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Usability evaluation and redesign recommendations for MyNet portal thesis guidelines

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Abstract

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This thesis presents a usability evaluation framework developed for the MyNet portal in the scope of thesis guidelines. The objectives of the study were to investigate the usability challenges on the pages, to provide suggestions for improvements, and to demonstrate possible solutions by redesigning the original user interface.

At the start of the project, the theoretical background was collected to inform the further study. Surveying and traditional in-lab moderated testing were considered to be efficient and cost-effective methods to constitute a usability testing framework.

In total, 30 thesis advisors and 148 students of Haaga-Helia UAS took part in the survey. The user group segmentation was primarily based on the gathered insights. The questionnaires were open for participants during the period from 19.12.2016 to 20.01.2017. Consequently, the usability testing took place during the period from 31.01.2017 to 09.02.2017. The testing was complemented by the various methods and techniques such as Concurrent Thinking Aloud (CTA), pre-test, post-test (SUS), and observations. 6 bachelor's degree program students participated in the test sessions individually.

The study findings revealed that the overall level of the ease of use of MyNet thesis pages was below the industry average. Learnability of the portal was measured as relatively low. However, the usability score alone achieved a good level. The evaluation helped to identify the main areas where usability improvements were required. Each area was considered during the redesign, which aimed to provide visual examples of the potential solutions.

As demonstrated by the study results, the designed testing framework successfully serves the purpose of usability evaluation. Therefore, it is recommended to include the framework in the design process.

Keywords
Usability, Usability evaluation, Usability testing, Think Aloud protocol, Survey, Redesign

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List of Abbreviations

BIT	Business Information Technology
CTA	Concurrent Think Aloud
Hi-Fi	High Fidelity
HCI	Human Computer Interaction
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
Lo-Fi	Low Fidelity
PC	Personal Computer
RTA	Retrospective Think Aloud
SEQ	Single Ease Question
SUS	System Usability Scale
UCD	User-Centred Design
UI	User Interface
UX	User Experience

1 Introduction

The decision for this thesis' topic was mostly influenced by the personal experience of the author with the MyNet portal during the various stages of her academic life. The offer to study MyNet in the scope of the thesis guidelines was made by the board of the thesis coordinators of Haaga-Helia UAS. In the course of the coordinators' work, the board had noticed repeating problems students and advisors were facing in the course of the thesis process. Since the portal had noticeable usability issues, it was assumed that such study could significantly help the design and development team to improve User Experience of MyNet thesis pages by investigating the system and testing its usability.

Nowadays, usability evaluation is considered to be an essential step in a system design. Due to a rich choice of methods, it is possible to focus usability assessment on the specific scopes of interest and to investigate various usability components. The level of usability as an interface quality determines how easy and pleasant a system is to use (Nielsen 2012a). It is advised to rely on usability evaluation insights during the process of a system design and development.

1.1 Objectives and research questions

The aim of this study was to aid Haaga-Helia UAS in advancing its services by improving usability and findability of MyNet thesis pages. The process was split into three stages: identification of usability problems, analysis of the gathered data and artefacts, and creation of compelling and adequate suggestions for usability improvement.

The following groups of questions were formulated in order to target the research and to draw the scope of it:

- Where do users commonly have challenges while browsing MyNet thesis pages? How critical are the problems users face during their interaction with the pages?
- What are the areas of the thesis guidelines which users consult with most frequently? Which areas are important to focus on during the portal's improvement and redesign?
- What are possible solutions for improving the usability of the portal and how could they look?

1.2 Structure of the thesis

This thesis is divided into 8 chapters. Chapter 1 contains introduction and outlines motivations for this thesis. Objectives and research questions are aimed to explain the purpose and the direction of this study. Consequently, the chapter outlines the background of the MyNet portal and the scope of the study.

Chapters 2 and 3 provide a theoretical framework for the terms and the methods used in the study. The study has a strong focus on the empirical part; therefore, the chapters 4-7 provide a description of the usability evaluation and redesign process.

Chapter 4 discusses the survey conducted prior usability testing in detail. The chapter contains information about the participants' background, user segmentation, and statistics based on it. The target audience for the survey was specified as students in the Bachelor and Master programs, as well as the thesis advisors at Haaga-Helia UAS.

Chapter 5 describes the process of usability testing. Starting from the objectives, the chapter discusses the design of the tests and the participants' background. The analysis of the quantitative and qualitative data is presented as the chapter summary.

Chapter 6 compiles all the qualitative findings from both the survey and the usability testing. The chapter presents the findings in an organised and categorized manner: all the findings are grouped according to the different aspects influencing usability. Suggestions are given right after the description of the findings in order to increase the connection between the usability issue and the proposal.

Chapter 7 briefly describes the redesign process stages and concludes with the possible solutions. The latter is categorised according on the areas of the user interface, which allows comparison between the original and the re-design.

The final chapter 8 concludes this thesis project by summarising the implementation phase, outlining the main outcomes, and leaving recommendations.

1.3 Product and studied scope

This chapter aims to provide an overview of the MyNet portal. MyNet is one of the Haaga-Helia UAS intranet solutions with the main purpose to store various types of information concerning academic processes. The platform is available to users in English and Finnish. The portal is based on the Microsoft SharePoint 2013 platform and uses an intranet solution called “Valo Intranet” by Blue Meteorite. The aforementioned company takes care of the configuration of the portal, while Haaga-Helia UAS provides servers and their maintenance. The MyNet home page is demonstrated in figure 1.

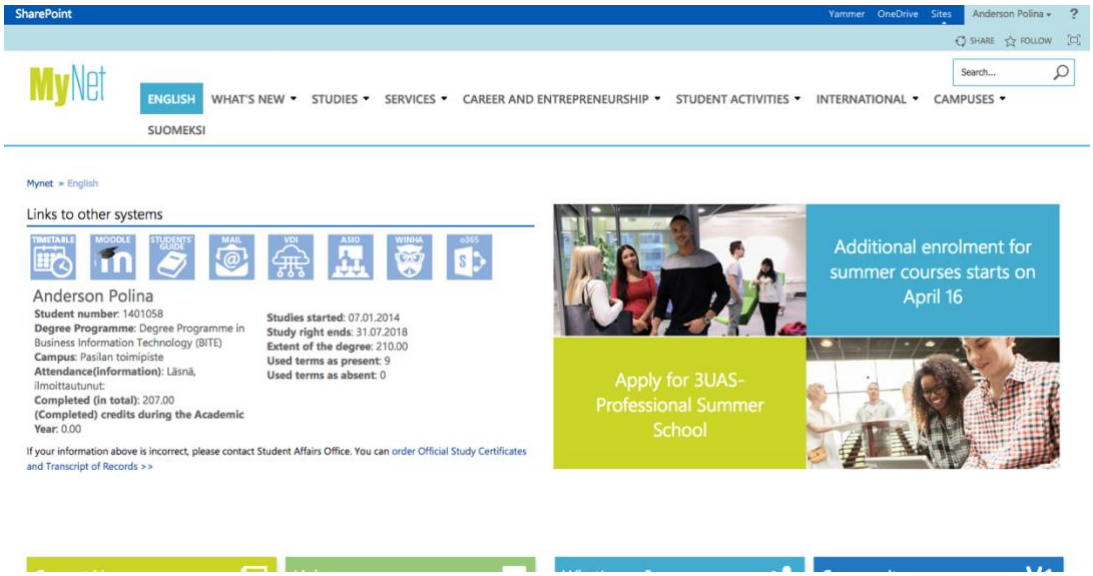

Figure 1. MyNet home page (English version)

MyNet encompasses crucial characteristics of the intranet infrastructure, as it is based on the intranet solution. An intranet is a private network shared by a well-defined group within an organisation. The typical purposes of an intranet are internal communication and information exchange, as well as content storage and collaboration. An intranet can be regarded as a corporate directory, where the most relevant content for the staff is stored (Telleen 1998).

MyNet thesis pages constitute to the scope of the portal dedicated to the thesis process guidelines. The pages are split into the instructions for students for Bachelor and Master programs. Moreover, the bachelor's degree guidelines are divided into general and program-specific instructions. The pages contain textual instructions, templates for reports and documents, various attachments, links to the connected resources (within or outside MyNet), contacts (names, email addresses, phones), and other information. The users of the pages are students of Haaga-Helia UAS. Additionally, the pages are used by the thesis advisors and coordinators in the course of their work.

2 Theoretical framework

This chapter provides a theoretical overview of the study by discussing the terms and concepts related to the usability evaluation. Redesign is regarded as a secondary and supportive activity of this study; therefore, the design-related process and terms are mentioned briefly in chapter 7.

Firstly, the definition of User Experience as a concept directly concerned with usability is given. Furthermore, the chapter discusses User Experience facets and highlights two of them: findability and usability. In the end, theoretical overview of usability evaluation is given with the emphasis on usability testing.

2.1 User Experience

User Experience has become increasingly important in the areas of human-computer interaction (HCI) and interaction design during the recent years (Hassenzahl & Tractinsky 2006). Multifaceted, rich and continuously expanding methodology behind UX design allows making products and services more pleasant and ergonomic. Great experiences with a product typically lead to a higher product acceptance, customer loyalty and, consequently, revenue growth.

In 1995 Don Norman, an electrical engineer and cognitive scientist at Apple, coined his working title as “User Experience Architect” (Norman, Miller & Henderson 1995). In one of the interviews, Norman was attributed a following explanation: “I invented the term [User Experience] because I thought human interface and usability were too narrow. I wanted to cover all aspects of the person’s experience with the system including industrial design graphics, the interface, the physical interaction and the manual” (Merholz 2007). Alternatively, the International organisation for Standardization (ISO) defines the term as “person’s perceptions and responses that result from the use and/or anticipated use of a product, system or service” (ISO/IEC 25063 2014).

User Experience depends on the qualities of users' interaction with a product, as well as users' context of use – their perceptions and motivations (Hassenzahl 2014). The cognitive model of users plays an important role in shaping experiences (Nielsen 2010a). According to Bank (Bank & Cao 2015, 6), the biggest challenge for designers and product managers is not in understanding technology or market but in knowing "how humans work". The process of forming experiences is the key concept for a UX designer to understand. From the first momentary impression to the long-established opinion about the product, UX design aims to shape positive emotional responses and reactions

(Interaction Design Foundation 2002-2018a). A careful analysis of both the usability and the pleasure derived from interaction with a system is a fundamental practice of User Experience Design. The primary aim is to ensure that the formed experiences are meaningful and personally relevant to the users.

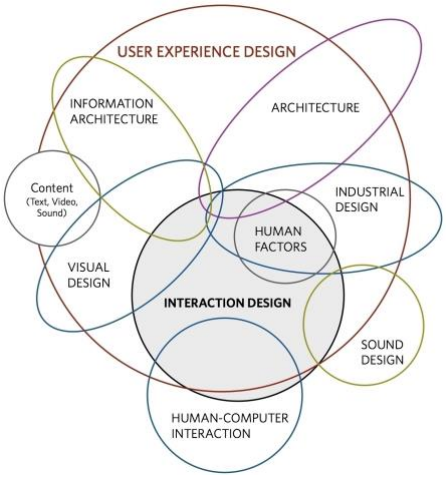

Figure 2. The Disciplines of User Experience (Saffer 2009)

User Experience has many subset disciplines such as Visual Design, Interaction Design, Information Architecture, Content Design etc. As demonstrated in figure 2, the fields are tightly intertwined and interdependent. Excellent UX design practice requires working with the regard to and on the intersection of all these various fields to ensure an organic and all-encompassing creative process.

It is commonly considered that UX design as a discipline began with usability; however, the UX umbrella has expanded to accommodate more qualitative attributes characterizing User Experience (Interaction Design Foundation 2002-2018b). Figure 3 demonstrates the seven facets of User Experience, as explained by Morville (2004).

Figure 3. User Experience Honeycomb (Morville 2004)

Usability, referred to as "usable", is the primary focus of this study. Additionally, the findability quality, referred to as “findable”, is of significant importance and consideration for the studied portal. As one of the primary goals of MyNet is to provide users with academic information and guidelines, it is crucial to ensure that they can easily locate and navigate to the needed information.

2.2 Findability

Findability is the quality that measures how easy it is to locate specifically targeted information that is assumed to reside within a system. One of the biggest failures occurs when users are not able to efficiently and quickly find what they are looking for on a website (Cardello 2014). Findability is considered as both an object and a system quality (Morville 2005). This constitutes that both approaches are possible: to enable an object to be defined and located easier and to make a system where it exists better adapted for searching and navigating through its content.

Various findability testing methods can be employed throughout the design process. In the course of this study, the findability quality of MyNet thesis pages was primarily evaluated during the process of usability testing, discussed in chapter 5.

2.3 Usability

Usability is a quality characteristic which reflects how easy, effective and efficient a user interface is to use. As discussed in chapter 2.1, usability is typically considered as one of the facets of User Experience; it is at the heart of UX design. The official ISO definition of usability is: “Extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO 9241-210 2010).

Interest in improving objects and processes by making them easier in use can be dated back to cavemen perfecting their tools in order to reach the intended level of performance. However, as Werby (2010) points out, the field of usability research started to flourish when the tools used by people have enhanced so much so they went against the human cognitive and physical limitations. It is considered that the origins of usability lie in the price decrease for personal computers (PC) in the 1980s, which allowed many employees to have their own machines. More and more people who were not trained enough for a computer usage at the time were feeling anxious and frustrated while using a PC.

Consequently, the need to make computer usage easier and “friendlier” gave a rise to such notions as Human-Computer Interaction (HCI) and usability (Cockton 2014, 15.1.1).

Usability is a crucial aspect of the world wide web: nowadays, it is the determining factor for success or failure for most of the products and services. If a website’s usability is poor, visitors will most probably leave, as this behaviour is "the first line of defence when users encounter a difficulty” (Nielsen 2012a). The abundance of the other options offered by the competitors and the fact that the users commonly leave websites after 10 to 20 seconds (Nielsen 2011) highlights the importance of designing with the usability considerations in mind.

In case of intranets, usability greatly influences the efficiency of use and, consequently, the productivity of the users. For intranet systems, Nielsen (2012a) suggested doubling usability which leads to being able to cut training budgets in half and to double the number of transactions employees perform per hour.

Usability is commonly defined by 5 quality components (Nielsen 2012a):

- *Learnability:* how fast and painless is the learning process for new users? Does the system teach the users through interaction or it is predominantly a trial-and-error process? Do users need to read manuals to understand and learn the system?
- *Efficiency:* upon getting a sufficient experience with the system, can users perform the tasks in reasonable and satisfactory time?
- *Memorability:* how easy it is for a recurring user to remember the system and resume the activities with ease after some time of non-activity? How hard is it to re-establish the proficiency of use?
- *Errors:* how often do users make errors while interacting with the system? How serious are the errors? Do users recognise them as errors? How easy can the errors be resolved?
- *Satisfaction:* how satisfactory and joyful is the interaction with the design?

2.4 Usability evaluation

Usability evaluation is a process of assessing to a which degree a system is easy and pleasant to use. Usability evaluation employs various methods of a highly contextual nature: their effects are not deterministic and can be notably different across different projects and organisational contexts (Cockton 2014, 15.2.2).

A professional practice of evaluating usability is very diverse. The field of usability is under continuous and dynamic development; new approaches and methodologies arise with the expansion of the practice into various contexts. However, one of the possible ways to look at usability evaluation is to split the methods into 3 groups (Hom 1998):

- *Usability testing:* a process of testing a system with users, while carefully observing their interactions, emotional response, and behaviour.
- *Usability inspection:* usability assessment performed by the usability experts with no direct user involvement.
- *Usability inquiry:* a process of asking users for their assessment and opinions about the system. Such methods do not involve testing (first-hand observed experience with a product); rather, the methods rely on the user feedback gathered during the surveys, interviews and focus groups.

In the context of this study, the methods of 2 groups were applied: usability testing and usability inquiry. However, the application of the former was more profound, whereas the latter served as a supportive part of the study. Therefore, usability testing is discussed in detail in chapter 2.4.2 and a usability inquiry method is demonstrated in chapter 4 in the process of surveying the target audience.

2.4.1 Formative and summative evaluation

Depending on the purpose and the development stage, the two types of usability evaluation are distinguished: formative and summative. According to Sauro (2015a), summative evaluation aims to determine how usable is an interface and formative evaluation inspects which elements are not usable. The terms come from educational theory, where they are serving to describe and assess student learning.

Formative or exploratory evaluation helps to form a product by measuring its usability on each development step and improving the identified issues iteratively (Rubin & Chisnell 2008, 27, 29). Formative evaluation is commonly utilized starting from the early stages of the product creation. Sometimes such evaluation is called problem discovery; it is typically conducted as a moderated user testing (Sauro 2015b).

During a summative evaluation, usability is assessed at the later stages of the project. This type of evaluation sums up the usability work which has been done before the evaluation. Summative evaluation is targeted to assess and expand the results of formative tests by determining whether a product or service meets the requirements. The aim of the test is to see how people are performing realistic tasks with the system (Rubin & Chisnell 2008, 34-35p).

2.4.2 Usability testing

Usability testing method is based on arranging an immediate user interaction with a system and analysing the results of this interaction with the help of various techniques.

The method can be seen as an irreplaceable usability practice as it gives direct input on how real users operate with the product (Nielsen 1994, 165).

According to Nielsen (2012a), usability testing could be considered as a sequence of 3 steps:

1. Recruiting a group of representative users.
2. Providing the users with the representative tasks.
3. Observing the users performing these tasks.

