

Chapter 14

After the PhD: A Study of Career Paths, Job and Training Satisfaction Among PhD Graduates from an Italian University

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14.1 Introduction

The aim of this chapter is to offer an initial presentation of the results from a survey conducted by the University of Pavia on its PhD graduates. Information was gathered regarding professional career paths chosen, job satisfaction and their doctorate experiences.

Doctorate programmes in Italy have not, unfortunately, been subject to extensive assessment and very little information is therefore available about their effectiveness, etc. This is in contrast with the international scenario where much attention has been paid over recent years to this subject (just scroll the 45,000+ hits that come up when one types “doctorate evaluation” into a web search engine, such as google scholar, to see just how much attention this topic has received).

This chapter focuses on two main points. The first point is the survey results – important for considering the role and the value of the doctorate, not only in Pavia University, but also more generally in Italy. It goes without saying that the data coming from a single university are of limited use due their specificity and low numbers, yet in the absence of other sources of information these results can nevertheless lead to the formation of first hypotheses regarding the general situation that exists for holders of Italian PhD degrees. The second point looks at the value of the survey itself and at the possible uses to which its results could be applied. Given these aims, further and more in depth analyses will be presented in successive papers, while the present communication discusses the descriptive data.

The survey was promoted by the *Nucleo di Valutazione* (Evaluation Committee) of the University of Pavia and it was intended to replace the formal role of an auditor who would normally assess the different opportunities/prospects that the University offers. Its overall aim was to collect a substantial volume of useful information for a more informed appraisal. With regards to the doctorate programmes in particular, the survey was designed to address a multitude of aims. It was important to gather information about the working experiences of Pavian PhD graduates, as well as to

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draw out their “considered” opinions after a reasonable amount of time had elapsed since the conclusion of their doctorate programmes. Two other key objectives were (1) to gather information that would help the doctorate programmes and schools increase their offer levels, and (2) to fulfill the purpose of the evaluation committee, that is to perform “comprehensive evaluation”. The motivation for the survey revolved around the belief that through the use of evaluation it is possible to enhance the quality of the teaching [10].

14.2 The Survey

Pavia is one of the oldest universities in the world, with more than seven centuries of history. In the Italian setting, it is a “medium-sized” university with around 20,000 students. It is a university that has played an important role in Italy, based on its geographical position (only 20 miles from Milan) and for the fact that it is globally acknowledged as being important in several academic disciplines. Thus, research has always been an important issue at Pavia University, and reflecting this, it has numerous doctorate programmes (almost 40) organized in five “doctorate schools”.

Three groups of PhD degree holders were involved in the survey, defined as having discussed their PhD theses 1, 2 and 3 years before the date of the survey. It has been a sort of pilot study since the intention of the Evaluation Committee is to conduct an evaluation every year (indeed, a second survey has just been completed). So, if for the group who completed their PhDs just 1 year ago, the survey was a pilot for what would become a stable system, for the previous groups it was the solution for the need of information on the previous doctorate programmes, and a unique way of offering important data on what is happening 2 and 3 years after PhD graduation.

An obvious limit to such a retrospective survey is that any evolutionary effects are mixed with cohort effects. Given the introductory aims of this preliminary study and the limited numbers of the samples involved, we did not even try to separate them. Nevertheless, we believe that the cohort effect is limited, given the substantial stability in both doctorate offers and of the job market in the recent years.

The survey was conducted through CAWI (Computer Assisted Web Interviewing) that guaranteed the anonymity of the respondents and easy control of the data collection. Eligible respondents were contacted via e-mail, post and SMS in order to enhance participation. Unfortunately the poor quality of the starting list resulted in a low response rate (60%). The number of “not found” was much more than the number of refusals; the number of refusals were only estimated through qualitative information since the approach did not allow for a precise count and this should be taken into consideration when interpreting the results. In the 2008 survey (the data for which are not included in the present study) a better starting list and a compulsory recall strategy led to a 75% response rate. Analyses will pay particular attention to the “late answering” data in order to validate the results of the study presented here. We found the CAWI approach to be particularly suitable for the surveying of this type of population group.

