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TEAM GUIDANCE IN THE DEVELOPMENT OF THE THESIS PROCESS AT HÄME UNIVERSITY OF APPLIED SCIENCES, ELECTRICAL AND AUTOMATION ENGINEERING EDUCATION

Abstract:

The aim of this article is to describe the development of the thesis process in the degree programme in the Electrical and Automation Engineering at Häme University of Applied Sciences through teamwork. The aim of the development work has been a smooth and student-oriented thesis process, which improves the quality of the thesis process from both the student's and the education provider's point of view. In particular, the focus is on team-based thesis supervision, where two teachers in different roles (thesis coordinator and communications teacher) hold a remote quided session every two weeks. The tutoring is organized as much as possible from the student's point of view: it is scheduled after office hours, does not require prior registration, and allows for questions on the progress of the thesis and on writing. This method has proved to be a good way of developing the thesis. The low participation threshold and the regular, frequent tutoring times encourage students to take part in the guidance. The evaluation of the thesis is also done as a teamwork: the thesis is always assessed by the main supervisor teacher and another teacher who reviews the content. In addition, the communication teacher assessed the thesis from the perspective of scientific practice. Supervision and evaluation as a team supports the teachers' work and helps to develop ways to enhance students' learning and acts as a systematic way to improve the quality of the thesis.

Keywords:

Thesis, Thesis process, Team supervision, Improving teaching quality

JEL Classification: I20, I29

1 INTRODUCTION

A thesis is a demonstration of competence included in University of Applied Sciences degree, in which students demonstrate their ability to search for, analyze and apply reliable information to practical problems. It is an important part of your studies and often acts as a bridge to the world of work. Writing a thesis can be challenging for students for several reasons. It can seem like a large, solo task that requires a lot of hours of work. The thesis process can drag on if the student does not progress according to the planned timetable, and motivation can also be lost. Thesis work requires perseverance, self-discipline, and the ability to tolerate uncertainty. Support from supervisors and peer support from other students is important.

The aim of this article is to describe the development of the thesis process in the degree programme in the Electrical and Automation Engineering at Häme University of Applied Sciences (HAMK) through teamwork. The aim of the development work has been a smooth and student-oriented thesis process, which improves the quality of the thesis process from both the student's and the education provider's point of view.

2 THEORY

The purpose of this chapter is to describe the nature and general process of a thesis in an University of Applied Sciences, to open up the thesis process at HAMK and to present common thesis stage challenges experienced by students.

2.1 The thesis process

The thesis is regulated in Finland by the Universities of Applied Sciences Act, which lays down the tasks, organisation, degrees, students, staff, and funding of Universities of Applied Sciences, as well as the thesis relevant to this article (Government Decree on Universities of Applied Sciences, n.d.). Being bound by law reflects the relevance of the thesis.

The descriptions of the objectives and criteria for theses can be summarized as follows:

The scope of a thesis at a University of Applied Sciences is 15 credits. They are practical development or research projects carried out in the final phase of studies. They often focus on concrete problems or development projects, which students work on in cooperation with companies or public organizations. The purpose of a thesis is to demonstrate students' ability to apply what they have learned in practical situations, develop independent problem-solving skills and present their results in a professional manner. Although the thesis is practical, it also includes a research component, which examines existing knowledge and applies it to solving a practical problem (HAMK, n.d.). Especially in the field of technology, a thesis is a broad and practical project that demonstrates the student's knowledge and readiness to work as a professional in the field. They aim to solve concrete problems or develop new solutions that can add value to a company. This may involve introducing a new technology, improving a process or developing a new product. Examples of engineering theses might include designing and testing a prototype of a new piece of equipment, optimizing a production process, improving energy efficiency or developing an information system.

A thesis requires careful documentation. The thesis includes a written report covering the design, implementation, and analysis of the results of the research. The report follows the principles of scientific writing. The report sets out the background to the work, the objectives, the methodology,

the steps taken, the results and the conclusions. The report should be clearly written and well structured (HAMK, n.d.).