The observation typically covers user behaviour, as well as verbal and non-verbal clues expressed by the participants. The analysis, commonly driven by the predefined criteria, is heavily based on the success and failure rates of the tasks and actions performed during testing.

The essence of user testing is to let users perform the tasks on their own and to learn by observing their experience with the tested system. It is important to avoid bias in task phrasing, questions or moderator's behaviour in order to gather reliable uncontaminated results. Moreover, according to Nielsen (2001), it can be dramatically misleading to solely listen to what people say; a more reliable and insightful approach is to observe their interaction with the system.

As reported by Nielsen (2012b), it is enough to test a particular scenario with 5 users. In most of the cases, it is more beneficial to run smaller tests and iterate them with the design revision and improvement than to conduct one big and expensive research. The best UX design practice is to start with the usability testing as soon as possible so that early design decisions are backed and supported with usability insight. Such practice allows designers to gradually address the emerging problems; it decreases the possibility to build a system based on unresolved usability issues.

Usability testing methods are differentiated by location, purpose and moderating manner. Among the various classifications are summative / formative, in-lab / remote, and moderated / unmoderated testing. Chapter 5.2 discusses the configuration chosen for this study.

3 Methods and techniques

The following chapter briefly outlines the methods employed in this study in order to evaluate empirically the usability of the MyNet thesis pages. The methods gradually assisted in developing an understanding of the key reasons behind user dissatisfaction or pleasant impressions during the interaction with the studied portal. Moreover, the methods used during the survey are demonstrated.

The chosen usability evaluation methods were a questionnaire-based survey and usability testing. The latter employed Concurrent Think Aloud protocol (discussed in chapter 3.2.2) combined with the pre-test (discussed in chapter 3.1), and the System Usability Scale questionnaire (discussed in chapter 3.1.2). Additionally, a method of quantifying usability testing data was adopted to provide comparable numerical results. The description of the frameworks showing how the methods were used can be found in chapter 4.2 for the survey and chapter 5.2 for usability testing.

3.1 Questionnaires

As defined by Sauro (2015c, 122), the purpose of questionnaires in usability testing is to collect feedback from participants before, during and after the testing session. The three distinct types are pre-test, post-task, and post-test questionnaires. Pre-test questionnaires mainly aim to understand the background of the participants, post-task questionnaires focus on capturing the immediate emotional responses, and post-test questionnaires sum up feedback about the overall experience (Dumas & Reddish 1999, 209).

The questionnaires can be composed of open-ended (plain text) and closed-ended (choice between the options) questions. The following chapters 3.1.1 - 3.1.3 describe the questionnaire types used in this study.

3.1.1 Screening questionnaires

Screening questionnaires are employed to determine how well a participant fits into the study according to the specific requirements (Rubin & Chisnell 2008, 126). The structure of the questionnaire is based on finding the answers to the following questions (Dumas & Reddish 1999, 143):

1. Is the participant acceptable for the test?
2. The participant can be possibly classified as a member of which user group?

Typically, the screening questionnaire is employed during the early period of the research; it is sent at the time of usability testing recruitment process or distributed among the survey participants. In this study screening questionnaire composed the first part of the survey and helped the researcher to define the user groups.

3.1.2 System Usability Scale (SUS)

System Usability Scale is a widely applied usability measuring tool. SUS was developed by John Brooke at Digital Equipment Corporation in 1986 (Brooke 1996, 189 - 194). The crucial strength of the method is the possibility of application to any participant sample size, even a notably small one, without affecting the results (Brooke 2013, 29, 38; Sauro 2011).

The tool relies on a set of ten questions with five response options. The questionnaire is typically presented to the participants at the end of the testing session. The questions measure the overall performance of the evaluated product as well as user satisfaction. The responses are mapped on the scale from 1 to 5, where 1 is “Strongly disagree” and 5 is “Strongly agree”.

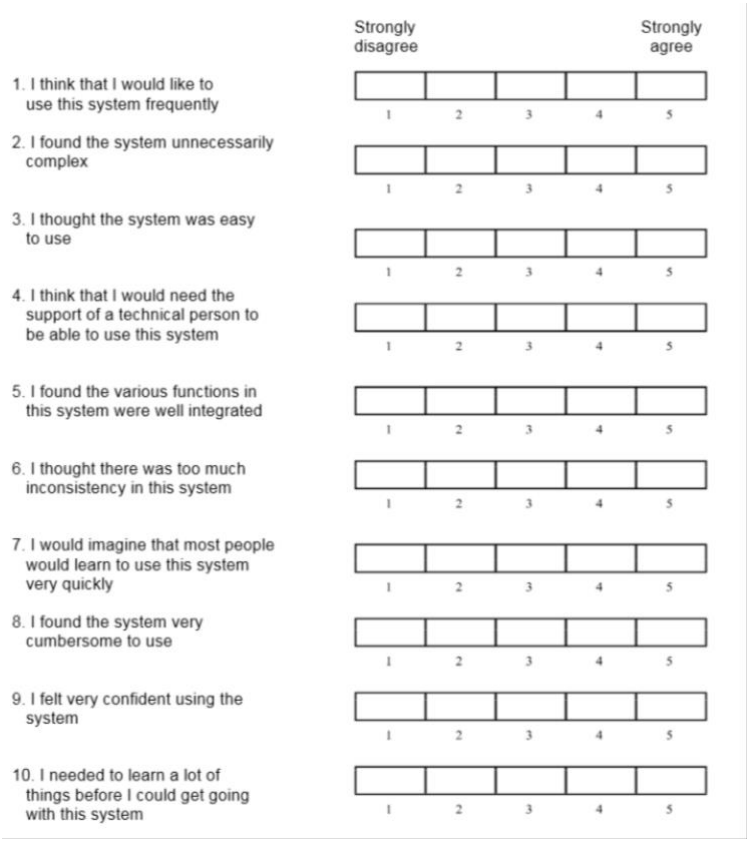

Figure 4. System Usability Scale questions (Brooke 1996, 192)

As seen from figure 4, the odd-numbered questions are formulated positively and even-numbered - negatively. Such structure is aimed to decrease bias by encouraging the users to approach the questions prudently (Brooke 1996, 191).

Upon the completion of the data collection, the results are interpreted into a single score. The score range is from 0 to 100, where the usability level increases respectively with the number. The score calculation is a rather complicated process, discussed in detail in the various literature. Typically, some of the already existing calculation tools are utilized during the analysis (Albert & Tullis 2013, 138; Sauro 2011).

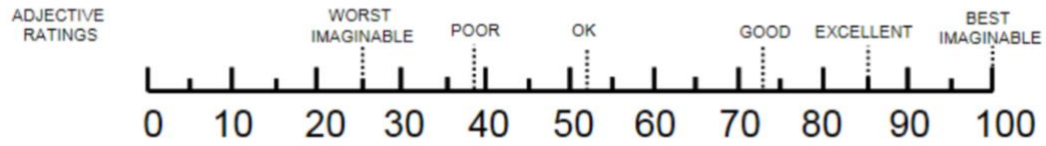

Figure 5. SUS score interpretation (Bangor, Kortum & Miller 2009, 121)

There are various ways to interpret SUS results. Bangor & al. (2009, 121) recommend using the conversion technique shown in figure 5 in order to label the usability of a product. A SUS score less than 68 is normally considered to be below average (Sauro 2011).

Although the scale is from 0 to 100, the score cannot be represented in percent as it is not changing linearly. Sauro (2011) proposed a method called “normalizing” of converting SUS score in a percentile score. The visualization of the method is presented in figure 6.

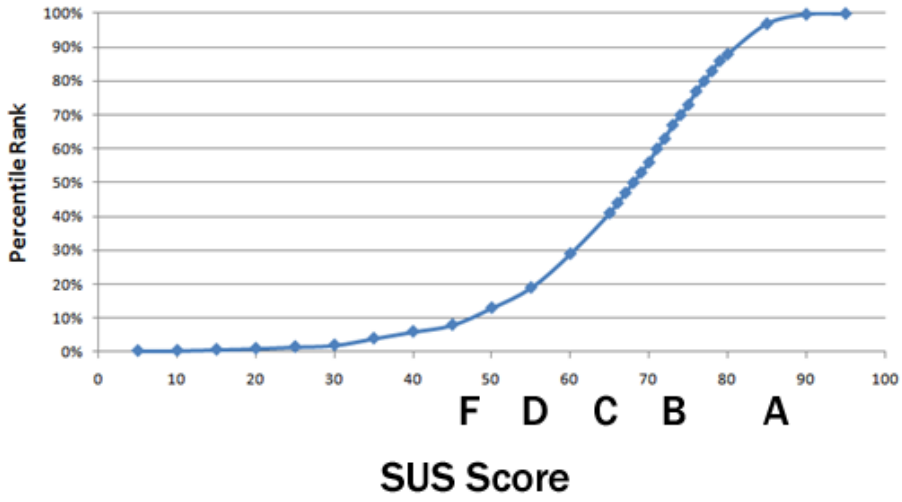

Figure 6. SUS normalizing and grading (Sauro 2011)

According to Sauro (2011), the process resembles “grading on a curve” and it is based on the distribution of all the scores. An SUS score of 74 would convert to 70% on a percentile

rank, whereas an SUS score of 80 would be of a higher perceived usability than 80% and can be interpreted as a B - grade.

Moreover, later research brought to attention the two-factor nature of SUS. According to Lewis & Sauro (2009), it is possible to calculate not only the overall usability score but learnability and usability factors independently from each other. At the same time, the research done by Borsci, Federici, and Lauriola (2009) confirmed the two-factor structure and also showed, that the factors are correlated. The method reported by Lewis & Sauro (2009) states that learnability can be calculated by multiplying the sum SUS contribution scores from the items 4 and 10 by 12.5; usability is the sum of other items SUS scores, multiplied by 3.125. As reported by Sauro (2013a), it might be equally crucial to focus on learnability and not just on usability for some specific studies.

3.1.3 Single Ease Question (SEQ)

Single Ease Question or SEQ is a post-task questionnaire. It assesses immediate user impressions in terms of how challenging the task was (Barnum 2011, 176, Sauro 2015c, 122). The assessment is done on a seven-point scale from "Very difficult" to "Very easy" (see figure 7).

Figure 7. Example of SEQ questionnaire (Sauro 2015c, 122)

SEQ offers a number of benefits to the researchers as it is based on a simple and straightforward question which is easy to analyse. Moreover, SEQ can be applied to various systems of different nature and size (Sauro 2010; Sauro 2012).

3.2 Usability testing framework

Nowadays, numerous ways to test usability and improve the quality of the system are available for researchers. Prior deciding upon the technique it is important to understand the goals and purposes of the planned research. Deciding which type is more suitable is a crucial decision in the entire process of usability testing (Bank & Cao 2015, 19).

It is necessary to know who the users are and what are the distinguishing factors between them, so it is possible to define user groups. The definition of the target group(s) among the user groups also supports the choice of the method. As mentioned in chapter 2.4.2, usability testing methods can be classified depending on the purpose (formative or summative), location (in-lab or remote) and moderator's role during the test (moderated or unmoderated).

The decisive difference between the in-lab and remote testing is that during the former the moderator and the participants are located in the same physical space. Therefore, in case of a remote testing, a moderator has to use a specialized software to communicate with participants and to record and analyse the testing session. The benefits of the remote testing over the in-lab testing are the possibility to reach larger and more geographically diverse user groups at fewer costs. It is also possible to maintain a more realistic environment for the participants and to gather more convincing usability results due to a typically larger sample of participants (Fidas, Katsanos, Papachristos, Tselios & Avouris 2007, 2-3). The benefits of the in-lab usability testing, as well as the reasoning behind the chosen methods, are discussed further in chapter 3.2.1.

Moderated and unmoderated usability testing differs mainly by the presence of a person in the role of a moderator guiding the session or the test being automatized. It is important to understand whether a potential interference in the testing process might be beneficial for the test or the aim is to get more systematic results concerning the specific area of the product.

3.2.1 In-lab moderated usability testing

Traditional in-lab usability testing is one of the most frequently used evaluation method, as it has various benefits. Typically, only one participant goes through the set of tasks on a usability testing session (Albert & Tullis 2013, 53). The method requires a relatively small number of users (4 - 10) and involves personal interaction between a test moderator and a participant.

It is crucial that the moderator stays as objective and neutral as possible in order to not bias the participant's actions or interfere with their normal behaviour. Additionally, such roles as observers, note takers, loggers, and technicians exist to help conducting a session (Barnum 2011, 163).

The decisive benefit of the in-lab usability testing over the various remote options is the significantly lower "degree of separation" between the moderator and the participants. The

common shared space allows to create more personal and, therefore, successful communication channels and to enhance mutual understanding. Testing in a shared location aids the observation of the facial and emotional cues of the participants. It allows to facilitate synchronous communication and to establish concepts between the moderator and the testers (Fidas et al. 2007, 3).

3.2.2 Think Aloud protocol: concurrent and retrospective

Think aloud protocol is one of the most efficient usability testing methods, widely applied in various in-lab and remote studies (Nielsen 2012c). The essence of the method is to invite users to speak "out loud" and to vocalize their thoughts and feelings while going through a set of tasks (Rubin & Chisnell 2008, 204; Nielsen 2012c).

Two types of ‘thinking aloud’ exist in the methodology: concurrent (CTA) and retrospective (RTA). The most common approach is to employ concurrent Think aloud method - to ask users to comment on the ongoing interaction immediately and continuously (Rubin & Chisnell 2008, 204). As opposed to CTA, retrospective thinking aloud happens at the end of the test: user summarises the feedback and the impressions from the interaction with a system. The recall of the impressions is typically facilitated by observing audio/video recordings of the session.

The drawbacks of CTA are that such way of functioning as continuously commenting on the experience out-loud is not natural for humans and can cause frictions in the user performance. Some users may take time to get used to this mode, some fail to adapt at all (Nielsen 2012c). In contrary, a research done by McDonald & Petrie (2013, 2943) shows that CTA has no significant effects on performance. However, users still can find themselves frustrated and perceive the tasks as more complex than they are, while performing a simultaneous thinking aloud.

3.2.3 Observation techniques in usability testing

Observations techniques allow gathering data by watching the participants of usability testing during the session. Observation of user interaction with a system can provide researchers with various types of feedback: verbal and facial expressions, gestures, and sighs (Barnum 2011, 138).

It is advised to invite various stakeholders such as designers, managers, and developers to observe the test session, as it increases the level of acceptance of the findings (Nielsen

2010b). Typically, the testing session is video/audio recorded to enable recurring access and further analysis of the gathered data.

3.3 Quantification of the usability testing results

A new approach of converting qualitative usability testing insights into quantitative data was employed in this study. The method was proposed by Latin (2017) as a way to test overall user experience and to pinpoint potential usability issues. The method provides a way to translate qualitative UX research findings into measurable and calculable data. According to Latin (2017), such approach helps to bring the UX concerns at the centre of data-driven business models.

The core idea of the method is to split the testing into small steps called scenario tasks. Upon the completion of the task (either successful or not), the participant should rate the perceived difficulty of the task on a scale from one (very easy) to seven (very difficult). This approach employs the SEQ usability method, discussed in chapter 3.1.3. The important aspect is that all of the scores measuring difficulty are inverted SEQ scores. For example, if a task difficulty was rated as “not difficult at all” (SEQ score SSEQ = 2), the number written in the table equals 6. Therefore, the formula to calculate the score was slightly modified:

$$S_{total} = S_{success} + S_{diffivulty} = S_{success} + (7 + 1 - S_{SEQ}) = S_{success} + (8 - S_{SEQ})$$

The scores are calculated for each task. Next, they are written in a table for each session. Numerous types of analysis can be performed with such data: from calculating an average score for a task to comparing various user group performance within the testing session. The empirical application of the method with a detailed description of the process is demonstrated in chapter 5.5.

4 Online survey

This chapter describes the first part of the usability evaluation study implemented in the form of an online survey. Beginning with the objectives and the research questions, the chapter outlines the reasons behind the questionnaire design and provides additional details about the surveying process. Analysis and user group segmentation are discussed in chapters 4.3. It is important to mention, that during the segmentation only the users in the role of students were considered; thesis advisor role was not analysed in such manner due to the limited scope of the project. The analysis of the data gathered from thesis advisors resides in chapter 4.4.

The presented survey findings are narrowed to the most decisive and crucial insights. The following chapters aim to outline the attitude users reported towards MyNet and the thesis pages. Also, the chapters contain descriptive data necessary to judge about the nature of user interaction with the portal. Among such data are

- frequency and reasons behind usage
- familiarity with the portal
- overall reported satisfaction
- reliance on the content.

4.1 Survey objectives and research questions

The objective of the survey was to broaden the knowledge and understanding of the nature of user interaction with MyNet and the thesis pages in particular. The feedback about the usage of the system was collected and analysed. The analysis played an important role in further defining the usability testing approach and highlighting some of the usability issues.

The direction of the survey was set by the following questions:

- What are the principles of user group segmentation?
- How easy and smooth is the interaction with MyNet for users?
- What areas of the thesis pages do users visit most frequently?

4.2 Questionnaire design

To achieve reliable results, two user roles of Haaga-Helia UAS students and thesis advisors were studied separately by employing two different questionnaires. The questionnaires were designed to perform multiple tasks from screening the participants to gathering qualitative and quantitative data about their satisfaction and experience with the researched portal. Additionally, demographic data were collected with the student

questionnaire in order to better understand the archetypes behind the various user groups. The data can potentially complement further research of the user personas and encourage the User-Centred Design (UCD) approach.

