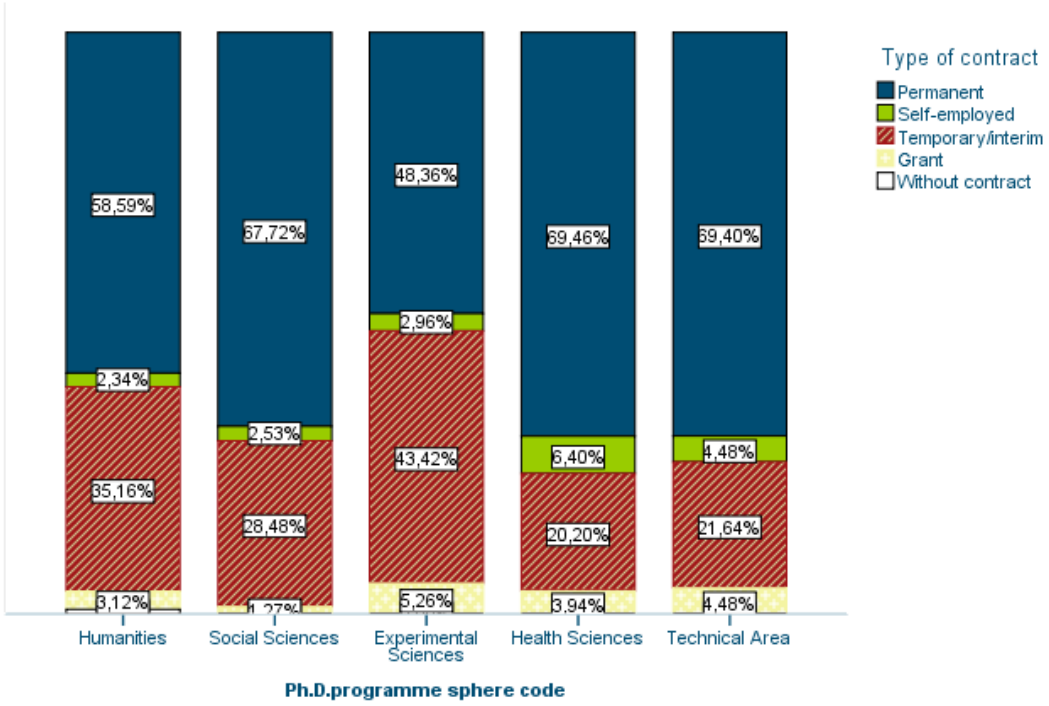


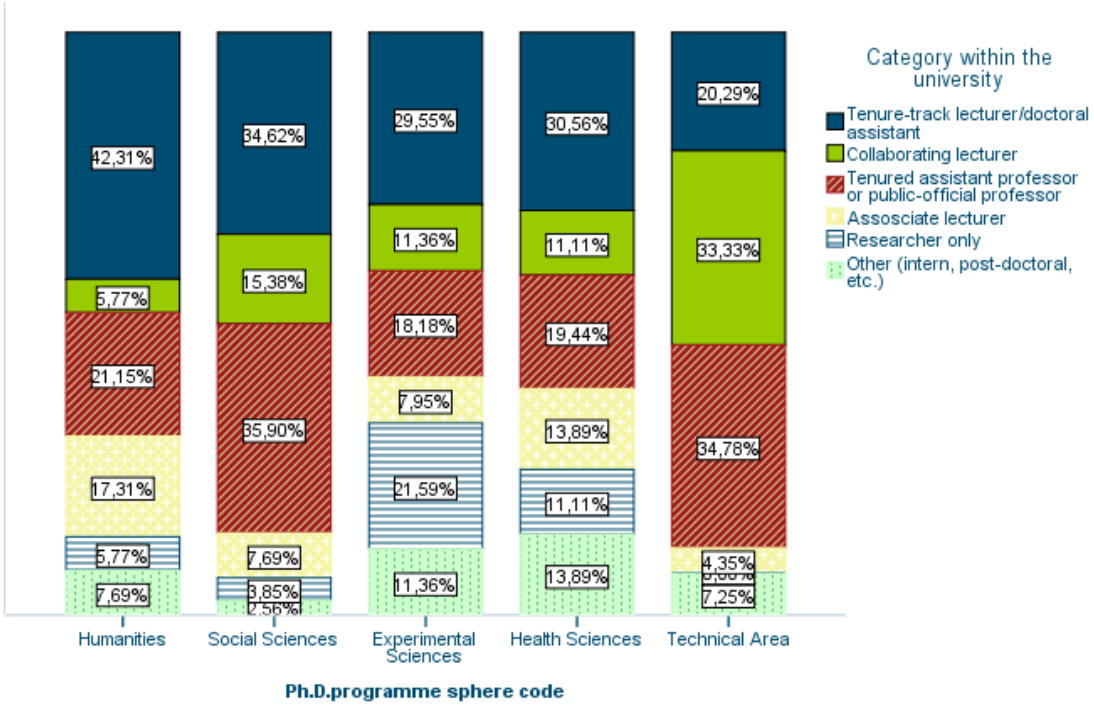
Table 12 shows the type of contracts, broken down by disciplinary spheres and place of employment of greatest dedication.

Table 12. Types of contract, by disciplinary spheres and category within university

		Type of contract					Total
		Permanent	Self-employed	Temporary	Intern	Without contract	
At the university	Humanities	33.30%		59.60%	7.00%		100%
	Social Sciences	58.70%		39.10%	2.20%		100%
	Experimental Sciences	30.20%		58.30%	11.50%		100%
	Health Sciences	30.60%		55.60%	13.90%		100%
	Technical Area	68.50%		24.70%	6.80%		100%
	Total	**46.00%**		**46.30%**	**7.60%**		**100%**
At a research centre or institute	Humanities	53.80%		46.20%			100%
	Social Sciences	42.90%		57.10%			100%
	Experimental Sciences	33.00%	1.00%	61.90%	4.10%		100%
	Health Sciences	56.80%		35.10%	8.10%		100%
	Technical Area	52.40%		42.90%	4.80%		100%
	Total	**42.30%**	**0.60%**	**52.60%**	**4.60%**		**100%**
At a company or other institution	Humanities	84.50%	5.20%	8.60%		1.70%	100%
	Social Sciences	84.70%	6.80%	8.50%			100%
	Experimental Sciences	77.50%	7.20%	14.40%	0.90%		100%
	Health Sciences	83.80%	10.00%	6.20%			100%
	Technical Area	80.00%	15.00%	5.00%			100%
	Total	**81.90%**	**8.50%**	**9.00%**	**0.30%**	**0.30%**	**100%**

Of the 580 Ph.D. graduates who work at the university, 91.2% are employed in the public university. Figure 10 shows their distribution by type of contract and disciplinary spheres.

Figure 10. Types of contract, by disciplinary spheres and place of employment of greatest dedication



Gross annual earnings

78% of the Ph.D. graduates earn over €24,000 annually, while only 4% earn less than €15,000 annually (see Table 13). The gross annual earnings have been calculated on the basis of the collective which is employed full-time (93% of the sample, that is to say, 784 Ph.D. graduates).

If these data are compared with the figures for the earnings of first- and second-cycle degree holders (see Figures 11 and 12), it may be seen that the situation of the Ph.D. graduates is clearly much more favourable in all areas. It must be kept in mind that these collectives differ not only in the level of the degree which is held, but also in age and, therefore, in the level of professional experience. Consequently, the data confirm the previously mentioned idea that the professional career of first- or second-cycle university graduates has a long trajectory and that their final situation is not determined in the year in which they obtain their degree or three years later, but rather it evolves until much further on.

Figure 11. Gross annual earnings of Ph.D. graduates with degrees from 2003 and 2004

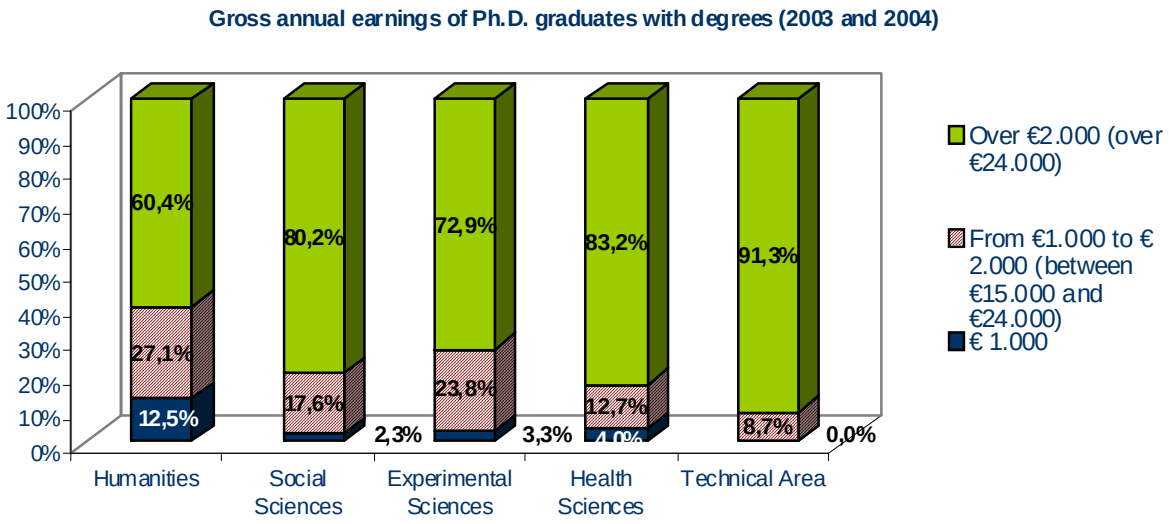
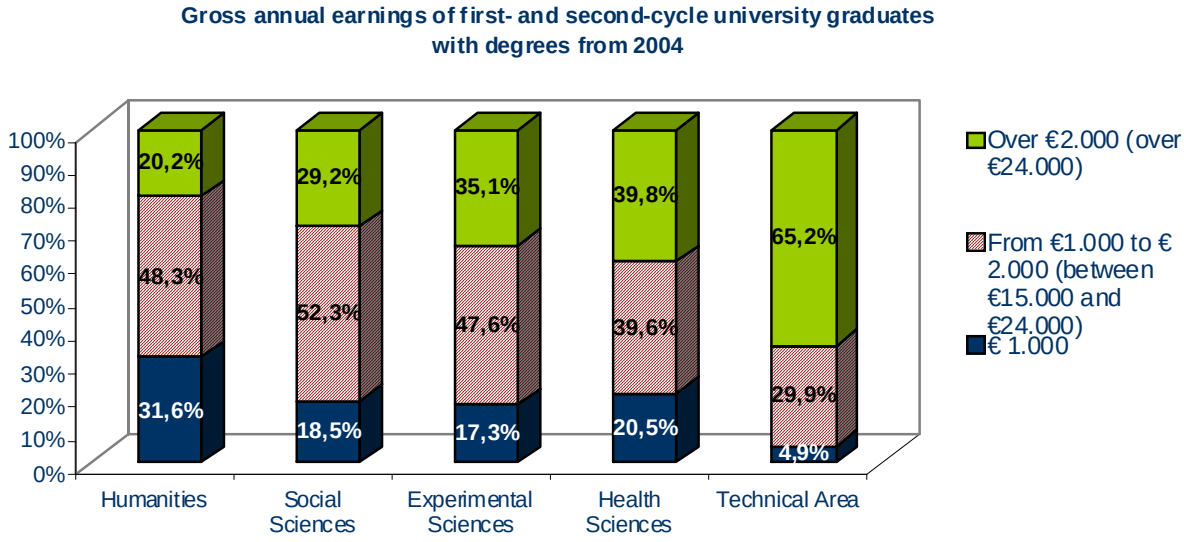


Figure 12. Gross annual earnings of first- and second-cycle university graduates with degrees from 2004



A comparison of Figures 11 and 12 also allows one to observe that the differences by disciplinary areas, while continuing to exist, are less pronounced in the case of Ph.D. graduates than in that of first- and second-cycle degree holders.

Table 13 shows the results with the categories of earnings of Ph.D. graduates further broken down. The average earnings of Ph.D. graduates (30%) are found in the range of €30,000 to €40,000 per annum. 11% earn over €50,000 per annum, a figure which reaches 23% in Health Sciences but only 2% in Humanities.

Table 13. Gross annual earnings, by disciplinary spheres (of the collective employed full-time)

		Ph.D. programme sphere code					Total
		Humanities	Social Sciences	Experimental Sciences	Health Sciences	Technical Area	
Gross annual earnings	Under €9,000	1.0%	0.8%	0.4%	0.6%		0.5%
	Between €9,000 and €12,000	2.1%	0.8%	0.7%	2.9%		1.3%
	Between €12,000 and €15,000	9.4%	0.8%	2.2%	0.6%		2.2%
	Between €15,000 and €18,000	4.2%	1.5%	3.7%	2.9%	1.7%	2.9%
	Between €18,000 and €24,000	22.9%	16.0%	20.1%	9.8%	7.0%	15.6%
	Between €24,000 and €30,000	26.0%	31.3%	28.6%	16.8%	29.6%	26.3%
	Between €30.000 and €40.000	28.1%	29.8%	29.7%	23.7%	39.1%	29.6%
	Between €40.000 and €50.000	4.2%	6.9%	7.8%	20.2%	10.4%	10.3%
	Over €50.000	2.1%	12.2%	6.7%	22.5%	12.2%	11.4%
Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

There is almost no difference of earnings according to whether the Ph.D. graduates are employed at the university, at a research centre or in a company, by disciplinary spheres. Significant differences are found only in the spheres of Social Sciences, Health Sciences and the Technical Area; in these spheres, the Ph.D. graduates who work in companies or other institutions are those who earn over €50,000 per annum.[7]

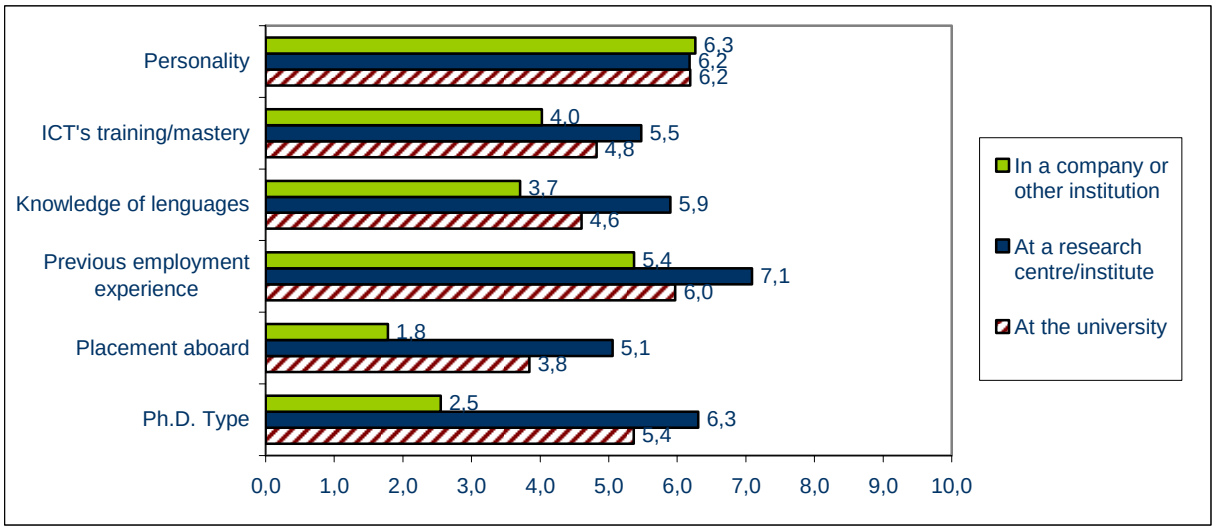
Contracting factors

The replies with respect to the degree in which the six proposed factors were significant in the contracting for the current job vary considerably depending on whether the Ph.D. graduates work at a research centre, at the university or in a company.

