

Article

Tales of Doctoral Students: Motivations and Expectations on the Route to the Unknown

Sara Diogo ^{1,2,*} , Andreia Gonçalves ¹, Sónia Cardoso ³ and Teresa Carvalho ^{1,2}

¹ Department of Social, Political and Territorial Sciences, University of Aveiro, 3810-193 Aveiro, Portugal; gonalves.andreiasofia@gmail.com (A.G.); teresa.carvalho@ua.pt (T.C.)

² CIPES—Research Center on Higher Education Policies, R. 1 de Dezembro 399, 4450-137 Matosinhos, Portugal

³ CeIED—Interdisciplinary Research Centre for Education and Development, Universidade Lusófona de Humanidades e Tecnologias (ULHT), Edifício (U) Av. Mal. Craveiro Lopes 2A, 1700-284 Lisbon, Portugal; sonia.cardoso@ulp.pt

* Correspondence: sara.diogo@ua.pt

Abstract: This paper provides a reflection on the way changes taking place in doctoral education are being perceived and internalized by doctoral students. The Doctoral perceptions are analyzed through Ph.D. candidates' motivations to enroll in the program and to their levels of satisfaction with the supervision experience. Comparisons between national and international students, as well as differences according to doctoral programs' scientific areas, i.e., between students enrolled in Science, Technology, Engineering and Mathematics (STEM) and in Social Sciences, Languages and Humanities (SSLH) are established. Based on a case study developed in a Portuguese university, conclusions point to the dominance of a romanticized, traditional view of doctoral education, with the academic profession at its core. This view is mostly shared by international students and those from SSLH scientific areas. In turn, national Ph.D. candidates and those from STEM areas have incorporated a more instrumental view of doctoral education, aiming for training participants to professions outside academia.

Keywords: doctoral education; conceptualization; Ph.D. candidates; supervision; paradigm shift; international students; scientific areas



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1. Introduction

Aligned with the knowledge society's narratives and principles, knowledge creation has become crucial for economic and social development. In this context, universities are seen as key drivers in the creation and consolidation of knowledge-based economies, with doctoral education assuming growing relevance as the privileged locus of knowledge production [1,2]. The importance attributed to human capital in the establishment of the knowledge society has thus positioned doctoral training and research as the European Union's (EU) cohesion and development strategies, substantiated in the creation of the European Research Area (ERA) [1]. Universities are pressured to move from purely teaching and research institutions towards a more entrepreneurial model, and pursuing their *Third Mission*, i.e., the generation, use, application and exploitation of knowledge and other university capabilities outside academic environments. This opens the way for important changes in doctoral education, namely in terms of its "boundaries", configurations and purposes [3–5]. Traditionally, if doctoral education has been linked to the "disinterested" production of knowledge and research framed mainly by the academic profession, it has begun to be increasingly expected—by governments, universities and doctoral candidates also—to provide "useful" and "practical" knowledge as well as to qualify professions outside academia. This paradigm shift seems, however, to be more visible in scientific areas such as Science, Technology, Engineering and Mathematics (STEM) than in Social Sciences, Languages and Humanities (SSLH) [5–8]. Indeed, it is possible to witness—especially

within the STEM field—to the multiplication of innovative doctoral programs aiming at strengthening collaboration with the entrepreneurial sector and to create experts able to work and respond to its needs [9–14].

The purpose of this research is to provide a reflection on the way changes taking place in doctoral education are being perceived by doctoral students (Ph.D. candidates). In particular, attention is focused on exploring the motivations and expectations of Ph.D. candidates enrolled in their first year of a doctoral program as well as on their experience through its pedagogical and educational aspects—Ph.D. candidates' perceptions on the relationship maintained with their supervisor(s) and the supervision process.

