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Live by the Research, Die by the Research¹

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Abstract

The situation of doctoral students is a complex ethical issue. They are not really students any more, but they are not yet full members of the Academy, so they are excluded from it. PhD students focus primarily on research, since if they do not publish in quality scientific journals, their future (both career and financial) is very much in question. As most of the doctoral student's capacity is taken up by research and publication during the training period, another important task is relegated to the background: learning to teach and to supervise research. Will the student have the ambition to become a good teacher and research supervisor as well as a researcher? What ethical factors can influence the personality development of a doctoral student? What experiences and perspectives will the newly graduated doctoral student bring to their academic career? Here I raise these questions both in general and in relation to graduate studies in mathematics.

Keywords: PhD training, PhD studies, research, university training, supervisor, Matthew effect, impostor syndrome

1. Introduction

A doctoral student is a university-educated professional who aims to obtain a doctoral degree. The situation of doctoral students in Europe varies from country to country. While in some countries doctoral students have a legal student relationship with a university, in many other European countries it is common practice for doctoral students to be employed as employees in research institutes or universities under a contract of employment.

¹ Title inspired by Matthew 26, 26:52

In general, it is necessary to submit a written work (dissertation), which may be accompanied by an oral exam (final examination). Doctoral students must demonstrate their ability to present scientific results on their own through the bumpy path of obtaining a degree. This can be the thorough research and study of the topic of the dissertation, the writing of the dissertation, or the writing of articles and studies — in other words, publications. In addition to their research work, doctoral students also have academic and teaching responsibilities. The latter mostly takes the form of seminars and practical sessions. In many cases, this leads to overload, as they do not have enough time to carry out their actual tasks.

So one area will suffer from this burden: it could be research or training² since courses are not generally taken for the whole duration of doctoral training. Put yourself in the doctoral student's shoes: What would you do when faced with the ethical question of whether to focus on your own academic career, which will provide you (and your family) with a future (both professionally and financially), or to focus on equipping your future students with the appropriate quality of mathematical knowledge? Put like this, the answer to the question is not necessarily clear. The situation is complicated by the fact that if the doctoral student is not a student and professional practitioner of education, then in the course of his/her studies, he/she was not exposed to methodological and didactic principles of what and how to teach. Does being a good student or a good researcher mean that you are a good transmitter of knowledge?

So the situation for doctoral students is not so clear-cut: they have to be researchers, students, and teachers. It follows logically that a doctoral student must have the skills of all three of these roles. At the same time, it is not insignificant that these fields are also the most common reasons for interest in doctoral level studies. Unfortunately, most doctoral program applicants are unlikely to realise that they will have to fulfil these roles simultaneously, in parallel. Not to mention that teaching, supervision, personal studies, publications, conference attendance, and the writing of the dissertation itself can be burdens that doctoral students have to cope with alongside family or other work commitments.

² And we have not even mentioned social life yet!

In this paper I engage with some of the issues that doctoral students face and then zero in on issues with mathematics doctoral studies. In particular I begin with Section 2 where I explore a series of issues that doctoral students across the disciplines face during their studies. Then in Section 3, I zero in on mathematics graduate studies. In Section 4, I share notes from an interview with a student of mathematics who completed not one but two doctoral programs in the discipline. Section 5 concludes this note.

2. The Main Issues Faced by Doctoral Students

If we look at the career path of a doctoral student in the light of the above, it can seem quite demanding. Nevertheless, it can be said that in the Organisation for Economic Co-operation and Development (OECD) countries there is a significant increase in interest in doctoral training, as well as in the number of doctoral students [6]. There are different reasons why students enter the race: some see a doctorate as a prestige, others see it as a chance to get a job in academia, or as a motivation for academic progress. And there are other reasons that may or may not necessarily be motivating the students: mental health, training, teaching, the supervisor, and last but not least, money. In the following we explore some of these factors.

2.1. Financial considerations for doctoral students

We begin with financial issues that come up in relation to doctoral students. In this section, these issues will be illustrated by the examples of four Central European countries — the Visegrád Four (V4: Czech Republic, Hungary, Slovakia, Poland).

