

Summary

Qualitative study of education of doctoral students in projects supported by FNP under Measure 4.4 of the Smart Growth Operational Programme

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Study

One of the key objectives of the Foundation for Polish Science is the training of research personnel. Programmes co-funded with EU structural funds (Measure 4.4 of the Smart Growth Operational Programme) enable researchers to create teams recruiting young researchers, including doctoral students. Under these projects, doctoral stipends and research are funded, which should ensure young people the best possible conditions for growth. The high quality of experiences gained by them during their work on the doctorate is thus key to the success of the Foundation's programmes.

Training of doctoral students within projects implemented under Measure 4.4 was the subject of an in-depth qualitative study. In the course of the study, four focus-group interviews were held. A total of 26 subjects, including 15 Poles and 11 foreigners, took part in the study.

The interviews raised such issues as motivation to undertake doctoral studies, as well as the quality of the scientific mentoring provided by the project leader, the scope of their duties, and involvement in various aspects of scientific work. We were interested in how doctoral students are stimulated to achieve autonomy, how their cooperation with other scientists looks, how they assess the research they conduct, and what plans they have for the future.

In the case of the foreign doctoral students, the fundamental question was different: What is the value of the training and experience they obtained on a Polish research team? Was the decision to conduct PhD programme in Poland the right one? And would they recommend the position of a doctoral student in Poland to other scientists?

Key conclusions

Motivation

The position of doctoral students in projects financed under the programmes (Measure 4.4 of the Smart Growth Operational Programme) has attracted not only persons who previously planned research work, but also those who were considering various professional options or indeed had other plans (e.g. to begin work in a company immediately after completing their second-cycle studies).

The clear majority of the interviewees joined projects after a direct invitation from the team leader with whom they had previously worked. The magnet was the authority and standing in the community of the project leader, the attractive topic for the project, and, to a large degree, the high stipend (greatly exceeding the typical doctoral stipends and comparable to the income opportunities on the commercial market). Previous acquaintance with the project leader or persons in his or her circle, confidence in the leader, and the opportunity to work in a recognized and friendly environment, were all relevant. What was decisive often was a recommendation by colleagues from studies, but also from master's thesis advisers. Foreigners more often applied for projects after finding an announcement on the Euraxess site. Interestingly, however, in this group as well there were persons who were previously familiar with publications by the project leader, had met him or her at a conference, or had heard of him or her from their own previous adviser.

Scientific mentoring

It is specifically the competencies and renown of the project leader that draw doctoral students to a given research team and fundamentally impact their assessment of the attractiveness of work on the project. Doctoral students realize the huge role played by the scientific supervisor. We can state with great satisfaction that in the sample studied, there was not a single person who felt disappointed in these expectations. For them the project leader is an authority figure, they trust his or her orientation in the field of research, and they are impressed by the leader's position in the research community as well as foreign experience and contacts. They also value the leader's way of thinking and creativity, observed in direct contacts. Another characteristic of the leader indicated by the subjects is his or her commitment to the work. In some interviews, the project leader was regarded as a role model, sets standards for involvement and integrity, motivates, teaches cooperation with other researchers, and facilitates international cooperation. In the scientific area, the leader sets the general goal of the research and backs up the doctoral students in successive steps on their way to this aim. He or she also models ethical standards.

All of the subjects interviewed were highly satisfied with the scientific level and working methods in the team. Different styles of work prevail in particular teams. Young leaders have a more direct management method, which involves less personal distance from the members of the team. More advanced leaders, especially those heading large teams, often delegate part of their duties to assistants or postdocs. Although their presence is less intense, in the assessment of the doctoral students they are accessible and scientifically supportive. Both the frequency and quality of the contact were rated very highly.

The quality of cooperation with the project leader is of crucial importance, because the director serves two different roles with respect to the doctoral students, which sometimes can come into conflict. On the one hand the leader is the doctoral candidates' mentor, concerned for their growth, and on the other hand is their boss, responsible for implementation of the project in compliance with the grant agreement, and must enforce the performance of certain tasks by his or her subordinates. According to the collected interviews, the laureates selected by the Foundation seem to skilfully combine these two tasks.

According to the comments by the interviewees, the supervisors on the one hand enjoy great authority in their eyes, and on the other hand, tend to rely on open communications, in which differences in status and place in the academic hierarchy do not impede the possibility of expressing their own opinions. To the contrary, the subjects feel encouraged to state their own views on the research and have a sense of influence on the project. The method of supporting doctoral students in solving research projects is also generally described as a combination of pointers and encouragement to seek their own solutions, which stimulates growth.