2.2 The thesis process at Häme University of Applied Sciences

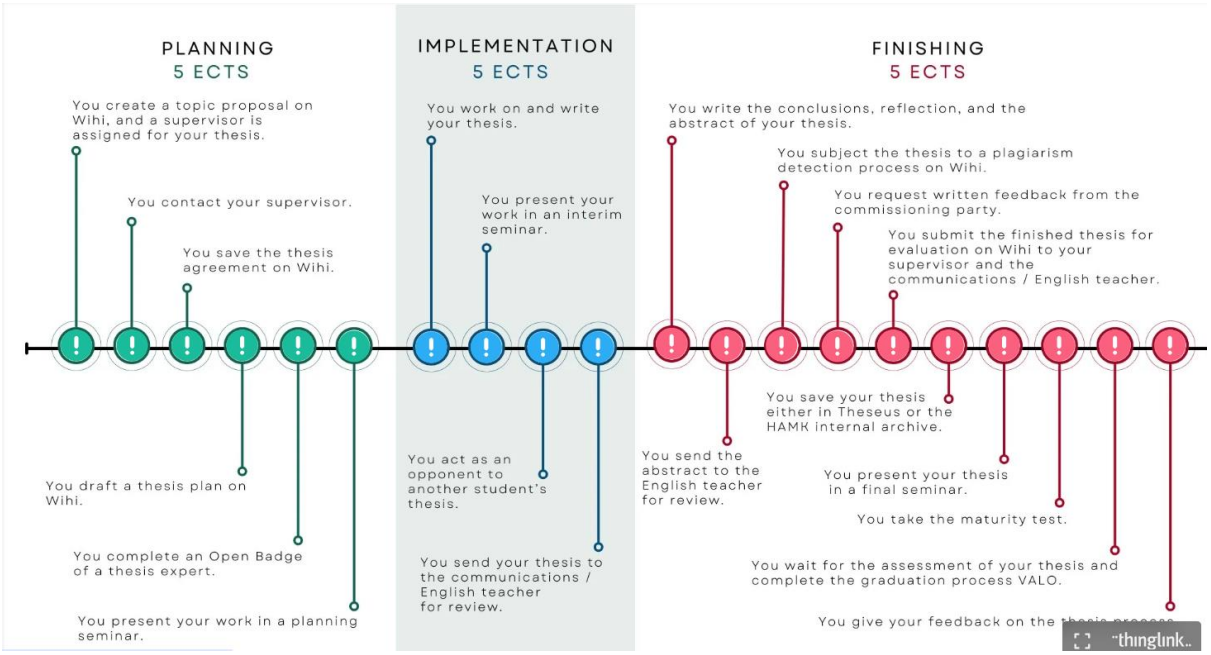
The thesis process at Häme University of Applied Sciences (HAMK) proceeds through the following stages: the thesis starts with the planning of the topic and the creation of a topic proposal, where the method of implementation is chosen (HAMK, n.d.). The theses in Electrical and Automation Engineering are usually functional theses, development projects oriented towards working life.

In the planning phase, the thesis coordinator presents the topic proposals. The proposed topics are discussed at a meeting, where the supervisors are also appointed. The thesis plan is drawn up in accordance with the chosen implementation method, a preliminary table of contents is prepared, and the implementation of the development process is described. It is also at this stage that information is sought, and the knowledge base is written. The implementation phase involves designing and/or producing a development project in line with the objectives, writing a thesis report, holding an intermediate seminar. In the intermediate seminar phase, students learn from each other in pairs according to separate instructions. While they are learning from each other's work, they often find things to correct in their own thesis as well. In the final phase, the thesis is finalized, published, evaluated and archived (HAMK, n.d).

The thesis process includes seminar work: a planning seminar, an intermediate seminar, and a final seminar. Before starting the thesis, the student will complete the Thesis Competence Badge, which demonstrates knowledge of the thesis process, good scientific practice, and the principles of sustainable development (HAMK, n.d.). The coordinator will draw up a target timetable for the thesis for each year group and will monitor the progress of the thesis alongside the supervisors.

The thesis process is divided into three 5-credit parts: planning, implementation, and finishing (Figure 1).

Figure 1: Stages of the Thesis Process at HAMK in Technology Degree Programmes?