Accordingly, while “personality” is the most decisive factor for being contracted at both the university and companies, it ranks third with respect to contracting at research centres.

[7] Significant result assessed by the chi-square test, with a confidence level of 95%.

Figure 13. Contracting factors, by place of employment with greatest employment dedication



The “prior professional experience” factor is very important regardless of where the Ph.D. graduates work, which makes sense because we are dealing with mature persons who already have a certain experience in the working world. This factor ranks first for research centres and second for the university and companies.

The “type of Ph.D.” ranks second in importance for contracting at a research centre, third for contracting at the university and fifth for contracting at companies.

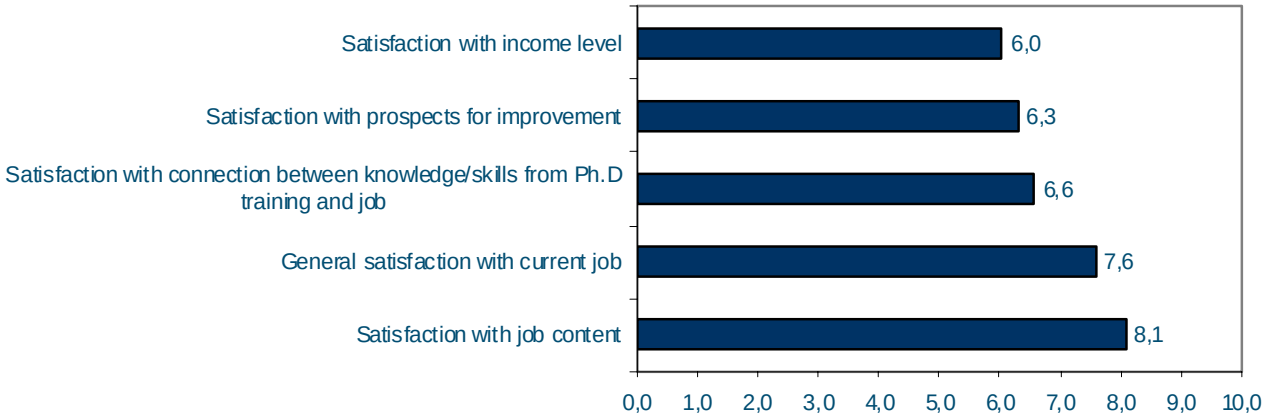
Of the other three contracting factors, “knowledge of languages” is more important for working at research centres and companies than at the university; “ICT training/mastery” is more important at companies (where it ranks third) than at the university or at research centres, and lastly, “placements abroad” ranks last in all three cases, although it registers an average of 5.1 in the case of research centres versus 1.8 in private companies.

All the averages are higher for research centres except the average of “personality”, which would seem to indicate that the demands for being contracted at research centres are higher than in the case of the other two situations.

Satisfaction with current job

The Ph.D. graduates give a very high score to their satisfaction with the content of their jobs (8.1 on a scale of 0 to 10) and with their work in general; likewise, they give a good score to the usefulness of the knowledge obtained with the Ph.D. and a passing score to their outlook for improvement and their satisfaction with their remuneration.

Figure 14. Satisfaction with current job



As may be seen in Figures 15 and 16, the differences are smaller between disciplinary areas than between places of employment.

Figure 15. Satisfaction with current job, by disciplinary spheres

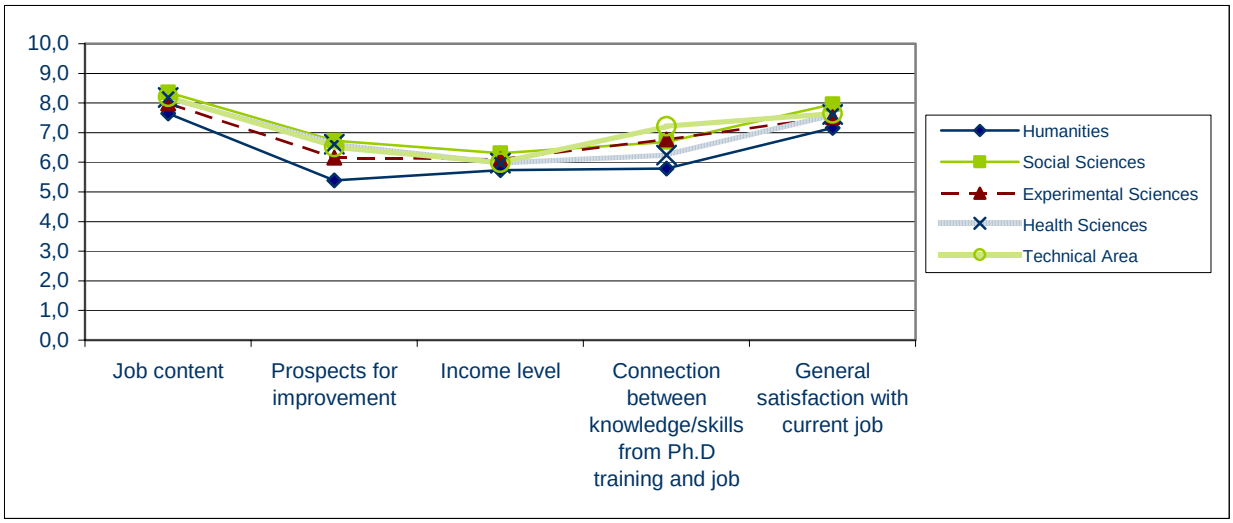
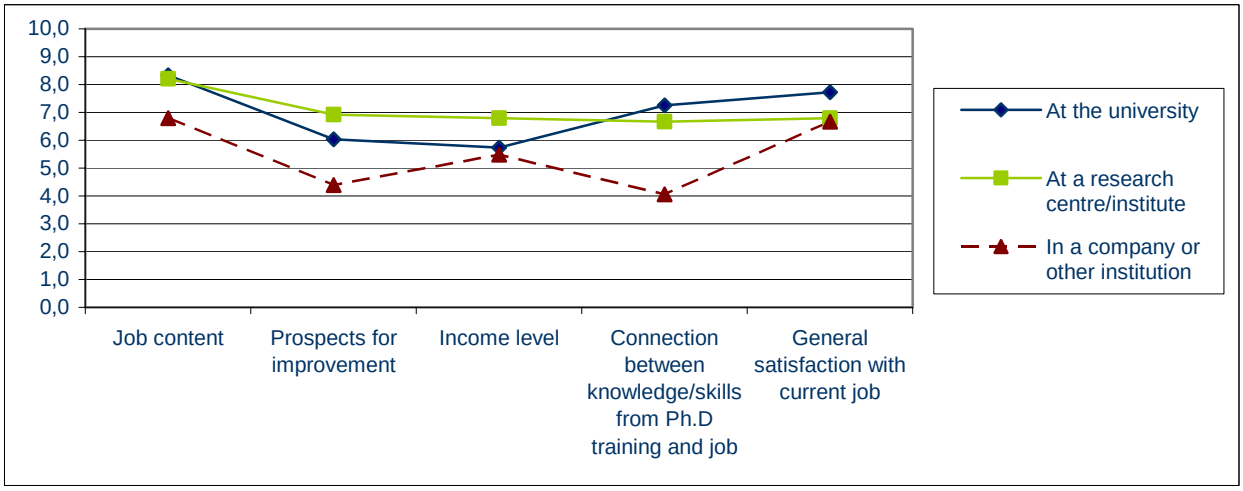


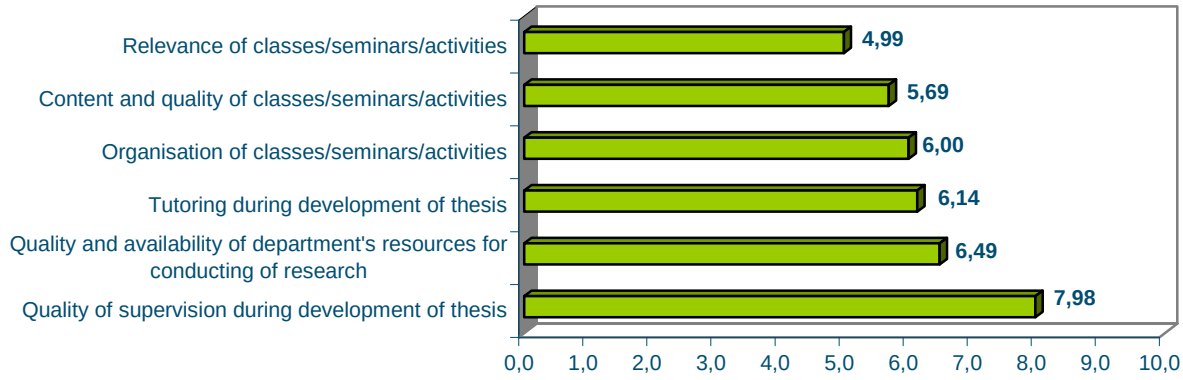
Figure 16. Satisfaction with current job, by place of employment



PART B: SATISFACTION WITH TRAINING

Ph.D. graduates give a very high score to the quality of the thesis supervision process, that is to say, to the effectiveness of their relationship with the thesis supervisors. This high score is not at all surprising if one considers that the persons who have completed their doctoral thesis have probably done so because they had a good supervision process.

Figure 17. Satisfaction with training



Likewise, the Ph.D. graduates expressed their satisfaction with the quality of the resources and their availability (bibliography, firstly, but also laboratories, etc.). The Ph.D. graduates in Experimental Sciences and the Technical Area are the most satisfied, while those of Humanities and Social Sciences are more critical (see Table 14). With respect to classes and seminars, what they value most, once again, is the relationship with the teaching staff of the Ph.D., but in general they are more critical with the initial period of Ph.D. training. Accordingly, the assessment of the importance of the classes and seminars barely reaches a passing score. The Ph.D. graduates in Experimental Sciences and Health Sciences are especially critical about the quality of the classes and seminars.

These results are highly coherent with those of the MIRROR study, which was carried out through surveys of Ph.D. candidates in the year 2005. In this study, 1,000 Ph.D. students in Catalunya stated that, even though the relationship with the teaching staff was quite satisfactory (with results higher than those of such countries as Finland or Sweden), the assessment of the relevance of the classes was much less satisfactory (less than that of the other countries participating in the international study). It is foreseeable that this weak point will be modified with the reforms introduced to adapt to the EHEA, with the implantation of academic masters degrees.

Table 14. Satisfaction with training, by disciplinary spheres

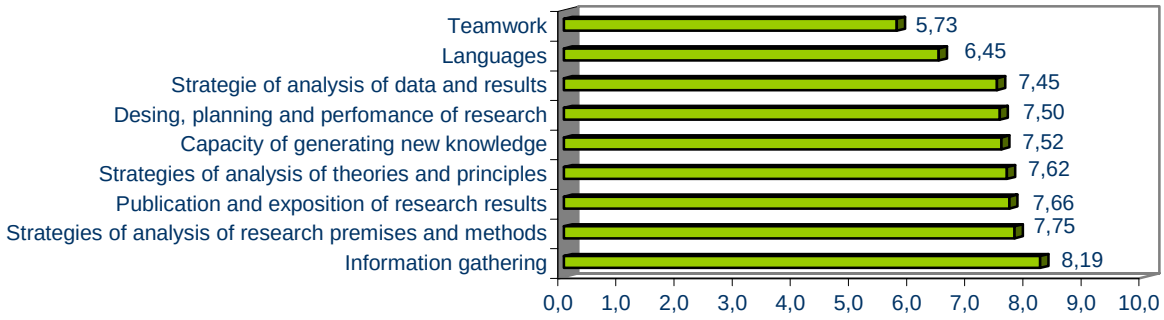
	Humanities	Social Sciences	Experimental Sciences	Health Sciences	Technical Area	Total
Quality of supervision of thesis	7.73	7.99	7.85	7.93	8.60	7.98
Quality and availability of resources	5.33	5.88	7.09	6.49	6.96	6.49
Tutoring during classes	6.46	6.92	5.85	5.26	6.88	6.14
Organisation of classes / seminars / activities	6.33	6.68	5.69	5.60	6.20	6.00
Content and quality of classes / seminars / activities	6.01	6.40	5.26	5.35	6.03	5.69
Relevance of classes / seminars / activities	5.33	5.49	4.77	4.50	5.33	4.99

Assessment of skills

The Ph.D. training should provide the skills necessary to turn Ph.D. graduates into knowledge workers. According to Schreiterer, it should be compulsory for all Ph.D.s to follow a curriculum which would assist the Ph.D. candidates in the acquisition of communication skills, collaboration skills, and project management and strategic thinking skills (SCHREITERER, 2008, 150). Moreover, Ph.D. training should not be strictly centred on a research topic or methodology, but rather it should foster reasoning and interdisciplinary approaches.

In order to define the skills which are unfolded in Ph.D. studies, the study carried out by the Carnegie Foundation (GOLDE and WALKER, 2006) should be taken as a basis. Figure 18 shows the overall average for the nine skills defined.

Figure 18. Average assessment of skills



All skills scored very good or better, except “teamwork” and “languages”. The highest score went to the “documentation” skill, which is not surprising if one considers that documenting is fundamental to a researcher in any sphere. “Teamwork” is the skill with the lowest average score, which is not surprising either if one considers that the defence of the thesis is, in the end, an individual act, but such a low rating is nevertheless undesirable if it is kept in mind that research today, both in the academic and non-academic spheres, is a cooperative task.

