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Course Supervision Challenges in PhD Education

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Abstract—A large portion of the PhD education in Sweden is dedicated to courses. This made it interesting to explore potential course supervision challenges in the PhD programme. A multiple-case study was conducted to identify such challenges and explore how these are perceived by students and supervisors at the Faculty of Engineering of Lund University. By interviewing students and supervisors in five different research groups, insights were gained into how the main stakeholders reason about courses. The findings indicate that courses that are to be included in the education are characterized by a large degree of freedom tailored to individual student needs and preferences. However, the type, timing, availability, value, and convalidation of courses are challenges that limit this freedom.

Index Terms—PhD, Education, Courses, Supervision, SoTL, Technology and Engineering

I. INTRODUCTION

IN Sweden, courses play a vital role in the education of PhD students. A large portion of this education is dedicated to courses, in some cases up to half of the programme curriculum. Lund University's Faculty of Engineering has different course requirements depending on the research subject. Figure 1 shows the number of research subjects that require a particular number of higher education credits for Licentiate and Doctoral degrees. Surprisingly, very few investigations and little literature can be found on the topic. That is why we have posed the following questions: How do students and supervisors perceive the role of courses in the PhD education? How are courses integrated with research? What is the value of courses? The purpose of this paper is to empirically explore potential course supervision challenges in PhD education.

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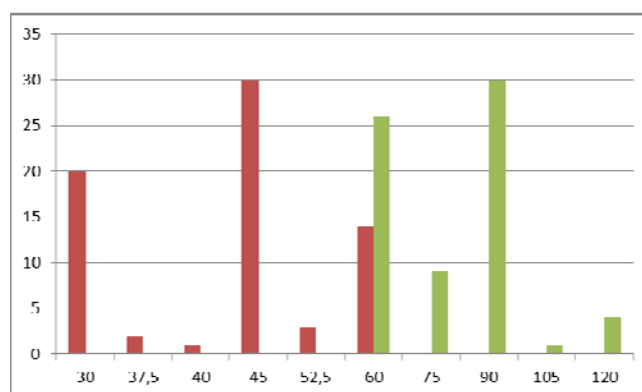


Fig. 1. Course requirements in research subjects. Red bars show the number of research subjects that require a particular number of higher education credits for a Licentiate degree. Green bars are for a Doctoral degree.

II. METHODOLOGY

A multiple-case study was conducted to identify course supervision challenges in the PhD education and explore how these are perceived by students and supervisors at the Faculty of Engineering of Lund University. The case study method was considered appropriate since it provides depth and insight into a little known phenomenon with a lack of previous investigations and literature [1]. Five cases (i.e., research subjects/groups) were primarily chosen based on the authors' affiliations, enabling data access and the opportunity to use the authors' previous observations and insights into the research groups.

To gather data, semi-structured interviews were conducted with students and supervisors. The students interviewed were at different stages in their education and the supervisors' experiences ranged from one to more than 30 years. Table I summarizes the number of individual interviews carried out. The data collected was put through a within-case analysis resulting in "case study write-ups for each site" [2]. The five case descriptions from the within-case analysis are presented in [3]. Finally, a cross-case analysis was carried out to identify patterns among the cases.

TABLE I
NUMBER OF INDIVIDUAL RESPONDENTS INTERVIEWED

	AC	CP	EL	EAT	PL	Total
PhD Students	6	5	5	5	4	25
Supervisors	4	2	3	2	3	14

AC = Department of Automatic Control, CP = Department of Combustion Physics, EL = Division of Engineering Logistics, EAT = Division of Ergonomics and Aerosol Technology, PL = Division of Packaging Logistics

III. RESULTS AND DISCUSSION

In the research groups studied, the selection of courses to be included in a PhD programme is characterized by a large degree of freedom to tailor the courses to individual student needs and preferences. However, it seems that this freedom has potential constraints related to the following five challenges: type, timing, availability, value, and convalidation of courses. These challenges were identified in the cross-case analysis and are discussed below.

Types of Courses

All the research groups studied required a number of different types of courses within their PhD programme. Table II illustrates the focus of the research groups across a palette of course types. The main discussion evolved around the question of whether the courses serve the acquisition of broad or deep knowledge, that is, an overview of the subject or courses tailored to the research topic. Generally, students wanted tailor-made courses that would directly relate to their research topic. This indicates that they were more interested in “depth” than “breadth”. This is in contrast to their supervisors’ views, who saw a broad range of courses as a necessity to develop as a researcher. The extent to which supervisors stressed this point differed across the research groups.

TABLE II
COURSES PALETTE ACROSS RESEARCH GROUPS

Type of course	AC	CP	EL	EAT	PL
Breadth	X	X	X	X	X
Depth	X	X	(X)	X	X
Methods		X	X	X	X
Pedagogical	(X)	X	(X)	X	X
Leadership		(X)			X
Transferrable skills		(X)	(X)		

All research groups required a breadth of courses. The question of depth varied, however. At EL, the thesis itself was considered to cover the aspect of in-depth knowledge, while courses served the purpose of extending the knowledge base of the students. Moreover, all research groups stressed the need for methods courses except AC, which probably resulted from mathematics being used as the dominating method in this subject.