2. Doctoral Education: A Shifting Paradigm between Teaching and Research

Doctoral training or doctoral education has been perceived in different ways along with the history of higher education. Initially, during the Middle Ages or Medieval Period, universities were mainly teaching institutions, where the award of a doctorate corresponded to a license to teach at a university [12]. By foregrounding discipline-based research, the Ph.D. licensed graduates to be “stewards of the discipline” who would be able to generate, conserve and transform their disciplines [15,16]. It was only with the Humboldtian University of Germany in 1810 and the assumption of the research university, that the doctorate started to assume a fundamental position [17,18]. Wilhelm von Humboldt introduced a new typology of University (the University of Berlin founded in 1809) based on research and teaching, through the idea of *Lernfreiheit*, i.e., the freedom academics should have to learn and investigate to be experts in a certain field [19]. It was this freedom to learn and to carry out research that attracted several students from England and the United States of America (USA) to continue their studies at German universities, as these opportunities were not offered to them in their home countries [12]. In fact, upon return, after their Ph.D. completion, new doctorates helped to develop the profile of academic research at the universities in their home countries [19]. As such, or as Yudkevich, Altbach and de Wit 2020 and others [20,21] still point out, in much of the Global South, the doctorate is still a *young construction*, marked by colonial and post-colonial inequalities [20]. It is thus since the institutionalization of the modern university, under the influence of Humboldtian ideas, that the relationship between teaching and research has been considered the core reference of universities. In this way, although research was a latecomer into the university, it became institutionalized in Higher Education Institutions (HEI) and incorporated by academics. At present, the most common type of doctorate is the “Doctor of Philosophy” or “Ph.D.” (in Latin: *Philosophiae Doctor*), which amounts to the degree awarded to students who can show their competence in a context of research and production of new knowledge [12]. Over time, influenced by the knowledge society narratives, doctoral training has been more oriented to social and economic needs, i.e., the research developed in this context needs to be “useful” both for social and economic purposes.

Although there are national differences regarding the consensus on what marks the beginning of the academic career, the doctorate degree has been traditionally conceived as a training period for future researchers' [12,16]. Increasingly, obtaining a Ph.D. is also assumed as a need for those who want to dedicate their professional life to research and development (R&D) activities outside academia. Doctoral education has thus undergone deep transformations and configurations [3]—in its design, planning, implementation, delivery, scientific area and in/within the established relations, such as supervision, assessment and accreditation. These configurations then mirror the multiplicity of expectations and the diversity of publics, as well as Ph.D. candidates' profiles and backgrounds. The literature [22–24] is consensual with the fact that changes in doctoral education are also internalized by its publics and stakeholders: “Doctoral education and training is no longer an exclusively academic affair but has become an object of institutional management as well as national and supra-national policy-making” [22] p. 528.

As such, it is possible to argue that there is a shift on how doctoral education is conceptualized all over the global north—both by HEIs and Ph.D. candidates—how it is

delivered, how supervision processes take place and how the relationship between teaching and research happens [21,25].

Particularly in this geographical context, the Bologna process, which entered officially into force at the beginning of the new century, represents the last *paradigm* of doctoral education, through the redefinition of the traditional academic degree structure in cycles, and the establishment of doctoral programs with a curricular component. Nevertheless, there seems to be a complex paradox in this paradigm shift. Even if it is undeniable that the Humboldt idea of university informed the ethos of most western universities for the past century or more, the relationship between teaching and research is not consensual, with the literature envisioning clashing ideologies on campus and relying on different ontologies and epistemologies of knowledge [26–30]. The public and specialized knowledge promoted by research would be in contradiction with the private knowledge imparted by teaching oriented towards the development and benefit of the individual student. Furthermore, by framing doctoral education in doctoral programs with a mandatory curricular component (the first year is structured around a set of four or five courses/curricular units), while reducing the whole degree to 3 years, leaving only 2 years to write the Ph.D. thesis (either in a monograph format or through a compilation of scientific articles) invests the process of knowledge creation into a certain *speedization* of science. On the other hand, or in parallel, the literature identifies these links between teaching and research as important aspects of academics' role and the construction of their identity [30–34], which can improve the quality of university teaching [31,35]. These changing dynamics in and of the relationship between teaching and research and between teaching and learning frame the construction of the knowledge society discourses [34], enforcing European convergence around the ideal of economic and social competitiveness and leading countries all over the world to implement (similar) *adaptations* in their higher education systems [36,37]. It is in this context that doctoral education has been gaining renewed attention from national governments, while European universities have simultaneously substantially changed the way doctoral training is provided and perceived; these changes also being visible in different Ph.D. candidates' profiles and backgrounds, scientific practice areas and ultimately incorporated in Ph.D. candidates' discourses and behaviors, as well as in their expectations.