14.3 How PhD Graduates Evaluate Doctorate Programme Teaching

A first, and in some way astonishing result, is concerned with how few doctorate programmes are organized through formal courses and lectures: only two thirds of the respondents reported to have attended their lectures (the percentage does at least increase across years, see Table 14.1) and the reason given for this was that there was no lecture course organized. Thus, even in one of the best of the Italian universities, it is evident that some departments believe that doctorate programmes do not present occasions for higher education, but instead only for “high qualification”. They offer, perhaps, good opportunities for joining research programmes and, in this way to “learn from experience”, but we believe some (organized) teaching is essential for any educational programme at any level.

Regarding the complexities of the teaching/training activities attended, PhD graduates were asked to judge the following features: quantity, quality, level of depth, teacher competence, teacher availability. Scores seem stable across groups but variable to a large degree between the respondents.

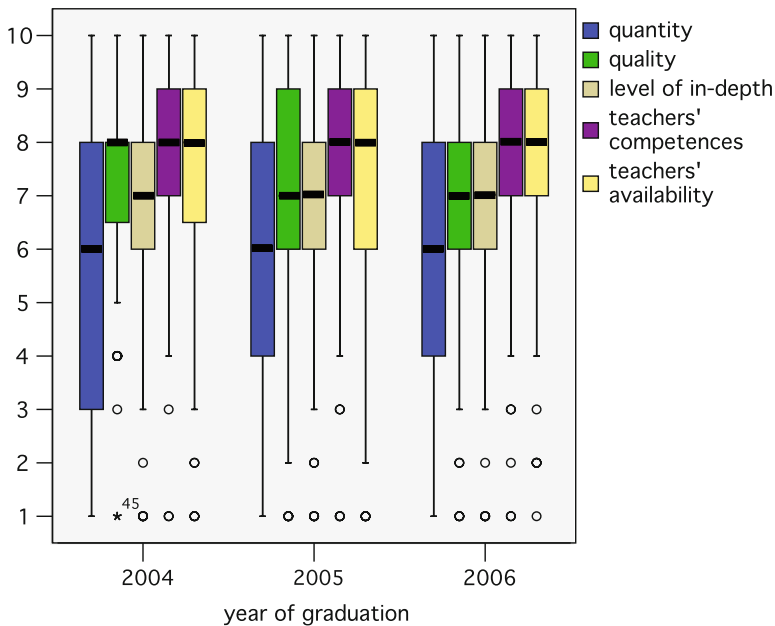


Fig. 14.1 Assessment (1–10 scores poor – high) of the teaching/training activities attended by PhD graduates by year of graduation ($n_{2004} = 79$; $n_{2005} = 91$; $n_{2006} = 90$). Features assessed: quantity; quality; level of depth (to which a subject was studied); teacher competence; teacher availability. *Boxplots* report the distribution of the answers: the *box* shows the values corresponding to the 25 and 75% of the distribution, the *bold line* in the box to the median, while the “whiskers” to the higher and lower observed value, excluding the outliers represented by *little circles or stars*

Table 14.1 Teaching/training activities attended by PhD graduates by year of graduation

	2004 (<i>n</i> = 79)				2005 (<i>n</i> = 91)				2006 (<i>n</i> = 90)			
	Lectures and courses (%)	Seminars and confer. (%)	Labs (%)	Lectures and courses (%)	Seminars and confer. (%)	Labs (%)	Lectures and courses (%)	Seminars and confer. (%)	Labs (%)	Lectures and courses (%)	Seminars and confer. (%)	Labs (%)
Attended	60.8	88.6	31.6	65.9	92.3	34.1	68.9	94.4	42.2	68.9	94.4	42.2
Did not attend	0.0	3.8	1.3	0.0	1.1	2.2	3.3	2.2	2.2	3.3	2.2	2.2
Was not offered	39.2	7.6	67.1	34.1	6.6	63.7	27.8	3.3	55.6	27.8	3.3	55.6