The question of pedagogical courses deserves further attention. At CP, EAT and PL they were considered an essential part of the course portfolio, while at EL students were encouraged to take pedagogical courses but could only apply 3 such credits to their degree, indicating a lack of incentives for taking such courses. At AC, none of the respondents mentioned pedagogical courses even though they are in fact part of the course portfolio. Other aspects of the course palette included leadership (though this only came up at PL) and transferable skills such as writing reports, communication etc. (at EL). It is important to note, though, that these are not to be found in any individual study plan (ISP) template, but are rather established procedures in the respective research groups.

Generally, the palette of courses resembles the classical

engineering model of “T-shaped people” (see [4]), acknowledging that both general and specific knowledge is required in a researcher’s career. The fact that specific knowledge was less emphasized by supervisors resonates with the question of market qualifiers vs. market winners – one requires specific skills (in-depth knowledge, the thesis) to qualify for a research career but broader knowledge (of other methods used, general knowledge of the subject) to succeed further.

Timing of Courses

Students and supervisors stress that timing needs to be considered in the course selection process. The types of courses that were taken first differed across the research groups. AC, PL and CP started with broad knowledge, which was later narrowed down to more focused courses. EL focused mainly on breadth, while EAT started with focused courses and then broadened the perspective. CP students often started with master’s and pedagogical courses to compensate for previous lack of knowledge. Differences arise from the admittance process: at CP and EAT, students start with a specific topic and need focused courses to get a head start in their research. In contrast, other research groups allowed students to come up with their research topic in the first semester or year, on the assumption that broader knowledge was needed to make an informed selection.

Students and supervisors highly recognize that planned courses are to be included in the ISP. The timing of taking courses, though, needs to fit with the long-term plan found in the ISP as to when the student plans to focus on courses vs. thesis work. A problem identified in this respect is that some courses are found in an ad hoc manner. This is discussed next.

Availability of Courses

The problem of finding relevant courses that fit the student’s research topic and process frustrates many students as well as supervisors. Three reasons were cited for this problem:

- The lack of a system of incentives to arrange PhD courses.
- The ad hoc admittance of students to industrial projects not allowing for education structures to be followed.
- The use of visiting researchers to give PhD courses.

The lack of a system of incentives is best expressed in the statement, “*There has to be an incentive to give PhD courses; today you don’t get a single dime!*” This was seen as a problem throughout. Unlike bachelor and master level courses, PhD courses do not result in any monetary rewards on the personal or departmental levels. With the workload being what it is, this may be one reason not to develop a new PhD course. Specialized courses were indeed arranged, but in most cases only as reading courses for the supervisor’s own students, not for students across departments. Consequently, many courses are often found in an ad hoc manner through word of mouth, networking, invitation, etc.

Value of Courses

The interviews show that the courses in the PhD education have multiple values, arranged here into four categories:

- Formal criteria: the general subject study plan sets the conditions for the number of course credits and course types.
- Thesis work support: these courses provide knowledge and tools applicable to the specific research topic.
- Supporting the process of becoming a researcher: these courses are given to broaden the knowledge and skills of students in their extended research field.
- Career preparation after the thesis: these courses focus on transferable skills.

Generally, students focus on their research and are therefore reluctant to spend time on courses that do not support the process of writing the thesis. Supervisors tend to have a more long-term perspective and consider the PhD education as a socialization process into academia, where the candidate grows as a person and into his or her role as a researcher. An additional value of courses mentioned by many students and supervisors is networking.

Convalidation of Courses

Even though convalidation of courses is used in some of the research groups studied, it never came up in the interviews. There are no formal rules for convalidation, but LTH provides guidelines saying that up to 50% of the course requirements may be fulfilled by convalidated courses [5]. The guidelines noted that only courses relevant to the research subject can be convalidated, and that this assessment is carried out by the supervisor. The guidelines also emphasize that convalidation of courses should not be seen as a means of shortening the educational programme.

CP had a rule stipulating that a maximum of 30 credits of courses can be convalidated, given that they are relevant to the research field. Such a formal rule does not exist at the other research groups studied. Nevertheless, course convalidation is rather common at some of the research groups examined. In contrast, convalidation is uncommon at PL, and mainly allowed for courses in leadership and project management.

IV. CONCLUDING REMARKS

At Lund University's Faculty of Engineering, a large portion of the PhD educational programme is dedicated to courses. Thus, the PhD supervision process related to courses is important. In order to improve this process, both the student and supervisor need to be aware of the potential challenges that may arise. This paper identifies some of these and compares the views of students to supervisors.

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