Czech Republic

Doctoral training in the Czech Republic generally lasts three to four years, depending on the programme. At the oldest and most demanding university in Czech Republic, the Charles University Faculty of Mathematics and Physics will offer in its doctoral programme a monthly stipend of 11,000 CZK (430 EUR) for full-time students from October 2020. Generally speaking, in the first year or year and a half, there are compulsory classes that students have to attend. This may depend on the subject of study.

From the second to the fourth year of study, the scholarship increases to 12,500 CZK (490 EUR) per month. Once the compulsory courses have been completed and the necessary number of credits have been obtained, the doctoral student can take an examination equivalent to a state examination. After that, the scholarship amount increases to 14,500 CZK (570 EUR) until the fourth year of study, so passing the state exam means an extra 2000 CZK (80 EUR) for the monthly scholarship. In addition, a further increase of 1000 CZK (40 EUR) is available if the doctoral student's publishing activity is outstanding. This is reportedly already available if there is at least one impact factor (IF) article in a journal in which the doctoral student is the first author, plus additional IF publications in which the doctoral student is at least a co-author. The scholarship is available for an average of four to five years. On this basis, if all the conditions are met, the maximum scholarship amount available is 15,500 CZK (610 EUR). For this, however, the doctoral candidate must have a good quality publication record (mostly with IF).³

Hungary

The current system of doctoral education has been in place in Hungary since September 2016/17. The minimum number of credits required for doctoral studies is 240, and the duration of training is eight semesters. Doctoral training consists of two phases: the first four semesters are "training and research" phase, the second is the "research and dissertation" phase. At the end of the fourth semester, that is, at the end of the training and research phase, and as a condition for starting the research and dissertation phase, a complex examination is required to measure and evaluate the progress of study and research. The doctoral candidate must submit his/her doctoral thesis within three years of passing the complex examination. The monthly amount of the doctoral scholarship is 140,000 HUF (380 EUR) in the training and research phase and 180,000 HUF (490 EUR) in the research and dissertation phase. In the case of a successful thesis, the doctoral student will receive a one-off grant of 400,000 HUF (1085 EUR).⁴

³ For details see <https://www.mff.cuni.cz/cs/vnitřni-zalezitosti/predpisy/opatreni-dekana/smernice-dekana-c-11-2020>, last accessed on July 28, 2022.

⁴ For details see <https://doktori.hu/>, last accessed on July 28, 2022.

Slovakia

Full-time doctoral studies in Slovakia last three to four years. The dissertation exam is usually taken halfway through the course, at the end of the second year, and is also equivalent to a state examination. The timing of this depends on whether the doctoral students have accumulated the required number of study and research credits. This is a major watershed for the scholarship amount, as the current legislation in Slovakia stipulates that the monthly scholarship for a doctoral student is 807.50 EUR, and 940.50 EUR after successful completion of the dissertation examination. In Slovakia, full-time PhD training is difficult to reconcile with full-time employment. The workload can vary from university to university, with some requiring doctoral students to be at the university at least 3 days a week for 6 hours a day, and in some cases up to 37.5 hours a week.⁵