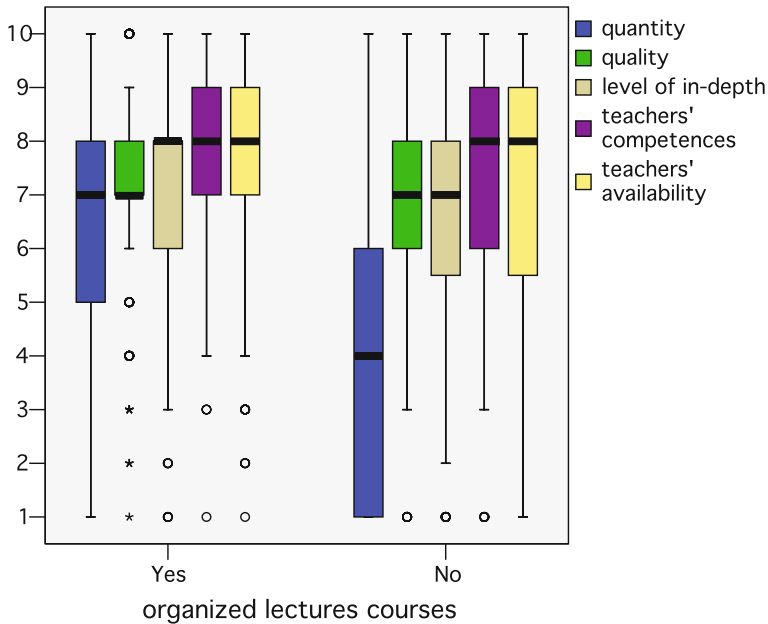


Fig. 14.2 Assessment of the teaching/training activities by the attendance of courses in the doctorate programme

Scores for all features were generally positive:

- the scores for teacher competence and availability were highest (over 75% scored more than 7 on a scale 1–10);
- quality and level of depth were generally high (50% scored more than 7);
- quantity was the feature that saw the most variability with only 50% of scores being over 6.

PhD graduates who declared that they had attended the organized lectures and courses, awarded quality, level of depth and in particular quantity with much higher scores compared to graduates who did not attend formal teaching, but only seminars and other direct contacts with teachers (Fig. 14.2).

14.4 How PhD Graduates Evaluate Their Doctorate Programme Research Experiences

A relatively high level of variability exists between average scores for the different features that characterize doctorate programme research activities: the median score across all features is consistently 8 for each of the three groups (see Fig. 14.3).

Higher levels of variability are observed for teacher availability, that probably reflect differences between the different programmes.