Table 15. Average score of skills (on a scale of 0 to 10), by disciplinary spheres and overall

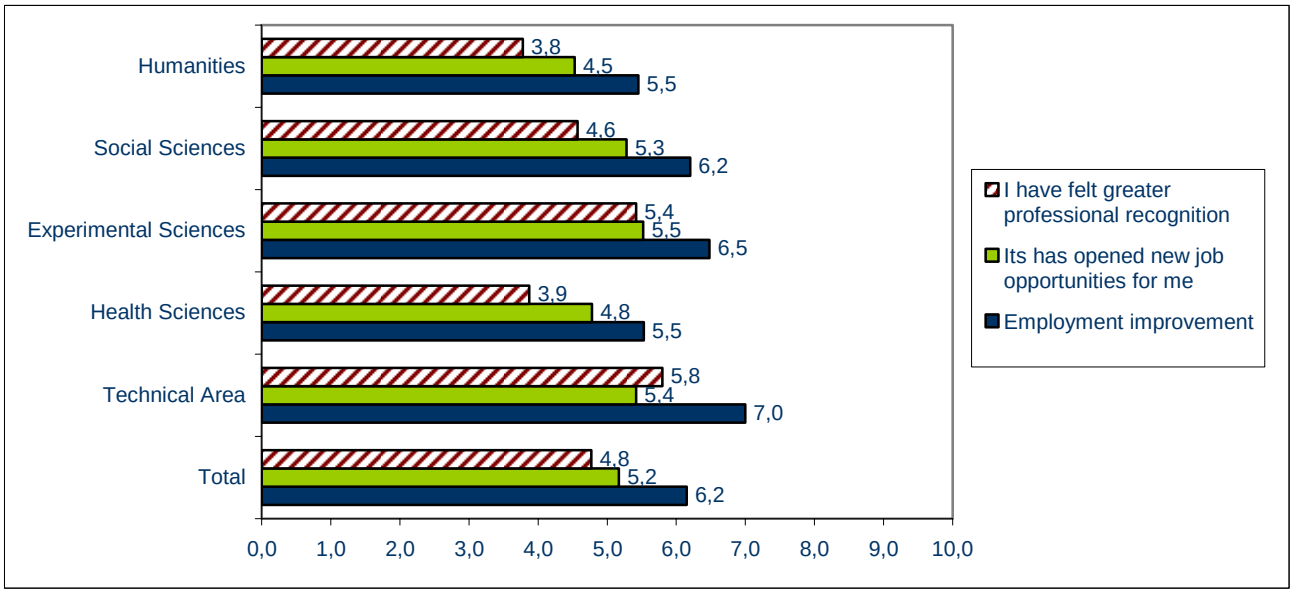
	Humanities	Social Sciences	Experimental Sciences	Health Sciences	Technical Area	Total
Documentation	8.46	8.41	8.05	**8.01**	8.27	8.19
Strategies of analysis of research premises and methods	7.80	7.77	7.75	**7.58**	7.95	7.75
Publication and exposition of research results	7.25	**7.16**	7.94	7.73	7.92	7.66
Strategies of analysis of theories and principles	7.92	7.80	7.62	**7.22**	7.72	7.62
Capacity of generating new knowledge	7.92	7.68	7.43	**7.00**	7.96	7.52
Design, planning and performance of research	7.38	7.64	7.54	**7.28**	7.66	7.50
Techniques of analysis of data and results	**6.89**	7.23	7.73	7.42	7.61	7.45
Languages	5.38	**5.24**	7.18	6.22	7.57	6.45
Teamwork	**3.53**	4.17	6.92	6.34	6.04	5.73

Table 15 shows the maximum scores (green shading) and minimum scores (bold-faced type) for each of the skills. As may be seen, the differences between areas are not usually very large, except for the “teamwork” and “languages” skills, which do not form the core of Ph.D. training but are rather a product of the methodologies and the environment in which the research is conducted. These differences may be attributed, as will be seen further on, to the various disciplinary traditions with respect to how the doctoral thesis is carried out. Consequently, the theses are quite often prepared within research groups in Experimental Sciences, Health Sciences and the Technical Area, a fact which favours the development of the “teamwork” skill; moreover, in these disciplinary spheres it is also more common for the Ph.D. candidate to choose to prepare a thesis based on a compilation of articles, something which may entail publishing in English, for example.

Impact of Ph.D. studies on current job

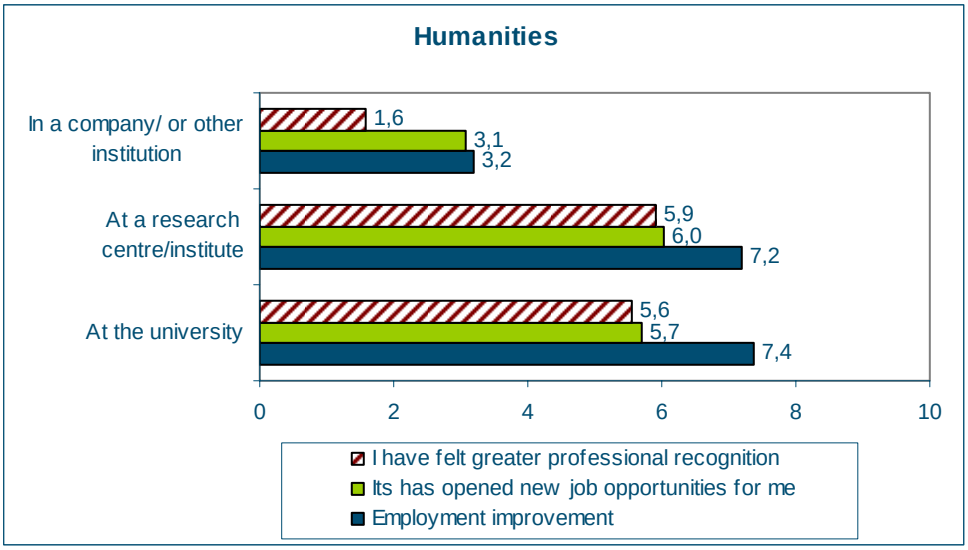
Obtaining a Ph.D. degree contributes only slightly to professional improvement (a score of 6 on a scale of 0 to 10), little to obtaining new jobs (5.4) and still less to a greater professional recognition (4.8), despite the long path and the effort necessary to achieve it.

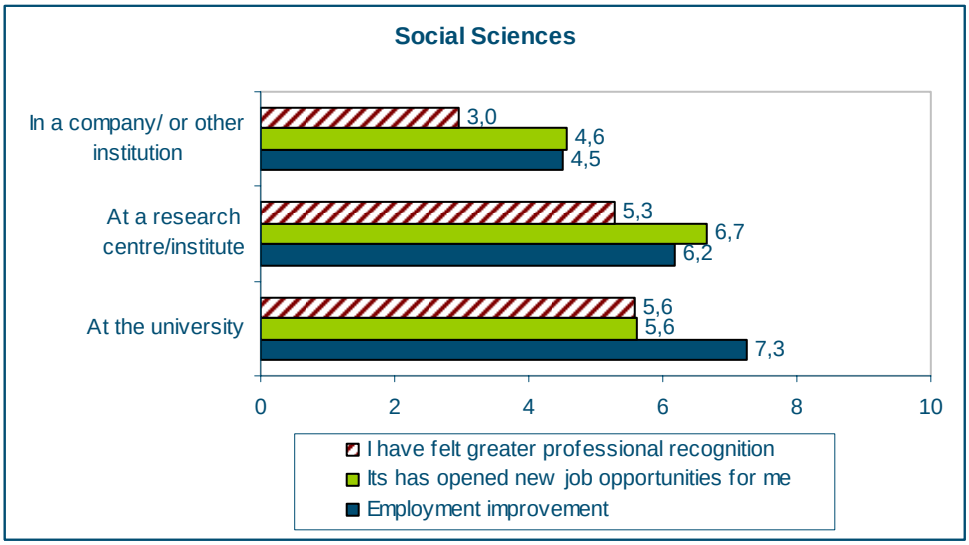
Figure 19. Level to which a Ph.D. degree has had an impact on one's current employment situation (on a scale of 0 to 10)

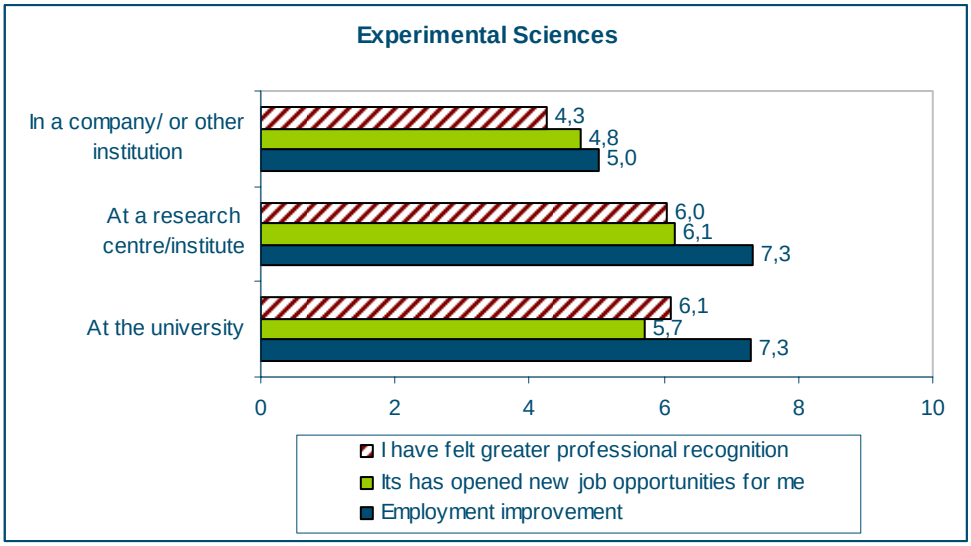


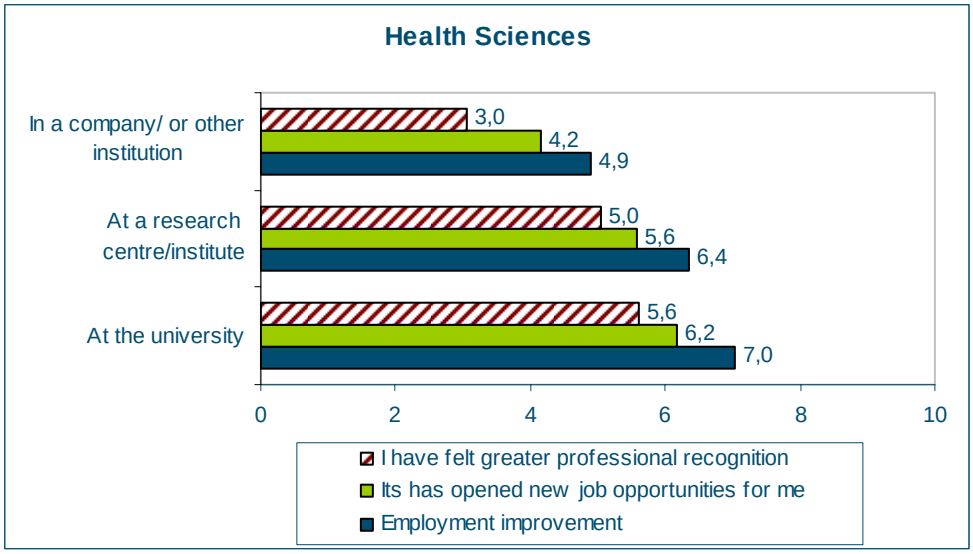
The impact of the Ph.D. degree varies according to disciplinary areas and, within each one, according to the place of employment. Thus, the impact is greater for Ph.D. graduates working at the university or at a research centre, than for those working in a company (see Figure 20).

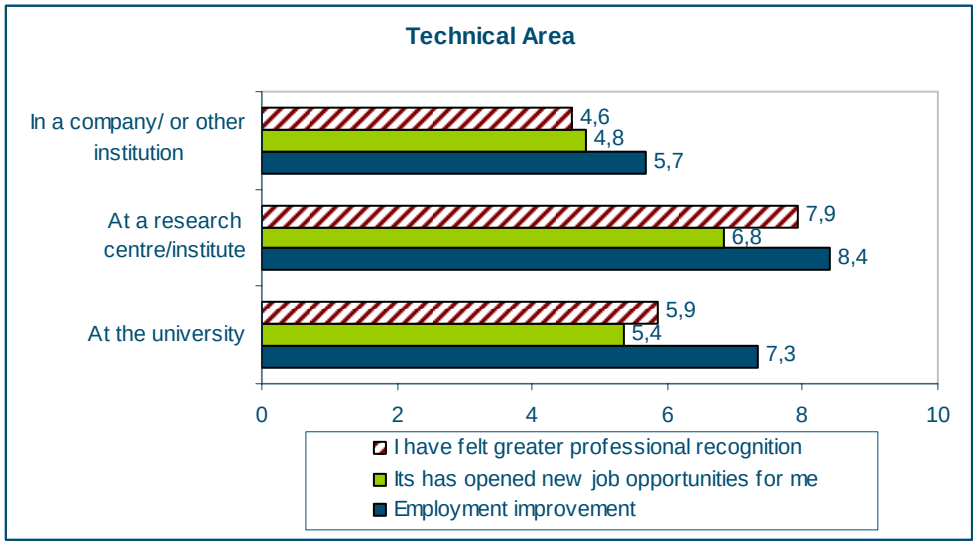
Figure 20. Impact of Ph.D. degree, by disciplinary spheres and place of employment







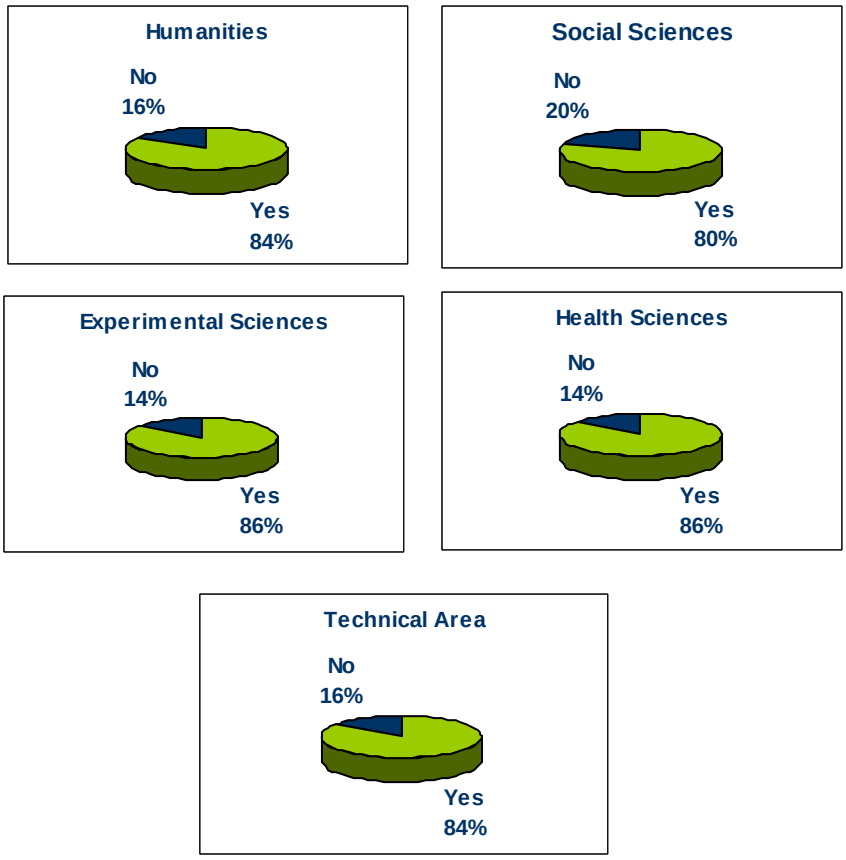

Health Sciences
In a company/ or other institution
At a research centre/institute
At the university
3,0
4,2
4,9
5,0
5,6
6,4
5,6
6,2
7,0
0
2
4
6
8
10
I have felt greater professional recognition
Its has opened new job opportunities for me
Employment improvement


Technical Area
In a company/ or other institution
At a research centre/institute
At the university
4,6
4,8
5,7
7,9
6,8
8,4
5,9
5,4
7,3
0
2
4
6
8
10
I have felt greater professional recognition
Its has opened new job opportunities for me
Employment improvement

Willingness to repeat Ph.D.