Poland

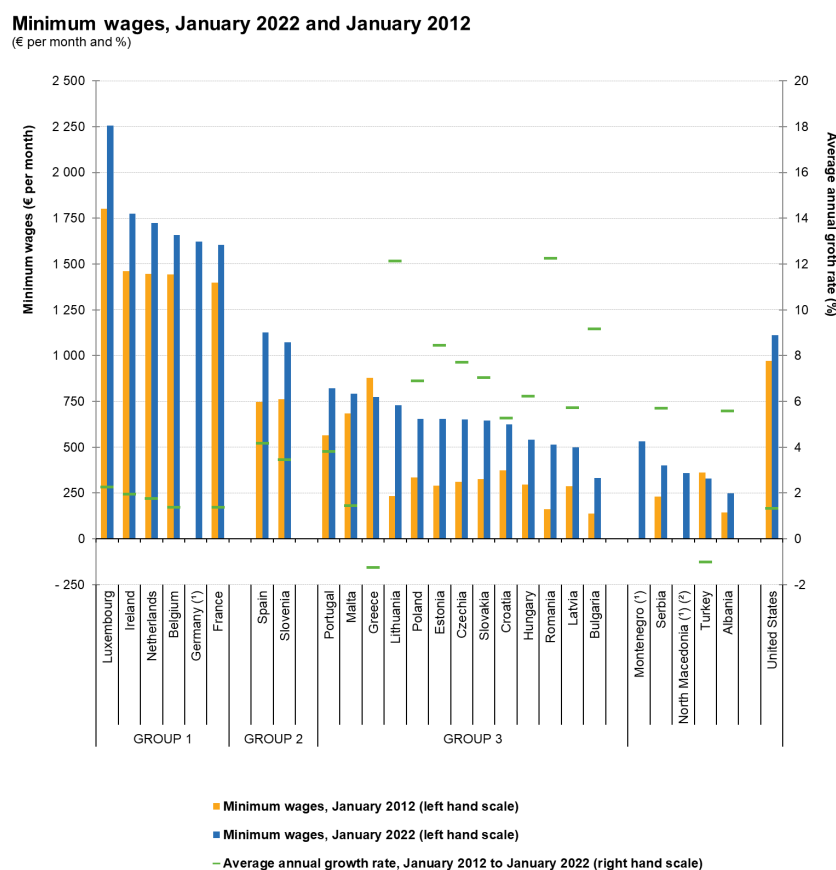
Full-time doctoral programmes in Poland usually last three to four years — often the full four years are required to obtain a degree. Polish PhD programmes are often more structured than in other countries. There are general requirements at national level, specified in the doctoral study regulations of the prospective host university. In Poland, doctoral students have the opportunity to undertake providing up to 60 hours of formal training, during which they teach undergraduate students. As usual, it is a prerequisite for doctoral students to complete compulsory courses as students. The compulsory education, which is the actual expectation, is only a minimum number of hours.

During the course of the studies, the amount of the scholarship is linked to the basic salary of a university teacher. Again, the amount of the scholarship depends on the stage of the course the student is at. On average, a doctoral student receives 37% of the salary of a university teacher up to half way through their studies. After passing the mid-term exam, the scholarship is increased to 57%. Outstanding students are awarded additional financial support at some universities. What does this mean in terms of amounts?

⁵ For details see <https://studyin.sk/slovensko/mali-sa-vam-ii-stupen-vs-riešenim-je-doktorandske-studium/>, last accessed on July 28, 2022.

Currently, the average monthly salary of a university teacher in Poland is 6410 PLN (1360 EUR). A lower stipend would therefore be 2371 PLN (503 EUR), while a higher stipend would be 3653 PLN (775 EUR).⁶

The figure below displays the minimum wages in the other European countries and in the United States in addition to the V4 countries.⁷



Note: Denmark, Italy, Cyprus, Austria, Finland and Sweden: no national minimum wage.
 (*) January 2012 data and average annual rate of change not available.
 (*) Minimum wage in force on 1 July 2021
 Source: Eurostat (online data code: earn_mw_cur)



⁶ For details see <https://studia.gov.pl/doktoranci/stypendia-programy-i-konkursy-grantowe/>, last accessed on July 28, 2022.

⁷ For details see https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Minimum_wage_statistics, last accessed on July 28, 2022.

We can ask ourselves how doctoral students in Prague or Budapest, for example, can live on the amount they are provided, while in Slovakia this amount is quite significant.⁸ Students may get a part-time contract from their university, but it is not uncommon for a doctoral student to have a second job in addition to their PhD studies, which, when supplemented by a scholarship, may not necessarily make the situation seem hopeless. Ideally, the periods mentioned above would apply to doctoral courses. Unfortunately, according to the Hungarian Statistical Office, it takes an average of 7.5 years to obtain a doctoral degree in Hungary [2], while the scholarship is awarded for a maximum of 4 years. In his latest paper, Woolston [9] claims PhD students in the United States also face severe financial problems.