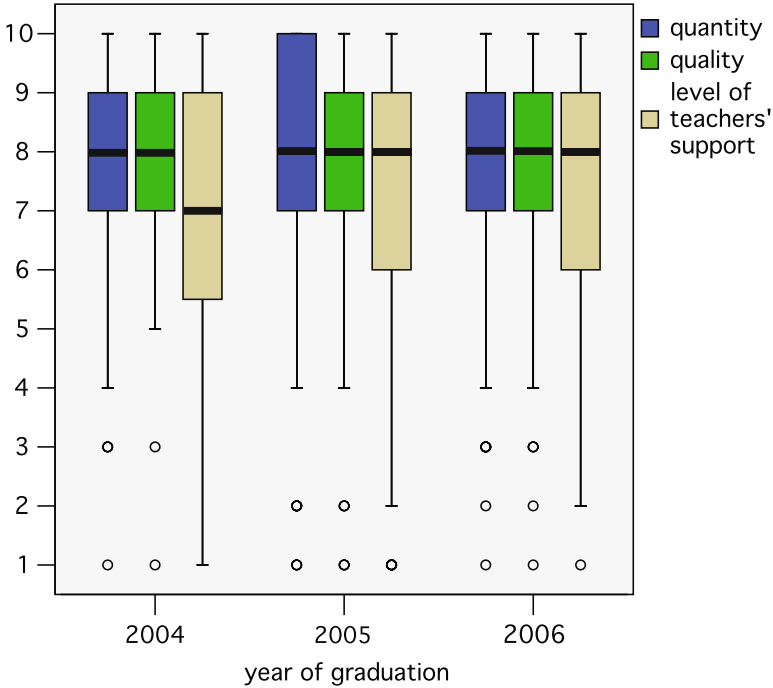


Fig. 14.3 Assessment (1–10 equals poor – high) of the PhD programme research activities by year of graduation ($n_{2004} = 79$; $n_{2005} = 91$; $n_{2006} = 90$). Features scored: quantity, quality, level of teacher support

Possible factors that could explain these differences (data not shown here) are whether or not the students had the opportunity to benefit from working within a research group within Pavia university, and whether they had the opportunity to experience working abroad as part of their doctorate programme. Again, the more organized that doctorate programmes are in terms of research experience, the more they were appreciated by the graduates.

14.5 How PhD Graduates Evaluate Their Doctorate Programme Research Experiences

One of the key areas of interests for this research lay in the potential to gain an understanding about the employment and work experiences of PhD graduates. Confirming that we are studying an “exceptional” population of students, 50% of the respondents stated that they continued to be employed by the businesses with whom they started during the doctorate programme. Among the others, many (30% of the total respondents) were anyway able to start new jobs after a relatively short delay (on average 4 months).

Two thirds of the respondents declared that they were currently work in a job that relates to their qualification. Only a minority (14%, see Table 14.3) are doing something unrelated to their research. Taking into consideration the possible “no answer” effect, this initial result indicates that the large majority of PhD graduates work within their research fields, and that extremely few are unemployed (see Table 14.2). The unemployment rate is just 3% for 1 year, 2% after 2 years and 1% after 3 years. So the problem for PhD graduates (and students) does not seem to be “if” they will continue to do research, but more (as we will soon see) “how”.

Fifty percent of the respondents work in a university, but, comfortingly enough, in second place are private firms (Table 14.4). “Precariousness” seems to characterize university jobs, but this is well-known and it often depends on external factors for which, unfortunately, 3 years of observation are not enough to judge the stability of jobs within universities. The fact that it is increasingly difficult to get a stable

Table 14.2 Type of job and time to get a job after PhD graduation, by year of graduation

	2004	2005	2006	Total
	(<i>n</i> = 79)(%)	(<i>n</i> = 91)(%)	(<i>n</i> = 90)(%)	(<i>n</i> = 260)(%)
I still do not have a paid job	1.3	2.2	3.3	2.3
I am back to the job I had before the doctorate (and that I had interrupted)	3.8	7.7	6.7	6.2
I continued to do the job I had before the doctorate (and that I had not interrupted)	15.2	12.1	16.7	14.6
I continued to do the job I got during the doctorate	48.1	51.6	41.1	46.9
I started a new job after ^a months	31.6	26.4	32.2	30.0
	100.0	100.0	100.0	100.0

^aMean = 4.15; standard deviation = 4.11.

Table 14.3 Consistency between job characteristics and PhD programme, by year of graduation

	2004	2005	2006	Total
	(<i>n</i> = 78)(%)	(<i>n</i> = 91)(%)	(<i>n</i> = 90)(%)	(<i>n</i> = 259)(%)
I still do not have a paid job	1.3	2.2	3.3	2.3
I have a research job relating to the doctorate programme	65.4	67.0	57.8	63.3
I have research job that does not relate to the doctorate programme	5.1	2.2	10.0	5.8
I have a job out of research, but that is still related to the doctorate programme	15.4	14.3	14.4	14.7
I have a job out of research that does not relate to the doctorate programme	12.8	14.3	14.4	13.9
	100.0	100.0	100.0	100.0

