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STARTING POSTGRADUATE EDUCATION AT A SMALL UNIVERSITY

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INTRODUCTION

In 1998/1999 I was secretary of a study of Swedish postgraduate education, conducted by a subcommittee of the association of universities in Sweden (SUHF). This study involved a questionnaire directed to more than 11000 postgraduate students, Ph.D. holders and employers. Some important results from this study were:

- Less than half of the respondents think that their postgraduate education has adequately prepared them for careers outside academia.

- Many employers do not distinguish between different academic degrees, and many Ph.D./licentiates outside academia are dissatisfied with their salaries and status.

- The most important causes for prolonged study times are excessive thesis requirements, inadequate guidance from thesis supervisors, and excessive departmental duties. 37 percent of all postgraduate students complain about the effects of insufficient thesis supervision.

Mälardalens Högskola (MdH) is a university college situated in the cities of Västerås and Eskilstuna, an hour by train from Stockholm. Although MdH features a broad range of academic disciplines, education and research in technology has become our forte. About fifty postgraduate students are active at MdH, though formally registered elsewhere at various doctoral degree awarding universities. In August 2000, the Swedish government decided that MdH were to be given university status within the area of technology from January 1, 2001. In other words, we were allowed to award doctoral degrees in subjects within this area.

This paper will report on how we develop our new postgraduate education at MdH, with a particular emphasis on how we try to take the findings of the SUHF study into account.

HANDBOOK OF POSTGRADUATE STUDIES

Suddenly given the chance of starting a doctoral education system from scratch, what would you want to achieve? At MdH, we wanted to maintain the quality standards of Swedish postgraduate degrees, while creating something new that avoid some of the drawbacks of established postgraduate study traditions in Swedish.

When the government decision was announced, we formed five task forces within MdH with the mission to develop rules and guidelines for various aspects of postgraduate studies. In these task forces, professors from a variety of disciplines (also from humanities and social science) were mixed with students and administrators so that no perspective should be forgotten. Many of the professors involved had much experience from postgraduate education at established universities, and had the expertise necessary to question traditions of doubtful value while protecting those that have proved useful.

The results of this work were collected into the *MdH handbook of postgraduate studies*. (The handbook is currently available in Swedish only. An English version is planned for the near future, since we expect to have a large proportion of foreign students in our postgraduate education.) The table of contents is as follows:

1. Aims and strategies for postgraduate education at MdH

2. Being a postgraduate student

3. Organization of postgraduate education

4. Admission

5. Financing

6. Supervisors

7. Study programs

8. International activities

9. Subjects of postgraduate studies

10. The licentiate degree

11. The doctoral degree

12. How to appeal

SELECTION OF SUBJECTS FOR POSTGRADUATE EDUCATION

In which subjects at Mdh should doctoral degrees be awarded? It became essential to maintain strict quality standards for subjects, while safeguarding the enthusiasm for the new possibilities. All departments of MdH were invited to propose broad subjects for postgraduate education programs. For evaluation of the proposals, the following criteria were adopted:

- a well-defined subject,
- at least one full professor,
- a substantial group of potential research supervisors who are active researchers in the area,
- sufficient resources in terms of finances, library and laboratories.

Of six proposals received in the first call, two were rejected. In one case *(innovation and design)* the subject had to be much more clearly defined, in the other case the department finances were in too bad shape. Four proposals were accepted: *computer science*, *applied mathematics*, *electronics* and *energy and environment technology*.

In a second call, a revised proposal for *innovation and design* was recently accepted. After the first rejection, the department had invested a lot of work in developing a novel and thorough subject description.

DEVELOPMENT OF SYLLABI

According to Swedish law, the fundamental document for a postgraduate education program is its syllabus, which must be passed by the faculty board. Properly designed and used, the syllabus can work both as a recruiting instrument, as a quality guarantee and as a guideline for students and supervisors. On the other hand, a bland syllabus will be soon forgotten, in which case other mechanisms will emerge over which the faculty board has no control such obsolete syllabi exist just about everywhere in academia. Therefore, we felt that we should give special attention to the process of syllabus design at MdH, to improve the overall quality and emphasize the importance of these documents.

We took a quite simple measure. After each department involved had submitted a syllabus for its subject, the responsible professor for each subject took part in a meeting where all syllabi were compared to each other. In this session we could discuss the views on postgraduate education behind the syllabi, pick up creative ideas from each other, and choose the best formulation where several alternatives were presented. We also agreed on which English words to use for important concepts.

One important issue on which consensus was reached was a set of joint courses for all postgraduate students in technology (including applied mathematics) at MdH. This range of courses total 15 credits:

- pedagogical course for postgraduate students, 2cr
- research methods in science and technology, 2 cr
- theory of science, 2 cr
- scientific writing, 2 cr
- project management, 2 cr
- cross-disciplinary project course in technology, 5cr

QUESTIONNAIRE TO SUPERVISORS AND POSTGRADUATE STUDENTS

The SUHF study indicated some problems prevalent in postgraduate education in Sweden. To obtain a clear picture of the situation at MdH, we created a questionnaire focusing on the SUHF findings. The questionnaire was sent to all current postgraduate students and supervisors at MdH, totaling some one hundred persons. Below is a summary of the 44 responses that we received.

The ability to use relevant information technology...

... is adequately trained (37) *... should be emphasized more* (4)

Project management...