Diversity of Doctoral Programs and Ph.D. Candidate–Supervisor Relationship

It is undeniable that doctoral education has been assumed as a strategic resource to implement the knowledge economy, meaning to promote economic development through innovation and limiting its use as an exclusive academic affair. In this context, doctoral education gains the attention of both supra-national and national policy makers, as well as that of institutional leaders. There are a plethora of Ph.D. program concepts, with attempts being made in the literature to classify and operationalize this diversification of Ph.D. types. For instance, Barbara Kehm has been developing an extensive work in this field [38,39], identifying at least nine different types of doctorates, based on their different goals and purposes. Briefly, the nine types are: (i) the research doctorate—the most traditional based on an original monography; (ii) the professional doctorate—usually created to satisfy a particular demand from a professional group outside academia and based on the development of research skills specifically needed in a particular professional context; (iii) the taught doctorate—based on a fixed curriculum and in learning outcomes compulsory to obtain the final grade; (iv) Ph.D. by published work—based on a combination of several articles published in peer-reviewed scholarly or scientific journals; (v) the practice-based doctorate—specific for the Arts and Design field; (vi) the new route or integrated doctorate—a four year degree which includes a one-year period of studying for a research master's degree followed by a three-year period of Ph.D. studies; (vii) the joint doctorate—offered by two or more institutions; (viii) the cooperative doctorate—based on co-supervision of academics from comprehensive and applied universities; and, the (ix) industrial doctorate—applied degree, usually existent in the engineering field [40].

The different typologies of doctoral education also imply transformations in the student–supervisor relationship. First and foremost, the student–supervisor relationship is now distant from the apprentice–master relationship common in the Humboldtian university and closer to a student–teacher relationship. Furthermore, in many of the previously mentioned typologies, doctoral candidates are also working with experts outside academia [41]. Supervisors are now expected to orient their students not only in research skills but also to co-publish research work, to advise them on career plans and even teach them soft skills and provide them with citizenship awareness [11]. The transformations in the Ph.D. candidate–supervisor relationship occur in a context of the marketization, financialization and overly performative emphasis on bibliometrics and rankings that pressures the use of academic time and often leads to an increase dissatisfaction and even mental health issues in Ph.D. candidates [41,42].

3. The Institutional Context and Methodology

3.1. The Institutional Context

Utilizing previous background, this paper relies on a specific case study to analyze how changes in taught doctorates are being perceived by doctoral students as well as their experience and satisfaction with their supervisor(s) relationship.

A case study was developed in a public Portuguese university under private law created in 1973 with a matrix structure based on 16 departments and 4 polytechnic schools. Since 2007, its legal status changed to public foundation operating under private law. The university is devoted to teaching and research, it awards undergraduate degrees and offers advanced degree programs leading to master’s and doctorates, and mainly focuses on the STEM fields. At present, there are 51 programs leading to a doctoral degree, all being classified as taught doctorates, as, since 2006, under the so-called Bologna process, the institution only offers Ph.D. programs with a curricular base. The doctorates consist of a three-year program with at least one year being course work with fixed curriculum and learning outcomes. Most Ph.D. candidates are not funded by the program and do not work as faculty or research members, being considered as students. The final thesis can assume both a traditional monography format and a compilation of published work. The establishment of a fixed curriculum and the shortening in the duration of these doctoral programs imply changes in the student–supervisor relationship, which is also shortened and expected to be more in depth. Changes in these doctoral programs have impacted the number of Ph.D. students, increasing since 2006 (cf. Table 1).

Table 1. Number of Ph.D. students/candidates at the University of Aveiro (2006–2018).

Nr. Students/Academic Year											
2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18
668	772	952	1189	1391	1522	1535	1605	1411	1317	1377	1124

Source: Strategic Planning Office (GPE) University of Aveiro (2018).

3.2. Study Design and Methods

Empirical data are based on a mixed methodology study constituting 33 semi-structured interviews and 169 validated questionnaires conducted with national and international students enrolled in the first year of their doctoral program, in both STEM and SSLH fields.

Interviews were submitted to thematic content analysis (carried out through the help of NVivo software) and the questionnaires to descriptive statistical analysis (using SPSS). The dimensions approached in the empirical data related to students’ rationale on pursuing a doctoral program and motivations and expectations underlying the choice of the Ph.D. program and institution. These themes focus on the way changes taking place in doctoral education are being perceived and internalized by doctoral students, as well as on their motivations to enroll in the Ph.D. program. From these main themes, other related/subsequent (sub)themes were explored, namely Ph.D. candidates’ perceptions on the faculty, the re-

relationship maintained with their supervisor(s), the supervision process and the overall perception (satisfaction) with the Ph.D. program as well, i.e., the educational aspects of doctoral education (e.g., teaching practices, syllabus) and the challenges and obstacles faced. These themes then fall into the main label of “the Ph.D. experience”. This paper focuses in particular on exploring the perceptions and expectations of doctoral students regarding doctoral education and the purposes of pursuing it. A particular attention has been placed in the comparisons between national and international students as well as differences in perceptions according to doctoral programs’ scientific areas, i.e., between those students enrolled in STEM and those in SSLH scientific areas.