As we can see, sufficient financial support for PhD students is crucial for them to obtain their degree. Such support schemes, however, are ethically questionable if not outright inappropriate, as not everyone has access to the relevant funds, considering PhD grant options are limited and the eligibility criteria are strict. Another serious moral issue is that of the financial security perceived by students who are awarded such scholarships. In many cases, students on scholarships are just as frustrated by their financial situation as those who are not, feeling professionally underrated when realising how little money they receive. Regardless of the poor financial situation of PhD students, universities expect their participation in international conferences and the publication of high quality papers; the related costs are often paid by the students themselves and this is obviously not fair. Students are heavily burdened by such arrangements and thus feel exploited.

2.2. *The supervisor*

The quality of the doctoral student's training is greatly influenced by the person who is in charge of the topic. A *Nature* study of 5700 PhD students found that mentoring is a key factor in PhD student satisfaction. While the majority are satisfied with their supervisor, nearly a quarter of respondents would change their supervisor if they could [8]. The role of supervisors is therefore not small: in addition to sharing their scientific and research experience, doctoral supervisors support doctoral students, stand by them in the

⁸ Of course we cannot buy a house, but we can live on it honestly.

most difficult moments, encourage them, care for them, and work with them. In good cases, they support, encourage, and nurture. But of course, not all cases are good cases.

Universities do not usually have specific and standardized mentoring programmes for doctoral supervisors [4], and usually the supervisor is a minor deity who can decide between life and death. Of course, there are those lucky enough to experience real, high-level, quality subject leadership. In general, however, supervisors tend to try to shape the doctoral student in their own image, rather than exploiting the potential and competences of the student. For example, in some countries, in order to be promoted to a professorship, the researcher applying for the professorship must have doctoral students supervised by him or her. So, in the eyes of the supervisor, the doctoral student can be seen as a means of moving up the ladder.

Following the example of the H-index, Barres [1] recommends using the M-index as an indicator of mentoring ability and defines it as follows: “The M-index would simply consist of an average of the H-indexes of a given scientist’s mentees that is of their average scientific productivity and impact” [1, page 278]. Barres also gives suggestions on how to choose a supervisor who is not only a good mentor, but also a good scientist. After all, the most important factor that will determine the general atmosphere during the entire PhD process is the supervisor’s personality.

In the case of PhD programmes, the lack of mentorship and transparency is considered a severe flaw. In their regular evaluations, usually performed annually, supervisors may even propose the termination of participants from PhD programmes, with appropriate justification. Regardless of the otherwise potentially excellent academic record of students, supervisors will have the final say. It is proven that not only the content of the evaluation (whether positive or negative) has a major impact on the mental state of the PhD student, but also its tone. A wrongly phrased evaluation may also have a negative impact on the communication between student and supervisor and their mutual reactions during an emerging conflict or disagreement. It may lead to serious conflicts if there is a lack of consensus on issues such as the recognition of authorship and dissemination. All this may generally deteriorate the well-being of the parties and delay the PhD process or even result in dropping out.

We should also bear in mind that the right supervisor may make life much easier for PhD students. It is considerably easier to navigate the bumpy road to a successful academic career when having a supervisor who, from time to time, writes that certain letter or makes that one crucial phone call or reveals some brand new opportunities. But again, this borders on moral ambiguity, as PhD students do not graduate on equal terms. They can benefit in both the short and long term.

2.3. Mental health issues during doctoral studies

The mental health difficulties of PhD students have also received increasing attention in recent years [5]. After all, mental stability is a key factor in a doctoral student's ability to perform well and give their best in the roles expected of them. Belgian researchers have found in a large sample study that participants in doctoral programmes are twice as likely to suffer from a mental health problem as other highly educated members of society. Furthermore, one in three of those affected are at high risk or more likely to develop a mental disorder [3]. A survey of PhD students at a US university found that more than three quarters of students experience above average stress levels [8]. Some PhD students (and even academics!) are never satisfied with themselves. No matter how loudly they succeed, no matter how well they are praised by their supervisors, they constantly question their own performance. Beneath the surface, which looks attractive from the outside, lurks a nagging doubt. They are constantly terrified that their whole existence will turn out to be a fraud, their studies, their research, their publications. Their inner experience is that they are in fact window dressers, and it is only a matter of time before someone proclaims that the king (or queen) is naked. They are sure to be exposed at some point, and the great deception cannot last forever. For people with imposter syndrome, one hundred percent is the minimum, perfect is acceptable. They apply chains of thought that recast reality in negative terms.

