Pedagogisk reflektion

Doctoral Students at Small Institutions – Challenges and Possibilities

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Introduction

In Sweden, 11 universities have PhD programs in biology. Most of them are large universities with well-established infrastructure for doctoral education, such as Lund University and Uppsala University. There are also institutions that have acquired permission to examine PhD students quite recently, such as Linnaeus University. However, among these 11 institutions, there are no university colleges (”högskolor”, i.e. smaller universities). I belong to one such university, Kristianstad University (HKR). At my faculty (natural science), despite not having the authority to confer a doctoral degree, we have had several doctoral students in biology over the years, and I have supervised a few. A distinguishing feature of these students is the need to be enrolled in a PhD program at another university. The conditions for such students are therefore a bit complicated – being employed and primarily active at HKR while engaged in a doctoral program elsewhere. The arrangement poses specific demands on doctoral students, and on their supervisors. The purpose of this paper is thus to identify specific challenges and advantages faced by doctoral students at small institutions and to discuss the implications of such pros and cons for the supervision of doctoral students.

Unfortunately, there seems to be no previous research contrasting institutions of different sizes (resources) in terms of consequences for doctoral students, which has been highlighted as a shortcoming (Gardner, 2010a). Therefore, several of the assertions given below cannot be

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confirmed by research but are rather based on presumptions or personal observations. Moreover, most content below is applicable to any discipline, although some is specifically linked to the field of biology.

To be a doctoral student at a small institution

Cons

It is a matter of fact that conditions for research vary between institutions, in part influenced by their size. This can pose challenges for doctoral students. Small institutions often have more limited resources compared to larger ones, both in terms of financial resources and personnel. For a doctoral student, a constrained financial base may make it more difficult to invest in or get access to research equipment, as well as potentially limit opportunities to secure research grants. In fact, in competition with more established research groups at large institutions, it can be quite challenging for small institution researchers, including doctoral candidates, to secure external research funding. This can partly be explained by the fact that large institutions often have more extensive networks and established research environments, which can facilitate approval by external funders. Therefore, at small institutions, additional efforts are usually required to convince stakeholders about the relevance and quality of the research.

Moreover, if a small institution is characterized by a small number of researchers, it may create an environment with limited diversity of perspectives and expertise. In fact, it is likely that small institutions may face challenges in retaining or attracting highly qualified researchers. This can in turn lead doctoral students to experience a shortage of available supervisors or sounding boards with specializations in their research area. Such aspects have previously been described to have bearings for *socialization*, i.e. the process in which knowledge, skills, norms, etcetera, are acquired within a specific context (e.g. Austin, 2002; Bragg, 1976; Tierney, 1997). For graduate students, Bragg (1976) identifies three different types of interactions important for socialization to be successful, i.e. with (1) structures of the educational setting, (2) other students within the same context (e.g. department or research group), and (3) faculty staff (e.g. senior researchers). Although some research indicates that the importance of student interactions for

socialization may differ between disciplines (Gardner, 2010b), one such setting shown to be successful is writing groups (Aitchison, 2009). Such groups do not only improve the writing process (e.g. manuscript content and structure, keeping deadlines, dealing with criticism, etcetera), but has also other positive effects, for example by contributing to a relaxed atmosphere within the work alliance (e.g. Aitchison & Guerin, 2014). Nonetheless, the prerequisites for Bragg's (1976) model should naturally be dependent on the size of the resources at the institution. In other words, at small institutions structures may be less developed, and the number of doctoral students and faculty staff less than at larger ones. At the very extreme are such institutions that do not have hardly any structures for PhD studies at all, and where doctoral students therefore need to find ways for socialization at other institutions.

Small institutions, in contrast to their larger counterparts, may be characterized by limited breadth and depth, not only in terms of research environments but also in structures of their PhD programs. This limitation can manifest in several ways, such as the diversity of PhD courses that are offered. For example, most Swedish universities with PhD programs in biology require at least 60 credits of courses to be included in the doctoral work (total 240 credits). However, there are some exceptions (3 universities), with the lowest number of required course credits (30) at Örebro University (2024). In this context it is also interesting to note differences in mandatory courses. Some universities list a relatively high amount of such courses, whereas others list only a few. For example, Lund University (2024) requires 8 courses summing up to 36 credits, in contrast to Linnaeus University (2024) which only requires 1 mandatory course (4 credits). This disparity could arguably be an effect of the resources at the universities, where the larger ones have better possibilities to offer more courses than smaller institutions. Students at the latter may thus need to look at the possibilities of taking courses at other universities to fulfil the PhD requirements.

Large institutions often hold extensive and multifaceted research programs that span a variety of disciplines and subject areas, whereas small ones may adopt a more niche focus, with fewer research groups and specialized domains. Such structural differences may consequently create an environment where doctoral students at small institutions may

not be exposed to the broad diversity of research questions and methodologies that they might encounter in larger settings. There is hence a risk that doctoral students at small institutions may experience a sense of isolation if they are the sole representatives within their research area, and that limited diversity within the research field may restrict perspectives and hinder exchange of ideas. If a small network also concerns senior researchers at the institution, this presents an additional challenge for doctoral students since interactions with other researchers, both within and outside their specific study field, may be constrained. In other words, there is a risk that opportunities for spontaneous discussions, interdisciplinary collaborations, and the exchange of ideas may be less frequent is such contexts. This deficiency in diversity and interaction can possibly impact the intellectual growth and breadth of doctoral students' research perspectives, as well as overall productivity (Louis et al., 2007). Another, and an even more serious, effect of few interaction possibilities at the institution is that such isolation may increase the risk of leaving the doctoral program (*attrition*). Such a scenario may be induced by confusion about the structures of the program, or by defective communication between peers (student-to-student) or with faculty staff (Ali & Kohun, 2006).