The General Data Protection Regulation (in force in Portugal through the Decree-Law no. year 2017–2018), hindered access to the Ph.D. candidates’ emails, who for the academic year of 2017–2018, were 1124 enrolled at the University of Aveiro. As access to their emails was denied several times, we looked into the website of the university, more specifically to the departments’ webpages, and 250 email contacts from doctoral students were collected. A non-probabilistic sample was thus selected, in this case, a convenience sample. The questionnaire survey was prepared using the Google Forms platform, and a link to it was sent to these contacts. As all responses were mandatory, all responses were validated. In total, 169 questionnaires were validated. Interviewees were gathered through the snowball effect method.

Study Participants

Students were enrolled in 9 different doctoral programs, of which 7 belong to the STEM fields (16 interviews, 106 questionnaires) and 2 doctoral programs belong to the SSLH fields (17 interviews, 63 questionnaires). A synthetic social-demographic characterization of the population surveyed in the questionnaire stands as follows: 62% female (105 women) and 38% male (64 men); the majority were between 24 and 31 years old, with an average age of 32 years old. Regarding their civil status, 65% (≈ 69) were single, 2% (≈ 2) divorced and 33% (≈ 35) were married or lived with their partner. With respect to the scientific domain in which these Ph.D. candidates were enrolled, the great majority of them were attending doctoral programs in the Social Sciences scientific area (37% ≈ 64) and in the Engineering Science and Technology (42% ≈ 25), followed by the Natural Sciences (15% ≈ 25) scientific domain, Health Sciences (11% ≈ 16), Humanities (7% ≈ 12) and Exact Sciences (6% ≈ 10). A total of 12 interviewees were international students and 21 were national students. The majority of interviewees were women and national students: 23 women, 5 of whom were international students, and 10 men, 7 of whom had a foreign nationality.

4. Results

4.1. The Idea of a Doctoral Degree According to the Different Scientific Areas and Type of Ph.D. Students—National vs. International

The great majority of Ph.D. candidates involved in this study perceived doctoral education to be aligned with a more traditional conception. However, there are relevant variations according to the different sub-groups—scientific areas and type of Ph.D. students—national vs. international. Students from SSLH resorted more to a traditional perspective than students from STEM areas—who tended to hold a more *commercial* view of doctoral education and research. In this sense, students enrolled in STEM areas considered a broader set of professional paths, with few of them looking at academia as an attractive possibility, quite differently from their SSLH colleagues, who tended to view the pursuit of their doctoral degree almost in a romanticized way. Moreover, when questioned about the relevance of a doctoral degree towards the context of increasing unemployment among doctorates, SSLH students tended to undervalue this scenario, assuming that it is quite low when compared with unemployment rates among people with lower academic qualifications.

“A slight increase in Ph.D. unemployment might be related to the crisis, to the fact that doctorates always earn more money, but this is a phase (. . .) So that’s all, we can never

see an indicator just by itself we need to look at it as a whole” (National female student, SSLH)

When disaggregating data according to students’ type, i.e., national vs. international, interesting findings also emerged. Curiously, international students were those—regardless of the scientific area—who tended to associate the Ph.D. more to an open access to an academic career. Nevertheless, attention should be drawn here. The label “international students” refers to students who access a Portuguese HEI throughout the special statute for international students (regulated through the Decree-Law no. 36/2014 of 10th March), which does not apply to European students, but rather to students coming from ACP (Africa, Caribbean and Pacific) countries, including developing countries [43]. The majority of international students from our sample (not all, but a significant part)—as it happens in the greatest majority of Portuguese HEIs—is constituted from individuals coming from Portuguese speaking African countries (PALOP), East Timor and Brazil [44]. The higher education systems and institutions of these countries are not as consolidated as European ones, and therefore, obtaining a higher education degree from a European institution, especially in Portugal, where there is a common language, is considered advantageous and prestigious when these international students return to their home countries [43,45]. As such, the association of this group of students with obtaining the doctoral degree and the immediate access to an academic career should be framed in this specific organizational and national contexts. In fact, in the specific case of this university, most of the international Ph.D. candidates decided to obtain a Ph.D. as they were already integrated into an academic career, and therefore, especially for those international students coming from Portuguese speaking countries, obtaining a Ph.D. is seen as an essential condition to maintain their position in the academic career.