84% of the Ph.D. graduates would do their Ph.D. again if they were to begin anew. This percentage is 10 points higher than the intention to repeat the course of study among first- and second-cycle degree holders (AQU Catalunya, 2008). The percentage ranges from 86% in Health Sciences and Experimental Sciences to 80% in Social Sciences (see Figure 21).

Figure 21. Percentage of Ph.D. graduates who repeat Ph.D., by disciplinary spheres



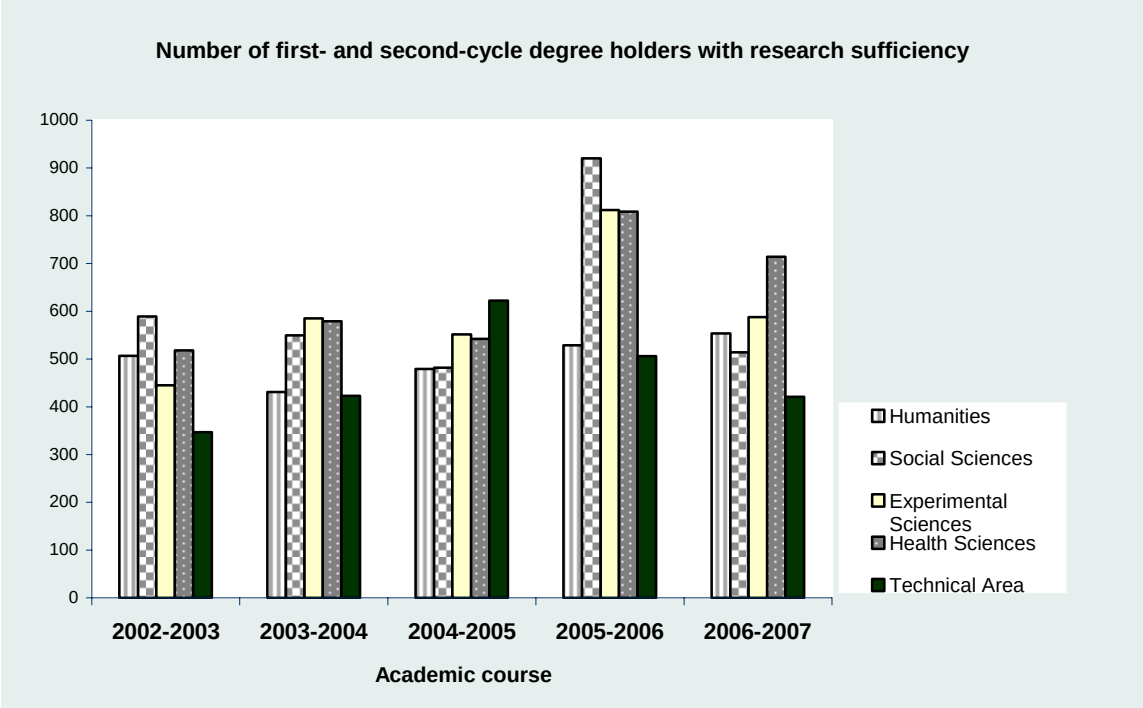
PART C: THESIS CHARACTERISTICS AND OTHER ACADEMIC ASPECTS

In this section an analysis is made of academic aspects of the Ph.D., such as data on the production of students, and the duration and characteristics of the doctoral theses and of the training process; these are aspects which may have an influence on the skills achieved as a result of this training process.

How many Ph.D. graduates are trained in Catalunya?

Figure 22 shows the evolution of the number of students who have obtained the Diploma of Advanced Studies (DEA) in the period 2002-2007.[8]

Figure 22. Evolution of the number of first- and second-cycle degree holders with research sufficiency, by disciplinary spheres



[8] Source: Commission for Universities and Research.

As may be seen, the distribution by academic years is quite homogeneous, although two peaks are observed: in the academic year 2005-2006 there was a considerable increase of Ph.D. students who obtained research sufficiency as compared to the rest of the academic years in the spheres of Social Sciences, Experimental Sciences and Health Sciences. This also happened in the academic year 2004-2005 in the Technical Area. In the academic year 2006-2007, the number of first- and second-cycle degree holders with DEA decreased in all spheres except Humanities, with respect to the previous academic year.

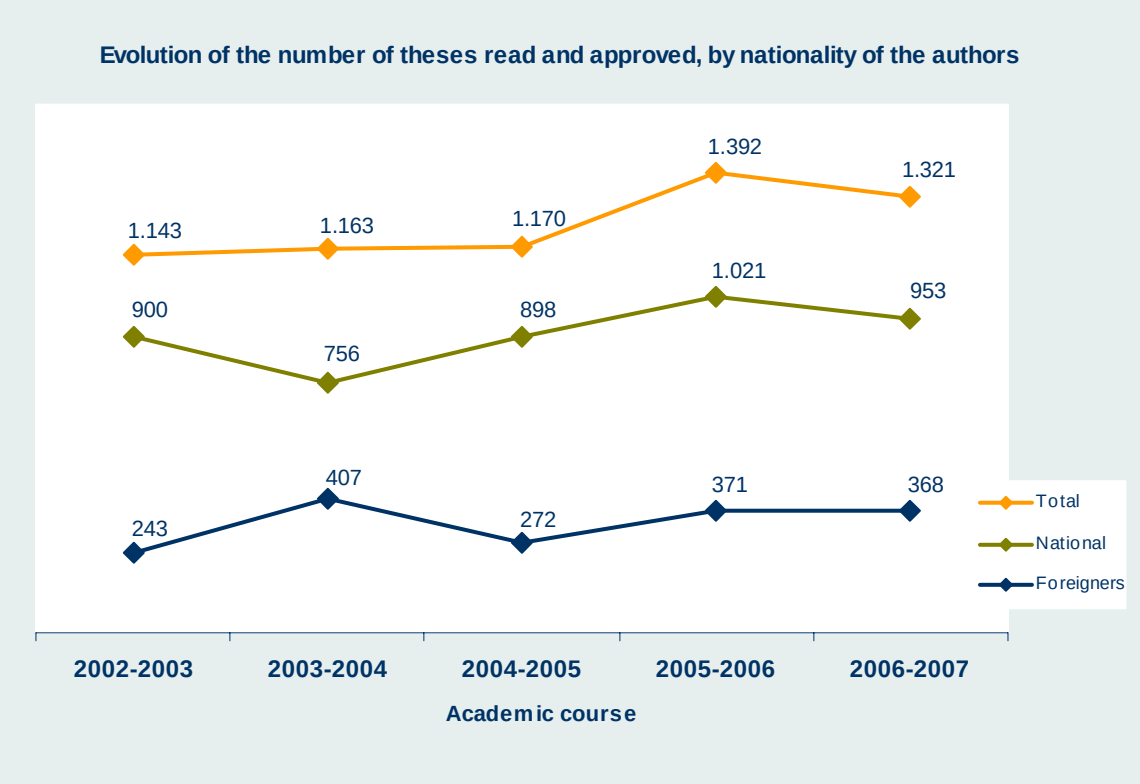
The distribution by spheres is also fairly homogeneous, something which is quite surprising if one considers that the distribution by spheres of the number of students with first- and second-cycle degrees is clearly heterogeneous: thus, while the majority of the first- and second-cycle students belong to the sphere of Social Sciences (46% in the academic year 2004-2005) and a minority belong to that of Experimental Sciences (7.3% in the academic year 2004-2005),[9] these differences are by no means as pronounced between the Ph.D. students.

Figure 23 shows the evolution of the total number of theses read and approved, by nationality of the authors.[10]

[9] Source: AQU Catalunya (2007).

[10] Source: Commission for Universities and Research.

Figure 23. Evolution of the number of theses read and approved, by nationality of the authors



It may be seen that the number of approved readings has evolved according to an upward trend over the course of time, even though the maximum number of theses (1,392) was registered in 2006.

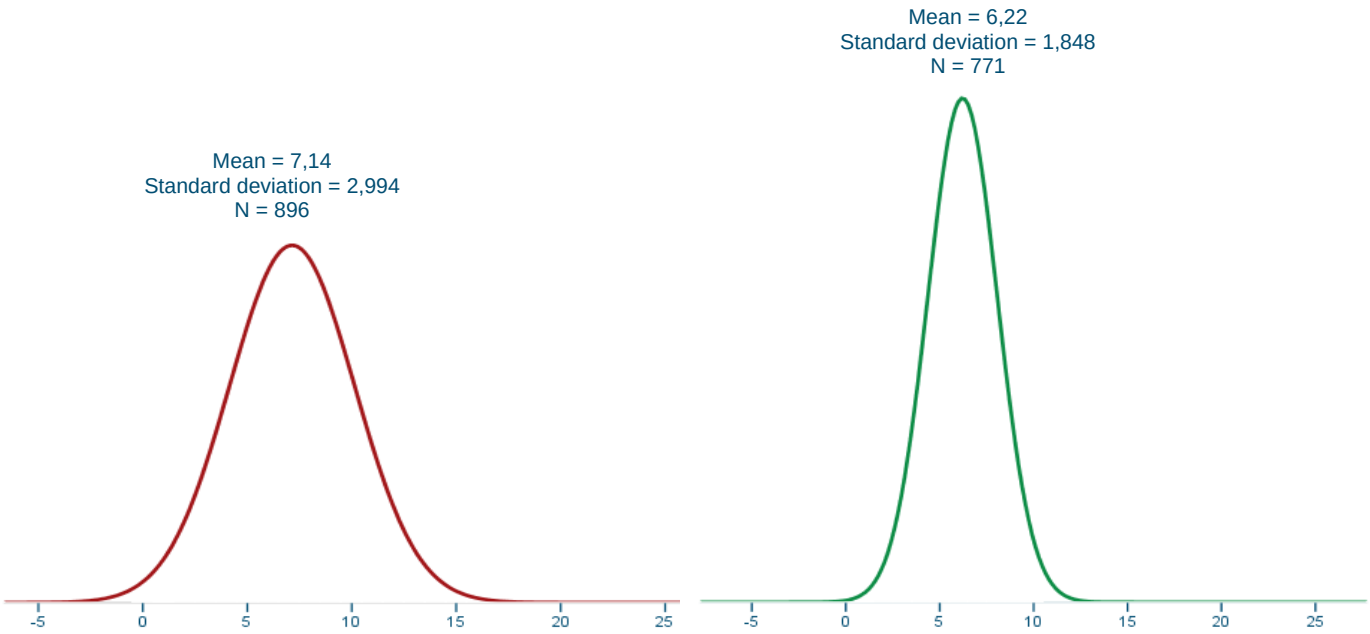
Nevertheless, if nationality is taken into consideration, the great majority of the Ph.D. graduates (about 72-73%) are of Spanish nationality. 2004 may be pointed out as the year with the most Ph.D. graduates of foreign nationality and, therefore, the year with the fewest Ph.D. graduates of Spanish nationality.

Duration of Ph.D.

In order to calculate the average duration of Ph.D. studies, we eliminated 125 observations (14% of the sample) which differed considerably from the behaviour of the rest (extreme values or “outliers”). Diverse discussions are under way about what is to be done with this type of values and about which is the best option: to correct them in the case in which they are due to an error, to replace them with the average of the data, to exclude them from the analysis, etc. In our case we will not take them into consideration in the analysis since they produce a large distortion in the distribution of the results (see Figure 24).

Overall, Ph.D. graduates take an average of 6.25 years to obtain their degree.

Figure 24. Distribution of the duration of the Ph.D. on the basis of the total data (*n* = 896), excluding the cases with a duration of over 10 years (*n* = 771)



As may be seen in Table 16, Humanities is the area in which the longest durations are registered, although it shows no significant[11] differences with respect to Social Sciences and Health Sciences. For their part, Experimental Sciences and the Technical Area are the disciplines with the shortest durations (which are moreover similar), while the sphere of Health Sciences stands in an intermediate position in this respect.

[11] Significant result assessed by ANOVA, with a confidence level of 95%.

Table 16. Results descriptive of duration of Ph.D. studies, by disciplinary spheres

	Average	Standard deviation	Average	Minimum	Maximum	*N*
Humanities	6.95	1.625	7.00	3	10	96
Social Sciences	6.93	1.704	7.00	3	10	120
Experimental Sciences	5.87	1.647	5.00	3	10	271
Health Sciences	6.28	1,919	6.00	3	10	159
Technical Area	5.83	1.901	6.00	3	10	119
Total	**6.25**	**1.809**	**6.00**	**3**	**10**	**765**

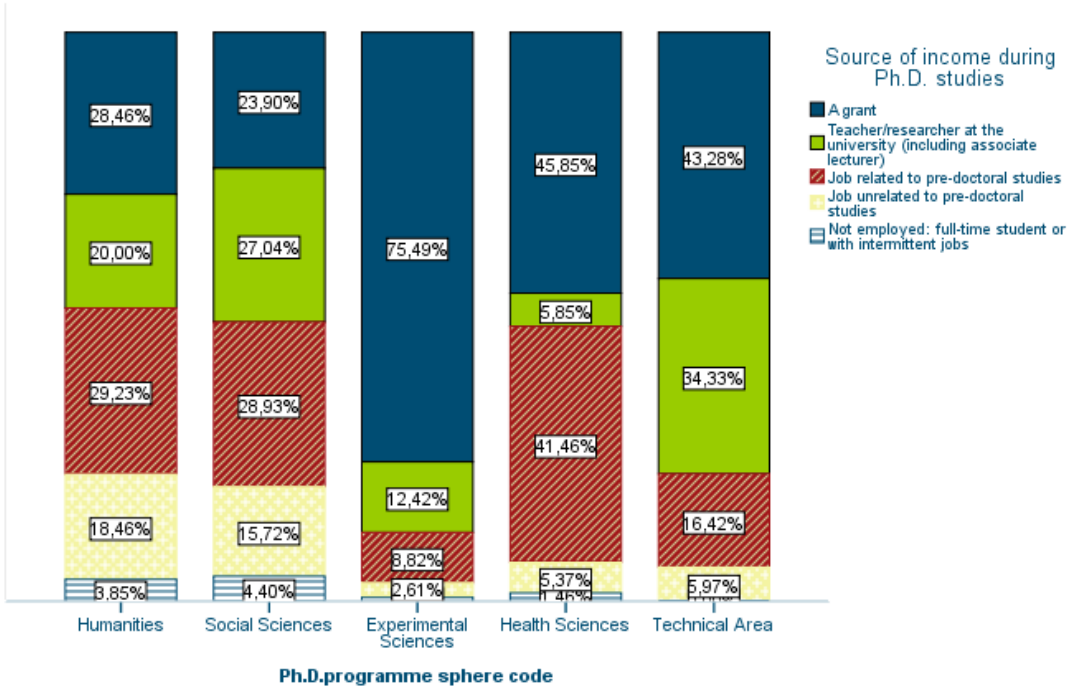
Employment situation during Ph.D. studies

Obviously, Ph.D. students are usually the oldest in the university system. This circumstance, together with the long duration of Ph.D. studies, lends a special significance to the study of the sources of income during the Ph.D.. Five possible situations have been envisaged: internship, employment at the university as a teacher, full-time employment in a job related to the studies prior to the Ph.D., unrelated employment and, lastly, no employment during Ph.D. studies.