Table 14.4 Work place, by year of graduation

	2004	2005	2006	Total
	(<i>n</i> = 79)(%)	(<i>n</i> = 91)(%)	(<i>n</i> = 90)(%)	(<i>n</i> = 260)(%)
Not working	3.8	4.4	4.4	4.2
University	51.9	61.5	53.3	55.8
Other public research institutes	7.6	2.2	3.3	4.2
Other private research institutes	5.1	1.1	3.3	3.1
Public companies/organizations	2.5	3.3	5.6	3.8
Private companies	19.0	12.1	18.9	16.5
Self employed	3.8	3.3	2.2	3.1
Other	6.3	12.1	8.9	9.2
	100.0	100.0	100.0	100.0

position within an academic institution is an almost global problem [13], and even though the Italian situation is very complicated we will see that instability is not even compensated for by good pay. On the other hand, most of those working in the private sector have a stable position (see Table 14.5).

From the analysis of the work characteristics, two main issues emerge: job insecurity and low salaries. Other studies have shown that Italian graduates earn less than their colleagues in most other European countries (see Table 14.6). Nonetheless, considering the average salary of Pavian PhD holders, they are also low in comparison with average Italian salaries (even less than those declared by bache-

Table 14.5 Job conditions for respondents working in universities and private firms, by year of graduation

	2004	2005	2006	Total
	(<i>n</i> = 41)(%)	(<i>n</i> = 56)(%)	(<i>n</i> = 48)(%)	(<i>n</i> = 143)(%)
University				
Professor (full and associate)	4.9	1.8	0.0	2.1
Researcher	26.8	16.1	16.7	19.3
Grant (“assegno”)	41.5	48.2	56.3	49.0
Grant (“borsa”)	0.0	8.9	6.3	5.5
Short term contract	4.9	10.7	6.3	7.6
“Occasional” contract	7.3	5.4	2.1	4.8
Permanent position (not as researcher)	2.4	0.0	2.1	1.4
Temporary position	9.8	7.1	6.3	7.6
Other	2.4	1.8	4.2	2.8
	100.0	100.0	100.0	100.0
Private firms	(<i>n</i> = 15)(%)	(<i>n</i> = 11)(%)	(<i>n</i> = 17)(%)	(<i>n</i> = 43)(%)
Short term contract	26.7	9.1	5.9	14.0
“Occasional” contract	0.0	0.0	5.9	2.3
Permanent position (not as researcher)	73.3	27.3	52.9	53.5
Temporary position	0.0	18.2	23.5	14.0
Self employed (professional)	0.0	36.4	11.8	14.0
Other	0.0	9.1	0.0	2.3
	100.0	100.0	100.0	100.0

Table 14.6 Net monthly salaries, by year of graduation (in euros)

	2004	2005	2006	Total
	(n = 75)	(n = 83)	(n = 86)	(n = 244)
N. missing data (refusal)	4	8	4	16
Mean	1,544.49	1,494.35	1,406.05	1,481.72
Standard deviation	798.22	737.90	659.43	730.47
Min	192.00	300.00	100.00	100.00
Max	4,000.00	5,000.00	4,000.00	5,000.00
1st quartile	1,200.00	1,200.00	1,100.00	1,200.00
Median	1,400.00	1,250.00	1,215.00	1,250.00
3rd quartile	1,900.00	1,500.00	1,500.00	1,600.00

lor degree holders for 1–3 years after graduation; see [2]). It is worrying that even though the median value of salaries does increase 3 years post-PhD, the first quartile salaries remain stable with time; i.e. of all respondents on low salaries, 25% do not see any substantial increases with time. Those working outside universities declare to be earning higher salaries (median values are over 1,500 euros net per month, compared to less than 1,200, considering all the three groups).

Instability and salary do seem to be the only negative aspects mentioned by the majority of respondents when questioned about job satisfaction (see Fig. 14.4).