“For me, for example, I want to be a university professor and so I need to be updated about my filed study and research” (International female student, SSLH)

“What I want after accomplish the doctoral program is to work as a teacher in a higher education institution. (. . .) I’ll try to find a job in academia. It is my main objective on life” (International male student, SSLH)

Curiously, however, when asked about the reasons to enroll in a Ph.D. program and their professional expectations, the overwhelming majority of surveyed students—about 80.5%—mentioned that they chose a doctoral program because they were interested in carrying out research, not only during the period of their Ph.D., but also in their professional path.

“I chose to pursue a doctorate degree in order to start a research career that I intend to continue later on, either in the academia or in an industrial environment” (National female student, STEM)

“I decided to do a Ph.D. because I would like to continue connected to my research field and doing a Ph.D. is a viable way, a channel for that. I don’t think, however, that there are many job opportunities here in Portugal, not many opportunities for doctorates, unfortunately . . . ” (National female student, STEM)

Not surprisingly, though, international students, regardless of the scientific area, did not see unemployment or precarious working conditions among doctorates as a problem, assuming that there were still relevant differences between countries.

“In Brazil, this is quite different. We do not have this growing number of Ph.D. holders. It’s because they’re coming here to do it. In Brazil, they are a small elite” (International female student, STEM)

Others (43.5% \approx 74) aim at having a more creative and innovative work and the possibility of creating something “unique”, while only 37.9% explicitly referred that they would be interested in teaching and/or performing more academic activities related to intellectual development. In total, 42% of the respondents pointed out the ambition to “actively contribute to society” as their primordial reason for enrolling in a Ph.D., and

26.6% of Ph.D. candidates intended to pursue an entrepreneurial and management career. However, this last option was mostly visible in students belonging to STEM doctoral programs—as they assumed the Ph.D. also as essential to developing a career outside academia and even to create a specific product to be able to create his/her enterprise:

“I think we shouldn’t wait for job opportunities. We need to make them. To study in doctoral programs makes new ideas in our minds. And if we search and work on them as well, it decreases the unemployment rate” (International female student, STEM)

In a nutshell, the main reasons sustaining this sample of Ph.D. candidates’ enrolment in a doctoral degree were intimately related to the sometimes more traditional idea they had on doctoral education. Interestingly, only 7% (≈ 12) of the respondents associated doctoral education with obtaining social status.

4.2. The Ph.D. Experience

This section presents the findings related to the perceived experience of Ph.D. candidates on their doctoral experience.

Considering that most of the surveyed Ph.D. candidates conceptualized doctoral education around the traditional paradigm, i.e., as the “disinterested” production of knowledge, with research framed mainly by the academic profession, the supervision process and the curricular plan and workload of the doctoral degree are central aspects of the doctoral experience.

Although being an ambiguous concept, interest lays in knowing the level of satisfaction of Ph.D. candidates with the supervision process and the relationship they maintain with their supervisor(s), given the central place of this relational process in doctoral education. This was the aspect in which Ph.D. students evidenced the highest level of satisfaction, with 61% (≈ 103) of the respondents reporting to be “very satisfied” with their supervisor. However, within this broad idea of satisfaction, it is possible to identify very different shades of contentment: in general terms, SSLH Ph.D. students tended to report more satisfaction than their STEM colleagues:

“I have three supervisors and I know that this is not very usual, but I’m really enjoying this experience, because they have three different visions. Every time I meet them and that I have to show my work, each one provides different inputs, very different from each other, but this obliges me to have more aspects into consideration and these different views are complementary to my work” (National female student, SSLH)

“My advisors are very busy people so it is really difficult to have continuous support from them and being able to schedule meetings. It is really challenging to get supervision or guidance from them” (National female student, STEM)

A relevant aspect in this analysis, however, is that even within the same scientific area, Ph.D. candidates acknowledged different treatments and processes according to their personal relationships and paths at the higher education institution/faculty/department.

“I have a very good relationship with my supervisors because I’m in this department since my bachelor, so I know the Faculty for many years now. Quite different from my colleagues who meet their supervisor(s) once every 3 months or something like that, we talk quite regularly and I feel at easy to knock on their door and solve a quick question, for example” (National female student, STEM)

Moreover, SSLH students tended to be those who mostly acknowledge the loneliness feeling of the doctoral journey, emphasizing the central role of the supervisor(s) and peers in this process.