To begin with, it is clear that an internship is, in principle, the situation which should be most beneficial because it allows a greater dedication to Ph.D. studies, while the situation of full-time employment outside the university should be that which poses the greatest obstacle to finishing the Ph.D. (especially if the sphere in which one works is unrelated to the respective studies).

Just as may be seen in Figure 25, there are some very large fluctuations between areas with respect to the type of sources of income during Ph.D. studies. Accordingly, while 76% of the Ph.D. graduates in Experimental Sciences had a study grant, only 24% of the Ph.D. graduates in Social Sciences were in this situation.

Figure 25. Main source of income during Ph.D. studies, by disciplinary spheres



At the other end, in the least desirable initial situation, that is to say, full-time employment in unrelated jobs, are 8% of the Ph.D. students (a figure which reaches 16% in the case of future Ph.D. graduates in Social Sciences), while only 3% are in this situation in Experimental Sciences.

The source of income during Ph.D. studies is an indicator of where the future Ph.D. graduates will finally come to work:

- In all the disciplinary spheres, the circumstance of being the recipient of a grant during Ph.D. studies increases the possibilities of working at research centres (where one finds more than the expected number of persons from this collective), although it does not necessarily increase the possibilities of working at the university.[12]
- Being a teacher at the university before obtaining a Ph.D. degree practically assures that the Ph.D. student will finally come to work at the university.
- On the other hand, holding a job at a company (regardless of whether or not it is related to the respective studies) practically assures that the Ph.D. student will finally come to work outside the university sphere.

[12] Significant result assessed by the chi-square test, with a confidence level of 95%.

Source of income and duration

In all spheres, the students who have a grant as their main source of income during their Ph.D. studies take less time on the average to finish the Ph.D. than the students who have any of the other sources of income, with differences which may range from half a year to one and a half years (see Table 17).[13]

Table 17. Descriptions of Ph.D. duration, by disciplinary spheres and sources of income

		Average	Standard deviation.	*N*
Humanities	Grant	6.64	1.432	33
	Teacher or researcher at the university	7.35	2.234	17
	Job related to pre-doctoral studies	6.96	1.311	26
	Job unrelated to pre-doctoral studies	7.11	1.779	18
	Not employed: full-time student or intermittent jobs	7.00	1.414	2
	Total	**6.95**	**1.625**	**96**
Social Sciences	Grant	6.60	1.538	35
	Teacher or researcher at the university	7.00	2.000	31
	Job related to pre-doctoral studies	7.22	1.809	32
	Job unrelated to pre-doctoral studies	7.00	1.455	18
	Not employed: full-time student or intermittent jobs	6.75	.500	4
	Total	**6.93**	**1.704**	**120**
Experimental Sciences	Grant	5.58	1.407	212
	Teacher or researcher at the university	6.81	1.635	32
	Job related to pre-doctoral studies	7.04	2.364	23
	Job unrelated to pre-doctoral studies	7.00	2.944	4
	Total	**5.87**	**1.647**	**271**
Health Sciences	Grant	5.75	1.542	85
	Teacher or researcher at the university	5.78	1.922	9
	Job related to pre-doctoral studies	7.07	2.110	58
	Job unrelated to pre-doctoral studies	7.20	2.588	5
	Not employed: full-time student or intermittent jobs	5.50	2.121	2
	Total	**6.28**	**1.919**	**159**
Technical Area	Grant	5.51	1.773	55
	Teacher or researcher at the university	6.11	2.024	38
	Job related to pre-doctoral studies	6.10	1.997	20
	Job unrelated to pre-doctoral studies	6.17	1.941	6
	Total	**5.83**	**1.901**	**119**

Among the collective of Ph.D. graduates who took more than ten years to obtain their degree, only 10% held a grant during their Ph.D. studies (this figure ranges from 24% in Experimental Sciences to 3% in Social Sciences). On the other hand, it is observed that this collective includes a greater proportion of Ph.D. graduates who held related employments (42%) or unrelated employments (17%), and likewise a greater proportion of Ph.D. graduates who were already teachers at the university (26%).

[13] Significant result assessed by ANOVA, with a confidence level of 95%.

Method of working on thesis

The thesis may be carried out by working individually or as part of a research group. By working individually, the Ph.D. student's autonomy is probably greater with respect to both the choice of the subject and the development of the thesis. When acting as part of a research group, the autonomy is lesser and there is a risk of dilution in the identification of the individual's and the group's final contributions to the thesis; nevertheless, the working environment is much closer to the form in which research is actually carried out (that is to say, collectively) and it may be expected to allow the development of interpersonal skills which the doctor will need in order to conduct research once the Ph.D. has been completed.

While the thesis is carried out individually in the majority of cases (over 70%) in Humanities and Social Sciences, the opposite occurs in the other three disciplinary areas, that is to say, the majority of the students (between 70 and 86%) carry out their thesis within a research group.[14]

Table 18. Method of working on thesis, by disciplinary spheres

	N	Method of working on doctoral thesis		Total
		Mainly independently	Mainly in a research group (or combined independently/group)	
Humanities	130	73.80%	26.20%	100%
Social Sciences	159	71.70%	28.30%	100%
Experimental Sciences	306	13.70%	86.30%	100%
Health Sciences	205	34.60%	65.40%	100%
Technical Area	134	28.40%	71.60%	100%
Total	**934**	**38.70%**	**61.30%**	**100%**

This study has allowed it to be observed that the method of working on the thesis influences the following aspects:

- **The type of thesis which will finally be carried out**

  83% of the Ph.D. students who make compilations of articles worked on their thesis as part of a research group. The Ph.D. students who do a monograph are more broadly distributed (see Table 19).[15]

[14] In the international MIRROR study it was observed that Catalunya is distinguished from the other three participating countries with respect to the method of working on the thesis. Thus, while 56% of the Ph.D. candidates in Catalunya stated that they worked independently, this figure was 80% in Finland, Sweden and Ireland.

[15] Significant results assessed by the chi-square test, with a confidence level of 95%.

Table 19. Contingency table on type of thesis and working method

	Method of working on doctoral thesis			
	N	Mainly independently	Mainly in a research group (or combined independently/group)	Total
Monograph (book)	553	40.0%	60.0%	100%
Compilation of articles, publication of articles before thesis	212	17.0%	83.0%	100%
Total	**765**	**33.6%**	**66.4%**	**100%**

- **Duration of the Ph.D.**

  If the Ph.D. student works independently, the duration is slightly longer than in the case in which the student forms part of a research group. These differences are only significant in Social Sciences and Health Sciences (see Table 20).[16]

Table 20. Average duration of Ph.D. studies, by working method and disciplinary spheres

	Method of working on doctoral thesis	Duration of Ph.D.
Humanities	Mainly independently	7.13
	Mainly in a research group (or combined independently/group)	6.50
	Total	**6.95**
Social Sciences	Mainly independently	7.11
	Mainly in a research group (or combined independently/group)	6.58
	Total	**6.93**
Experimental Sciences	Mainly independently	6.87
	Mainly in a research group (or combined independently/group)	5.74
	Total	**5.87**
Health Sciences	Mainly independently	7.12
	Mainly in a research group (or combined independently/group)	5.97
	Total	**6.28**
Technical Area	Mainly independently	6.32
	Mainly in a research group (or combined independently/group)	5.64
	Total	**5.83**
Total	Mainly independently	6.98
	Mainly in a research group (or combined independently/group)	5.88
	Total	6.25

[16] Significant result assessed by Student's t test, with a confidence level of 95%.

Moreover, among the collective of Ph.D. graduates who took more than ten years to obtain their degree (*N* = 125), there is a greater proportion of persons who worked independently on their thesis in all spheres except the Technical Area.

- **Developed skills (see Figure 26)**

  The persons who carried out their thesis within a research group value more highly the level of achievement of the "teamwork" skill than the persons who have not done so, in all the disciplinary areas.

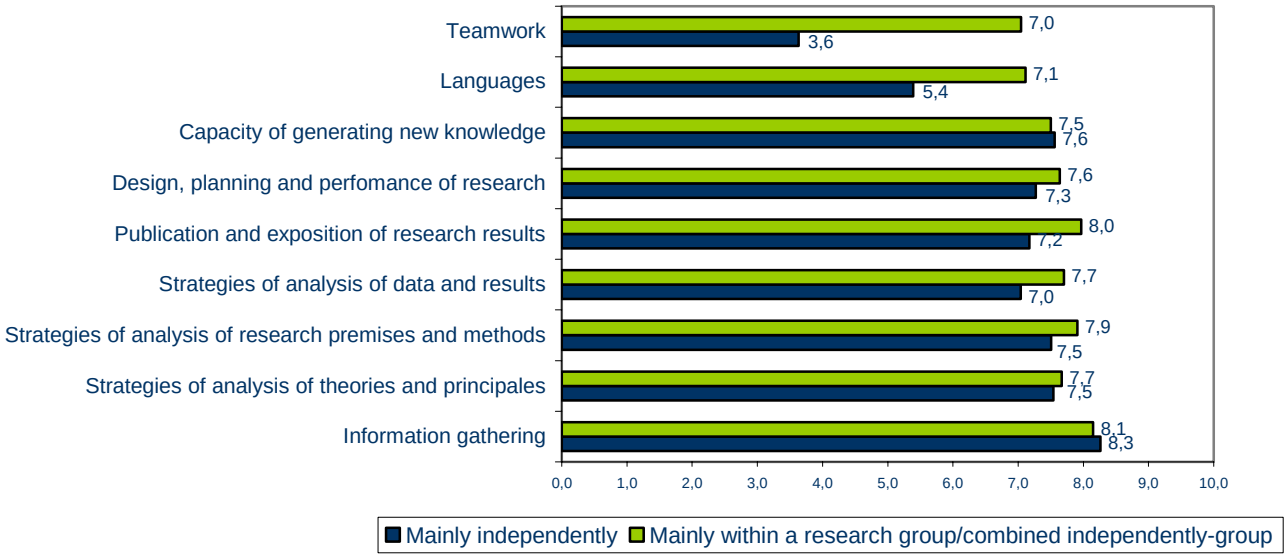
  Aside from the "teamwork" skill, in the Technical Area the Ph.D. graduates who worked on their thesis as part of a research group perceived their level of achievement to be higher in four other skills: "strategies for analysis of research premises and methods", "techniques for analysis of data and results", "publication and exposition of research results" and "languages".[17]

  In Health Sciences it is also observed that the Ph.D. graduates who have worked on their thesis as part of a research group value highly their level of achievement in "design, planning and performance of research" and "languages".

  Although these findings are not conclusive because they are not observed in all the areas or in the same skills, they do appear to be in accordance with the research on the benefits of collaborative learning. The circumstance of researching together with other researchers would strengthen the acquisition of research skills: it does not only allow one to learn from one's own research, but also from that of others.

[17] Significant result by assessment of the Mann-Whitney U test, with a confidence level of 95%.

Figure 26. Development level of skills, by method of working on doctoral thesis



- Final place of employment

  In terms of disciplinary spheres, it may be observed that it is more probable that the Ph.D. candidates who work on their thesis for the most part within a research group will finally come to work at the university or at a research centre, while the Ph.D. candidates who work on their thesis for the most part on an independent basis show a tendency to come to work at a company or some other institution,[18] except in the field of Experimental Sciences, where this behaviour is not observed.

[18] Significant result assessed by the chi-square test, with a confidence level of 95%.

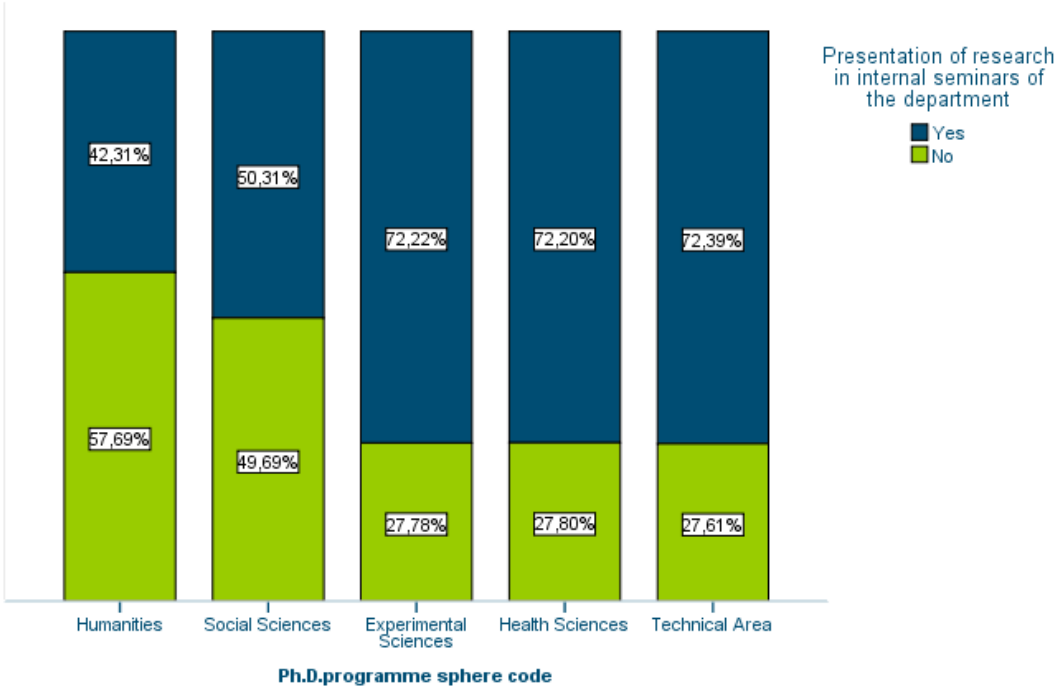
Presentation of research study

The presentation of the research results in academic or non-academic environments is one of the skills which a doctor shall master, aside from the fact that the sharing of research premises and methodologies with other researchers is, in itself, a training activity. Thus, it is not surprising that the majority of the Ph.D. programmes offer opportunities for Ph.D. candidates to participate in internal seminars or in national or international symposiums or workshops.