The questionnaires were hosted on Google Forms. The platform was chosen mainly due to the rich variety of affordable free-of-charge functions, which could be applied in the course of the questionnaire creation, analysis and presentation of the gathered data. The questionnaires were active during the period of one month between the 19th of December 2016 and the 19th of January 2017.

Two questionnaires were split into sections according to the following questions:

- Does the respondent fit into the relevant studied user scope?
- What are the basic demographics of the respondent?
- What is the respondent's expertise in using the Internet and its services?
- Does the respondent have any experience with MyNet and the thesis pages? What experience was it and how the participants describe it?

Such structure of the questionnaires was chosen due to a careful analysis of the expected results which were essential for the further study. It was necessary to define who are the respondents and by what condition they can be classified into the user groups.

A closer look was taken at the relation between the frequency of the thesis pages usage and the study goals of the participants who were using the pages. Additionally, the existence of previous experience in thesis writing or working with student web portals prior the usage of MyNet was assumed to be of potential influence on the experience with the portal. The questions regarding commonly used devices for browsing MyNet have also provided ideas for the improvement. The full list of questions for both the student and the thesis advisor group questionnaires can be found in the appendices 1 and 2 respectively.

4.3 Findings: student group

In total, 148 students of both Bachelor (123 participants, 83% of the total number) and Master (25 participants, 17% of the total number) programs took part in the survey. The majority of the students fit the age group of 22-27 years (43.9%) and reported no problems with using the Internet and technology. 85.1% of the participants were local students. Most of the respondents spoke Finnish fluently (83%); the prevailing number had reported browsing MyNet pages in the Finnish language (68.9%). Students who were fluent in English composed 91%, while 30.4% claimed to browse the English version of MyNet. More than a half (68.2%) had had previous experience with academic portals similar to MyNet.

Each respondent was at least slightly familiar with the portal. The majority claimed to be a relatively frequent visitor of MyNet: 70.1% of the students were using it actively, ranging from once per day up to once per week.

73.7% of the students who had experience with the thesis pages, claimed to use the pages actively in the course of their thesis process or at least had skimmed through them. More than a quarter (26.3%) of the participants responded that they have never visited the pages or that they had never even heard about their existence (appendix 3, diagram 1).

As can be seen in figure 8, the majority of the students assessed their overall satisfaction with MyNet in terms of quality, ease of use and the content as medium (between 5 and 7 out of 10). The average composed 8 out of 10 (27.4%), labelled as high. 43.2% of the respondents reported that they frequently base their study decisions on the information found on MyNet (see figure 9).

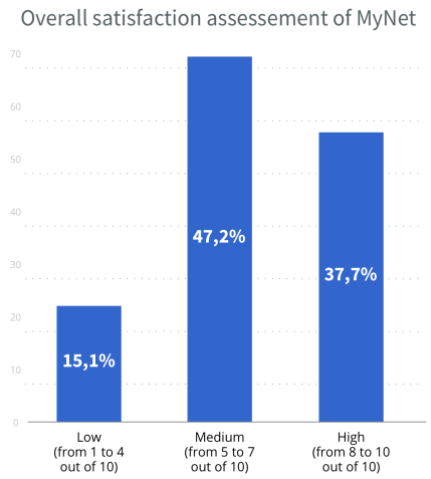

Figure 8. Overall satisfaction assessment of MyNet

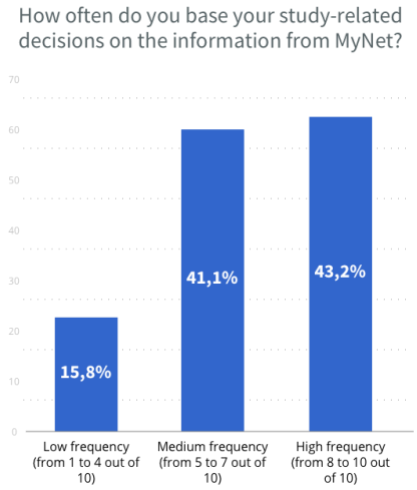

Figure 9. How often do you base your study-related decisions on the information from MyNet?

As figure 10 shows, 35.2% of the students claimed to know the portal well, whereas 37.3% felt that there are some areas of the portal they are not too familiar with. The remaining 27.5% stated that the portal is not very well known to them.

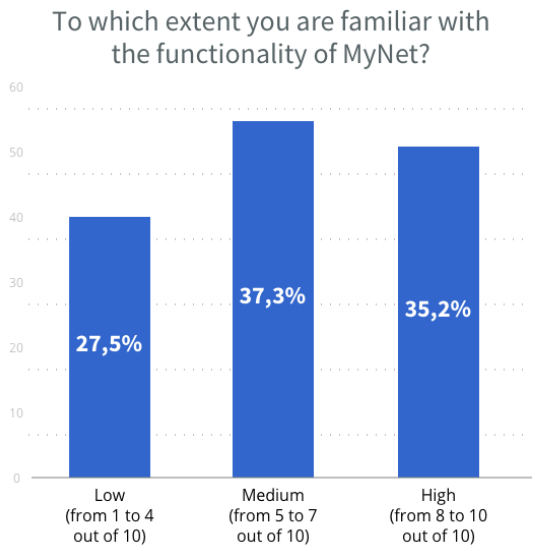

Figure 10. To which extent you are familiar with the functionality of Mynet?

The most frequent activities performed on MyNet thesis pages were ranked in the following order (the most frequent on top):

1. The general "ABC quick guide" thesis process description (62%).
2. Templates used in the thesis writing process (55.8%).
3. Thesis forms (50.5%).
4. The description of the maturity test and its regulations (33.7%).
5. How to register for thesis (29.5%).
6. Information about the Urkund system (27.4%).
7. What bureaucracy documents are required to be signed (the "paper" process) (22%).
8. Scheduling of thesis seminars (21%).
9. Other less frequently mentioned activities.

Among the alternative resources of information students frequently listed thesis advisors and friends from the university.

4.3.1 User group segmentation

At the beginning of the research, it was assumed that user group segmentation would be primarily conditioned by the graduation level of the respondents (under- or post-graduate). Instead, during the analysis phase, the segmentation relied on the students' individual stage inside the thesis process. The two groups namely novice users and experienced users emerged during the survey process and were analysed separately. The novice user

group composed 64.8% of all the respondents, whereas the experienced user group was 35.2% from the total of participants.

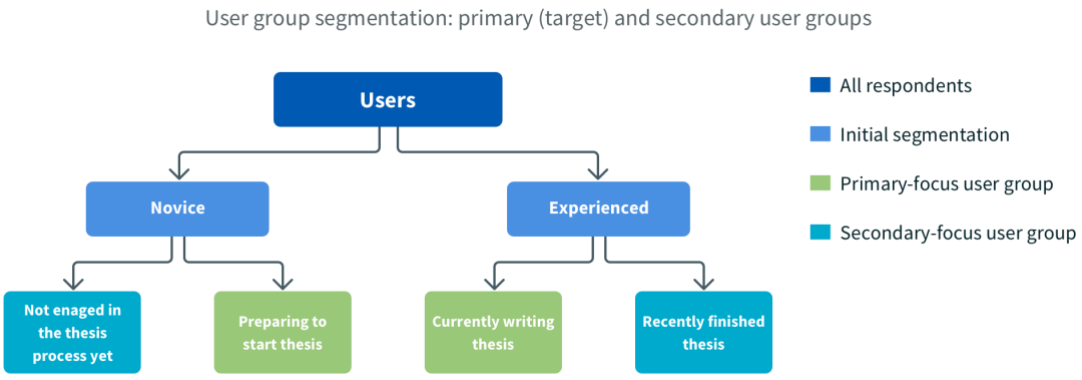

Figure 11. User group segmentation: primary and secondary user groups

The novice user group was split into two groups of the respondents who were to be found on the preparation stage and the users who were not yet engaged in the thesis process at all. The experienced user group was also regarded as a combination of the two groups of respondents. The first group consisted of students who were writing their thesis at the time of the survey. The second group was representing the respondents who had recently finished their thesis. The visualization of the segmentation is shown in figure 11. The participants' relation to the thesis process is presented in figure 12.

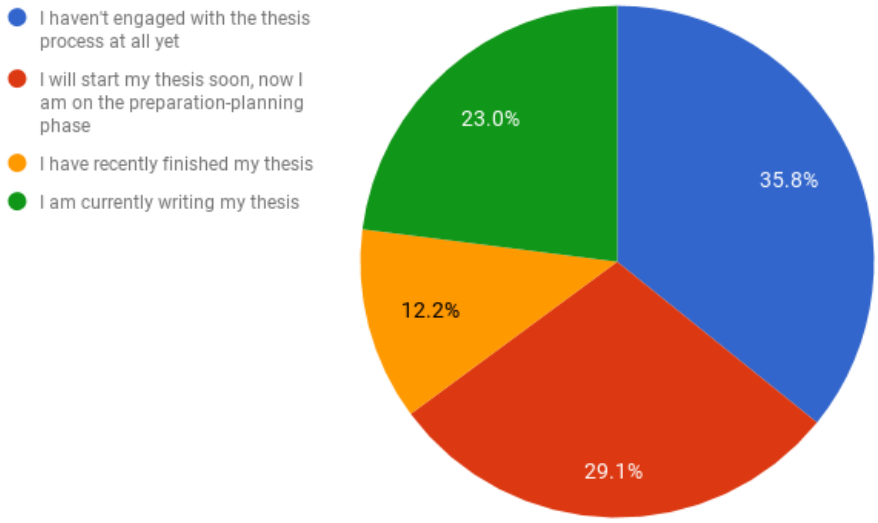

Figure 12. Student survey results. What is your relation to the thesis process?

Each group was given a distinctive name, later used in the study. Table 1 provides an overview of the group codes and the meaning behind it.

Table 1. User groups, segmented during the survey

Code	Name of user group
N_{NE}	Novice users: not engaged in the thesis process yet
N_{Prep}	Novice users: on a preparation phase
E_{CW}	Experienced users: currently writing a thesis
E_{FIN}	Experienced users: finished the thesis process

In order to understand better each user group, the question investigating their current study goal was analysed. The question was: “Which of these study-related goals do you consider as your personal target right now?”. The respondents were offered multiple choices:

1. To smoothly start your student life in the university.
2. To successfully finish current semester courses.
3. To pass some minimal number of courses required in order to get sufficient amount of credits.
4. To organise your future exchange.
5. To organise your future study-related work placement.
6. To start with your thesis soon.
7. To focus on writing the thesis.
8. To finish the thesis and graduate.
9. Study goals are not among my personal targets right now.

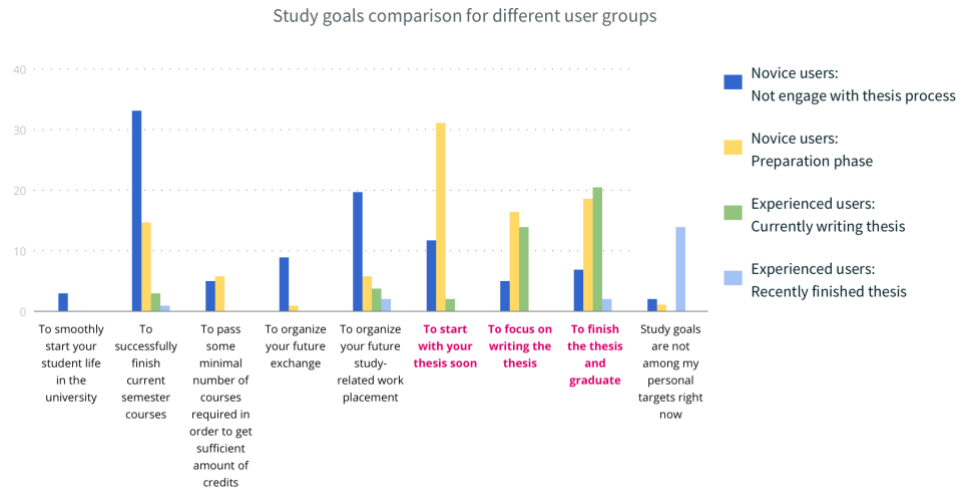

Figure 13. Study goal comparison for different user groups

From figure 13 it can be seen how the proposed segmentation by the relation to the thesis process correlates with the user goals of the participants. The focus goals for the study were the ones related to the thesis process:

6. To start with your thesis soon.
7. To focus on writing the thesis.
8. To finish the thesis and graduate.

Figure 13 demonstrates that the highest interest in fulfilling the thesis-related goals was shown among the students who were writing their thesis and the students on the preparation phase. Respondents who have not engaged in the thesis process yet also showed interest in fulfilling thesis-related goals. These insights influenced the identification of the target user groups. The groups were experienced users during the time of conducting their theses and novice users on the preparation phase.

4.3.2 Novice users: not experiences with the thesis process (N_{NE})

The novice users who were not engaged in the thesis process at all at the moment of the survey composed 35.1% of the total number of the respondents. The group was given a code-abbreviation name N_{NE} (Novice_Not Experienced). The data gathered from this group mainly informed the general findings and open answer analysis.

42.3% of the N_{NE} group have never visited MyNet thesis pages. The remaining respondents stated, that they only skimmed through the pages. None of the N_{NE} representatives was using the thesis pages actively. Only 13.2% of the respondents claimed to use MyNet in order to find information about the thesis process.

4.3.3 Novice users: on the preparation phase (N_{Prep})

29% of all the respondents were novice users who were preparing to start the thesis process. As mentioned in chapter 4.3.1, these participants are considered as one of the target user groups. The group was given an abbreviation N_{Prep} (Novice_Preparation).

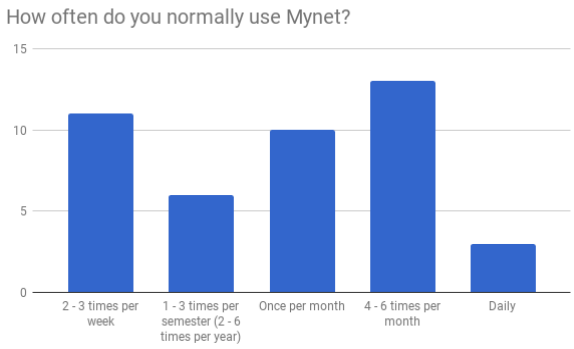

Figure 14. A frequency of MyNet usage

The majority of the students in N_{Prep} group claimed to be active MyNet users. 62.8% of the MyNet usages occurred from once per day up to once per week (see figure 14). 51.2% of the group representatives stated that one of the reasons they are using MyNet is to find

information about the thesis process. 90.7% of the users knew about MyNet thesis pages; however, all of them reported different activity levels (see appendix 3, diagram 2).

The students were mainly using MyNet thesis pages to check the following information (the top 3):

1. The general "ABC quick guide" thesis process description (70%).
2. Templates used in the thesis writing process (56.7%).
3. Thesis forms (53.3%).

4.3.4 Experienced users: currently writing a thesis (E_{CW})

23% of all the respondents had been conducting their thesis at the time of the surveying. 64.7% had not had any prior experience with the thesis process. The frequency of usage of MyNet varied a lot (see appendix 3, diagram 3). The majority of 29.4% reported that they use the portal multiple times per week (see appendix 3, diagram 4). 88.2% of the respondents claimed that one of the reasons they had used MyNet is to find information about the thesis process.

The frequency of decisions being based on the information from MyNet was 8 out of 10 (20% of the students); the average composed 7 out of 10 (see figure 15). The average level of familiarity with the functionality of MyNet was assessed as 5.4 out of 10.

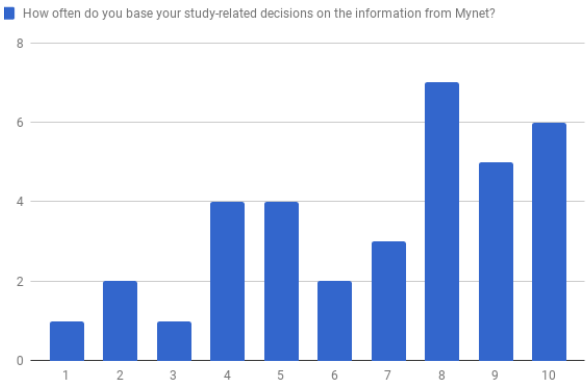

Figure 15. A frequency of reliance on the information from MyNet

As seen from figure 16, the majority of the students (61.8%) was actively using the thesis pages during their work. All of them knew about MyNet thesis pages; however, 5.9% had never visited and used the pages.

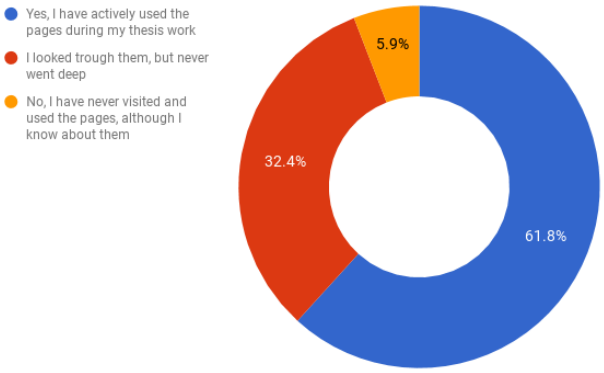

Figure 16. Student survey results: ECW. Have you ever used MyNet thesis pages?

The rating of the information most frequently searched by the writers was reported as follows (the top 3):

1. Thesis forms (64.5%).
2. Templates used in the thesis writing process (64.5%).
3. The general "ABC quick guide" thesis process description (51.6%).