“Although the Ph.D. has been a journey, it is a very lonely process. The work is done individually. This is both a very long and lonely journey with the support only of the advisors.” (National female student, SSLH)

Although most respondents reported high levels of satisfaction with the supervision process and the faculty of the doctoral program, 32% (≈ 54) of respondents reported that

they often felt disoriented with the workload and a lack of coherence with the “path to follow”, also due to the lack of advice and guidance from their supervisor(s). About 8% of the respondents reported that they “always” felt their supervisor was absent (≈ 14), clearly demonstrating a constant lack of availability to help them. This was especially evident in STEM respondents, a fact that corroborates the study by [46,47] on the motivations among international students to pursue a Ph.D. in mathematics and sciences studies.

Considering that our sample of international students mostly comes from Portuguese speaking countries, they also referred to obstacles associated with the high costs of obtaining a Ph.D. degree, as Portugal has a higher cost of living when compared to their home country and also because the possibility of Ph.D. students to work as researchers and/or assistants to receive a “salary” is remote. In line with these personal obstacles, several pedagogical and institutional challenges also emerge. For example, although 56.2% of the respondents (≈ 95) felt satisfied with the faculty and the doctoral program, most international students found it difficult to accompany the lectures as they were (usually) concentrated only in a single day in the week. This concentration of lectures was reported by international students to be “totally unproductive”, making it difficult to consolidate work and study, as part-time students reported, leading to exhaustion and stress. International students also expressed difficulties in accessing peer and academic culture [45].

Other pedagogical obstacles were highlighted, especially by STEM Ph.D. students, who complained about the excessive theoretical focus, a too restrictive syllabus associated with a tight corset, the need to be more oriented to practice and the lack of relationship with industry.

“The program is problematic. I really don’t like it: it’s very restrictive. If I want to take other subjects from other departments it is almost impossible as I need to ask for equivalences and the Ph.D. director keeps putting obstacles to that (. . .). I’m not satisfied with the curriculum precisely because of this: because of the subjects and the lack of freedom we have, it’s like a corset! There is a lack of options” (National male student, STEM)

“I’m disappointed with the dynamics of some classes, which I found very theoretical, very content-oriented and with little critical reflection, little discussion, few practical cases” (International male student, SSLH)

Interestingly, Ph.D. candidates from SSLH did not perceive the curriculum in such a restrictive way as their STEM peers, but was quite the opposite:

“I’m quite satisfied—although, in the beginning, there were so many subjects to choose among, one might find it confusing” (International female student, SSLH)

5. Discussion of Results

When analyzing the perceptions on what a doctoral degree should be, a (more) traditional conception of the doctorate emerges, materialized not only in the Ph.D. experience but also in the motivations and expectations Ph.D. candidates have after the completion of the degree, e.g., possible professional paths. This traditional view vary according to the main broad areas examined—SSLH and STEM—and according to the type of students’ constituting the sample: national vs. international. While students from STEM areas move further away from it and evidence a more commercial view of doctoral education and research, and therefore consider a wider set of professional paths, SSLH students ground on a more traditional perspective on doctoral education with academia representing a possible working place. Interesting enough, SSLH students are those who tend to not make any references to the precariousness of researchers’ and academics’ working conditions and the unemployment situation of doctorates.

Differences are also found between students’ type, i.e., national vs. international. Regardless of the scientific area and bearing in mind the specificity of our sample of international students and the status of an “international student” in Portuguese academia, international students are those who view the Ph.D. as an open access to an academic career,