According to Stubb *et al.* [7], PhD students generally complain about stress, anxiety, and exhaustion. As mentioned before, the mental health of PhD students is also affected by financial instability, the workload and, in some cases, abuse by their supervisors. These are obvious ethical and systemic issues in the profession, and their elimination is essential to create a suitable environment for PhD students.

2.4. Teaching and research supervision duties

Teaching at university is very different from that at secondary school. University researchers, professors, adjunct professors, and even teaching assistants (except possibly some of those in education programs) are not primarily teachers, but rather researchers and scientists in their own field. To be an excellent teacher, is it really necessary to be an excellent scientist? It is possible to be born with teaching talent, but in most cases it is rare. Generally speaking, you can become a good teacher by teaching. You can have all the prior knowledge you want about teaching methodology, most of it will be purely theoretical. Although education / pedagogy / didactics graduates already have some minimum, as they are required to have a teaching practice, the situation will be completely different in the real world, when you have to teach more than just a few lessons to a class. Also consider that any practical experience they may have is all gained at most in secondary school, and we can go back to our previous point that this is very different from university instruction, for which no programme prepares you in advance.

Ideally, when a student decides to pursue a doctorate, he or she is motivated primarily by academic activity and research: to immerse themselves in a problem, to explore a particular topic in detail. As part of their doctoral training, PhD students also take classes that help them deepen their own knowledge, explore possible links with frontier sciences. In addition to listening to the lessons, the PhD student also gets a taste of the teaching activities of the university, be it about holding the lessons (here we can think mainly of practices / discussion sections / problem sessions and seminars), supervising the topic or judging the opponents.

Even after earning a PhD, one does not become an excellent educator in one fell swoop, of course one is also not immediately an excellent researcher at that stage. After the doctoral training, of course, the doctoral student can breathe a sigh of relief, as he/she has reached the end of his/her student duties, one less role to fill. He/she can find a job at the Academy. But recall that he/she has very likely gained only minimal experience teaching at the university, as the emphasis is on research in most doctoral programs. Of course, it is not obligatory to be employed at a university, as you can choose from a number of job opportunities that recruit PhDs and others with

advanced degrees. Such jobs usually pay better and there is no teaching and research supervision requirement.

The question is why anyone would want to work in the Academy if they could work elsewhere under better conditions and circumstances. I believe the answer is simple: dedication. This is by no means a negligible factor, as it is what enables new graduates to draw strength and continue learning after obtaining their degree — this time, primarily in teaching. It is thanks to this commitment that one will not get bogged down in the whole thing and end up leaving the academic career path.

3. Issues Faced by Doctoral Students in Mathematics

Almost everything up to this point was about doctoral studies in general. Let us now zero in on doctoral studies and doctoral students in mathematics.

We have already mentioned in Section 2.2 how important doctoral supervisors are to the mental health and successful academic development of doctoral students. We have also mentioned that most universities do not offer standardized and systematic training for faculty who will supervise graduate students. This means that doctoral supervision is often ad hoc, and in many instances, turns out to be haphazard, if not harmful. However, in the absence of guidelines and training for supervisors, some professors of mathematics developed and published their own guidelines where they describe their expectations as well as their mentoring style for their PhD candidates. See for example related documents from Professor Ravi Vakil⁹ and Professor Allen Knutson.¹⁰ Such initiatives are commendable indeed.

Negative experiences when learning or teaching mathematics have alienated many from the subject. It is a significant problem, as mathematics is an important discipline, equipping students with a broad range of useful skills. No wonder those who wish to master in economics, engineering or software engineering all study mathematics, too. PhD students in mathematics need

⁹ <http://math.stanford.edu/~vakil/potentialstudents.html>, last accessed on July 28, 2022.