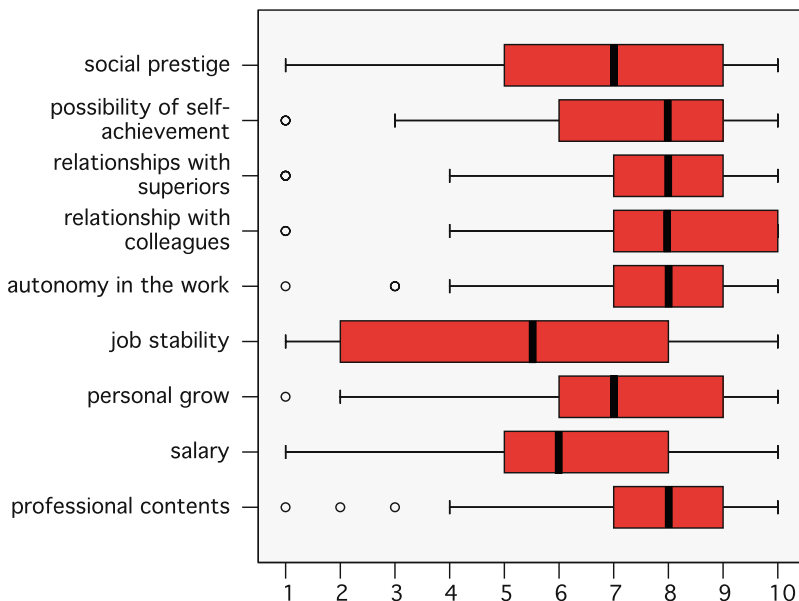


Fig. 14.4 Levels of job satisfaction expressed by PhD degree holders graduated in 2006 (n = 91). Features considered: social prestige, possibility for self-fulfilment, relationships with superiors, relationships with colleagues, autonomy at work, job stability, personal growth, salary and professional contents

Table 14.7 PhD qualification appreciation/acknowledgement at work (where, 1 = none, 10 = a lot), by year of graduation and place of work (at university vs. outside of university)

1 = none – 10 = a lot	Total (<i>n</i> = 249)	Year			Structure	
		2004 (<i>n</i> = 76)	2005 (<i>n</i> = 87)	2006 (<i>n</i> = 86)	University (<i>n</i> = 145)	Other (<i>n</i> = 80)
N. missing data (refusal)	11	3	4	4	0	0
Mean	6.8	7.0	6.8	6.7	7.6	5.9
Standard deviation	2.7	2.5	2.8	2.9	2.3	3.0
Min	1	1	1	1	1	1
Max	10	10	10	10	10	10
1st quartile	6	6	6	4.75	6.5	3
Median	7	7.5	7	7	8	6
3rd quartile	9	9	9	9	9	8

Most of the other components of job satisfaction present median scores of about 8 on the scale of 1–10, and this is certainly a very good result, particularly in comparison with the opinions expressed in other surveys by young workers of the same age (see, for example, [2]).

To complete the analysis on job satisfaction, we examined the answers given to the question “do you think that the value of the education and training received during your doctorate degree is recognized in your job?”. On a scale that went from 1 “not at all” to 10 “a lot”, average responses only reached the “sufficiency” mark (typically identified as “over 6” in Italy; from 6.7 for the 2004 graduates to 7 for those of 2004). The difference between academic and non-academic workers is quite substantial (see Table 14.7). Certainly, the difficulty that PhD graduates face in finding a job that relates to their qualification is not new and it is, in fact, a global problem. Nevertheless, in other European countries the high qualification acquired with a PhD seems to be more highly considered, also by private firms. (see [12, 14]).

14.6 PhD Holder Levels of General Job Satisfaction

In a similar format as that used for customer satisfaction surveys, we asked PhD holders to score the importance given to the possible outcomes of their doctorate experiences and their level of satisfaction perceived for each of these. Features considered included the following: life experience, increased chances of finding interesting professions, acquired competences, the provision of necessary. The results reported in Fig. 14.5 present some interesting findings: importance levels score high in every feature (with some variability) while satisfaction is high on life experience, moderate but positive on acquired competences and the provision of theoretical/basic profession training, but the possibilities for a better profession was rated as medium-low on average, although with a large response variability.