Presentation of research in internal seminars

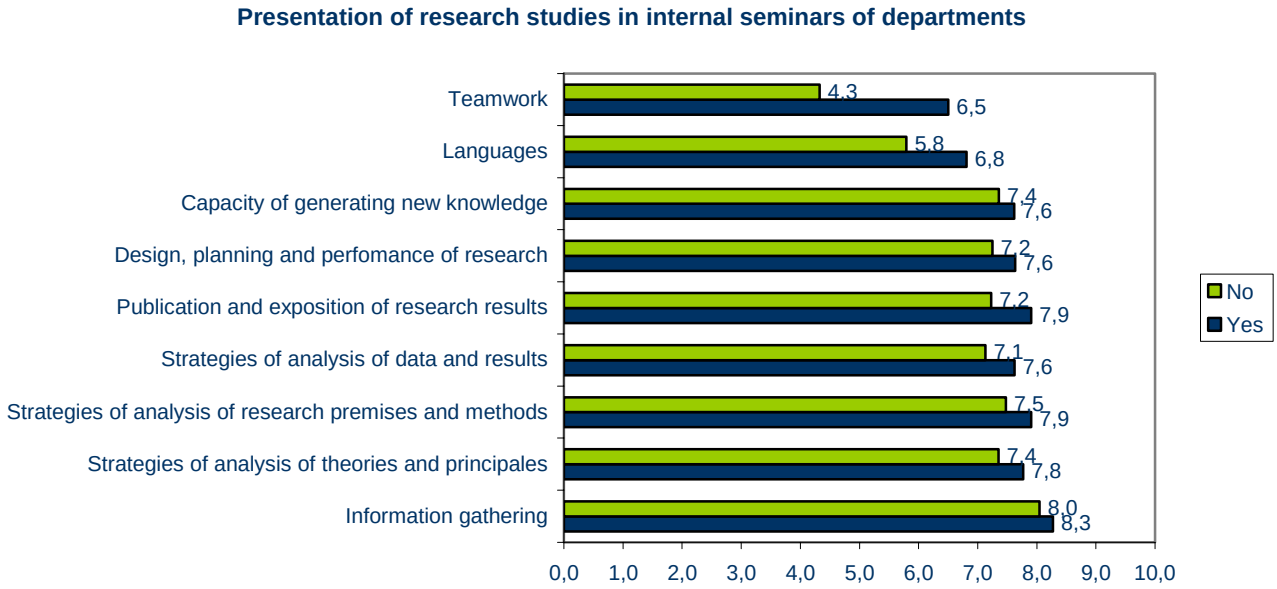
64.4% of the Ph.D. candidates present their research in internal seminars of their department. It is interesting to observe that there are two traditions with respect to internal dynamics: internal presentation is less usual in the areas of Humanities (40%) and Social Sciences (50%), while it is indeed usual in Experimental Sciences, Health Sciences and the Technical Area (72%).

Figure 27. Presentation of research studies in internal seminars of departments



The presentation of the thesis in internal seminars of departments also has a positive influence on the achievement of the assessed skills, as may be observed in Figure 28.

Figure 28. Development level of skills according to whether presentations are made in internal seminars



The statistically significant observable differences are listed below:[19]

- In all the areas, the Ph.D. candidates who made presentations in internal seminars value more highly the achievement of the "teamwork" skill than the Ph.D. candidates who did not make such presentations.
- In Social Sciences and Experimental Sciences, the Ph.D. candidates who made presentations in internal seminars value more highly the level achieved in the skills of "publication and exposition of research results", "languages", "strategies of analysis of theories and principles" and "capacity to generate new knowledge" than the Ph.D. candidates who did not make such presentations.
- In Experimental Sciences, aside from the five skills mentioned above, there are also significant differences in the averages of both groups with respect to "design, planning and performance of research".
- In the Technical Area, aside from the "teamwork" skill, the difference between the two groups is significant only in "techniques of analysis of data and results".

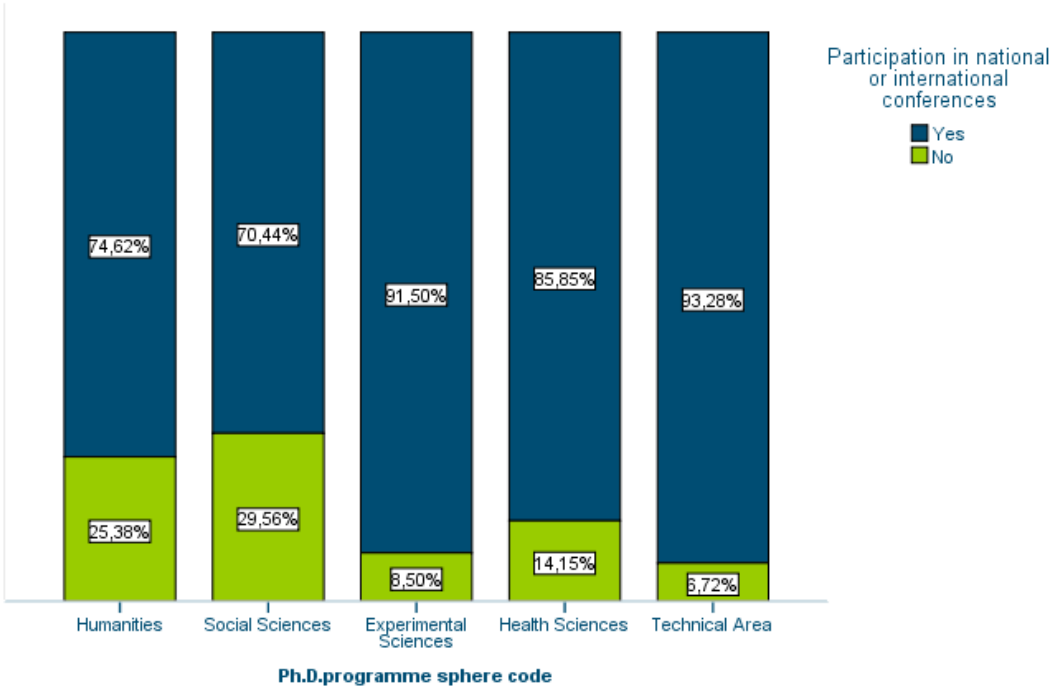
It should be noted that six positive contrasts are observed in Experimental Sciences, that is to say, the internal seminars are especially beneficial in this area.

[19] Results assessed by the Mann-Whitney U test, with a confidence level of 95%.

Presentation of research at national or international conferences

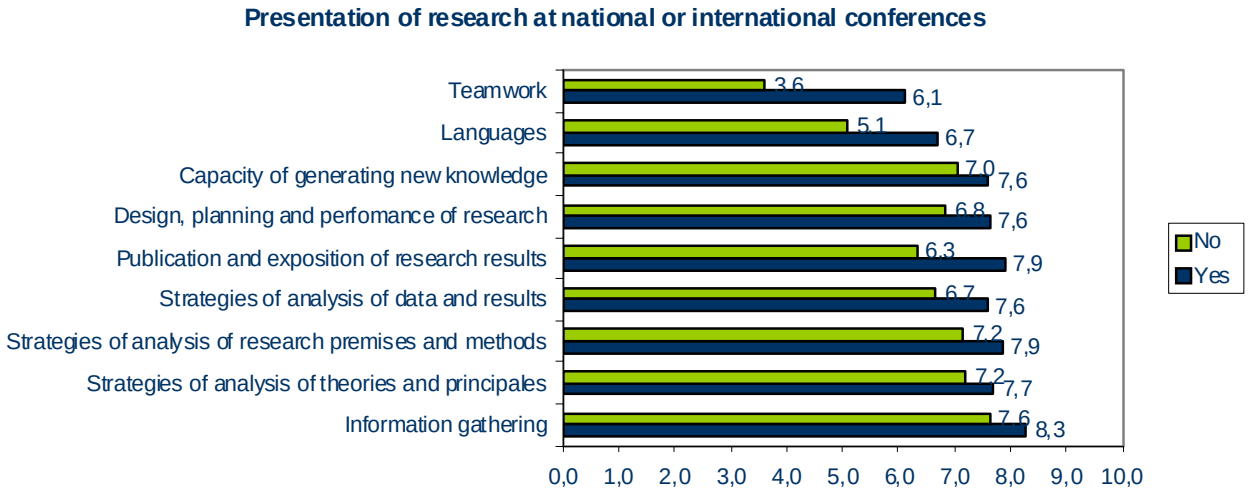
85% of the Ph.D. candidates participated actively in some national or international conference. This percentage ranges from 93% in the Technical Area to 70% in Social Sciences.

Figure 29. Presentation of research at national or international conferences



The circumstance of having presented research at external seminars has an effect on the perception of the achievement level of skills (see Figure 30).

Figure 30. Development level of skills according to whether presentations were made at external seminars



The assessments used to control the disciplinary area of the presentation of research at external seminars have allowed the following significant differences to be confirmed:[20]

- In all the areas except Health Sciences, there is a higher level in the "publication and exposition of research results" skill.
- In all the areas except Humanities, there is a higher level in the "teamwork" skill.
- In three areas (Humanities, Social Sciences and Experimental Sciences), there is a higher level in the "design, planning and performance of research" skill.
- In two areas (Humanities and Social Sciences), there is a higher level in "documentation".
- In two areas (Social Sciences and Technical Area), there is a higher level in "strategies of analysis of research premises and methods".
- In one area alone were differences found in other skills: "teamwork" in Humanities and "strategies of analysis of theories and principles", "techniques of analysis of data and results" and "capacity of generating new knowledge" in Social Sciences.

In short, it appears that the presentation of research at external seminars is highly beneficial in all areas, and especially in Social Sciences (8 positive assessments) and Humanities and the Technical Area (4 positive assessments).

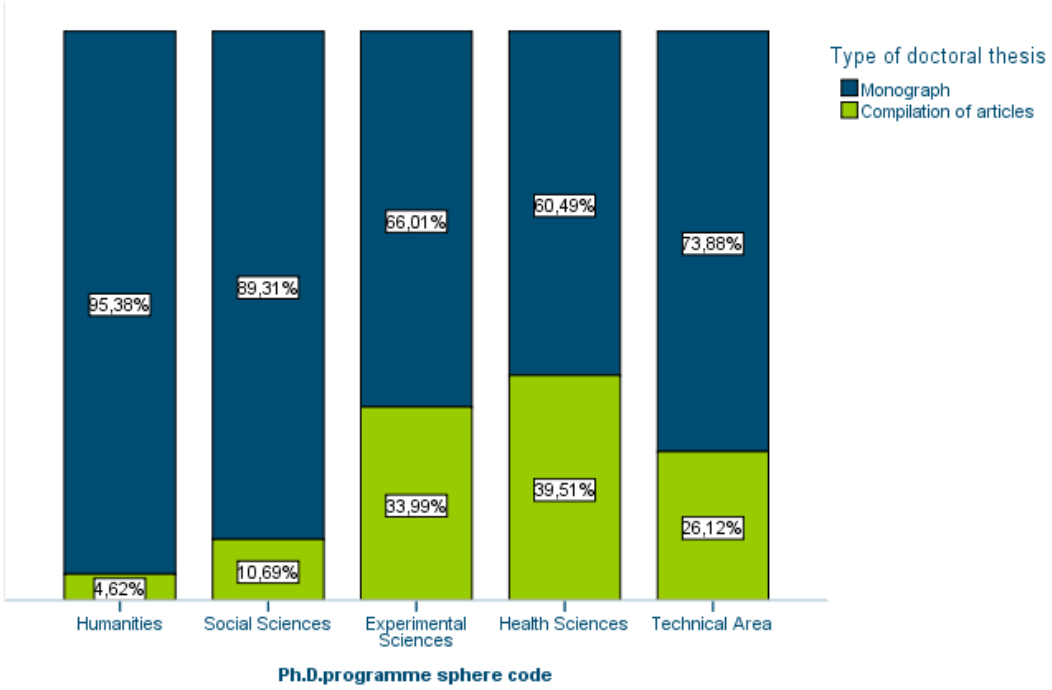
[20] Results by assessment of the Mann-Whitney U test, with a confidence level of 95%.

Monograph vs. compilation of articles

Monographs are the majority format (74%) of the doctoral theses. The thesis format type, as was observed in the MIRROR study, depends on national and disciplinary traditions. Thus, in Ireland over 90% of the thesis were monographs, while under 50% were monographs in Sweden and Finland; Catalunya would find itself in an intermediate situation in this respect.

The thesis format in Catalunya depends to a high degree on the disciplinary area: Humanities and Social Sciences are areas in which theses are in the format of a compilation of articles only very rarely, while in Health Sciences, Experimental Sciences and the Technical Area, this format is much more common. Accordingly, while 95% of the theses in Humanities are monographs, this percentage is 60% in Health Sciences.

Figure 31. Types of doctoral thesis, by disciplinary spheres



Since the assessment of research by teaching staff depends, to a large extent, on the number of articles published, in principle the circumstance of having published during the Ph.D. helps the future doctor to acquire the necessary experience to publish in international journals. Three years after obtaining their degree, however, 73% of the Ph.D. graduates who carried out a monograph thesis had published at least one article in a scientific journal, a figure ranging from 79% in Health Sciences to 57% in Social Sciences.

The type of thesis is observed to be independent of the university where the Ph.D. is studied.[21]

The circumstance of having made a compilation of articles or a monograph hardly causes any fluctuation in the achievement level of skills and in any case it would be difficult to interpret the differences because the type of thesis is closely related to the method of working on the thesis (it should be recalled that 83% of the Ph.D. candidates who make a compilation of articles carry out their thesis within research groups).

Likewise, the circumstance of preparing a monograph or a compilation of articles does not influence the duration of the Ph.D. studies in Experimental Sciences. On the other hand, in the Technical Area and Health Sciences, the Ph.D. candidates who did a monograph took a longer average time to complete their Ph.D. than those who made a compilation of articles, although this difference is significant only in Health Sciences.[22] This analysis cannot be performed in Humanities and Social Sciences since, in these fields, only a very small population carries out theses in the format of a compilation of articles. It should be noted, however, that among the collective of Ph.D. graduates who took more than ten years to obtain their degree, there is a larger proportion of Ph.D. graduates in all the areas (except Experimental Sciences) who prepared monographs.

Table 21. Descriptions of duration of Ph.D., by disciplinary spheres and types of thesis

		Average	Standard deviation	Minimum	Maximum	*N*
Monograph (book)	Humanities	6.96	1.628	3	10	90
	Social Sciences	7.01	1.711	3	10	110
	Experimental Sciences	5.84	1.648	3	10	179
	Health Sciences	6.55	1.935	4	10	88
	Technical Area	5.81	1.838	3	10	86
	Total	6.36	1.809	3	10	553
Compilation of articles, publication of articles before thesis	Humanities	6.83	1.722	5	9	6
	Social Sciences	6.10	1.449	4	9	10
	Experimental Sciences	5.92	1.652	4	10	92
	Health Sciences	5.94	1.858	3	10	71
	Technical Area	5.88	2.088	3	10	33
	Total	5.96	1.780	3	10	212
Total	Humanities	6.95	1.625	3	10	96
	Social Sciences	6.93	1.704	3	10	120
	Experimental Sciences	5.87	1.67	3	10	271
	Health Sciences	6.28	1.919	3	10	159
	Technical Area	5.83	1.901	3	10	119
	Total	6.25	1.809	3	10	765

[21] Result assessed by the chi-square test, with a confidence level of 95%.

[22] Result assessed by ANOVA, with a confidence level of 95%.