4.3.5 Experienced users: finished thesis writing (E_{FIN})

The data gathered from the E_{FIN} group was mainly used during the general and open-ended answer analysis. All of the respondents who had recently finished their thesis reported active use of the portal. 83.3% claimed to use MyNet in order to find information about the thesis process.

E_{FIN} group was using the thesis pages mostly to check (the top 3):

1. Information about the Urkund system (72%).
2. The description of the maturity test and its regulations (66.7%).
3. The general "ABC quick guide" thesis process description (55.5%).

4.4 Findings: thesis advisor group

One of the thesis advisors remarkably pointed out in an answer to an open-ended question of the survey: "For a student, a thesis is a **project**, they do it once. From a teacher's point of view, it can be seen more like a **process**".

Thesis advisors gave valuable insights about both their own, as well as the students' usage of the thesis pages. In total, 30 teachers took part in the survey, where 23.3% were members of the Thesis Coordinator Group.

The majority (40%) of the thesis advisors reported that they normally used MyNet two to three times per week. The most common tasks were (the most frequent on top):

1. Checking the instructions.
2. Checking thesis process guidelines.
3. Checking schedules and re-exam dates.
4. Using MyNet to get a link to the other services and applications (Moodle etc.).
5. Downloading documents and templates.
6. Updating the information.

As demonstrated in figure 17, the majority of the respondents (83.4%) were using MyNet thesis pages in the course of their work. However, 13.3% of the thesis advisors almost did not use the thesis pages and one out of 30 advisors reported not knowing that the pages exist.

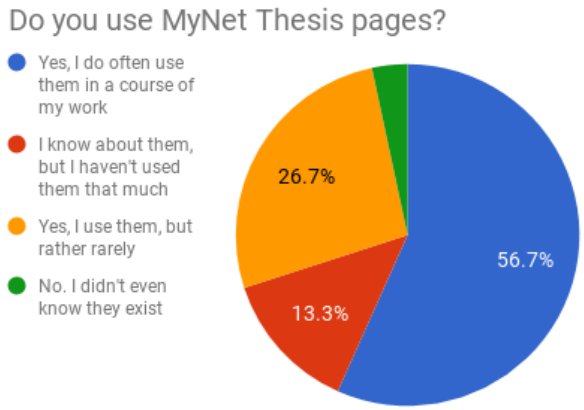

Figure 17. Thesis advisor group responses: “Do you use MyNet thesis pages?”

Figure 18 shows that for the majority (34.5%) the frequency of the student requests regarding the thesis process reportedly was two to three times per week. Reportedly, most of the requests were resolved by finding information and showing it to the students. The absolute majority of the advisors reported that generally, the bachelor’s degree students are requesting help more often than the master’s degree students.

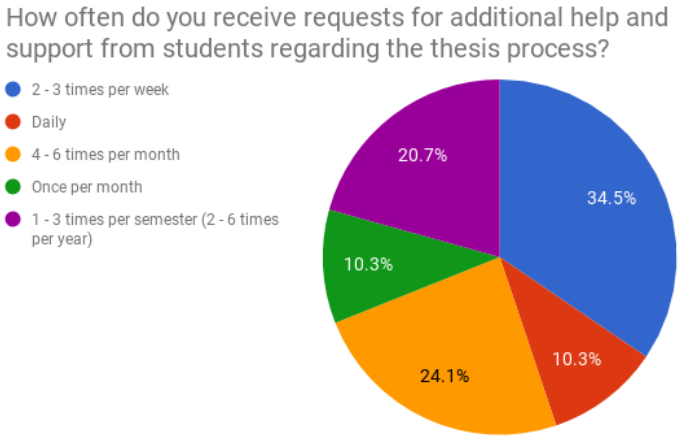

Figure 18. Frequency of the student request for help reported by the thesis advisors

As seen from appendix 6, more than half (58.6%) of the requests is connected with the students failing to find the right information provided in the study resources. As seen in appendix 3 (diagram 5), around 80% of the questions directed to the thesis advisors have their answer on MyNet thesis pages. Therefore, by improving the findability of the portal it is potentially possible to relieve the advisors from almost half of the student requests and leave more time for resolving the specific issues.

As an answer to an open-ended question, some of the thesis advisors reported that quite often it is hard for them to find relevant information because of the structure of the portal and pages. They left comments and suggestions for MyNet thesis pages:

- Referencing and citations in the reporting guidelines should be explained better and clearer.
- More clarity in the guidelines (especially in which information concerns a student and which is not) is needed. Information clutter and redundancy should be eliminated.
- Quick explanations and links to the most important pages - graduation schedule, the rule of lowercase letters in thesis advisor's email address in Urkund etc. should be prominent.
- More visible placing of program-specific guidelines is needed.
- Better and more intuitive structure, layout, and content (updated documents and links), less disperse information.
- The content of English and Finnish version of the pages should align.

4.5 Survey analysis

Some of the participants did not know about the existence of MyNet pages containing information about the thesis process. Moreover, 5.9% of the thesis writers had never visited and used the thesis pages although they knew about them. Additionally, it was alarming that there were examples of teachers among thesis advisors who did not use the thesis pages in the course of their work; one of the advisors did not even know that the pages exist. The benefits of using MyNet thesis pages should be explained better to both the students and the advisors at the university and supported by the experience users have during the interaction with the pages. Otherwise, some part of the target audience may be overlooking helpful and useful information to accomplish their goals.

64.7% of the thesis writers had not had any prior experience with the process. Therefore, there is a need to provide such students with an all-encompassing overview of the process and to help them in forming a strategy and planning next steps. It is possible to accomplish these goals by taking a closer look at the consistency and content organisation of the portal.

As mentioned in chapter 4.3, the majority of the participants was using MyNet actively. However, the level of the perceived familiarity with the platform did not correlate with the frequency of use. This could potentially indicate various usability and other UX challenges. For example, content dispersity across the pages, outdated information, and inconsistency could lead to low predictability of the system. In these cases, users struggle to determine the information as complete and valid. It is reasonable to assume that users do lose a feeling of control and cannot label themselves as familiar with the portal. Such hypothesis was also supported by the open-ended answer analysis.

Figure 19 illustrates the pattern behind the usage of MyNet and the thesis pages by the thesis writers. The groups are represented by overlapping circles, so it can be seen how the MyNet and particularly the thesis pages usages are corelated. Considering that the vast amount of essential information which resides on MyNet thesis pages is produced particularly for the students during the process of thesis writing, more than one-third of the target audience ignoring the resources is an alarming finding. Improved usability of the pages can greatly assist in inviting and keeping the users, in helping them to embed the thesis pages in their activities.

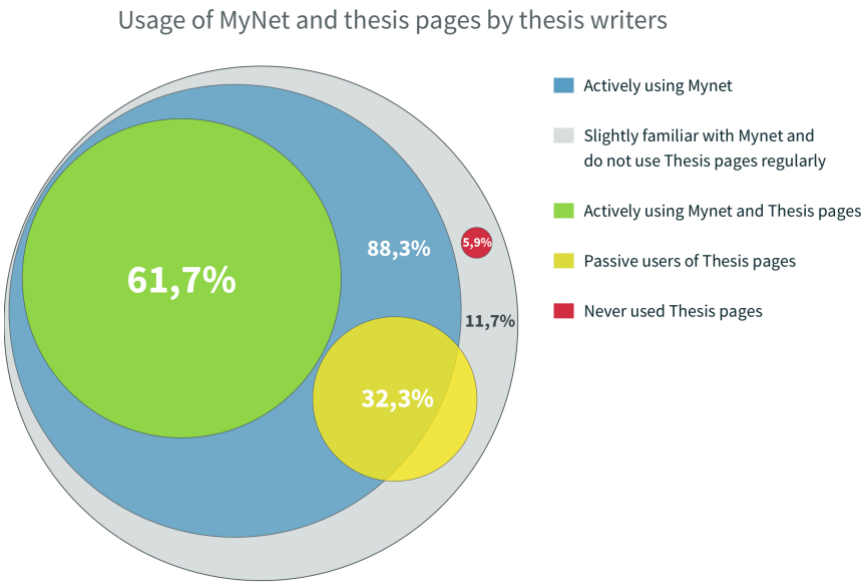

Figure 19. A usage of MyNet thesis pages by thesis writers (E_{CW})

Students base their study decisions on the information they find from MyNet relatively frequently. Generally, the top 3 most frequently searched topics on the thesis pages were the overall process description ("ABC Quick Guide" page), templates used in the thesis writing process, and the information about the form of a thesis. Furthermore, 61.7% of the thesis writers were actively using the thesis pages during their work. Such statistics also draw attention to the vitality of the improvements.

Almost all of the advisors mentioned that "finding information and showing it to the students" was their usual activity. According to the survey results, the majority of the thesis advisors was receiving a few requests per week from the students. Having in mind that students have access to the same resources, such feedback confirmed findability as a problematic quality of the portal. As discussed in chapter 2.2, findability has a crucial influence on the productivity when it comes to intranet solutions. In the current case, advisors and students potentially could gain more time for more meaningful tasks if they do not have to face the struggles of searching for information.

5 Usability testing of MyNet thesis pages

A combination of qualitative and quantitative user research methods based on concurrent Think Aloud (CTA) protocol together with controlled observations constituted the main part of the data gathering process. In the following chapters the objectives and the research questions, as well as the test design and implementation are unfolded step-by-step. Six users were invited to participate in the usability testing sessions. The participants' background and other details are discussed in detail in chapter 5.2. The analysis is divided into the observation phase (qualitative data) and the SUS results (quantitative data). It is presented in the different chapters 5.5 and 5.6 respectively.

5.1 Usability testing objectives and research questions

One of the primary objectives of the usability testing was to determine how well new users understand the content organisation and navigation on the thesis pages, how fast do they learn the structure and how efficient is their information search. The following questions formed the stem for defining the framework, as well as designing and building the test scenarios:

- How intuitive is the interface for the users? How easy is it for users to find specific information?
- Do users feel control over the system? What level of control do they expect to have? Can users predict the effect of their actions?
- How enjoyable and satisfactory is the interaction with the system?

5.2 Test framework design

Usability testing was chosen as a primary research method due to multiple reasons. The method is based on direct user involvement and allows to observe participants behaviour while going along the scenario tasks. Such scenario-based approach aids the comparison and measurement of the results during the analysis stage. The method has its crucial benefits over various analytical approaches. The latter is typically performed by the usability experts and hypothetical users; therefore, less real-life situations are reflected with such methods. By involving actual users, it is possible to tap into the core of the usability issues and to observe the real struggles users face during the interaction with the system. Also, possessing such argumentation it is easier to convince management or development team of the importance of usability test findings.

This research is considered to be a step in an iterative improvement process. According to the product specification and the objectives of this research, usability testing conducted for this project was of formative nature. Formative and summative usability evaluation

approaches are discussed in chapter 2.4.1. To recap, formative evaluation is used to diagnose various usability issues and to provide improvement recommendations (Albert & Tullis 2008, 46).

As discussed in chapter 3.2.1, traditional in-lab testing is identified as the most suitable choice for formative usability evaluation. The choice of the evaluation framework is presented in figure 20.

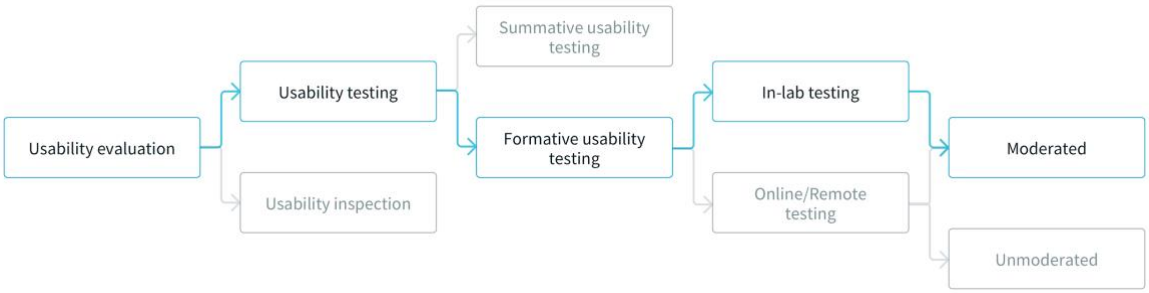

Figure 20. Choice of the evaluation framework for the study

Each session took approximately 1 hour. The sessions were composed of three parts:

1. Preparatory pre-test.
2. Think Aloud test session.
3. Post-test which consisted of SUS questionnaire and two open-ended questions.

The process was audio and video recorded with the verbal consent received from the participants at the beginning of each session. Both the screen and the participants' emotional responses were documented and stored by the researcher until the project was completed. Additionally, the feedback was recorded manually using pen and paper; however, since there were no observers to keep the notes, the moderator focused more on the test session rather than scripting. Such approach prevents unnecessary delays and miscommunication between the moderator and the participants. In addition, it decreases the probability of overlooking an important observation.

The pre-test mainly targeted demographic and background information in order to further assist in understanding and segmenting the users into archetypes. It was conducted in the form of a personal interview. Moreover, the nature of questions and informal communication played a role of “icebreakers” to help the participants feel more open and relaxed before the test.

The usability testing was based on a specially developed scenario which targeted the most frequently performed actions on the MyNet thesis pages. The list of the actions was derived from the survey discussed in chapter 4. In the context of the controlled

observation, it was crucial to increase the level of realism of the tasks. The activity was based on a search of specific thesis-related information via the portal. The questions were composed with the regard of the general thesis process flow. The list of the questions can be found in appendix 4 (questions list 1).

Concurrent Think Aloud (CTA) technique and controlled observations, discussed in chapters 3.2.2 and 3.2.3 respectively, were extensively employed during the usability testing process. The techniques allow collecting qualitative data such as emotional responses, impressions, and expressed thoughts in order to understand the participants and their perspectives better. Moreover, the concurrent nature of Think Aloud technique significantly benefited keeping the restricted testing time within the frame. It also encouraged immediate thought verbalization, which prevented the participant from forgetting their feedback.

The post-test summarised the freshly-gained experience the participants had with the portal. SUS test helped to systemize and quantify their impressions and feedback, whereas the two opened ended questions gave the participant the opportunity to express their own unframed thoughts and feelings about the experience. The questions can be found in appendix 4 (questions list 2).

During the study, some minor changes were applied to the SUS questionnaire. For example, the word “cumbersome” was replaced with the word “awkward” in statement 8, as recommended for tests with non-native English speakers (Finstad 2006, Bangor & al. 2009). The word "system" was also substituted with a word "portal" to bring the questionnaire closer to the subject of the study. The resulting SUS questions are listed in appendix 4 (questions list 3).

Initially, SEQ was not a part of the testing framework. However, later it was brought into the analysis stage in order to assist quantification of the findings. It was possible to reconstruct and log the answers to the questionnaire by observing the users' reactions, which were video-recorded for the further analysis.

The methods and techniques employed in the usability testing part of the study of MyNet thesis pages are demonstrated in figure 21.

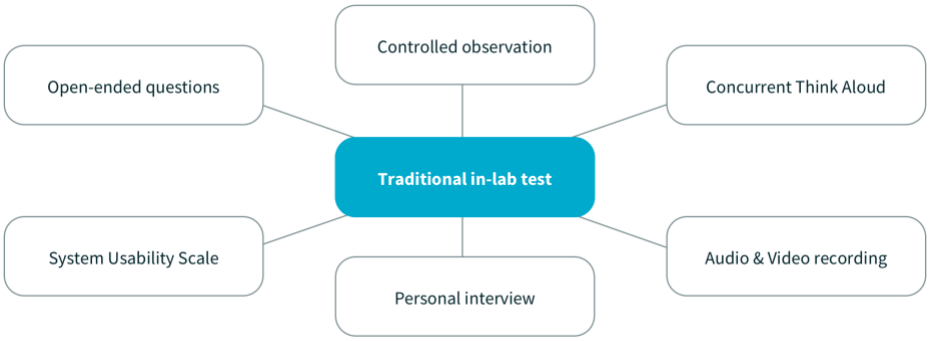

Figure 21. Methods employed in the user testing

5.3 Participants

A user group composed of six students of Haaga-Helia UAS was recruited from the User-Centred Design class. The group was primarily represented by 1st-semester students. All of the participants were inside the BIT (Business Information Technology) degree program, therefore, they had matching specific program guidelines. A closer look at the collected demographics can be taken in appendix 5. Due to the privacy, personal information which can be used to identify a respondent is not listed in this thesis paper or any publicly available materials.

All the participants had a lot in common regarding the study arrangements. However, their experience with Haaga-Helia and the academic process in general varied a lot. One of the students had conducted studies in Haaga-Helia UAS prior the degree studies he was undertaking at the moment of testing. Some students had academic experience in their home countries prior to coming to Finland. Another students had been studying on the other Haaga-Helia UAS degree program and had switched in the middle of their studies. Other participants were new in the academic process. Allocation of the participants of the usability testing to the segmented user groups according to their overall experience is presented in table 2.

Table 2. Participants classified by the user groups

Participant	User group code	Reason for classification
User 1	E_{FIN}	Had written a thesis for Haaga-Helia UAS already
User 2	N_{NE}	Had not engaged in the thesis process yet
User 3	E_{FIN}	Had conducted a thesis for the previous UAS
User 4	N_{NE}	Had not engaged in the thesis process yet
User 5	N_{NE}	Had not engaged in the thesis process yet
User 6	N_{NE}	Had not engaged in the thesis process yet

The majority of the respondents was classified as N_{NE}. The group was suitable for testing the usability of the portal from the perspective of a new user.

5.4 Test sessions procedure

The testing sessions were spread over a time span of two weeks from the 31st January 2017 to the 9th of February 2017.