Considering satisfaction levels (assessed using the usual customer satisfaction questions, such as “if you could go back in time, would you repeat this experience?”), a relatively variable situation exists among respondents (see Table 14.8).

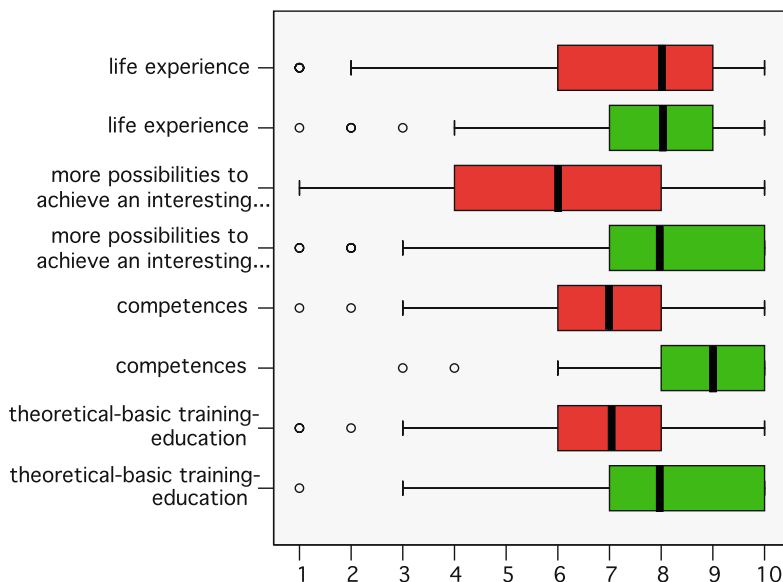


Fig. 14.5 Importance (*upper box-plot*) and satisfaction levels (*lower box-plot*) given by the PhD graduates from 2006 with regard to life experience, increased chances of finding interesting professions, acquired competences, theoretical and basic training preparatory to specific professions ($n = 91$)

The percentage of those that would repeat the same experience in the same doctorate programme was less than 50%; a bad result when compared to graduate responses from lower level degrees (e.g. bachelor or masters) at the same university and year that ranged from 75 to 85% (see [9]). The percentage of graduates that would prefer to attend programmes in countries abroad was very high (over 25%); an unsurprising result considering that respondents may have personal experiences of how a doctorate degree is considered overseas.

Table 14.8 Satisfaction levels, by year of graduation. *If you could go back in time, would you repeat this experience?*

	2004	2005	2006	Total
	($n = 79$)(%)	($n = 91$)(%)	($n = 90$)(%)	($n = 260$)(%)
Yes, in the same programme and at the same university	46.8	48.4	45.6	46.9
Yes, in the same programme but at a different university	7.6	11.0	10.0	9.6
Yes, but in a different university	11.4	2.2	2.2	5.0
Yes, but abroad	21.5	26.4	30.0	26.2
No, I would not attend a doctorate programme at all	12.7	12.1	12.2	12.3
	100.0	100.0	100.0	100.0

Although the aim of this chapter was simply to initiate a discussion based on a preliminary analysis of the data, it is worth commenting briefly on the results of the first multivariate analyses conducted on satisfaction level variables. The goal of these analyses was to identify the factors that have most influence, given all the possible interactions, upon the final scores for the doctorate programme/experience. After trying a very explorative approach, including CHAID trees (examples are not reported here) that consider almost all the variables available, usual log-linear models were applied to the satisfaction level data variables using, as explicatory variables, the data that resulted as being more interesting from the CHAID analyses. The following table (see Table 14.9) presents the results from the model that considered the following question as a dependent variable “how did you judge your doctorate experience in comparison with your expectations?” (opportunedly dichotomised) and all the variables suggested as “interesting” in the first CHAID analysis (dichotomised following the results of the first step of analysis) that, at the same time, resulted as significant by the model.

It is interesting to note how in explaining satisfaction, the first important variable is research experience satisfaction – this presents strong evidence supporting genuine reasons for why doctorate students enter research. This confirms the result from the descriptive analysis that the second most important factor is satisfaction regarding teaching/training activities; once again, confirming that more organized doctorate programmes are better appreciated by PhD students.