Results, publications

In a situation of growing dependence of research teams on published works and the grants obtained on the basis of such works, pressure to obtain positive results is a serious threat in the process of training young researchers. All of the doctoral students interviewed, without exception, stated that they had not felt pressure to obtain positive, "publishable" results. They draw from their supervisors a belief that unsuccessful experiments are part of the research process. In the event of multiple failures, constructive discussions are held with the scientific adviser and a debate with the entire group. The doctoral students interviewed had no doubt that their supervisors count not only on the result of the specific experiment, but also on integrity and a capacity for critical reflection.

According to the interviews, the subjects also do not feel pressure from their project leaders for quick publication. The subjects believe that the period of doctoral studies should be used not only to obtain the doctoral degree, but also to build up appropriate accomplishments. They also realize the importance of publishing in a scientific career. Their previous experiences connected with publishing were quite varied: opportunities to publish

are strongly dependent on the discipline and the specifics of the research, and most of the subjects were at an early stage of their doctoral studies. Publication strategies differ greatly between teams. In some places, the emphasis is on quick publication and great autonomy of doctoral students in this respect. At the other end of the spectrum are groups that place great importance on the prestige of the journal, and thus there is a great focus on one high-quality study or article, which they work on for a very long time. The latter strategy appeared to predominate in the groups studied.

Another topic of the interviews with the doctoral students was the method of drafting publications, and more specifically the supervisor's participation in this process. First, doctoral studies should teach autonomous writing of publications. Second, publications in general are the fruit and testimony of work by persons who do not include just the doctoral student alone. Third, the supervisor is in large measure accountable for these publications (at least with respect to project performance indicators). Equally important, publication of an article in a good journal requires professional elaboration of the topic, often exceeding the possibilities of a beginning researcher. In the teams studied, there is an attempt to achieve the proper proportion of effort from both sides. Publications are a result of joint work, during which the doctoral students develop skill at working on scientific texts, without shifting the burden of responsibility for this task to the scientific supervisor.

Another issue raised in the discussions on drafting of publications was the rules for co-authorship of articles. It is well known that this area can be the subject of abuses, and proper rules for acknowledging the contribution of researchers to the creation of publications should be one of the foundations for work in teams financed by FNP. According to the doctoral students interviewed, the rules for determining co-authorship of publications are quite clear in their teams. Although the adviser/supervisor devotes a great deal of work to preparing the publication, his or her co-authorship is determined by the actual share in generating, working up or analyzing the results. Also in groups where publications are the result of the work of many people, the rules for inclusion in the list of authors are clear to the doctoral students.

Contact with other scientists

Another experience valued by doctoral students is conference presentations. Here also the common practice is for the adviser to be involved in preparing the presentation and coaching on the public aspect of giving the presentation, in which other members of the team are also helpful. Thanks to the support of their supervisor and the entire team, the doctoral students interviewed have a feeling of confidence that the material they are presenting is valuable and are not worried about confrontation with "external" researchers. It may even be said that they take an enthusiastic attitude toward new opportunities for encounters and promotion of their own achievements.

The doctoral students perceive their working environment as scientifically stimulating. The horizontal support received from other members of the team is also rated highly. Team members from other countries are a particularly valued resource. The difference in their experiences and education increases the appeal and usefulness of their shared discussions. Renowned groups of FNP laureates also attract foreign visitors. The doctoral students mentioned the opportunity to present their results to visiting scientists. Workshops led by foreign guests are organized in some groups. Most of the doctoral students take direct part in international cooperation or have plans for such activity. As part of this cooperation, many people go on study visits and brief internships, but consultations at a distance (correspondence, Skype calls), exchange of samples, or commission of analyses, are also common.

Autonomy

The essence of training of doctoral candidates is to encourage their autonomy and independent thinking. At the same time, their role in the project is largely defined in advance and subordinated to the aims and needs of the project leader. The subjects have the sense that their task is to realize the previously adopted research concept and to follow the supervisor's way of thinking. But they also take the view that in their striving for a defined goal, they have great autonomy in seeking their own path to achieving it. While the general research tasks are essentially adopted in advance, the doctoral candidates are expected to provide ideas and proposals on specific solutions. In some instances, promising ideas are developed in the form of side projects of the doctoral students. It sometimes happens that doctoral students' ideas mark out new methods for development of the project. All of the subjects thus have a sense of responsibility for organization of specific stages of the research process, and, as follows from that, an influence on the entire project.