As advised by Nielsen (2014), at the start of the session the participants had been shown a quick demo video of a Think Aloud test session (Nielsen Norman Group 2014) in order to form a better understanding of what is expected from them. The participants were ensured and reminded multiple times that the purpose of the session is to investigate whether the portal is working as intended; the testers were comforted that the aim is not to test the participants and there is nothing which can be done wrong.

After the video presentation, users were welcomed to take a look at the MyNet home page. They were asked to describe what they thought the purpose of the portal was. After the users familiarised themselves with or refreshed the idea about MyNet and the thesis pages, they were offered to follow a task-based scenario.

All the testers were asked to try to find the information on the thesis pages even if they have known the answer from their experience. It was important to see their "journey" to the final destination - the searched piece of information. As mentioned previously, each participant was taking part in an individual testing session. The same scenario was applied to all the testers with slight variations for some of the participants. At times, some tasks were performed simultaneously with the other ones or omitted, when users decided to give up. Observations of the behaviour were heavily employed throughout the process with the help of unbiased “why” questions directed to the users to help to convert the observations into user feedback.

The moderator was proposing the tasks and observing the success and difficulty parameters of each scenario step. Despite not applying SEQ question in the first place, it was possible to track the needed data based on the post-observations from the video footage. All sessions were recorded and most of the tasks were summarised with the overall verbal assessment of the perceived difficulty of the task. As seen from figure 22, the recording allowed to check both the facial expression of the participant and the actions on the screen.

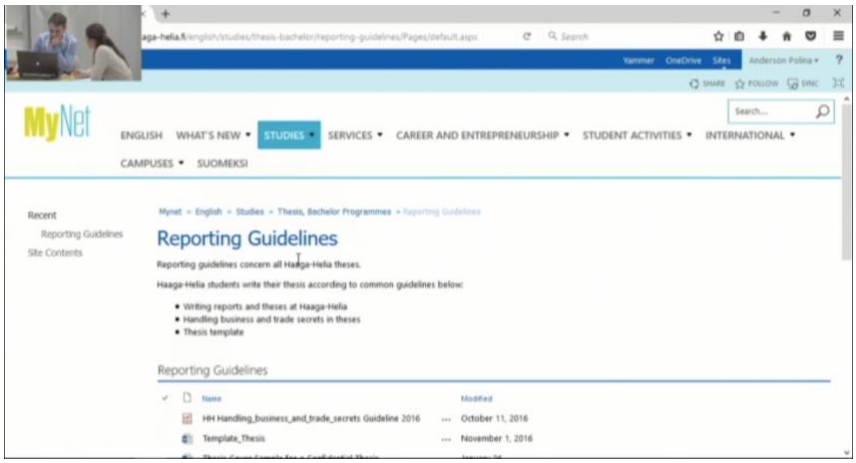

Figure 22. Screen from the recording of the user testing session

5.5 Quantified results

The video recordings, SUS data, and open-ended questions, as well as handwritten notes from the session, were employed during the analysis step. The recordings were replayed in order to extract the information needed for the measuring technique, as well as the general findings and their rating among the participants. It was important to analyse how often users ran into the same usability issues and how the issues were resolved. The scores were calculated based on the success and difficulty of the tasks and were later composed into a table for each session. The tables can be found in appendix 6 (scenario 1 - 6) respectively.

Each task is marked with a code; the relevant task question can be found in appendix 4 (questions list 1). In the course of the analysis, success and difficulty rate for each task influenced the score directly. The rating scale of the variables is presented in tables 3 - 4.

Table 3. Success and failure score decoding

Value	Condition	Case
1	Failure	Complete failure
2	Indirect success	Failure at first, but completion in the next attempts
3	Direct success	Immediate task completion

Table 4. Measure of the difficulty of the task (SEQ score)

Code	Name of user group
0	The task was not given to a participant
1	Very easy
2	Easy
3	Quite easy

4	Medium
5	A bit difficult
6	Difficult
7	Very difficult

The data about the success and difficulty of the tasks was recorded in a table to assist usability test analysis. As explained in chapter 3.3, the formula used to quantify and calculate the scores was:

$$Score = Success\ + (8 - difficulty).$$

In table 5 the average score between all the sessions is reflected. The red numbers signalize the low average of the task (below seven). The orange numbers represent the tasks which had a low score in at least one of the sessions.

Table 5. Average score of tasks (sessions 1-6)

AVERAGE OF USER TESTING SESSIONS

Average score of tasks by the success rate and difficulty

Task	Success	Difficulty	Score
T1	3.00	1.17	9.83
T2	3.00	2.50	8.50
T3	0.83	3.17	**5.67**
T4	3.00	2.60	8.40
T5	3.00	3.50	7.50
T6	2.60	2.80	7.80
T7	0.67	5.17	**3.50**
T8	3.20	3.60	9.20
T9	2.67	1.00	9.67
T10	3.00	1.83	9.17
T11	3.00	1.20	9.80
T12	3.00	1.17	9.83
T13	3.00	1.50	9.50
T14	2.50	2.50	8.00
T15	2.67	1.00	9.67
T16	3.00	1.50	9.50
T17	2.50	2.83	7.67
T18	3.00	1.60	9.40
T19	0.20	4.40	**2.20**
T20	0.67	4.33	**3.00**
Average			7.89
Low average			3.59

The lowest score of 2.20 out of 10 was observed for the task T19 “When is the next thesis evaluation seminar?”. The evaluation seminar schedule for the BIT students was located on the program specific guidelines page. To a big extent, such low score is connected to the confusion around the naming and the precise meaning of the term. For the majority of the users, it was unclear whether an evaluation seminar is the same as thesis seminar and what the possible differences were. Users were not sure to what part of the process the term is related to, therefore, some of the users tried the global search and others were browsing and skimming through pages in search of a keyword.

The task T20 “To whom you should send your abstract for a language check?” scored only 3 out of 10. First of all, users were not sure what an abstract is and what kind of language check is meant - automatic or manual, by the writer or by a third-party. Mostly, students were trying to use global search, which was not very helpful. The success was primarily among the users who were patiently browsing through the step-by-step guidelines ("ABC step guide" page or a program specific guideline for BIT).

The task T7 “What are the different forms of a thesis?” got a score of 3.5 out of 10 possible points. The thesis forms are research, product-based, portfolio and diary. The reason behind the increased difficulty or indirect success of the task was that the information about the thesis types was distributed on a few pages. Users were guided to the general thesis page, where the information about only 2 out of the 4 types can be found. Some information is “hidden” in the documents or it is spread over pages. As a result, users either were giving an incomplete answer or were stating, that the task is difficult because they are not sure if the information they have found was comprehensive.

The task T3 “What documents do you need to sign before the beginning of the [thesis] work?” was marked with a score of 5.67. Again, the reason behind this is the dispersity of information. There is no list with all the agreements or documents and users typically spot only a commissioning agreement or a commissioning agreement with the agreement of confidential appendices, overlooking the research permit (and other possible agreements the author is not aware of). The different list of the documents could be observed from the "ABC Quick Guide" page and the program-specific guidelines. This fact is giving an impression of incompleteness or irrelevance of the found information. Users often mentioned that in such situation they would ask their thesis advisors for help.

5.6 System Usability Scale analysis

The interpretation of the System Usability Scale is not straightforward and demands a certain framework to decode the results. SUS and the interpretation methods were discussed in chapter 3.1.2. As mentioned before, in order to facilitate correct calculations of SUS score there exist various tools and solutions. A spreadsheet template created and distributes by Satori Interactive was used for this study to count the score correctly and quickly.

Table 6. System Usability Score Calculations

System Usability Scale Calculations

Participant	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	SU Score	Learnability	Usability
User 1	5	3	2	1	2	3	4	3	4	2	**62.5**	37.5	81.25
User 2	3	2	4	1	4	3	3	2	4	3	**67.5**	50	78.125
User 3	4	5	3	3	2	4	3	4	4	2	**45.0**	62.5	90.625
User 4	2	3	4	1	3	4	4	3	5	1	**65.0**	25	87.5
User 5	3	2	4	1	4	1	5	1	5	2	**85.0**	37.5	78.125
User 6	2	5	1	2	2	5	1	5	2	2	**22.5**	50	71.875
										AVERAGE	**57.91666667**	**43.75**	**81.25**
										Normal score:	68		

The SUS score of MyNet was calculated as 57.92, which is notably below the average of 68 (Sauro 2011). The results of the SUS questionnaire can be found in table 6. Measured SUS score was mapped to the percentile rank suggested by Sauro (2011) and the percentage was calculated, as shown in figure 23. The score is equivalent to 24% or grade D+ (2+ on the scale from 1 to 5).

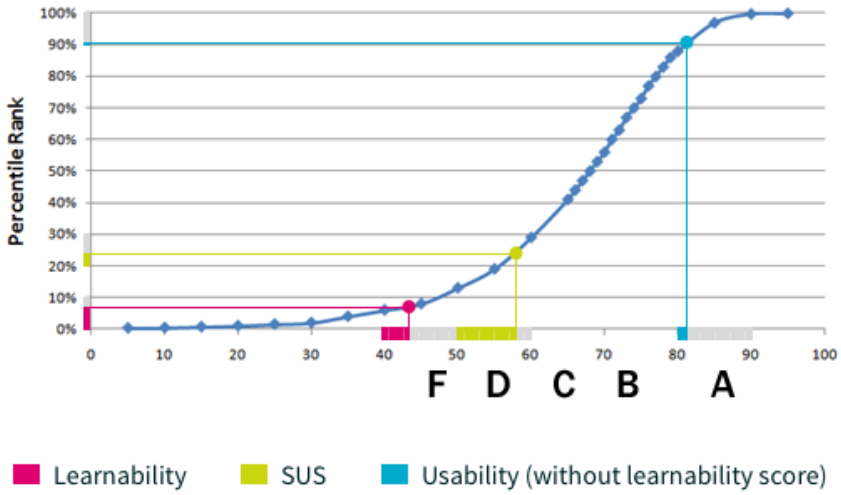

Figure 23. Mapping of the measured SUS score to the Sauro (2011) percentile rank

According to the score interpretation suggested by Bangor & al. (2009, 121), the usability of the portal was measured as "ok" (see figure 24). The results determined the portal's usability level as not good enough. However, it cannot be said that the usability of MyNet is poor.

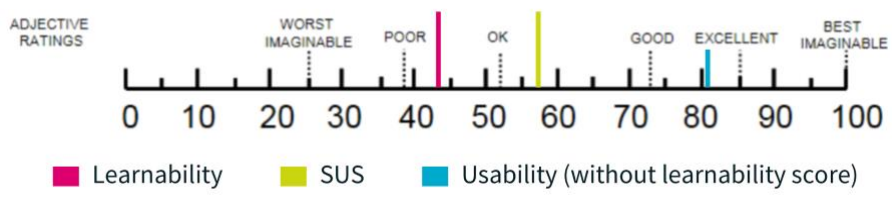

Figure 24. Mapping the SUS score on the Bangor & al. (2009, 121) interpretation diagram

As discussed in chapter 3.1.3, according to Sauro (2013a) it is possible to measure the learnability score of the system separately from the usability as a second factor of SUS. The learnability score based on the gathered data constituted 43.75. It is notably lower than the usability score alone, which was 81.25. Therefore, since the learnability level is rated as poor and falls behind the F grade, it is evident that more attention during the redesign needs to be paid to the elements impacting learnability.

5.7 Usability components and findability analysis

The following results describe the portal from a perspective of the five usability components mentioned in chapter 2.3. The memorability of the portal was not tested during this study, as it would require the involvement of recurring users who have been inactive on the MyNet portal for some period of time.

According to the SUS questionnaire results, learnability score was marked as poor. Qualitative data derived from observations support the finding: often, users experienced difficulty in remembering the location of the program-specific (BIT) guidelines page which they had visited before. The portal itself does not require users to learn numerous functions since the interactions are relatively simple. However, the fact that MyNet tutorials are given to all the new students at the beginning of their studies testifies that the learnability quality of MyNet can be improved.

The results regarding the efficiency of use of the thesis pages varied a lot. Some tasks were accomplished very quickly and easily, while others were too problematic and drove users to give up. Information search, which involved unfamiliar concepts such as thesis forms (appendix 4, questions list 1, question T7) or the Cross-Program Group (appendix 4, questions list 1, question T14), often resulted in skipping the task. Such cases showed that a system does not support an efficient search of the unexplored topics, where a user did not know the actual keyword but knew the search area. Additionally, as 13% of the thesis advisors reported in an open-ended answer, it is hard for them to find information on MyNet thesis pages. 50% of these advisors used the pages actively. It is an alarming finding connected with efficiency, considering that 43.3% of the advisors use MyNet thesis pages rarely or do not use them at all in the course of their work.

During the usability testing, users were making a relatively few errors. One case was connected with the navigation and wording, when a user misinterpreted "Process Description" page purpose in the left navigation; she assumed that the page contained an overall process description, whereas actually, it related only to maturity examination.

Another type of errors was connected with the dispersity of the content. Users were stopping their search after finding incomplete answers, which potentially could cause serious problems in real life. Such cases were reported in the open-ended answers within the survey. For example, one of the users claimed getting incomplete information about the publication process and consequently facing an inconvenient situation.

As reported in chapter 4.3, the average satisfaction rate of MyNet was high with a score of 8 out of 10. In the course of user testing, the participants were well disposed towards the system and reported the experience as being positive. However, they also mentioned that the problems with inconsistency, navigation and information clutter affected their impressions and consequent satisfaction in a negative way.

The scenario-based tasks were designed around the activity of searching for the specific information. Therefore, such approach allows evaluating not only the usability but the findability quality. In the process of testing, it became evident that findability on the thesis pages varies a lot: some information was marked clearly and was very easy to find, whereas more unfamiliar topics could cause a significant struggle for a user. Various suggestions about findability improvement are discussed further in chapter 6. Additionally, findability of MyNet thesis pages themselves was observed as high; none of the users had a problem with locating thesis pages inside the MyNet structure.

To conclude, out of the five components a special attention should be paid to improving learnability and efficiency of use of the MyNet thesis pages. Memorability needs to be studied further. Satisfaction was found to be tightly dependent on the status of the other components. The error component is the most crucial in the context of real life since such errors can lead to actual academic problems. As information search is among the primary activities inside intranet systems, it is recommended to pay close attention to the ways of improving findability of the MyNet portal.

6 Findings and suggestions

The following chapter summarises the analysis of the usability evaluation findings and discusses the suggestions in detail. The focus lies mainly on the problematic areas which this study aims to improve.

Despite the recommendation to present the positive findings among the negative ones (Sauro 2013b) in order to protect the development team from discouragement, the presented insights are restricted to the most crucial and critical. Therefore, the listed findings mainly focus on the problematic zones of the thesis pages. However, positive feedback concerning the simple colour palette, the richness of information and guidelines, logical and clear order on the BIT program-specific guidelines page and helpful "ABC quick guide" page was often provided by the test participants.

The following chapters are considered to be of interest to the design and the development team working on the MyNet portal. Statements from real users, situations registered during the tests and answers to the open-ended questions are listed at the beginning of each chapter. Such way of presentation aims to bring more personal touch and to bridge the gap between the users and the reader.

6.1 Content organisation

The feedback left by users during the usability testing and surveying, which reflects the core challenges of content organization:

- *"*The only disturbingly hard task for me was to find contact information."
- A user did not expect to find program-specific guidelines at the bottom of the general page: "The text ends with the feedback request. Usually, feedback is the last step of the process, so I did not expect anything below this text."
- "All the content is easy to find provided that you know where to look or which keyword to search for."
- "A lot of helpful information but problems with the presentation."
- “As there are so many links, I would still be a little bit worried that there is something that I am overlooking.”
- “In my experience, it is typical for MyNet that the information is all around and not in one place.”
- “For me, it would be good to have a specific page to see the big picture of the thesis process and only then go into the details.”
- “The quick guide has been the easiest place to search for information.”

The original layout often did not consider prioritization of the content. A significant piece of information can be found at the bottom of the page or elsewhere, where it is not directly visible. Among such examples are the program specific guidelines on the general thesis

bachelor's degree page (see appendix 7). One of the users did not scroll down to these guidelines during the test, which dramatically increased the complexity of a few tasks.

Another issue found on the general thesis page (see appendix 7) is the duplicated list of program-specific guidelines. Such redundancy should be eliminated, as it confuses users and resembles a technical bug.

Moreover, users reported lack of the thesis process general picture. One of the users mentioned that a bulleted structure of the content would have been more beneficial for her. She reported that it would have been easier to focus on the already defined steps rather than to read sentences and formulate the steps herself. Furthermore, often it was observed that the order according to the steps of the thesis process would have been more natural for the content and navigation menu items, as opposed to the original alphabetical order. Users frequently reported that the original content order was not intuitive. By organising the content according to the steps, it is possible to demonstrate the general picture of the thesis process.

Additionally, it was reported that the cases involving a search of an unfamiliar topic with no keyword known to a user were the most problematic. An overview of the page content, as well as clearly defined and visually prominent paragraph headers, can greatly aid in skimming through the pages during the information search thus increase findability.

6.1.1 Content categorisation

The feedback left by users during the usability testing and surveying, which reflects the core issues around content categorisation:

- "I would expect the information about what a thesis should be, its requirements, process, dates. This is my logical flow," - a user browses general thesis page.
- "I think on this site you are spending lots of time going into details because the things are not summarised clearly."
- "I only found out about [Haaga-Helia UAS] internal thesis publishing possibility when I was due to publish."