... is adequately trained (16) *... should be emphasized more* (26)

In addition to courses in project management, some respondents suggested that more industry connected research projects would be valuable.

The ability to collaborate efficiently with others...

... is adequately trained (26) *... should be emphasized more* (14)

Training in conflict management as well as cross-disciplinary courses was suggested.

Language proficiency...

... is adequately trained (30) *... should be emphasized more* (14)

Respondents stressed that proficiency in two languages (usually Swedish and English) should be acquired. It is important to encourage students to spend part of their study time at a foreign university, for this reason as well as others.

Communication with non-specialists....

... is adequately trained (16) *... should be emphasized more* (25)

A creative suggestion was to organize events when the university is open to the public.

The ability to work inter-disciplinarily...

... is adequately trained (18) *... should be emphasized more* (18)

It was widely suggested that there should be ample opportunities for contacts across scientific disciplines within our postgraduate education.

Knowledge of career paths outside academia...

... is adequately trained (21) *... should be emphasized more* (17)

Creation of a natural forum for exchange of information and ideas between researchers at MdH and employers and agencies outside academia was suggested. Such meeting places exist already, but could perhaps be developed further.

Thesis supervision...

... is adequate (28) *... insufficient* (10)

Suggestions included: Education of supervisors. Instigating regular meetings and other forms of communication between student and supervisor. Teaching reduction for supervisors. Hiring more competent supervisors. Giving every student several supervisors. Creating a network of supervisors. Hiring post-docs. Encouraging and appreciating good supervisors. Spelling out more details in the individual study plans.

According to the SUHF study, many employers do not duly appreciate Ph.D.s and licentiates. What can be done to make postgraduate education a better investment for a future career?

Answers included: make employers more involved in our education via Ph.D. projects and other collaboration with industry and society; find deputy supervisors outside academia.

From this questionnaire we conclude that each of these issues needs to be addressed, albeit the need is more marked for certain issues such as project management and communication with non-specialists. There can be multiple solutions for the same problem. Therefore we started the by crafting the meta-solution described below.

THE INDIVIDUAL STUDY PLAN AS A CONTROL MECHANISM

According to Swedish law, every postgraduate student must have an individual study plan. These study plans should be agreed upon by both student and supervisor, and should be revised at least once a year. Just like the syllabus, the individual study plan is a document that can be used actively or be largely neglected.

At MdH, the dean must sanction every study plan. Under the dean, a director of studies for all postgraduate education at MdH will read every individual study plan (and all revisions) in detail. This will be the foremost central source of knowledge of all Ph.D. student projects at MdH. The data in the study plans will be maintained in a database for easy retrieval.

With the system described, the protocol for the individual study plan can be used as a control mechanism that allows more fine-tuning than just saying that some courses shall be mandatory. The faculty board has decided on a certain protocol, which among other things tries to meet several of the issues of the SUHF study. For example, every individual study plan must contain the following section:

The postgraduate education shall prepare for careers both within and outside academia. In order to achieve this, the education must address the following points, whether in courses, as part of thesis work, or in some other way. For each point, describe how it has been or will be addressed during the education.

- *research ethics*
- *theory of science and knowledge*
- *ability to use relevant information technology*
- *project management*
- *ability to collaborate efficiently with others*
- *proficiency in the Swedish language*
- *proficiency in the English language*
- *communication with non-specialists*
- *ability to work inter-disciplinarily*
- *knowledge of career paths outside academia*
- *international experience*

ORGANIZATION

The organization of postgraduate education at MdH is described in our handbook. In short, the central authority is the faculty board and the dean. A director of studies works under the dean, as part of the central administration. Some major duties of the director of studies are: scrutinizing the individual study plans, organizing courses for supervisors, coordinating all postgraduate courses, preparing cases for the dean and the faculty board.

Every postgraduate student is assigned a team of supervisors, consisting of a main supervisor and at least one deputy supervisor. The faculty board maintains a list of approved main supervisors at MdH. The criteria for main supervisors are:

- You must have the research credentials of a professor or "docent" (comparable to French and German *habilitation*).
- You must have taken a pedagogical course and a course for supervisors.
- You must have been a main or deputy supervisor of at least two licentiates or doctoral degrees.

Few persons satisfy all these demands already, so the dean can make temporary exceptions.

THE THESIS DEFENSE

The public defense of doctoral theses is a Swedish tradition that can be very valuable, but often turns out to be somewhat of an anti-climax. To ensure that this ritual has content and a meaning that is understood by everyone involved, MdH has established the following aims for the thesis defense:

- It shall be an opportunity for the public to understand how the Ph.D. candidate has contributed to the body of knowledge in the field.
- It shall provide a high-quality scientific review of the thesis.
- It shall give the Ph.D. candidate opportunity to show his or her ability to discuss scientific issues, both on a high scientific level and on a popular level.

Several formats of the thesis defense act are possible to meet these goals. One format is described in the handbook.

CONCLUSIONS

At the time of my writing this paper, MdH have been a doctoral degree awarding university for six weeks only. No doctoral or licentiate degree have as yet been awarded. In fact, only a handful of postgraduate students have been registered and submitted an individual study plan. Therefore it is impossible to assess the efficiency of the measures we have taken to create a modern system for postgraduate studies in Sweden. Nonetheless I feel that something can be learnt from the process we have gone through, which I have tried to describe in brief above: University-wide cooperation and well-advised reform is possible also in the domain of postgraduate education.

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