Source: HAMK, n.d.; personal information from Moodle/Learn database

In addition to the main supervisor, the thesis is assessed by a second content assessor and a communication or English supervisor. According to HAMK (n.d.), the key evaluation criteria for the assessment of a functional thesis are:

- task-related aspects: a clear purpose and objective that is useful to the world of work
- aspects related to the knowledge base: the knowledge base supports the task of the thesis, contains high quality sources that are useful and reliable for the topic
- methodological and implementation aspects: the method of implementation serves the topic and the process is carried out independently and purposefully, with guidance
- aspects related to results and conclusions: the thesis has produced a product, process or equivalent that meets the objectives.

2.3 Challenges in the thesis writing process

The thesis involves challenges related to both the research and/or development process and reporting/writing about it. These are largely interlinked.

Effective planning and time management is vital to complete the thesis within a reasonable timeframe. This involves planning each chapter, estimating task completion times, and reviewing chapters before moving on to the next one. Managing time effectively to complete the thesis within a given deadline is crucial. A well-planned schedule and consistent work habits help but many students have challenges in it. (Skeith, 2018) Many students work and have families, which increases scheduling challenges.

Nurkamto et al (2022) present the challenges that students writing a thesis face, according to thesis supervisors. Students have difficulties in writing background material and literature review,

and reading of theoretical sources is limited. They also have difficulties in identifying the focus of their own research and linking it to previous studies and background material.

Students have practised academic writing during their studies. However, many still face challenges. The genre of academic writing is challenging because it involves demanding steps such as developing ideas, planning, outlining theoretical frameworks and conceptual frameworks, writing drafts, revising and rewriting (Kiriakos, 2018).

According to Skeith (2015, p. 115 - 118), the problems and challenges in thesis writing include the following issues. Conducting research effectively, including interviews and data collection, can be difficult for many students. Developing research skills, narrowing down the topic and seeking guidance from advisors is needed.

The citation of references is often a problem. When teaching citation, the cooperation of staff, including library staff, is essential. (Lamptey & Atta-Obeng, 2012) Instructors may also assume that students have already mastered the skills and knowledge to use citations and prevent plagiarism better than they actually do. In turn, students feel they need more practice (Peters & Cadieux, 2019).

In Nurkamton's (2022) study, citation of sources was not a problematic point thanks to available citation software such as Zotero and Mendeley. However, Nurkamton's study also found that natural use of sources is a challenge: students do not know how to reference but use direct quotes from sources.

The overall structure of the text and the table of contents are difficult to design. The logical structuring of the content and the order in which things are presented is a challenge. Students have difficulties in writing coherently: the transition from one topic to another is not smooth. Managing the different parts of the thesis, such as the introduction, literature review, methodology and results, can be difficult. Students need help and guidance to develop these skills. In addition, some have difficulties with spelling and tend to use very simple sentence structures (Nurkamto, 2022).

Academic writing practices are of course taught during the studies, but during the thesis writing phase, students face many challenges and need help in managing the research or development process itself, as well as in writing. Writing has traditionally been seen as an isolated activity where the dialogue is between the writer and the reader (Kiriakos, 2018). Thesis students are used to studying with students in their year group, and this kind of writing, done almost alone, feels challenging and requires strong motivation. The feeling of working alone is eliminated through mentoring practices.

3 PRACTICAL SOLUTIONS

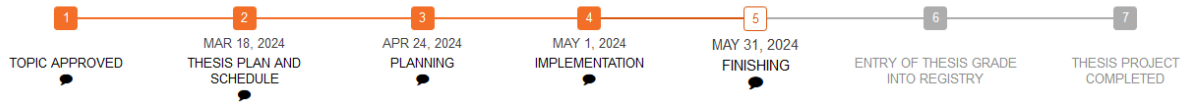
This chapter describes the methods used at HAMK, especially in Electrical and Automation Engineering, to improve thesis supervision. The main ones are the information system solution Wihi and especially the supervision method team-based thesis supervision sessions.