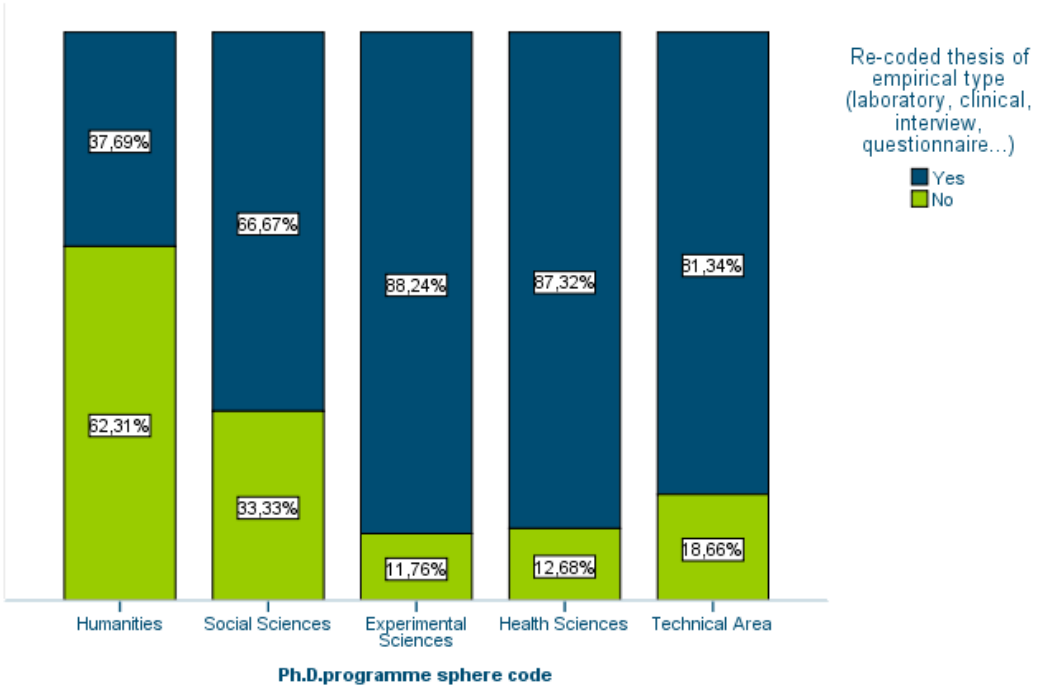
Empirical thesis

An empirical thesis implies the management of laboratory, clinical, fieldwork, survey or statistical data, etc. This type of work entails, generally, techniques for collecting data, analysing them and expounding them. In fact, it forms the core of the Ph.D. training in many disciplines. However, in some spheres of knowledge, such as philosophy, mathematics or law, it is not the main way in which knowledge is generated. Figure 32 shows that empirical theses are in the majority in all spheres except Humanities and that they are almost the norm in Experimental Sciences and Health Sciences.

Within the disciplinary spheres, the type of thesis varies considerably according to sub-areas:

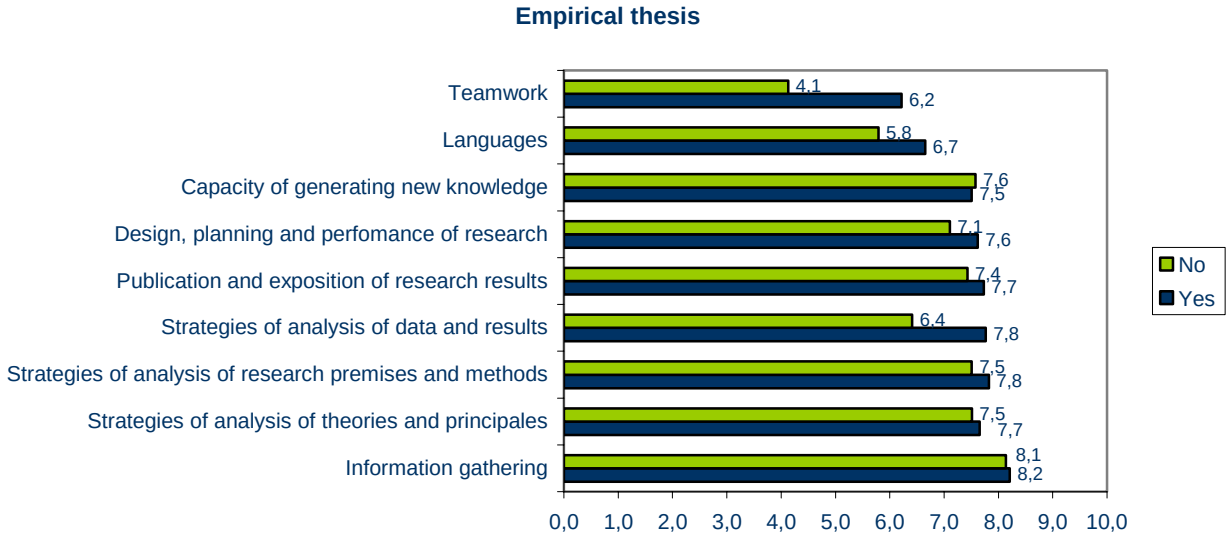
- In Humanities, 0% of the philosophy theses are empirical as compared to 46% of the theses in Geography and History.
- In the Social Sciences, the percentage of empirical theses ranges from 84% in Pedagogy (or 74% in Psychology) to 33% in Law.
- In Experimental Sciences, the percentage of empirical theses ranges from 97% in Biology and Nature to 61% in Physics and Mathematics.
- In Health Sciences, 98% of the theses in Pharmacy are empirical versus 84% in Medicine.
- In the Technical Area, 100% of the theses in the Agricultural Area and 96% of those in Advanced Production Technologies are empirical versus 57% in Architecture.

Figure 32. Empirical thesis (yes/no), by disciplinary spheres



The circumstance of preparing an empirical thesis has a positive influence on the type and level to which specific skills relating to research are developed, but not to such an extent as the circumstance of making presentations or of working within research groups.

Figure 33. Development level of skills according to whether the thesis is empirical or not



- In all areas except Humanities, it has been found that the achievement level of the "techniques of analysis of data and results" skill is significantly higher for the Ph.D. candidates who prepare empirical theses. This result is clearly foreseeable: if an empirical thesis is not prepared, this skill will not be developed on such a high level.
- In two areas (Experimental Sciences and Health Sciences), the making of an empirical thesis is related to a higher level of achievement in the "design, planning and performance of research" skill.
- Lastly, in Experimental Sciences the empirical thesis is also related to higher achievement in the "documentation" skill; in Health Sciences it is also related to the "strategies of analysis of theories and principles" skill, and in the Technical Area it is related to the "teamwork" skill.

The duration of the Ph.D. is influenced by the use of empirical studies during the preparation of the thesis. The circumstance of using this type of research causes the duration to be lesser with respect to other types of research. In Social Sciences, Experimental Sciences, Health Sciences and the Technical Area, which are spheres in which the use of empirical studies is more common, this pattern is maintained. Humanities alone shows an independence of the duration with respect to the use of empirical techniques.

Pre-doctoral mobility

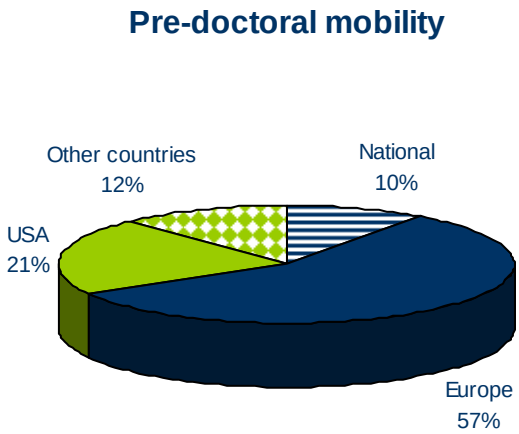
One half of the Ph.D. graduates had mobility during their Ph.D. studies. The Ph.D. candidates in Health Sciences, probably because they already worked at health-care centres during their studies, are those who had the least mobility (38%), while the Ph.D. candidates in Experimental Sciences and the Technical Areas are those who had the most mobility (59%).

Table 22. Mobility during Ph.D. studies, by disciplinary spheres

	N	Mobility during Ph.D. studies			Total
		No	Yes, national (Catalunya or Spain)	Yes, abroad	
Humanities	130	49.20%	5.40%	45.40%	100%
Social Sciences	159	58.50%	5.70%	35.80%	100%
Experimental Sciences	306	40.50%	4.20%	55.20%	100%
Health Sciences	205	61.50%	6.30%	32.20%	100%
Technical Area	134	41.00%	3.70%	55.20%	100%
Total	**934**	**49.50%**	**5.00%**	**45.50%**	**100%**

Figure 34 shows the destination of the placements. As may be seen, over half of the Ph.D. candidates participated in such placements in Europe and only 10% did so in other centres within the national territory.

Figure 34. Destinations of pre-doctoral mobility



Post-doctoral mobility

31% of the Ph.D. graduates carried out post-doctoral research appointments or "postdocs" after obtaining their Ph.D. degree. The Ph.D. graduates in Experimental Sciences are those who most go on postdocs (40%), while those of Humanities are those who do so the least (20%).

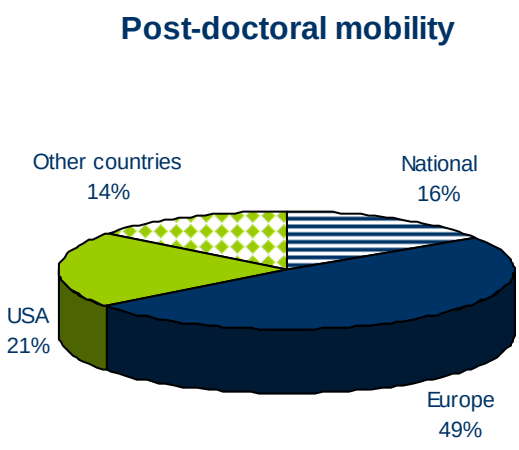
In fact, GOLDE et al. (2006) point out that the time required to obtain a job on finishing the Ph.D. continues to grow, especially in Sciences. In the United States it is expected that a Ph.D. graduate shall complete one or two postdocs in order to be eligible for a permanent position. Consequently, the postdocs in Sciences are beginning to be considered almost compulsory and they already form a veiled "fourth cycle" which is necessary for one's academic or research career.

Table 23. Post-doctoral mobility, by disciplinary spheres

	N	Post-doctoral mobility			Total
		No	Yes, national	Yes, abroad	
Humanities	130	79.20%	1.50%	19.20%	100%
Social Sciences	159	74.80%	5.00%	20.10%	100%
Experimental Sciences	306	59.50%	6.50%	34.00%	100%
Health Sciences	205	75.10%	4.40%	20.50%	100%
Technical Area	134	64.90%	4.50%	30.60%	100%
Total	**934**	**69.10%**	**4.80%**	**26.10%**	**100%**

Figure 35 shows the destination of the postdocs.

Figure 35. Destinations of post-doctoral mobility



Language of thesis

45% of the theses were written in the Spanish language, a figure which ranged from 59% in Social Sciences to 28% in Experimental Sciences.

36% of the theses were written in Catalan, a figure which ranged from 52% in Humanities to 19% in the Technical Area.

14.5% of the theses were written in English, a figure which ranges from 36% in the Technical Area to 3% in Social Sciences. Among the Catalan Ph.D. students, the MIRROR study observed a lesser tendency to write theses in English (22%), as compared to 70% of the Ph.D. students in Finland or 78% in Sweden, where English is chosen to assure the doctoral theses has a greater impact.

Table 24. Language of thesis, by disciplinary spheres

	N	Language of thesis					Total
		Catalan	Spanish	English	Other	More than 1 language	
Humanities	130	51.50%	34.60%	6.20%	3.10%	4.60%	100%
Social Sciences	159	35.80%	58.50%	2.50%	0.60%	2.50%	100%
Experimental Sciences	306	40.20%	28.10%	21.60%	0.30%	9.80%	100%
Health Sciences	205	31.20%	53.70%	4.40%	0.00%	10.70%	100%
Technical Area	134	19.40%	40.30%	35.80%	0.70%	3.70%	100%
Total	**934**	**36.10%**	**41.50%**	**14.50%**	**0.70%**	**7.20%**	**100%**

By universities, the UPC and the UdG stand out with theses written in English in proportions of over 40% and 30%, respectively. However, while at the UPC the second language chosen after English is Spanish, at the UdG the first language is Catalan followed by English.

At the UB and the UAB, Catalan and Spanish are jointly predominant; while at the UdL 60.5% of the Ph.D. candidates choose to write their theses in Spanish and 13.2% in more than one language.

Table 25. Language of thesis, by universities

	Language of thesis					
	Catalan	Spanish	English	Other	More than 1 language	Total
UB	36.8%	45.5%	8.6%	0.4%	8.6%	100%
UAB	41.8%	40.9%	10.6%	1.4%	5.3%	100%
UPC	17.0%	35.7%	42.0%	1.8%	3.6%	100%
UPF	47.4%	34.2%	13.2%		5.3%	100%
UdG	53.1%	10.2%	30.6%		6.1%	100%
UdL	18.4%	60.5%	7.9%		13.2%	100%
URV	36.8%	44.7%	10.5%		7.9%	100%
Total	**36.1%**	**41.5%**	**14.5%**	**0.7%**	**7.2%**	**100%**

The choice of language is influenced by the type of thesis. The use of the format involving a compilation of articles, for example, increases the probabilities that the thesis or part of the thesis will be written in English (the relation is significant in all spheres except the Technical Area, in which the great majority of Ph.D. students prepare their theses in the form of a compilation of articles). Likewise, the circumstance of seeking a European Doctoral Degree entails the preparation of the thesis in other languages than Catalan or Spanish. On the other hand, the choice of language is observed to be independent of the university where the studies are carried out.

Grading of defence of theses

As may be observed in Table 26, only 2.8% of the Ph.D. graduates do not reach a mark of excellent *cum laude*. The only categories which distinguish the sample are excellent *cum laude* and excellent *cum laude* by unanimity.

There are hardly any differences between the disciplinary areas except the Technical Area, which appears to be more demanding inasmuch as less than 40.1% of the theses receive the highest mark.

Table 26. Grading of defence of theses, by disciplinary spheres

	N	Grading of defence of thesis					Total
		Pass	Good	Excellent	Excellent *cum laude*	Excellent *cum laude* by unanimity	
Humanities	130	1.50%	0.80%	5.40%	19.20%	73.10%	100%
Social Sciences	159	1.30%	1.90%	5.00%	23.30%	68.60%	100%
Experimental Sciences	306	0%	0%	0.70%	31.40%	68.00%	100%
Health Sciences	205	0%	0%	0%	26.80%	73.20%	100%
Technical Area	134	0%	0%	1.50%	40.30%	58.20%	100%
Total	**934**	**0.40%**	**0.40%**	**2.00%**	**28.60%**	**68.50%**	**100%**

This tendency may also be observed in Table 27, which analyses the distribution of Ph.D. degrees with Distinction, by disciplinary spheres.

Table 27. Possession of a Ph.D. degree with Distinction, by disciplinary spheres

	N	Possession of Ph.D. degree with Distinction		Total
		Yes	No	
Humanities	130	10.00%	90.00%	100%
Social Sciences	159	11.90%	88.10%	100%
Experimental Sciences	306	12.10%	87.90%	100%
Health Sciences	205	12.20%	87.80%	100%
Technical Area	134	4.50%	95.50%	100%
Total	**934**	**10.70%**	**89.30%**	**100%**

Possession of the European Doctoral Degree

The European Doctoral Degree entails that the thesis has been developed, at least in part, in some other European country; that it has been written, in part, in some other European language, and that one member of the jury is from the European country where the pertinent placement has been carried out.

As may be observed, this degree is rather scarce. The spheres in which it is most common are Experimental Sciences and the Technical Area (13%), and it is least common in Social Sciences (3%).