as also evidenced in [48]. For these international students, mainly coming from Portuguese speaking countries, obtaining a Ph.D. is seen as an essential condition to maintain their position in an academic career and even to progress within it. Complementary to these views also lays the general idea among the total sample of Ph.D. candidates that they are interested in carrying out research, not only during their Ph.D., but also *along* their professional path. In fact, this idea on what doctoral training is and how it contributes to doctoral graduates' paths is also aligned with the study of [16], who have examined, through a 5-year project, the role of doctoral education in the United States. The authors report that the work of scholarship and stewardship can be meaningfully cultivated and utilized in diverse career paths pursued by doctoral graduates, whether they serve in the academy as researchers or teachers, or use their education in business, government or non-profits [16]. Such perceptions also assume relevant significance for HEI who are renovating the configurations of their doctoral programs to become more international, collaborative, and attentive to labor market needs, while also developing professional doctorates, as the studies from [13,14] conclude. The pursuit of an academic career is particularly evidenced by the international students' probably due to the fact that in their countries of origin, unemployment or precarious working conditions among doctorates is still an unknown phenomenon due to the scarce number of Ph.D. holders in the population. On the contrary, the intention to pursue an entrepreneurial or management career is more evidenced by STEM students. Interesting enough, as mentioned earlier, is also the fact that only 7% (about 12) of the respondents associate doctoral education with obtaining social status. While these data resonate with the study by Tarvid (2014) [49] on the perceptions of Latvian Ph.D. candidates on doctoral education, the reasons students point to for enrolling in a Ph.D. are different from those found in other national contexts. For example, the study by [50] Leonard, Becker and Coate (2005, focusing on the United Kingdom, shows that for students in education programs, their motivations related first to personal motivations (such as intrinsic interest, personal development, the joy of study and acquiring the degree) and only then to the labor market, such as professional development, vocational requirements, or acquisition of research skills). Moreover, in Finland and Austria, a comparative study by [51] Moreno and Kollanus (2013) analyzing computer science doctoral programs found that around half of Ph.D. students chose doctoral education primarily for personal fulfilment, while others mentioned different career-related reasons, such as academic career, professional development, career change and employment opportunity. These findings corroborate the studies of Pinto and Sá (2020) and Grant (2011) [52,53] who conclude that traditional expectations, usually associated with traditional (national) students, include specialist knowledge and systematic understanding of the field of study, as well as mastery of research methodologies used in the field of expertise, and high-level thinking skills such as the advanced capacity for critical, conceptual and reflective thinking. The reasons mentioned by Ph.D. candidates in this university may raise the hypothesis that the way students in Portugal perceive a doctoral degree is still highly framed by a more traditional paradigm, with doctoral training being paramount to initiate an academic career and to prepare for a research or academic career, and not as a degree—as has been underlying the knowledge society discourses—as a means to obtain knowledge and cognitive tools to foster innovation and promote economic development.

In parallel with the analysis on how doctoral education is perceived by doctoral candidates, a reflection appears intimately connected to the experiences Ph.D. candidates relate to the doctoral program they decided to pursue, namely in terms of satisfaction, supervision and challenges faced. Even if the Ph.D. journey is usually presented as an individual phenomenon, it is possible to find similar experiences and challenges shared by Ph.D. candidates, especially when data are disaggregated by subgroups. This is highly evident when analyzing the educational aspects of the Ph.D. experience. For example, when studying doctoral education in the social sciences in Britain and Australia, Parker (2009) [54] reports that doctoral education has traditionally been conceptualized around the dyadic model of supervision of independent research with the student-supervisor

relationship at the core of the learning process. In this approach, the academic supervisor occupies the position of “expert”, providing criticism and comment on doctoral candidates’ work [54]. The literature is consensual on the fact that advisors/supervisors have a central role in doctoral education, and “good” guidance is crucial for the success of doctoral students [8,45–47]. Supervisors thus have the role of providing their experience, time and support in order to stimulate skills to doctoral candidates, allowing them to prepare the best possible dissertation and/or work and even for their future professional life [16,43,48]. These findings revealed then a solid echo in our data. When analyzing the supervision process, and the relationship students maintain with their supervisors, it was clear that this was the aspect in which the samples showed the highest level of satisfaction, and with SSLH Ph.D. students reporting more satisfaction than their STEM colleagues, even if SSLH students acknowledged more the loneliness feeling of the doctoral journey, pointing to the role of the supervisor(s) and peers in this process. These findings also shed light into what Delamont, Parry, and Atkinson (1998) [55] referred to as the “the doctoral supervisor’s dilemmas” regarding the difficulty in establishing a delicate balance between dominating the student’s research and neglecting it. Another variable in this dilemma is the fear Ph.D. candidates hold of becoming a “photocopy” of the supervisor and “losing credibility” when their goals are to personalize the work they develop [56].