¹⁰ <https://web.archive.org/web/20141112170221/http://math.berkeley.edu/~allenk/advising.html>, last accessed on July 28, 2022.

to be made aware that teaching will require a lot of extra effort on their behalf, in addition to their research work because, once they start teaching, they will have to advise their students about the attributes that make a good mathematician. If they fail as teachers, their students will lose their enthusiasm and interest.

Let me address those settled already in their academic careers in mathematics: In the name of ethical conduct we need to be aware of the consequences of the lack of proper teaching skills for future generations. Let us not forget we were in the same position as them, before we obtained our degrees! We need to teach without oppression, relying on good communication instead and showing pathways representing rather principles than rules. We need to encourage our students to think critically and at the same time not to be afraid to use complex mathematical apparatuses. And when they fail (because they will inevitably fail now and then) we need to provide both professional and moral support.

Now to the doctoral students: Answering ethical questions is not an easy skill to master as a PhD student. And yet, when studying for your PhD, you will rarely discuss ethical issues that affect teaching. Ethical issues concerning data recording and analysis or publications are more frequently addressed. Your moral compass should be the old proverb: always do the right thing. So be aware of your own responsibilities and obligations, respect others and their opinions, whether they be students or professors, and be honest with others as well as with yourself.

4. The Real Life Experiences of A Mathematics Doctoral Student

In the early days of the COVID pandemic, in the summer of 2020, I had the opportunity to talk to a former PhD student who has completed not one, but two PhD programmes in mathematics; he also has a Master's degree in teaching. The PhD programmes were completed in two different countries of the V4.¹¹

¹¹ So it couldn't have been that bad an experience if he voluntarily did it twice, right. Right?

In this section, I share some notes from my interview with this person (henceforth to be called FPS) and briefly discuss some of the issues that came up.

4.1. *The Interview with FPS*

Q. Why did you apply for a PhD training?

A. *As a final-year Master's student, after one of my exams, the associate professor who I had previously studied with called me into his office and asked me what my plans were for the future. As I was studying to be a maths teacher, the answer was obvious: to teach maths, which was already my passion and, fortunately, still is. That is when he suggested that I looked around at the doctoral schools in one of the countries, because he saw potential in me. It was unexpected. The funny thing is that I did not have much time to think about it, because the application deadlines were just days away. I have collected the topic papers that most interested me. After a short reflection, I contacted the potential supervisor and, after a consultation, submitted my application to one of the best-known universities in the country, with the approval of my future supervisor. Nowhere else. I put all my eggs in one basket, I thought. Perhaps this is where I made my first big mistake.*

Q. By this, you mean the university of your choice? Have you had several big mistakes?

A. *I do not mean university. The choice of the supervisor proved premature. As I said above, I was looking primarily for published topics. The topic I applied for was suitable and interested me. Initial consultations with the topic leader went well. I had no teaching duties, only to complete the doctoral courses, read articles and process data in her research. She was quite firm with her ideas. Of course, I must say that she had no bad intentions. It was just that when I had to submit some kind of report, some kind of material, it was never good enough, or I got quite negative feedback, which was demotivating. I spent more and more time on each one, striving for perfection, trying to make it as good as I could, and even when I had finished it, I did not dare send it to her for days. Then came the next reprimand, telling me why I had sent it so late and that the material still needed improvements — so it went round and round. I also taught in a secondary school, on a 50% contract, because the doctoral scholarship was not really enough to live on.*

Eventually it got to the point where the head of the doctoral programme called me in to see me. I realised afterwards that this was my second big mistake: not going to see him earlier. My supervisor had outlined her position to him, so he called me in. My supervisor was not present at this meeting. The programme leader was nice, he did not make me feel the difference in the hierarchy at all, he wanted to solve the problem at hand. During this discussion I was confronted with the fact (and then independently by the psychologist) that I have Impostor Syndrome. According to him, I was not the first such person he had met. But by then, irreversible damage had been done: I had to look for a new supervisor. I wanted to keep my subject — I had already put a lot of work into it. This in turn has significantly narrowed the options. But with the help of the head of the doctoral programme, I found a new supervisor, and thanks to her, everything worked out well. True, I had to give up teaching at secondary school. I do not know of any other big mistakes. (smiles)