The motivation to independent thinking applies not only to research in the literature, but first and foremost to discussions of the results obtained and planning of further steps. A key issue is the open, "democratic" nature of the discussion, in which members of the group, regardless of their status in the team, are encouraged to present their ideas and to question the adopted solutions. The doctoral students describe with satisfaction the free debates held within their teams and with their supervisors. They are particularly pleased with instances in which an opinion raised by an "ordinary" member of the team is treated seriously enough to result in a modification of the project. They also learn autonomy in contacts with researchers and partners from outside the team.

At a more advanced phase of doctoral studies, a manifestation of autonomy is the readiness to formulate one's own research project and plan the next step in one's career, e.g. leaving for a postdoctoral fellowship. The early phase of involvement in research work means that most of the subjects here were currently seeking ideas for their own research projects. Nonetheless, they participated actively in discussions on the research prospects of their own and other teams.

There are also instances where PhD students prepare their own grant projects. This happens primarily in situations where the prospect of completion of the FNP grant is relatively near and the supervisor encourages applying. There is also another reason: in some teams, it is expected that members will seek grants, considering this as one of the researcher's tasks and also an element of the training of young scientists. The other doctoral students interviewed, who do not yet feel pressure to obtain funding for research, also have the feeling that applying for grants is an important skill they would like to acquire during their doctoral studies.

In short, the doctoral students interviewed are satisfied with the level of autonomy achieved in the cooperation with their supervisor/adviser. They particularly appreciate this as they have a sense that autonomy is balanced by genuine support.

Plans for the future

When asked about their further professional plans, the doctoral candidates in the sample were largely not yet decided on what they want to do in the future. As they stressed, being at a relatively early stage of their doctoral studies, they are focused more on their immediate tasks, experiments, or completing their doctorate on time. Their further aims, after the doctorate, seem to them an issue that is far off in time. They expect that ideas for the future will appear during the course of their doctoral studies, and they don't feel a need to establish long-term plans.

Much as in the case of the motivation to take up doctoral studies, a relatively small group of the subjects feel that they want to continue their research work and remain at the institution. The motivation here is primarily an objective interest in science. Some of the subjects declare plans to take up work in industry or to establish their own firm based on their research results and experiences. Most of the subjects have imprecise plans: they are eager to remain in science, but do not rule out other possibilities. A well-regarded option is to combine research work with the commercial sector. Significantly, the subjects feel that doctoral studies and the team they are working in provide a good foundation for building their own professional life, whether or not in academia. They regard their own work on the project and their own doctorate as developmentally aimed and creative, and consequently, as a good preparation for further professional life in various forms. This does not mean discouragement from science or the unreliability of this field. To the contrary, research work appears to be a good foundation for further commercial ventures.

Uncertainty as to future professional plans means openness and readiness for mobility. The doctoral students have a sense that working in their current team and institution is not the only option. They are willing to consider various possibilities, including work abroad. They treat a change of place as a natural thing, much like continual searching for the most attractive options. Despite the optimism with which the doctoral students speak of their anticipated possibilities, their statements betray a sense of instability in their working

conditions, and uncertainty and unreliability of their long-range plans. On one hand, it may be concluded from their statements that they are not planning their future because they are not yet aware of all the possibilities, and on the other hand because they have a sense that their environment is rapidly changing and it is not worthwhile to attach to it their ideas for the future.

Doctoral students from abroad

For doctoral students from Poland, doctoral studies with an attractive stipend, in an intellectually stimulating environment and an opportunity for international mobility, seems a safe choice. Additionally, some of them remain in groups in which they worked earlier, so they didn't have to overcome the additional stress connected with a change of environment. For them the doctorate is an opportunity to obtain additional qualifications, opening the way to various career paths. The perspective of foreign doctoral candidates is distinctively different. For them, coming to Poland was a huge challenge, as is life in the Polish reality (uncertain legal status of foreigners, social isolation). Thus they count even more on measurable effects of their stay here. Because in most cases they would like to obtain a postdoctoral fellowship in another European country, they need to achieve not only research experience but also strong publications. Although they value the working style in Polish teams, including the low level of stress and the lack of pressure for quick publication, they clearly feel greater internal pressure to publish. Like the Polish doctoral students, they rate very highly the level of the research projects they are participating in. They are impressed by the accomplishments of their project leaders and value their direct contact with them. They perceive their scientific environment as attractive; within the same institution they can easily find specialists from related fields and seek their assistance. They appreciate the high level of the apparatus and research infrastructure. They participate in cooperation with foreign institutions, which provides them a sense of involvement in international science. One of the measures of the subjects' satisfaction with their stay in Poland is that most of them are inclined to recommend studies in Poland to their friends. Some of them have already done so.