In addition, if small institutions also mean limited research infrastructure, it can pose a significant risk to the research opportunities and realization of experimental projects for doctoral students. For example, laboratories, often central to biological studies, may arguably be less equipped or have fewer resources at small institutions compared to large ones. If true, this means that doctoral students at small institutions may encounter challenges in accessing advanced technological equipment and necessary tools for their research projects. For doctoral students reliant on advanced laboratory experiments, restricted equipment may require them to be creative and innovative in finding alternative methods or solutions. It may also mean that certain types of research, especially those requiring highly specialized equipment, may not be feasible.

Pros

Small institutions, where the staff is limited, can presumably result in closer relationships among colleagues compared to larger institutions, creating a conducive environment for open communication and direct support. The fact that a research group is small may hence facilitate the doctoral student and the supervisor truly getting to know each other, which may promote communication and create an atmosphere where the doctoral student feels more comfortable sharing ideas, thoughts, and concerns. Likewise, the supervisor can more effectively tailor support and guidance to the individual needs and working styles of the doctoral student (cf. Wichmann-Hansen et al., 2011).

One could hence argue that the working climate and the sense of belonging to a community could potentially be influenced by the size of the institution or research group. A doctoral student may experience a higher level of camaraderie in a smaller group, and possibly receive greater support from supervisors, fellow students and colleagues compared to larger groups. This is supported by Louis et al. (2007), who found negative correlations between the work-group size of graduate students and postdoctoral fellows, their willingness to share their work, and to openness of the discussion climate. Whether this also applies to senior researchers is not clear. Yet, belonging to small research environments where seniors have few students to supervise would naturally lead to better opportunities for more frequent supervision, which arguably may promote a sense of inclusion and support for the doctoral students in their work and research endeavours.

Another potential advantage of being a doctoral student at small institutions is greater flexibility compared to larger ones. One example is related to what was mentioned above, regarding the courses included in doctoral programs in biology. At an institution such as Linnaeus University (2024), where the requirements for specific courses are limited, there may be better opportunities to adapt the program content based on the doctoral student's interests and research area compared to institutions with more specified requirements. Greater flexibility at small institutions may also be linked to simplified work structures, with less

developed hierarchies, and shorter and faster decision-making processes. With fewer bureaucratic obstacles, the doctoral student can instead dedicate more time to the primary task, viz the research project.

At a small institution, competition for resources may be less compared to larger ones, thereby constituting an advantage for the doctoral student. This encompasses not only personnel, such as supervisors and other senior researchers, but also access to laboratory equipment, which may be utilized less at a small institution compared to a larger. If true, this means that the doctoral student has better opportunities to book and use equipment for their experiments and research projects. Lower competition may possibly also extend to scholarships, research grants, and other structural resources.

Based on personal observations from universities within my network, I argue that doctoral students at small institutions often have rather good opportunities to be engaged in teaching, which may not be as pronounced in larger institutions where senior faculty members receive the lion's share of teaching. This does not only apply to teaching per se, but also to developing and leading courses. Such experiences enrich the doctoral student's academic portfolio and contribute to integrating research into education and fostering the academic development of students.

The conditions for participation in discussions about the institution's activities, including strategic decisions and research directions, are likely better at small institutions compared to larger ones. Through such involvement, doctoral students not only gain a deeper understanding of how academic institutions function but also have the opportunity to shape and influence the overall research environment at their institution. This likely creates meaningful and rewarding participation in decision-making processes that can enrich doctoral students' academic experiences.

Finally, doctoral students at small institutions may find it easier to establish themselves as researchers compared to larger settings. The more intimate academic environment may allow for closer associations

with faculty members and peers, fostering a supportive and collaborative atmosphere. With fewer students and a more personalized approach to mentoring, doctoral candidates can receive individualized guidance that may facilitate their research development. As a result, doctoral students at small institutions may possibly experience a smoother path towards establishing themselves as emerging researchers, compared to doctoral students at larger institutions.

Strategies for successful supervision at small institutions

For supervisors, it is important to bear in mind that conditions for doctoral students may vary between institutions, in part directed by size and resources. To acknowledge and address challenges and advantages for doctoral students at small institutions, I suggest that supervisors specifically consider the following when guiding students:

- Take advantage of the flexibility of a small institution in establishing the individual study plan.
- Provide guidance in optimizing the utilization of available resources, such as personnel and equipment.
- Offer support in identifying funding sources and developing persuasive research grant applications.
- Emphasize the benefits of a less competitive environment for securing research resources for future projects.
- Highlight the advantages of a cohesive and small research group, and encourage collaboration within the group for increased productivity, using, for example, research seminars and writing groups.
- Support participation in and development of external networks and collaboration (e.g. encourage participation in conferences, workshops, research schools), both to expose the student to a broader research landscape and to increase access to external funding opportunities.
- Encourage participation in courses at other institutions to promote breadth and depth in the research subject.
- Encourage engagement in teaching to develop pedagogical skills and enhance future career prospects.

- Make the student aware of the benefits of short communication and decision-making pathways.
- Emphasize the possibilities to be engaged in planning and development efforts at the institution.
- Invite successful researchers from small research environments to meetings or seminars.

In conclusion, the effectiveness of a research team, including its doctoral candidates, is not solely determined by the size of the institution and resources. In fact, other factors are probably more important, such as showing respect for each other's differences and expertise in the group, assisting weaker group members, and believing that productivity is enhanced by collaboration rather than individual efforts (Clark, 2005). Nevertheless, the impact of structural conditions at institutions are also interesting to recognize, and it is somewhat surprising that is has not been addressed in previous research (see also Gardner, 2010a). This thus motivates future research efforts on the subject.

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