Q. So you have completed your PhD training?

A. *The short answer is yes. The longer answer is: I have done a lot of work, but this time I have had help from several directions. Things have turned out for the better, so to speak. I published my first paper, which was also a first-authored paper, and then came a paper with IF. I have also participated several times in international conferences, where I have received positive feedback from researchers about my results. Success has brought another success. I was still not completely at peace with myself, but I talked a lot to my psychologist about it, which helped. He pointed out to me that I was experiencing the concept of the Matthew effect, which can be described as accumulated advantage: “For to everyone who has will more be given, and he will have an abundance. But from the one who has not, even what he has will be taken away.” (Matthew, 25:29) I tried to look at things in a more positive way.*

Q. After that, how have you come up with your second doctorate?

A. *The first programme focused more on the didactics of mathematics. I have to say that during my doctoral years there I had managed very few classes, which I missed. During my doctoral studies, however, I was expected to know some of the more serious mathematics. As I had studied a lot on*

these topics and was keen to work on some of them later, the topic was given – and this time I made sure I was sure with the topic leader. I sat in on the presentations of the chosen topic leader at various conferences, then I contacted him, we corresponded, and we got to know each other better. Out of all my supervisors (undergraduate, masters, PhD trainings), he was the most rigorous, but a true mentor in every way. He asked me for accounts, but also gave, offered, did not overload me with information, supported me, showed me the way, yet did not limit me. He was keen to share his vast knowledge, educating me not only as a student, but also as a researcher and a man (and I was in my 30s at the time). I couldn't have wished for better. During my second doctorate, I was able to teach students more. I was given the opportunity to do this every semester, which also taught me a lot. Both doctoral programmes gave me something different.

Q. Are you planning, perhaps, a third doctorate?

A. *They say never say never. But in the meantime, I started a family and my wife, who has been with me through the whole ordeal, insisted that if possible, there should not be a third. (laughing.)*

4.2. Analysis of the interview

Several of the difficulties for PhD students discussed previously can be found in the interview responses of FPS provided above. These responses illustrate that the general phenomena described above in Section 2 can also occur in mathematics PhD training. Let us reflect on the ethical issues related to FPS's experience:

- Selection of supervisor: the expectations were not clear, the style and personality of the supervisor were not known to the candidate. The supervisor should have clearly laid down the rules between the two parties.
- The supervisor interfered too much with the direction of the research leaving insufficient room for the PhD student to develop.
- The supervisor mostly provided negative feedback, did not offer constructive criticism, but blunt negativism only, which put unnecessary pressure on the student. This led to regular visits to the psychologist.

- Low grant payments meant the student was forced to take a second job. This left him with insufficient time to do his research and other tasks. As a result, he lagged behind the others, which further damaged his relationship with his supervisor.

As indicated by the interview, FPS worked with radically different supervisors regarding their mentalities. When I asked about his personal opinion as to what had been the most profound force influencing him in the course of his PhD studies, he immediately pointed out the definitive role of supervisors. This answer matches what has been discussed previously.

5. Conclusion

For those who wish to pursue doctoral studies, it is important to consider all its positive and negative aspects before applying. Obtaining a PhD is not an easy process and there can be many pitfalls along the way. The right choice of topic, the person who supervises the topic, the financial background: all have a major impact on whether the doctoral student will be able to complete the training, whether he or she will be able to succeed in his or her future career, or whether he or she will become a good university lecturer, with the right ethical compass.

Our education system (or we can say, the Academia) should accept the ugly truth. The reality is that not every PhD holder can teach a class or be a good research supervisor. If a PhD holder is good at research or has a good understanding on his/her subject, it does not mean that he/she is a good teacher or a good mentor. But the latter skills can be developed, practised, and honed. Unfortunately however, since the development of this skills is rather neglected in doctoral training, this task falls to the individual. Will he/she have the ambition to become a good teacher as well as a researcher and mentor?

Let us end on a higher note. All is not lost, even if we have painted a slightly negative picture. We simply have to be aware that everything has a price. The question is: are we willing to pay the price?

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