3.1 Wihi system

The Wihi system is a system designed to guide and manage the thesis, tracking the progress of the thesis and recording events, files, communications, and activity during the thesis process. The Wihi system documents the thesis process, which includes the design of the topic, the selection of the implementation method, the planning and implementation phases, and the final phase,

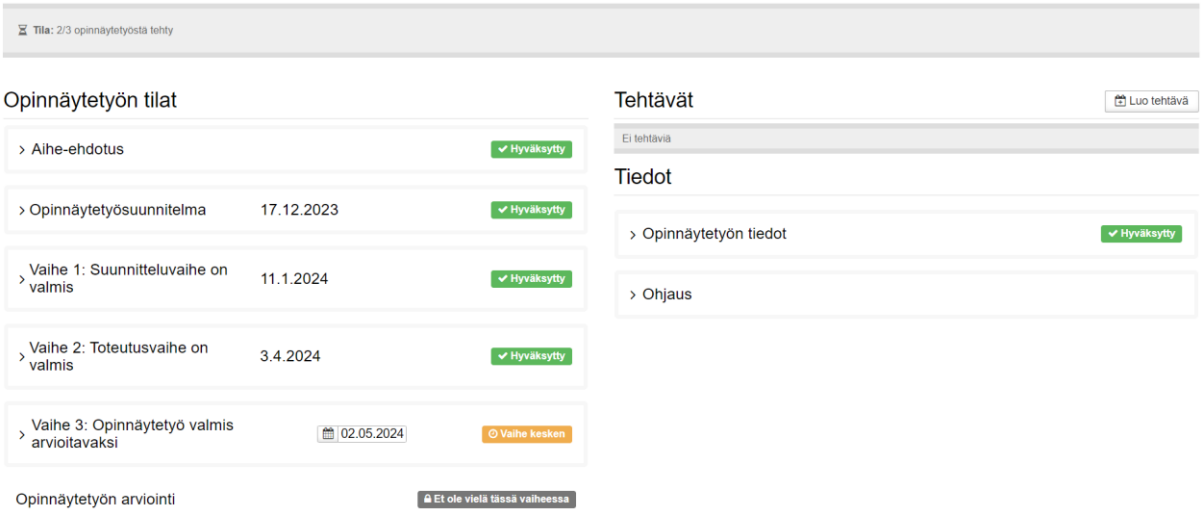
where the thesis is published, evaluated, and archived. (Eduix, n.d.; HAMK, n.d.) The teacher's or instructor's view can be seen in figure 2 and the student's view in figure 3.

Figure 2: Teacher's/Instructor's Wihi system view



Source: Personal information from Wihi system

Figure 3: Student's Wihi system view



Source: Personal information from Wihi system

Wihi documents the whole thesis process, from the design of the topic, the creation of the topic proposal and the choice of the implementation method, through the design and implementation phases, to the final phase, where the thesis is published, evaluated, and archived. All communication related to the thesis takes place in a single system, including topic proposals, milestones, communication, authentication of the text, evaluation, and archiving.

The Wihi system has three roles: the coordinator checks the topic proposals and assigns a supervisor to the work; the supervisor supervises the work and the student works on the thesis. The supervisor starts supervising the work when the student begins to develop a thesis plan based on the topic proposal approved by the coordinator. In the supervision system, the emphasis is on active feedback and responding to messages to support the student's smooth thesis work (HAMK, n.d.).

The system enhances the supervision of the thesis by documenting the process, enabling communication, providing different roles and supporting active supervision. Wihi also acts as a team management tool. The people involved in thesis supervision and evaluation work through a common platform. The system records events during the thesis; this way they are not left in the

student's and supervisor's emails. This ensures quality, for example in case of a change of supervisor or in case of disruptions or interruptions in the guidance process.

3.2 Team-based thesis supervision sessions

The quality and accessibility of guidance is a key factor in the thesis process. Both are developed through team-based thesis supervision sessions at HAMK's Electrical and Automation Engineering.

Team-based thesis supervision sessions are held regularly every week via remote access. Every second week is for those working on a thesis in Finnish and every second week is for those working on a thesis in English. In addition to the thesis coordinator, a lecturer in either Finnish Communication or English will be present to supervise the writing.