Although most respondents reported high levels of satisfaction with the supervision process and the faculty of the doctoral program, 32% (≈ 54) of our respondents reported that they often felt disoriented with the workload and a lack of coherence with the “path to follow”, also due to the lack of advice and guidance from their supervisor(s). About 8% of the respondents reported that they “always” felt their supervisor was absent (≈ 14), clearly demonstrating a constant lack of availability to help them. This was especially evident in STEM respondents, a fact that corroborates the study by [57] on the motivations among international students to pursue a Ph.D. in mathematics and science studies. Nonetheless, references to the solitude idea of a doctoral journey (also expressed by SSLH students, even in a smaller scale) finds consensus in the literature and should be understood bearing in mind the different pedagogic strategies and practices, assessment methods, feedback [57], networks [47] and learning contexts of different scientific areas [22,57–59]. For example, in more applied scientific fields—STEM—where experiences are part of the doctoral program, the supervisor must ensure that the student has access to facilities and an appropriate environment for experience [60], which usually happens in groups rather than individually as it normally happens in SSLH scientific areas. Isolation and loneliness are also aspects that greatly impact mental health [41,42,61–63].

Another *food for thought moment* which emerges from these results is that they are not consistent with the perceptions previously presented, when surveyed Ph.D. candidates associated the doctoral degree with the pinnacle of academic achievement and the open door to work in academia. Is it possible that the knowledge society discourse of directing knowledge to social and economic utility, while strengthening the relationship with industry, is found ingrained in most of the Ph.D. students’ discourses, especially those from STEM scientific areas? However, SSLH Ph.D. candidates seem to incorporate some of the values underlying the knowledge society narratives, especially concerning the way Ph.D. programs are organized, assuming the need to be more oriented to “practical” concerns and to strengthen the relationship between higher education institutions and industry.

6. Conclusions

Doctoral education and doctoral student learning processes are, at present, much more complex, flexible and *faster* than the *initial* Middle Ages license to teach at a university or the freedom of research and learning experienced at the light of Humboldtian reforms.

In view of the changing dynamics of doctoral education, that, in our understanding, represent a paradoxical shift in doctoral education, a reflection is provided on the way doctoral students perceive doctoral education, and on their evaluation of the satisfaction with the supervision role and relation in a specific case of taught doctoral programs in a

Portuguese university. This analysis allows for a better grasp of the way Ph.D. candidates have internalized/incorporated their doctoral experience.

Although the study focuses on a small sample of Ph.D. candidates of both genders, this sample triggered research for comparative perspective, with relevant dimensions emerging according to the subgroups of analysis: doctoral student types (national and international) and scientific areas (STEM and SSLH). This analysis evidenced that some students hold a more romanticized, traditional view of doctoral education, still perceiving the Ph.D. as the degree that enables them access to an academic career. Simultaneously, students, in general, tend to be satisfied with their supervision experience based on a more traditional model.

It is interesting that while students from STEM scientific fields are more likely to reconcile the doctoral degree with the ideals of the knowledge society and universities' *Third Mission* on the generation, use, application and exploitation of knowledge bearing in mind different employment possibilities outside academic environments; SSLH students hold a more traditional and even optimistic vision on what a doctoral degree is, not focusing on the path or even on the end of their doctoral journey. They seem to ignore the possible scenarios of precariousness and even unemployment in Portugal. Curiously, these optimistic perceptions are mostly shared by international students, especially those from Portuguese speaking countries, who aim to initiate or to progress in the academic career are therefore more reluctant to embrace a profession outside academia. It is thus possible to say that regardless of the scientific area, this specific group of international students is more aligned with the traditional paradigm of doctoral education centered on the student-supervisor relationship [5,24]. This *romantic*, more traditional view of the doctorate degree that Ph.D. students hold (especially for international students and from the SSLH field), formed from the paradox of the paradigm shift of doctoral education. By placing the student, teaching and curricular practices, namely through the supervision process, as dominant views and central to the doctorate degree, it pulls away from the actual "research paradigm", focusing on the entrepreneurial, "useful" production of knowledge for social and economic purposes.

This difference of perceptions draws attention to the need for doctoral programs facilitating the socialization and integration processes of international and non-traditional students in academic practice. Moreover, and especially in times such as those experienced at the present, marked by covid pandemic and massive displaced population due to war and political conflicts, communication should be maintained effectively and clearly to avoid feelings of anxiety and "constant confusion". Faculty, supervisors and HEIs need thus to promote successful learning, teaching, and research environments in order to produce working-learning friendly environments. In fact, a common and consensual finding in this study is the fact that Ph.D. candidates, even if not verbalized, share the idea that they have embarked on a route to the unknown.

The authors acknowledge, however, the "issues" of a single case study approach, using a small sample. Other options for expanding this research are the inclusion of more countries and students—both national and international—broadening the background sample of international students. There is also the possibility of improving the data and creating time series that would allow for more empirical analysis, e.g., including doctorates already established in the labor market.

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