Various types of information were found to be mixed under the same paragraph, although it would have been more structural to split them into a few separate groups. For example, a text block on the general thesis page contained information about thesis overview (number of credits, hours etc.), a few lines about the general and specific guidelines, a sentence about one of the thesis types with an example link, a mention for the students with disabilities, and a link to a feedback survey.

In order to improve information search, it is necessary to categorise the content and place the relevant information together under the same paragraph and page. Also, this approach increases findability of the information.

6.1.2 Content relevance and quality

The feedback left by users during the usability testing and surveying, which reflects the need for the content to be of high relevance and quality:

- “So, you can start writing your thesis only after you finish your work placement? Is it a must or a suggestion?”
- "Many inactive links can be found on the portal."
- “If I would not have known about it, I would not guess that I need it.”
- "Students do not know which information concerns just her/him. There are various information resources," - a thesis advisor mentions about the pages.

As the main purpose of the portal is to store and distribute textual guidelines, the UX issues connected with the quality of the content are among the most critical ones. The redesign of the text materials was not included in the scope and purpose of this study. However, the usability testing insights can prove to be useful for a potential future content improvement.

For some of the users, it was a struggle to locate specific information. One of the users was frequently checking global search during the test. It was frequently mentioned that the central information is "wrapped" in less important one, which significantly complicated skimming. Users lacked the structure behind the textual guidelines, which is also essential to facilitate an efficient search.

Among the most crucial issues was information dispersity and consequent incompleteness and redundancy of the guidelines, as well as information being outdated and not integral. During a challenging period of thesis writing it is important for students to feel control over the situation; therefore, the information which they rely on should be actual and relevant. A notable number of participants expressed distrust to the guidelines, stating that they are afraid that some additional information is "hidden" in one of the attached documents or elsewhere. For example, the descriptions of the thesis types (research, product-based, portfolio, diary) are not listed altogether and users had to refer to various resources in order to collect all the information. Moreover, users can get different amount of information from different resource points. A solution for such issue could be in providing links to the original pages with an appropriately categorised content instead of duplicating or extending the content elsewhere. Such approach is widely

utilised in intranets and wiki pages; for example, in Wikipedia. Moreover, Microsoft SharePoint offers a wiki solution (Create and edit a wiki 2017) to all its users.

It is advised to refine the content, to get rid of outdated information and links, and to categorise the guidelines better. Additionally, information can be emphasized and preselected from a list of options; more about such solutions in chapters 7.4.3 and 7.4.5.

Users frequently start the interaction with MyNet by changing the interface language. Many users are confused with the need to identify themselves with credentials whereas the profile information is not used for their benefit. Personalisation is suggested to be enhanced. As a user logs in, the data about the user's name, study program, language preferences and other settings can be retrieved. Personalisation would require more design and development work since it would change the nature of interaction with the portal. However, such approach can yield great results in improving the user experience.

6.1.3 Content consistency

The feedback left by users during the usability testing and surveying, which emphasizes the demand for consistency:

- "It is very confusing that the pages are not organised uniformly."
- "Sometimes search can be very easy, but other times it takes longer to browse as the pages seem to have a slightly different format."

The most alarming inconsistency of the thesis pages lied in the difference between the English and the Finnish versions of the guidelines. It was reported by both the thesis advisors and the students that the Finnish version of the pages was organised better, and the content was richer. An accurate translation is essential, so both Finnish and English-speaking students have the same informational support. Furthermore, some of the program guidelines were reported to be organised better than the other. In some cases, the program guidelines were labelled as more useful than an "ABC Quick Guide" page. One of the users reported: "Basically, you can find anything you need from [BIT program] instructions". Such cases give rise to a certain inequality between the students according to their language abilities and the degree program.

Users expressed a need for a fixed layout, so the important types of information are always quickly accessible, and the layout is learnable. Documents and contacts were proposed as such types. Moreover, thesis advisors mentioned the necessity to make links more visible. Various solutions as infoboxes, links to the relevant information at the bottom

of the paragraph, and instruction sections at the beginning of a page are discussed in chapters 7.4.3 and 7.4.4 respectively.

6.2 Navigation

The feedback left by users during the usability testing and surveying, which underlines the core problems connected with navigation:

- "I click on the link and I have to go back since the [left navigation] menu disappears. It is annoying."
- "I would like to have left-side menu ‘frozen’."
- "The disappearing menu should be static. Annoying to hit 'back' [button] every time to finish browsing a page."
- “Navigation is clearly not usable: when your mouse is away [from the dropdown], the menu is gone,” - user navigates to the thesis pages via the top navigation menu.
- “I have an impression that there are so many layers of pages here - general, program specific, maturity evaluation... I do not really understand where I am right now.”

The behaviour of the left navigation menu was regularly reported as highly troublesome. The issue crucially influenced the quality of navigation; the finding is one of the most impacting the usability. The menu was changing the content or disappeared totally depending on the current page; users were frustrated by the need to always return to the previous page because of the inconsistent menu. Such functionality influenced the user experience heavily and created frustration, which was reported during each usability testing session and in the survey results. It is suggested to make the left navigation menu consistent and universal for all the pages.

Among the other navigation issues was confusion, which users expressed with many perceived page layers. By improving wording and visual appearance of the left navigation menu it is possible to make the structure of the pages more transparent and easily navigable. This way the content organisation and the location at the moment of browsing could be clearer to users.

The functionality of the top navigation dropdown was bothersome for most of the testers. When users tried to navigate to the thesis pages, the dropdown frequently disappeared, or the wrong list item was expanded. The list for "Studies" tab contained numerous options; when a user needed to scroll to the item on the bottom, the dropdown was frequently collapsing. Reducing the number of options in the dropdown by improving grouping and categorisation of the items can aid both the technical and the cognitive aspects of the interaction.

According to Hick's law, the amount of time to choose the correct option is proportionally dependent on the number of options (Soegaard 2018b). In other words, the load on a user's working memory decreases and the search becomes more efficient with a shorter list of options. In spite of the options being arranged in alphabetical order, when users search for some piece of information they rarely know the precise name of the category and have to scan through the list. In this case, nesting can prove to be a better solution for information organisation. Moreover, with the elimination of the need to scroll the dropdown the technical issue might be resolved, as well. Additionally, it is suggested to increase the time the dropdown stays open after the cursor stops hovering it.

A clearly marked "emergency exit" is among the positive findings; the redirection to MyNet home page happens upon clicking on the logo. However, after a user clicks on the logo, the language preferences are lost. This problem can be configured on multiple levels, one of which (personalisation) was discussed in chapter 6.1.2.

The links to other portals (OneDrive, Yammer) could be grouped together under the main settings dropdown (top-right corner) in order to free some space. As the links do not facilitate the primary action, it is not necessary to keep them visible on each page.

6.3 Information scent

The feedback left by users during the usability testing and surveying, which shows the cases of poorly maintained information scent on the thesis pages:

- "Should I scroll down or go to the menu?" - a user was browsing the general "Bachelor's Thesis" page.
- "I am searching for a keyword from the menu that would guide me, but I do not see any."
- "Should I keep reading the guidelines until the end or should I branch out with the help of these links?"
- "It is confusing that [the interface] points me into portfolio thesis link and after I click, I land on the general page with no specifics. I think this information should be separated."
- User likes that she saw the name of her program: "This is for BIT, this is good!"
- "If I would like to know how to start writing my thesis, I do not think this would be helpful for me," – a user mentions about the general "Bachelor's Thesis" page.

Information scent is one of the most important concepts of information foraging. Information foraging is based on the analogy between the wild animal food-gathering principles and information-gathering behaviour of the users. Users will continue clicking as long as they sense that they are "getting closer" to what they are searching for; the

information scent must increase in strength and progress should be rapid enough to be worth the spent or predicted effort to finish the task (Nielsen 2003).

Despite the apparent abundance of the information provided on the pages, one of the users expressed lack of tips and guidance. While seeing many pages with lots of information, she could not focus her attention and just kept browsing around. She expected information clearly indicating where to start, how to conduct the thesis process, what are the supporting courses and examples of thesis topics. Frustrated by the information abundance, the user clearly experienced an information overload syndrome during the first 10 to 15 minutes of familiarising herself with the thesis pages. The UX improvement goal is to ensure just the right amount of information per screen, so the overload does not happen.

Some of the users found themselves browsing irrelevant information after they have spent a few minutes patiently reading. During the process of skimming, all of the users were searching for keywords to guide them further. For example, it was hard to follow the scent while researching the thesis types: from the "ABC Quick Guide" page users were linked to the general thesis page, where the incomplete information about the thesis types was presented among the other instructions and descriptions.

As mentioned by Nielsen (2003), navigation and information scent are closely connected. The latter depends largely on the quality of the former. It is easier for users to see the direction and guidance on where to start by having clear categories and the structure reflecting the process flow and emphasizing the essential topics. Also, it is important to leave clues in the form of content order, tooltips, step-by-step guidelines, and keywords. The details about the content such as for whom it is relevant, at which step etc. should be shown prominently, so users do not make errors by misinterpreting the purpose. The feedback about the current location of the users is very important, as it provides an overview of the path and ensures that the “trail” is correct. Carefully designed wording also supports information scent.

6.4 Wording: use of language

The feedback left by users during the usability testing and surveying, which describes the confusion users felt regarding the names of the used terms and concepts:

- “[The page name] 'tools’ sounds like something connected more to what I need for the actual writing, like a template.”
- "It is confusing. Is it to help me or to help others?" - about the “Cross-Program Groups” page.

- “There are different topics in the menu on the left but for me, they do not seem connected to the thesis process at the first sight.”

During the process of usability testing, it was found that many students find specific terms related to the thesis process unfamiliar and confusing. Consequently, this prevents the students from understanding certain parts of the instructions "on the go". To help the users who are new to the thesis process, a thesis dictionary or alternative way of explaining the main concepts and terms, as well as the differences between some of the items could be introduced. The lists of the ambiguous terms and differences, as reported by the test participants, can be found in appendix 8, lists 1 and 2 respectively.

Moreover, during the testing, it was mentioned that not all the names of the paragraphs and pages describe the content well. For example, a notable level of frustration was caused by clicking on the link labelled as “Urkund”, however, landing on the “Ethical Principles” page. A solution for such cases can be in combining the names if both of them reflect the content of the page. By providing descriptive paragraph headers it is possible to mimic a table of contents for each page, so users have an overview of the presented text, which aids to content categorisation discussed in chapter 6.1.1. Another example was the names of the repositories on the Publication page. A descriptive word such as "internal" or "public" can be added to the name of the publishing platform in order to guide the readers.

The best way to ensure a well-maintained information scent is by clearly notifying users of what they will find by following a link or diving deeper into a category. This can be achieved by the unambiguous description of the content and clear naming reflecting the essence of the contained information. It is not the best practice to invent new words or slogans for navigation options (Nielsen 2003). The names should be easily recognised rather than recalled.

6.5 Visual aesthetics

The feedback left by users during the usability testing and surveying, which specifies the various faults the interface has from the visual perspective:

- “I do not like that [the tabs] are not in one row and there is a lot of different fonts on the [general “Bachelor’s Thesis”] page. It could be more organised.”
- “Breadcrumbs menu is too small. I would rather use the dropdown.”
- “The page looks boring,” - about the "ABC Quick Guide" page.
- A user does not notice that the "Process Description "page in the left menu is a subpage of the "Maturity Examination" page. User assumes that it is a general thesis process description.
- “I think that the illustration of the lady with the papers does not look professional.”

- "In the English [version], the menu is not shown completely on small PC monitor (15")."
- "I would keep the text colours simpler, so it is easier to read."
- A user clicked on the "Essay" page under the "Maturity Examination" page because she assumed that the former describes a thesis type.

As the information on the portal can be overloading (as discussed in chapter 6.4), it is suggested to use minimalist design principles in order to reduce the design to its essential aspects. A famous example among such principles is "Less is more", which stands for the use of only the necessary design elements (Chapman 2010). Minimalist design has a significant impact on the content and the layout strategies. Negative space (blank areas) is commonly used to improve the reading and skimming experience. Minimality of UI elements, fonts and colour in the design can potentially help to direct users' attention without distracting them from the content (Meyer 2015).

The consistency of the left navigation menu was discussed previously in chapter 6.1.3. In this chapter, the usability issues associated with the visual aspects of the navigation menu are outlined. A few times the unclear difference between the menu and the submenu options resulted in user frustration and being lost in the page hierarchy. The levels (primary, secondary, tertiary) of the menu items should be clearly visible and distinguishable; possibility to collapse and expand the parent items in order to see the sub-options can also benefit the distinctiveness.

Currently, the top navigation menu has a few usability problems. Firstly, it hosts a language switch button among the menu options (discussed in chapter 6.1.2). Secondly, the menu itself takes almost the whole screen length and pushes some of the options on the second line, which does not look aesthetic. Rethinking of the placement and size of the top navigation menu, the search field near it and the language button is proposed as a solution for both issues.

During the usability testing and the survey, the breadcrumbs menu was reported as uncomfortable in navigation. However as reported, the size may not be the key to improvement. Currently, the breadcrumbs menu is positioned problematically according to the Gestalt law of proximity. The breadcrumbs menu and the header are too close to each other, so they may be perceived as grouped elements. The similarity is enhanced by the use of the resembling blue colour according to the law of unified connectedness (Soegaard 2018c). By increasing the proximity, such navigation element is distinguished from the general text.

Despite the "ABC Quick Guide" page being commonly reported as the most helpful one, some visual redesign is advised as it might enhance the positive experience of the step by step instructions and make such crucial source of information even more useful. It is suggested to make the steps atomic and more precise to reach the positive effects of a bulleted list.

Redundant visuals which carry little information were noted as confusing by the testers. For example, the illustrations alongside the text on the general thesis page or a hard-typed arrow pointing randomly at the side menu received a lot of comments. The discussed elements can be seen from appendix 7. In some cases, the users relied on the arrow, assuming that it points to a specific left navigation menu item which they need to take a look at. According to the Minimalistic Design guidelines, it is beneficial to remove the interface elements which carry little to no information. Especially if the content is relatively rich.

Furthermore, visual consistency in fonts and colours can be potentially improved to facilitate more efficient reading and skimming. As there is a lot of text content, people reportedly rely on the visually highlighted elements such as menu item names, links, and paragraph names. Chapter 7.1 describes the choice of fonts and colour palette suggested for the redesign. Additionally, consistent look of the UI elements such as tables, links and email addresses could promote the neatness of the design and consequently the pleasure of usage.

Finally, the actions connected with the page management (share, follow, sync, expand), which can be found on the top right corner of the original design, are advised to be moved down on the page to enhance the connection between the action and the object. Interestingly, the survey participants reported that they would like to have a possibility to mark a page as favourite, which is implemented in the original design by following a page. Apparently, some of the users did not notice the actions on the top-right.

6.6 Mobile optimization

The feedback left by users during the usability testing and surveying, which highlights the need of further improvements related to mobile version of the portal:

- "The mobile version is not user-friendly at all. You have to scroll and scroll all the way down to reach your email or Moodle login etc., which are the most common [functions] to be used".
- “The pages are not very functional on mobile devices”.
- “This does not work on mobile”.

One of the findings was that the users were lacking an easy-to-use mobile version of the portal and the majority of them was changing their normal behaviour from using mobile devices to using desktops for browsing MyNet.

For the majority of the respondents the most popular device to browse the internet was the mobile phone (89.2%), followed by desktop (77%) and tablet devices (27.7%) (see figure 25). However, when asked “With the help of which device do you usually browse MyNet?”, the majority of the respondents chose desktop devices (91.8%) with a significant decrease in mobile usage (27.2%) (see figure 26). Tablet usage decreased as well (9.5%).

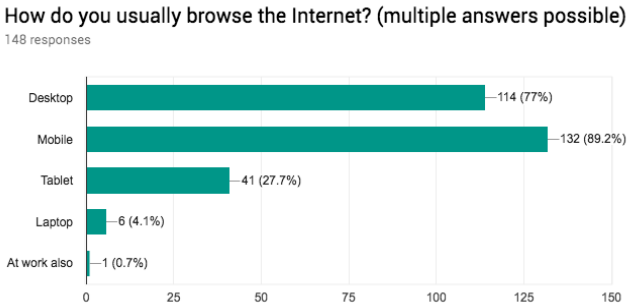

Figure 25. Devices used to browse the Internet

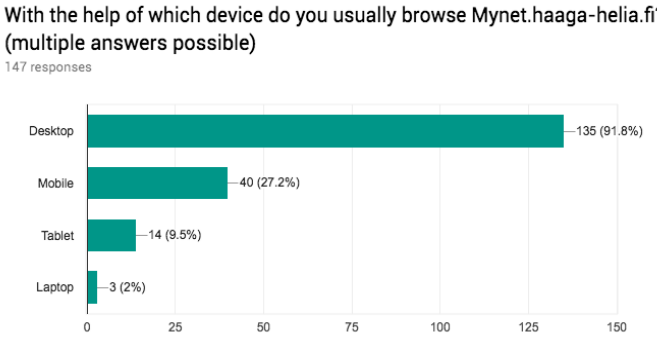

Figure 26. Devices used to browse MyNet

Also, the finding was supported by the responses to open-ended questions, listed at the beginning of this chapter. However, one positive comment emphasising the importance of mobile-friendliness was left regarding this issue:

- *"There have been huge improvements done with MyNet during 2016 in terms of usability. It is much more up-to-date now; it is possible to use MyNet easily with mobile devices and the information is easier to find.”*

Summarising all the findings, the design and the development team are encouraged to pay more attention to the mobile version of the portal and to continue the improvements in the area.