Table 28. Possession of European Doctoral Degree, by disciplinary spheres

	N	Possession of European Doctoral Degree		Total
		Yes	No	
Humanities	130	10,00%	90,00%	100%
Social Sciences	159	3,10%	96,90%	100%
Experimental Sciences	306	13,40%	86,60%	100%
Health Sciences	205	9,30%	90,70%	100%
Technical Area	134	12,70%	87,30%	100%
Total	**934**	**10,20%**	**89,80%**	**100%**

Table 29 shows the distribution of the European Doctoral Degree by universities. The URV, the UPC and the UdG are the universities with the largest number of persons who have obtained the European Doctoral Degree.

Table 29. Possession of the European Doctoral Degree, by universities

	Possession of European Doctoral Degree		
	Yes	No / Don't Know / Not Available	Total
UB	9.5%	90.5%	100%
UAB	6.7%	93.3%	100%
UPC	12.5%	87.5%	100%
UPF	5.3%	94.7%	100%
UdG	12.2%	87.8%	100%
UdL	7.9%	92.1%	100%
URV	34.2%	65.8%	100%
Total	**10.2%**	**89.8%**	**100%**

If one considers the European Doctoral Degree together with the grading of the defence of the thesis, it is found that, in all disciplinary spheres, the circumstance of having to go on placements abroad during the doctoral thesis does not assure the highest mark in the defence

of the thesis. On the other hand, in the sphere of Experimental Sciences alone, the possession of the European Doctoral Degree is indeed associated positively with the achievement of the Ph.D. degree with Distinction.

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ANNEXES

ANNEX I. TECHNICAL FILE

Company which performed the fieldwork DYM, Market Research.

Population	National Ph.D. graduates from the academic years 2003 and 2004 of the Catalan public universities. Foreign Ph.D. graduates have not been included.
Sample	The sample required to achieve a sampling error per degree programme and sub-area of not over 8% was calculated. In practice, this criterion entails telephoning the whole population of Ph.D. graduates since in few sub-areas is the population over 40 Ph.D. graduates.
Period	The study was carried out between 5 March and 7 April 2008.
Call hours	From 10 a.m. to 9 p.m., plus 1 hour on Saturday mornings.
Back office	All the economic activity branch codes were reviewed on the basis of the open code.
Average time	The average time of the telephone calls was 15.6 minutes in the case of the Ph.D. graduates with employment; 16.5 minutes if, at the time of the interview, the Ph.D. graduates were not employed but had indeed worked after obtaining their Ph.D. degree, and 11 minutes if they had not worked after obtaining their degree.
Type of calls	All told, 8,129 calls were made, with an average of 4 calls per interview. 64% of the interviews were made on fixed telephones (600), 29.4% on mobile telephones (275) and the remaining 6.3% were calls abroad (59).

Telephone records: final result

Final result of interviews	*N*	Percent
Completed interview	934	57.98%
No telephone or wrong number	449	27.87%
Postponement	114	7.08%
Telephoning discontinued, full quota	0	0%
Refusal to do interview	71	4.41%
Excess calls (no answer in 15 calls)	22	1.37%
Postponement – no answer	8	0.50%
Cancelled interview	13	0.81%
Total	**1,611**	**100%**

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ANNEX II. SURVEY OF PH.D. GRADUATES 2003 AND 2004

PH.D. PROGRAMME
.....
ATTACHED CENTRE
.....

Year in which the Ph.D. degree was obtained: 2003 or 2004			
ACADEMIC DATA			
1. With which degree did you accede to the Ph.D.? (access degree)	For foreigners → open For nationals → codes of Table 1 plus other open codes		
2. In which year did you obtain your access degree?			
3. At which university did you obtain your access degree?	For foreigners → open For nationals → codes of Table 2 plus other open codes		
4. In which year did you begin your Ph.D. studies?			
5. Which type of thesis did you prepare?	(1) Monograph	Only in the case of "Monograph" 6. Have you derived any publication from it in addition to the doctoral thesis itself?	(1) One article (2) More than one article (3) A book / chapters (4) No
	(2) Compilation of articles	→ Go to Question 7	
7. In which language did you write the thesis?	(1) Catalan (2) Spanish (3) English (4) Other (5) More than one language (in the case of a European Doctor thesis)		
8. What mark did you obtain on defending the thesis?	(1) Pass (2) Good (3) Excellent (4) Excellent *cum laude* (5) Excellent *cum laude* by unanimity		
9. Did you obtain the European Doctoral Degree?	(1) Yes (2) No		
10. Were you granted a Ph.D. degree with Distinction?	(1) Yes (2) No		
11. How did you work on the doctoral thesis?	(1) Independently for the most part (2) In a research group, solely or combined with independent work, for the most part		
12. In your thesis, did you carry out experimental, laboratory or empirical tasks (with questionnaires, interviews, etc.), or did you use statistical techniques?	(1) Yes (2) No (3) Other (specify)		

CURRENT EMPLOYMENT SITUATION AND EMPLOYMENT BACKGROUND

13.1. Are you currently employed?	(1) Yes → Go to Question 14 (2) No → Go to Question 13.2
13.2. Have you worked since obtaining your Ph.D. degree?	(1) Yes → Please state your last job. Do reply in the section on EMPLOYMENT SATISFACTION (Questions 41 to 45) (2) No → Go to the questions on SOURCE OF INCOME DURING PH.D. STUDIES AND SATISFACTION WITH STUDIES (Questions 17 to 27), MOBILITY (Questions 52 and 53) and UNEMPLOYMENT (Question 74). Lastly, reply to the questions on SOCIO-ECONOMIC SITUATION (Questions 69 to 73)
14. Where do you have, or where have you had, the job of greatest dedication?	(1) At the university (2) At a research centre or institute Do not reply to BRANCH OF ECONOMIC ACTIVITY (Question 31) (3) At a company or some other institution / Other
Only if you work at the University (Point 1 of Question 14) 15. Public or private?	(1) Public Go to Question 16 and do not reply to BRANCH OF ECONOMIC ACTIVITY (Question 31), FUNCTIONS (Question 32), TYPE OF CONTRACT (Questions 33 and 34), DURATION OF CONTRACT (Question 35), SPHERE (Question 37) or NUMBER OF WORKERS (Question 39) (2) Private Go to Question 17 and do not reply to BRANCH OF ECONOMIC ACTIVITY (Question 31), SPHERE (Question 37) or NUMBER OF WORKERS (Question 39). Please reply to TYPE OF CONTRACT and DURATION OF CONTRACT (in the case of "Temporary")
Only if you are working at the public university (Point 1 of Question 14 and Point 1 of Question 15) 16. With which category?	(1) Tenure-track lecturer / doctoral assistant (2) Collaborating lecturer (3) Tenured assistant professor or public-official professor (tenured professor at a university school...) (4) Associate lecturer (5) Researcher alone (with a grant or a research project) (6) Other (post-doctoral grant-holders...) / D/K
17. Which was your main source of income during your Ph.D. studies?	(1) A grant (2) Teacher or researcher at the university (including associate lecturers and researcher contracts) (3) A job in the sphere of the pre-doctoral studies (4) A job in a sphere not related to the pre-doctoral studies (5) No employment: studying full-time or with intermittent jobs

SATISFACTION WITH PH.D. STUDIES	
Assess from 1 (very negative) to 7 (very positive) the following aspects which describe your Ph.D. studies	
18. The content and quality of the classes/seminars/activities	.....
19. The relevance of the content of the classes/seminars to the thesis	.....
20. The quality of the organisation and development of the classes/seminars/activities (fulfilment of calendar, place...)	.....
21. The quality of the tutoring **during the period of classes/seminars** (with the teachers of the subjects)	.....
22. The quality of the supervision **during the development of the thesis** (relationship with the supervisor/s of the thesis)	.....

23. The quality of the resources of the department and their availability for carrying out the research	.....
24. The Ph.D. studies overall	.....
25. If you were to begin again, would you carry out the Ph.D. studies once more?	(1) Yes (2) No
26. During the Ph.D. studies, did you have opportunities to participate actively in national or international conferences? (presentation of papers, posters...)	(1) Yes (2) No
27. During the Ph.D. studies, did you present your research in internal seminars of the department?	(1) Yes (2) No

CURRENT JOB / LAST JOB

In relation to your **CURRENT JOB** (main job) or your **LAST JOB**:

28. In which year did you begin the job? ..... (*two digits*)

29. What was necessary for this job? Was it a requirement to...

(1) hold a Ph.D. degree?	→ Go to Question 30.1
(2) hold your specific degree? (licentiate/engineering/diploma/technical engineering)	→ Go to Question 30.2
(3) hold a university degree alone?	→ Go to Question 30.3
(4) Or was no university degree necessary?	

30.1. For the job which you hold or held, do you think it is necessary to have a Ph.D. degree?	(1) Yes (2) No
30.2. For the job which you hold or held, is the required specific degree indeed necessary?	(1) Yes (2) No
30.3. For the job which you hold or held, do you think it is necessary to hold a university degree?	(1) Yes (2) No

31. To which branch of economic activity does the company where you work or worked belong? .....

Do not reply to this question if you work at a university or a research institute (Points 1 or 2 of Question 14)

32. Which functions do you or did you hold? Do not reply if you work at a public university (Point 1 of Question 15)

(1) Direction/management	(2) Commercial or logistical	(3) Teaching	(4) R+D
(5) Medical and social care	(6) Design, art	(7) Technical functions	(8) Other qualified functions (administrative assistant...)
(9) Non-qualified functions (auxiliary...)			

33. Which type of contract do you or did you have? Do not reply if you work at a public university (Point 1 of Question 15)

(1) Permanent	
(2) Self-employed →	34. In the case of "Self-employed", do you work:
(3) Temporary	(1) For own account
(4) Intern	(2) For other's account
(5) Without a contract	In the case of "Without a contract", do not reply to CONTRACTING FACTORS (Questions 46 to 51)

35. What duration does or did the contract have? (Only if you marked "Temporary" in Question 33)

(1) Under 6 months (2) Between 6 months and 1 year (3) Over 1 year

36. Do you work full-time? (Do you work 35-40 hours/week?)		(1) Yes (2) No (part-time, other)
37. The company is of what nature? Do not reply if you work at the public or private university	(1) Public	(2) Private

38. How much do or did you earn annually (gross)?

(1) Under €9,000	(2) Between €9,000 and €12,000	(3) Between €12,000 and €15,000
(4) Between €15,000 and €18,000	(5) Between €18,000 and €24,000	(6) Between €24,000 and €30,000
(7) Between €30,000 and €40,000	(8) Between €40,000 and €50,000	(9) Over €50,000

39. How many workers does the company have? Do not reply if you work at the public or private university

(1) Under 10	(2) Between 10 and 50	(3) Between 51 and 100
(4) Between 101 and 250	(5) Between 251 and 500	(6) Over 500

40. Where do or did you work? (province or country)

(1) Barcelona	(2)Tarragona	(3) Girona	(4) Lleida
(5) Rest of autonomous regions	(6) Europe	(7) Rest of world	

ASSESSMENT OF SATISFACTION IN RELATION TO YOUR CURRENT JOB

Assess your satisfaction from 1 (not at all) to 7 (very much): (except if you are not employed at present or if you work without a contract)

41. With the content of the job	.....
42. With the outlook for improvement and promotion	.....
43. With the level of remuneration	.....
44. With the connection with the knowledge/skills acquired in the Ph.D. training and at work	.....
45. With the job in general	.....

ASSESSMENT OF CONTRACTING FACTORS

Assign a score from 1 (not at all important or not influential) to 7 (very important or very influential) to the reasons or factors which led to your being contracted: (except self-employed workers for own account or without a contract)

46. Type of Ph.D.	.....
47. Placements abroad	.....
48. Prior employment experience	.....
49. Language training / Knowledge of languages	
50. Training in the use of computers and new technologies / Mastery of technological and computer tools	.....
51. Personality: character, social skills, communication...	.....

MOBILITY

52. Did you had any mobility experience **during your Ph.D. studies**?

(1) No	Go to Question 54	
(2) Yes, national (Catalunya/Spain)	Go to Question 54	
(3) Yes, abroad	53. Where?	(1) Europe (2) USA (3) Other

54. Have you had any **post-doctoral** mobility experience?

(1) No	Go to Question 56	
(2) Yes, national	Go to Question 56	
(3) Yes, abroad	55. Where?	(1) Europe (2) USA (3) Other

ASSESSMENT OF TRAINING RECEIVED

Assess the extent to which you developed the following skills during your Ph.D. studies. Assign a score from 1 (very low) to 7 (very high) to the level of training received at the university:

56. Documentation	.....
57. Acquisition of strategies of analysis of theories and principles	.....
58. Acquisition of strategies of analysis of research premises and methods	.....
59. Techniques of analysis of data and results	.....
60. Publication and exposition of research results	.....
61. Design, planning and performance of research	.....
62. Capacity of generating new knowledge	.....
63. Languages	.....
64. Teamwork	.....

IMPACT OF YOUR PH.D. STUDIES ON YOUR CURRENT JOB

65. Have you changed jobs after obtaining your Ph.D. degree? (1) Yes (2) No

Assign a score from 1 (not at all) to 7 (very much) to the improvement which has been entailed by your Ph.D. studies in the employment sphere

66. Employment improvement	.....
67. Possibility of access to new jobs	.....
68. Improvement of economic remuneration	.....

SOCIO-ECONOMIC SITUATION

69. Which is the highest level of studies of your parents?

(1) Both have primary studies / no studies	(2) One of the two has intermediate studies	(3) Both have intermediate studies
(4) One of the two has higher studies	(5) Both have higher studies	

70. With respect to your father's current or past job:

He is/was

(1) Self-employed → 71.1. Does his job require a university level? (1) Yes (2) No

(2) Employed by others → 71.2. Which level?

(1) Direction/management
(2) Highly-qualified expert
(3) Qualified worker
(4) Non-qualified worker

72. With respect to your mother's current or past job:

She is/was

(1) Self-employed → 73.1. Does her job require a university level? (1) Yes (2) No

(2) Employed by others → 73.2. Which level?

(1) Direction/management
(2) Highly-qualified expert
(3) Qualified worker
(4) Non-qualified worker

UNEMPLOYED (Only if you answered "No" to Question 13.1)

74. Are you seeking employment at present?

(1) Yes → Go to Question 76
(2) No

75. If you answered NO, for what reason?

(1) To continue studying / to prepare for a competitive examination for public employment

(2) Maternity/family → 75.1 If you answered "Maternity/family", once the present situation changes, do you expect to seek employment?

(1) Yes → End of the survey
(2) No → End of the survey

(3) Other

Reply to Questions 76 to 78 only if you are seeking employment (i.e., if you replied "Yes" to Question 74)

76. How long have you been seeking employment?

(1) Under 6 moths (2) Between 6 months and 1 year (3) Between 1 and 2 years
(4) Over 2 years

77. Which means do you use to seek employment? (you may mark more than one option)

(1) Personal or family contacts
(2) Personal initiative (submitting CVs, requesting interviews...)
(3) Advertisements in the press
(4) Competitive examinations/competitions for public employment
(5) Catalan Employment Service
(6) Creation of own company or office
(7) University services (employment exchange...)
(8) Educational cooperation agreements
(9) Professional association or organisation
(10) Internet
(11) Other
(12) Not seeking employment
This option will be activated only if you have replied "No" to the preceding 11 options

78. Since you obtained your Ph.D. degree, how many jobs have you refused because you considered them hardly appropriate? .....