The aim is a student-centered approach: sessions are timed to allow students who are at work to attend. There is no need to register in advance. Students can ask questions about both the process and the writing; both the thesis coordinator and the writing tutor are always present. For content guidance, students apply directly to their content supervisor.

There are usually 5-10 students at a time in the guidance sessions. If necessary, the hour-long tutoring time is extended, or students are assigned to break-out rooms.

Students can ask questions and show a draft of their thesis. Typical questions related to the thesis process include practices related to the different stages of the process, such as approval of the thesis topic, preparation of the thesis plan, issues related to the Wihi system, registration for seminars, teaching. Writing questions often concern the structure of the thesis, the formulation of objectives and the language used. Citation of references is the most commonly challenging writing issue. Finding sources also comes up from time to time.

A very frequent issue raised in both the process and the writing sessions is that of maintaining motivation. The guided workshop has proven to be a good method for preventing and solving overcoming procrastination and writer's block. Many students come to the guidance workshop without a specific question just to seek motivation and inspiration. It may be enough to let them explain their situation or simply to listen to the stories of fellow students at different stages of the process. Peer support is crucial in this situation.

The thesis is written in a well-defined format, which nowadays also must meet accessibility requirements. Familiarity with software and technical tools used in the thesis process can be a challenge, for which students seek help from thesis supervision sessions.

In addition to the student perspective, supervision sessions develop the supervision skills of supervisors, as answers are sought collectively. Bazarfkan (2019, p. 2) states that there are many studies that focus on developing research skills, but fewer studies have focused on the process of gaining thesis supervision expertise.

The team teaching and team supervision model used in HAMK's Electrical and Automation Engineering education ensures the quality of supervision and assessment both in thesis supervision sessions and in the thesis process. Team teaching refers to a teaching model in which several teachers work together to plan, implement, and evaluate teaching. This teaching model is considered to be effective. This approach allows for a more varied and broader range of teaching by combining the different expertise and teaching methods of teachers. Students benefit from receiving instruction from more experts, which broadens perspectives and deepens understanding (Anderson & Speck, 1998, pp. 671-673).

The roles of the instructors should be clear but mutually supportive. It also aims to develop a positive so-called supervisory climate (Bazrafkan, 2019, pp. 5-6). This has been observed in thesis supervision sessions.

Anderson & Speck (1998, p. 673) highlight the view of Colby and Rice (1971) that when team teachers model dialogue with each other, they make it "easy for students to participate." They also point out Hertsog and Lieblen (1994) that "Team teaching also can promote dialogue leading to increased student participation. Increased student participation naturally follows when teachers encourage the expression of multiple perspectives by modeling learning and mutual respect" (Anderson & Speck, 1998). 673 This activating effect on students is clearly seen in the case of the workshops.

Although Nurkamto's (2022) study highlights many challenges in online tutoring, the online method has not been perceived as problematic in HAMK's Electrical and Automation Engineering tutoring workshops. Remote access brings more students to the tutoring sessions than if the tutoring were to take place on campus, this has been raised in student discussions.

The writing challenges described in chapter 2.3 are clearly evident in the tutorials and it is therefore these that the tutorials seek to help with.

Thesis workshops enhance and validate the quality of the process from both the student's and the organization’s point of view. The practice has become an established part of the thesis management process in Electrical and Automation Engineering. It is also important to recognize that thesis management skills are not self-generated but are a skill that individuals and organizations together can develop.

4 CONCLUSIONS

In a multi-stage process involving all students, such as a thesis, even small streamlining steps, when multiplied, make the process more efficient and increase satisfaction. A thesis workshop is an accessible, low-threshold form of guidance for students, where they can get answers to their questions quickly. In addition, they are supported in maintaining their motivation to write and receive and provide peer support. When questions are not drawn out, challenges do not have time to become major problems that would slow down or even interrupt the student's thesis process.

Each year, the HAMK Electrical and Automation Engineering degree programme produces almost 70 theses. A thesis represents about 400 hours of student work. In addition to the content supervisors, the thesis coordinator, communication, and English teachers also spend a significant amount of time on them. So even a small step forward in the process means significant progress and a more efficient use of resources for the organization.

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