6.7 Additional findings and suggestions

Many students had complained about the numerous services they had to use in order to keep track of their student life: Moodle, WinhaWille, MyNet etc. The users expressed the wish to have a more integrated system, not divided by separate logins and passwords – a so-called "source of truth".

In order to increase flexibility and efficiency of use, a few design ideas can be implemented to aid users' productivity. For example, shortcuts for more frequent users, a saved list of documents and templates for the quick access, text highlights, the top five most frequently visited pages and other solutions. Some of the suggestions were employed during the redesign.

It was suggested to add consent forms for interviews in the list of templates. Moreover, users requested more guidelines about the process of marking parts of the thesis as confidential. A few students said they would like to see some examples of the actual theses to have an idea prior starting their own. Moreover, as mentioned in chapter 4.4, thesis advisors reported during the open-ended questions that referencing and citations in the reporting guidelines should be explained better and clearer.

From the observations, it became clear that users also need more information about the main internal mechanisms such as thesis advisor assignment. For example, it is important to explain that the relevant thesis advisor gets assigned to each student according to the chosen topic area. This particular solution eliminates the attempts to find the relevant advisor in MyNet. Another example is the process of the English language check, which was interpreted a few times as a self-grammar check; actually, it is a procedure of sending the thesis to an English-language teacher. The procedure was briefly mentioned in one of the pages without a link to further investigate the process.

6.8 Validity and reliability of the results

Widespread and known usability evaluation practices such as Think Aloud protocol, observations, open-ended questions and surveying were used to ensure the reliability of the gathered data. Quantitative data was derived mostly from the survey and the converted usability testing metrics. Qualitative data channelled mainly through the observations and CTA.

Consistency of the results was supported and proved by the analysis of the collected data. Moreover, reliable techniques and tools such as SUS (Sauro 2011) and SEQ (Sauro 2012) themselves constitute the valid way to measure and interpret the test results.

Reliability considerations could be raised around the fact that only one person had been performing the role of the moderator and the observer. Involvement of the bigger number of test conductors allows to ensure the level of low subjectivity of the usability testing interpretations. However, as the author followed the best practices and aimed to avoid bias at any instance, this issue is relatively weak. It is recommended to involve various conductor roles in the further usability testing for MyNet thesis pages.

Additionally, the fact that mainly one user group out of four segmented was studied emphasises the need to conduct further iterative studies involving the students with the different background; on the 7th semester, for example.

7 Redesign

Redesign of MyNet thesis pages constituted the final step of this study. It is important to repeat that the main objective of this thesis project was to evaluate the usability of the portal rather than to create a pixel-perfect and complete design. Therefore, the following chapters cover the steps taken by the author in order to visualize the findings and the suggestions given in chapter 6.

Only the pages dedicated to the bachelor's degree thesis process underwent the redesign. However, the similar design pattern is suggested to be applied throughout the thesis pages. The design solutions are explained in chapter 7.4, which provides a design framework and allows to extend the solutions to a wider scope. However, the current redesign considers only the desktop version of the portal.

7.1 Design inspiration and assets collection

At the beginning of the study it was decided that the design will not change crucially comparing to the original version regarding the colours, the main visual elements and the interaction principles. The chosen colour palette was based on the existing colour scheme and reduced to the following set as shown in figure 27.

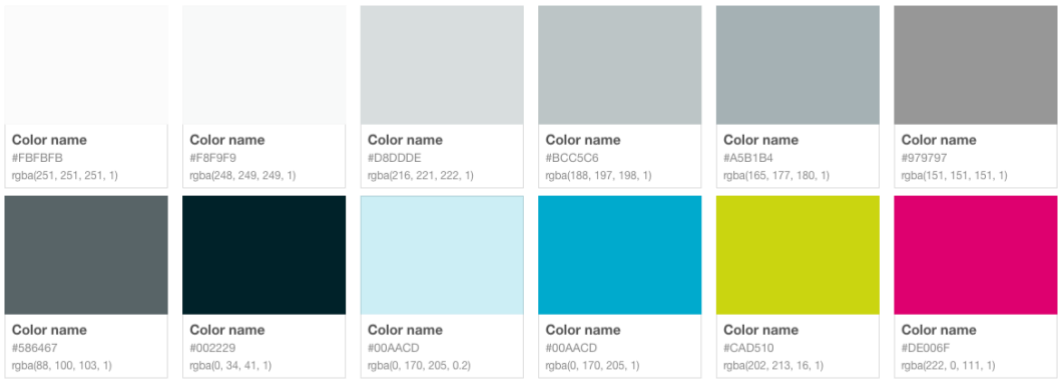

Figure 27. Colour palette used in the redesign

The fonts used in the MyNet system were "Segoe UI", Segoe, Tahoma, Helvetica, Arial, and "Segoe UI Light" in the headers.

The chosen number of fonts for the redesign was reduced to three (see figure 28):

- "PlayfairDisplay" font family for the headers
- "SourceSansPro" for the menus and quick info panels
- "Charter" for the body text.

Sufficient line height and spacing between the text elements ensured more comfortable readability, as discussed in chapter 6.5.

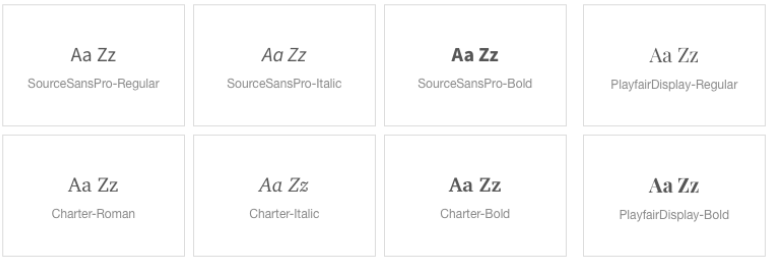

Figure 28. Font families used in the redesign

The original MyNet logo was used in the redesign. Additionally, all the texts were copied from the pages with only minor or no modifications. All the meaningful changes in the text are discussed in chapter 7.4.

7.2 Low-Fidelity: sketching & wireframing

On the ideation stage, a mind map (see figure 29) illustrating the thesis process was composed and later refined under the supervision of the head of the thesis coordinator's board. The mind map became a backbone for the structure of the pages in the new design. Also, the original structure was a frequent point of reference. An online tool Coggle.it was used to create the visualisation.

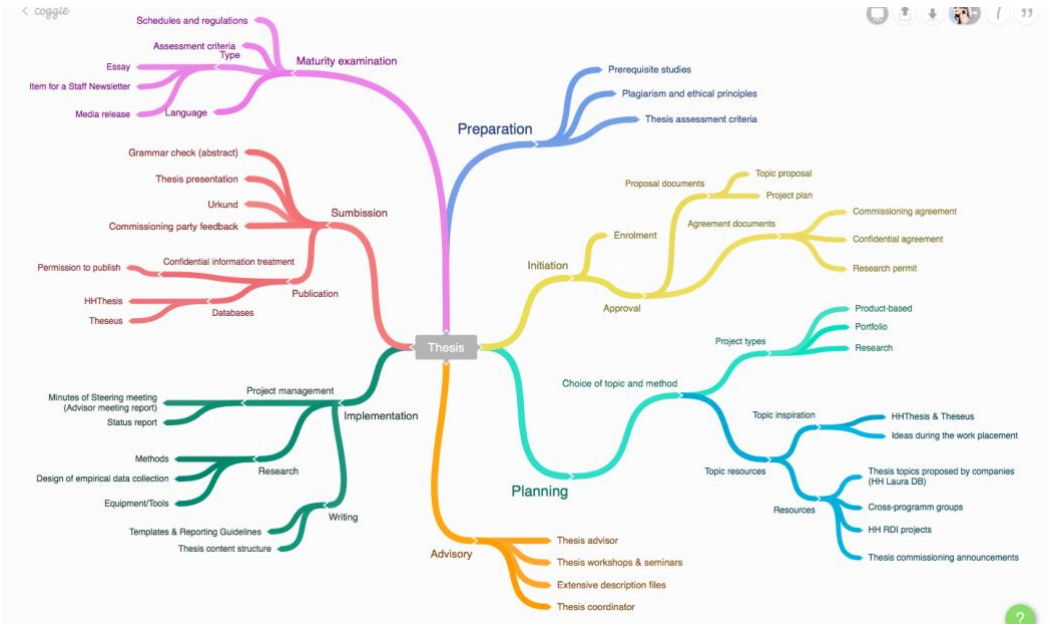

Figure 29. Mind map of the thesis process

The design process began with text-based sketching. This technique greatly helped to focus on the content hierarchy and the logical structure of the represented information. For this purpose, Freehand solution by InVision (InVisionApp 2011) was used. The tool allows to quickly create drafts and refine elements; it was chosen as it is frequently used by the designer in her working life. The content division was based on the layout: header, top navigation, left menu navigation, footer, and main content area. The initial text-based sketch is shown in figure 30.

Figure 30. Initial text-based sketch

By the end of the Lo-Fi sketching, the layout with the content structure was composed as a stem for the future design. Figure 31 shows the deliverables for the described stage.

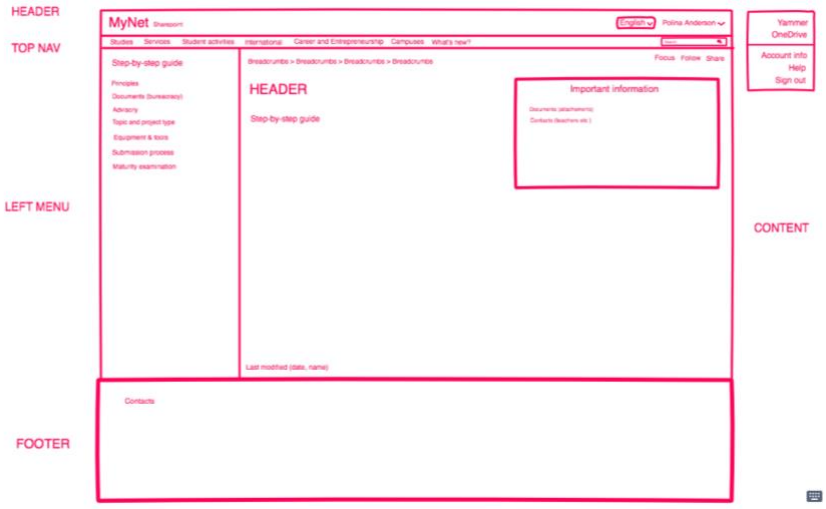

Figure 31. Initial text-based sketch mapped on the layout

The whole top right area was set as a personalisation area. The most significant information was designed to be shown in a separate and highly visible section on the

right-top of the page. The section was called an infobox; it is discussed further in chapter 7.4.3.

7.3 Middle to High Fidelity: creating mock-ups & prototyping

After refining the usability issues, sketching the content structure and wireframing new ideas, the process of redesign gradually turned to higher fidelity deliverables. The basic differences between the deliverables such as a wireframe, a mock-up and a prototype are explained in table 7 (Treder 2016).

Table 7. Wireframing, Prototyping, Mockuping – What's the Difference? (Treder 2016)

	Fidelity	Cost	Use	General traits
Wireframe	low fidelity	$	Documentation, quick communication	Sketchy, black, white & grey representation of the interface
Prototype	**middle** to high fidelity	$$$	User testing, reusable backbone of the interface	Interactive
Mockup	middle to **high** fidelity	$$	Gathering feedback and getting buy-in from stakeholders	Static visualization

The design process was unfolding gradually. At first, a wireframe with the layout of the general thesis page was designed in Balsamiq (see figure 32). During the process, the elements of the wireframes were adjusted in order to improve the user interface.

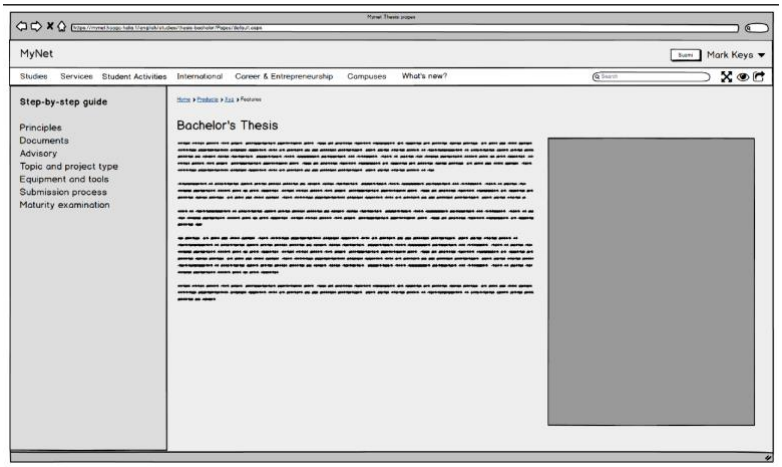

Figure 32. Wireframe created in Balsamiq (2008)

As the fidelity of the deliverables grew, so grew the number of various states. As reasonably little time was spent on the wireframing, since the original design gave a lot of clues about the final interface, most of the interactions and features were developed in the

last prototyping stages (see figure 33). Higher fidelity prototyping was done with the help of Sketch (2010).

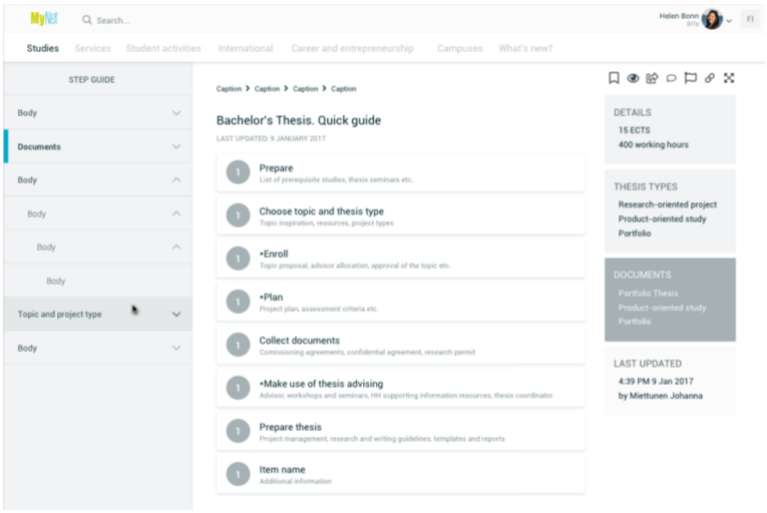

Figure 33. Mock-up

7.4 Design solutions

During the usability evaluation process, numerous findings were identified and analysed. This chapter aims to describe the design solutions employed to fix the discovered usability issues. Each subchapter discusses a layout area or a design element which underwent changes or was newly introduced.

The original design version examples, presented in the following chapters for comparison, were collected in March 2018.

7.4.1 Header

This chapter describes the changes in the header area of the pages: main dropdown, language switch button, search field, and the top navigation. The original design and the author highlights are demonstrated in figure 34.

Figure 34. Original design of the header

The main dropdown is found under the name of the user on the top-right corner. In the original version, the dropdown had two options: "About me" page and the action to sign out. In the redesigned version, the links to the external portals (Yammer and OneDrive) were moved to the dropdown according to the reasons discussed in chapter 6.2. Additionally, language switch button and the help pages were also placed in the dropdown (see figure 35).

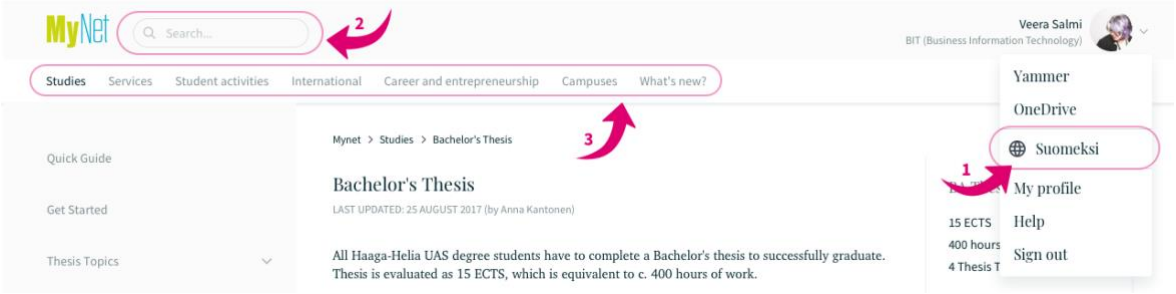

Figure 35. Redesign of the header

All the users had to change the interface language upon arrival. For the users who were less experienced with MyNet, it was harder to locate the language switch button since it was placed in-line with the tabs on the top navigation bar (see figure 34, arrow 2). As discussed in chapter 6.2, one of suggestion was to log and save user language preferences for each profile; therefore, users do not need to refer to this button often and its' position in the dropdown is justifiable. Otherwise, if the personalisation is not feasible technically, the language button should be reachable with one click and placed outside of the dropdown. Importantly, the button behaviour does not include redirection to the home page: by switching a language, only the page locale should change.

The search field also changed its location due to aesthetic reasons, discussed in chapter 6.5. In the original design, the top navigation is pushed down to a second line due to a lack of space, which creates ambiguity and does not look professional according to the users. Placing the search field to the top-left corner allows saving more space for the top navigation menu.

7.4.2 Left navigation menu

Usability issues connected with the left navigation menu were mainly discussed in chapter 6.2. Figure 36 shows the original navigation menu. The original menu changes the states while traversing down the page structure.