Unexpectedly, working within a university structure is less important than the above mentioned features (and all those considered) and is not statistically significant, once all others are considered.

Table 14.9 Relative odds ratios, estimated using a log-linear analysis between declared satisfaction levels and variables that were more explicative among those collected in the survey on PhD graduates

Variable “satisfaction in comparison with expectations”
 1 = *above expectations + as expected* (n = 170; 64.4%)
 0 = *below expectations* (n = 90; 35.6%)

Number of observations = 260
 χ^2 (4 df) = 86.22 (p-value = 0.000)
 Log-likelihood = -125.53
 Pseudo R^2 = 0.2515

Risk factors	Odds ratio	p-value	IC 95% lower	IC 95% upper
Satisf. of research activity \geq 6/ Satisf. of research activity < 6 (scale 1–10)	8.61	0.000	3.76	19.70
Satisf. of teaching activity \geq 6/ Satisf. on teaching activity < 6 (scale 1–10)	4.30	0.000	2.16	8.55
Doctor. experience useful for personal development \geq 6/ useful for development < 6 (scale 1–10)	3.98	0.005	1.50	10.54
Does not work in a university/ works in a university	1.42	0.284	0.75	2.69

14.7 The Impact of Evaluation: A Reflection on the Use of the Evaluation

The world of the Italian doctorate remains almost unexplored,¹ despite its importance and all the efforts that universities make and are sustaining, [3, 7]. In Italy there is actually a National Committee for Evaluation of the University System that every year releases a report on all the Italian doctorate programmes, but rarely has addressed evaluation issues, being its focus on the resource allocation. Only recently it has been sponsored a study (still pilot and not systematic) addressed to study PhD holders' job trajectories (see [5, 6]). On these subject also the Consortium of University Presidents [11] produced a document that, to the best of our knowledge, has not produced any effect or any further development. With our work we hope we have given a first contribution to a too limited debate with a necessarily brief intervention on the results from a knowledge-evaluative survey conducted on a single Italian university, hoping that soon in the next future there will be the possibility to compare several ones.

As a final remark, we would like to linger over another important aspect, fundamental in our opinion, for the success of these evaluative processes. Indeed, various other authors (for example, see [1, 4, 15]) have also emphasized how important the “use” of the evaluation results is for achieving overall success of an evaluation study. Data, comments, results and, in particular, the affirmation of difficulties in specific modifiable features could have lost all importance if they had been shared only among “specialists” with vested interests.

So, above any academic publication, the most important presentation of this study is that made by the Evaluation Committee of Pavia University. Being both the sponsor and the most important “customer” of this study, this committee has shared and, importantly, disseminated the results, via both formal presentations² and discussing them with the various stakeholders.

If something were to change following this study, that in itself would be the best result and the ideal measure of real success. This is in the hope that the doctorate, like an “ugly duckling” [8], will be able to take off and fly, as will also hopefully happen to the rest of the research sector that is so deeply caught up in the difficulties of our country today.

Acknowledgement I would like to thank Stefano Govoni, all the other members and the staff of the Nucleo di Valutazione of the Pavia University, not only for having accepted this evaluation activity so enthusiastically, but also for having believed in it, for the support given, and for the use of the results that we have promoted. I also acknowledge the help of Francesca Pozza for the analyses and the work of Nicoletta Parise who, although busy in other fields, organized and supervised the survey and performed the checks and the first analyses on the data with the highest level of professionalism. All responsibility for content and conclusions stated within this chapter and for all possible mistakes are attributable to the author only.

¹ At the time this chapter is going to press, few national initiatives to study the effectiveness of doctorate programs have been realized (e.g. by the University consortium STELLA) or planned (e.g. by the National Institute for Statistics – ISTAT).

² By including them in its standard reports and awarding them maximum publicity on the web site: <http://nuv.apnetwork.it/attach/file/presentazionedottori.pdf>.

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