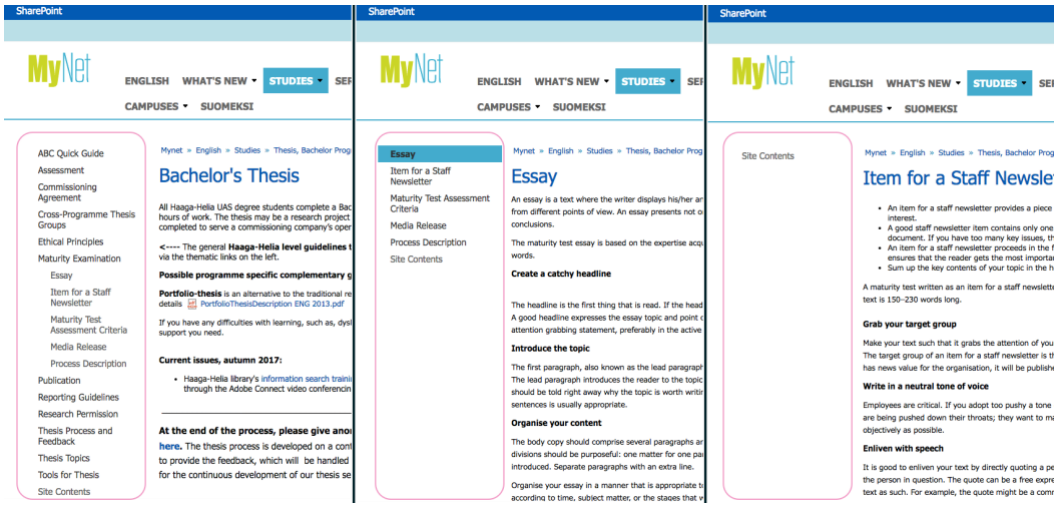

Figure 36. Original left navigation menu: three states

The redesigned navigation menu is demonstrated in figure 37. The menu is consistent across all the thesis pages, which improves the flexibility and efficiency of use. Some menu items of the menu are expandable and collapsible to allow for an easier navigation to the sub-pages. The menu items themselves represent the various pages which can be found in the scope. User location in the page hierarchy is marked properly with the background and a bright contrast line on the left from the page name. The level of the page (primary, secondary or tertiary) is clearly indicated with the help of spacing and collapse / expand actions.

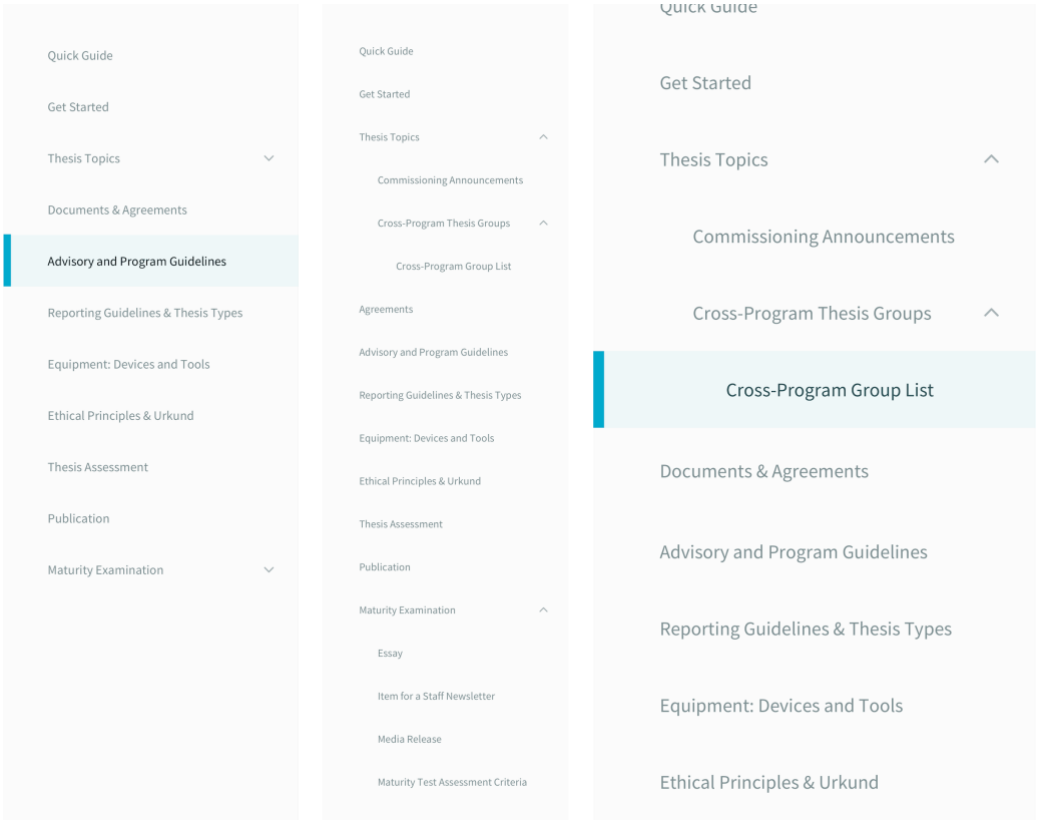

Figure 37. Redesigned left navigation menu

Names of some of the pages are changed to clearly describe the content, as discussed in chapter 6.4. All the pages were organised according to the thesis process order, as opposed to the alphabetical order in the original design. The full list of new names for the pages is provided in appendix 10.

7.4.3 Infoboxes

The concept of infoboxes was introduced during the redesign due to the need for grouping and placing visibly certain types of content. Infoboxes are fixed design elements which host the helpful key information on the page. Such elements are visually consistent throughout all the pages and populated by the author. Figure 38 shows an example of infoboxes on the redesigned "Publication" page.

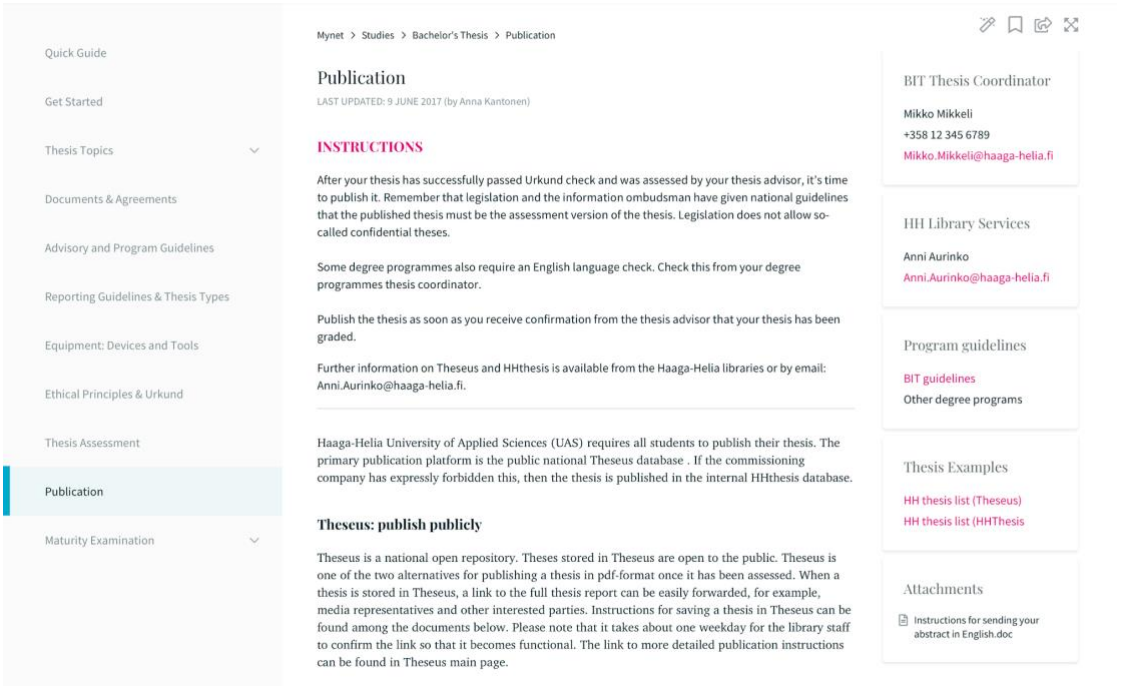

Figure 38. Infoboxes. "Publication" page (redesigned)

The content groups for the infoboxes were formed according to the research findings. Each type of the content resides in a separate box to prevent clutter. The groups and the presented order are proposed as follows:

- The factual concise regulations, which are primary content of the page (number of thesis types, amount of credits for thesis project etc.).
- Contacts (name, phone number, email address).
- The most relevant pages and links to them.
- Schedule dates (deadlines and re-exams).
- Attachments (documents and templates).

Also, users expressed a wish to see more examples of how a thesis should look like. Links to thesis repositories are added in the quick access cards on the "Get Started", "Reporting Guidelines & Thesis Types", and "Publication" pages.

Additionally, a link to a correct program-specific guideline, as well as the relevant thesis coordinator's contacts is preselected and placed in separate infoboxes on the general thesis page, "Step Guide", "Get Started", "Advisory", "Thesis Assessment", and "Publication" pages.

7.4.4 Main content area

This paragraph aims to summarise various suggestions for the content improvement discussed in chapter 6. The content should be relevant and up-to-date, organised in a concise and atomic bulleted structure. The prioritization of the content and order according to the thesis process steps should guide the organisation; additionally, it is advised to improve the categorisation of the terms and concepts; as an example, shown in figure 39, all the thesis types are clearly listed. An overview of the page content could be beneficial for the purposes of skimming. The consistent layout of the content should be employed throughout the pages.

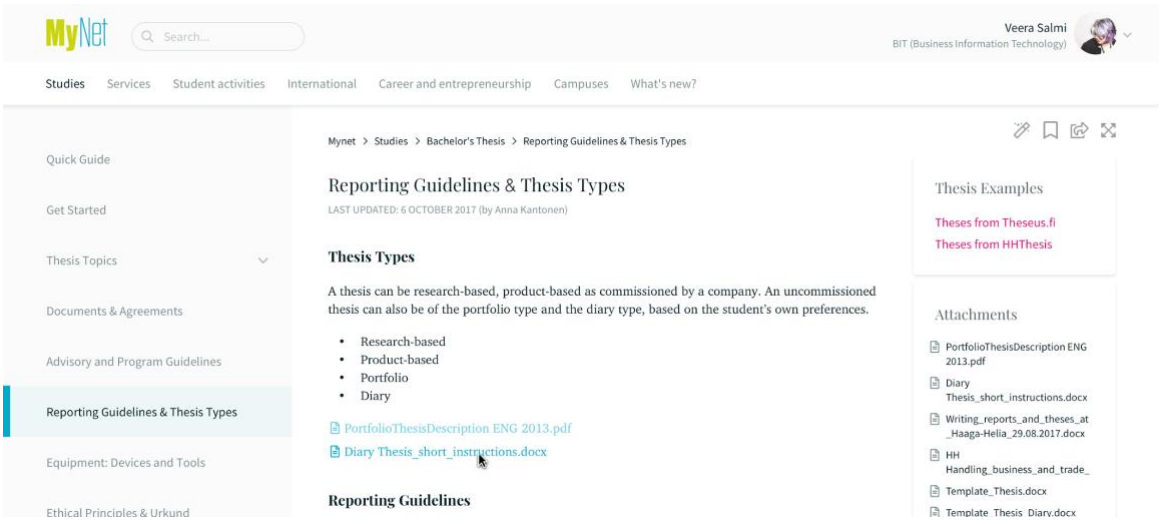

Figure 39. "Reporting Guidelines & Thesis Types" page (redesigned)

Figure 40 demonstrates various solutions implemented on the general thesis page. The text was divided and categorised into logical groups with the help of spacing and paragraphs. Paragraphs & paragraph headers are visually highlighted by using the bold font which is different from the body text. This gives a possibility to have an overview of the page and to have more bulleted visual structure. The spacing between paragraphs aids more comfortable reading.

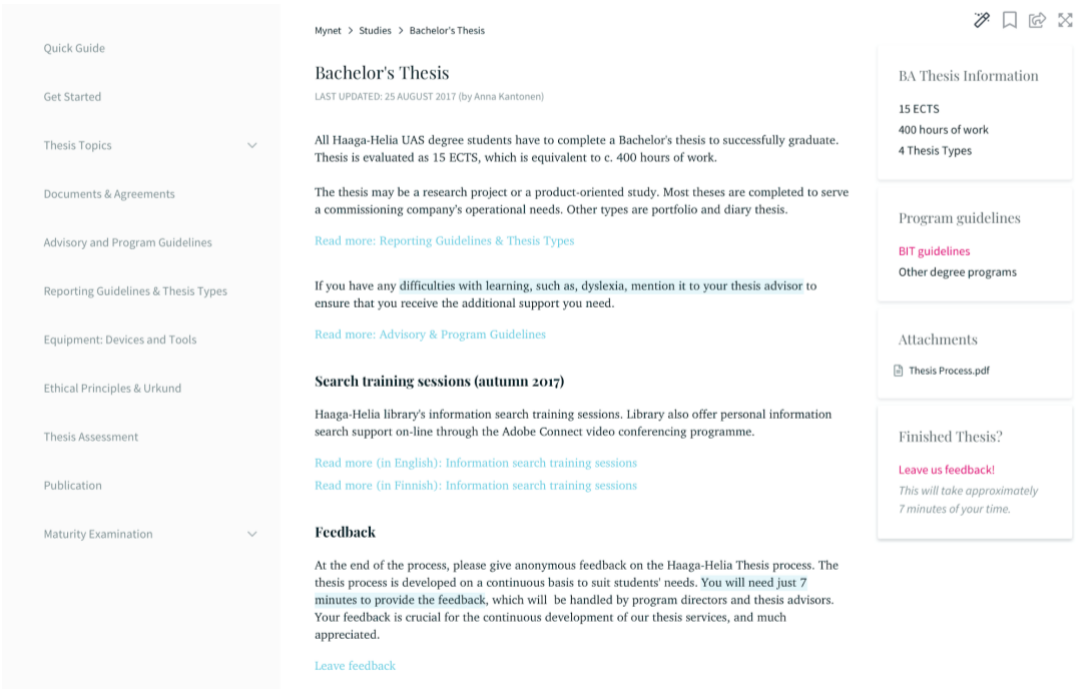

Figure 40. General "Bachelor's Thesis" page (redesigned)

As seen in figure 40, links to the relevant pages and resources are listed at the end of each paragraph, while the text itself briefly outlines the topic and directs to the page, where all the content is shown. As discussed in chapter 6.1.2, such an approach can help against content dispersity, redundancy and various consequent issues. Furthermore, the colour of the links is chosen to be less disturbing to the eye to allow for comfortable reading, as opposed to the usage of default link colour in the original design.

Despite the breadcrumb menu being reportedly too small, it was decided to keep the size of the font (13px). However, some space around the menu was added to make the menu more visible, so it stands out as a separate UI element. Figure 40 demonstrates the redesigned breadcrumbs menu.

To assist users by pre-selecting and emphasizing the most important guidelines, the instructions section is placed at the beginning of a page as an opening paragraph and a summary of the page (where appropriate). It also aligns with the strategy of moving the most important content to more visible areas of the interface and creating an overview of the presented content (chapter 6.1). Figure 41 demonstrates the placing of instruction paragraph.

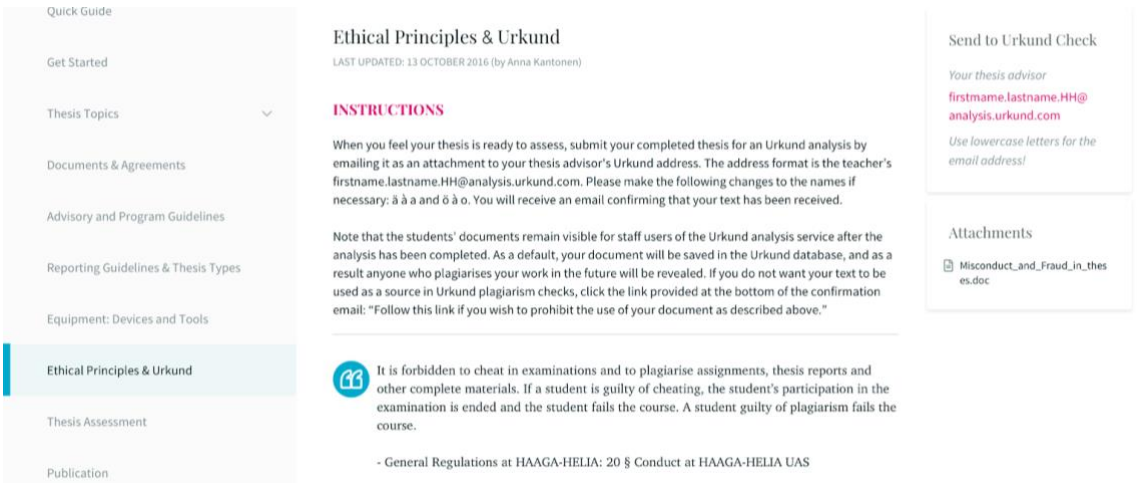

Figure 41. "Ethical Principles & Urkund" page (redesigned)

In the original design, there is no consistent decision on where to use lists and where to organise the content in tables. In the redesign, all the information which contained more than two information points per item (name, phone, email address, location etc.) was organised into tables. Some of the redesigned tables are shown in figure 42. The tables were redesigned to look consistent across all the pages. Email addresses are copied to clipboard upon the click on the “letter” icon in one of the columns. It was set as a consistency rule that more than 3 presented options compose a table.

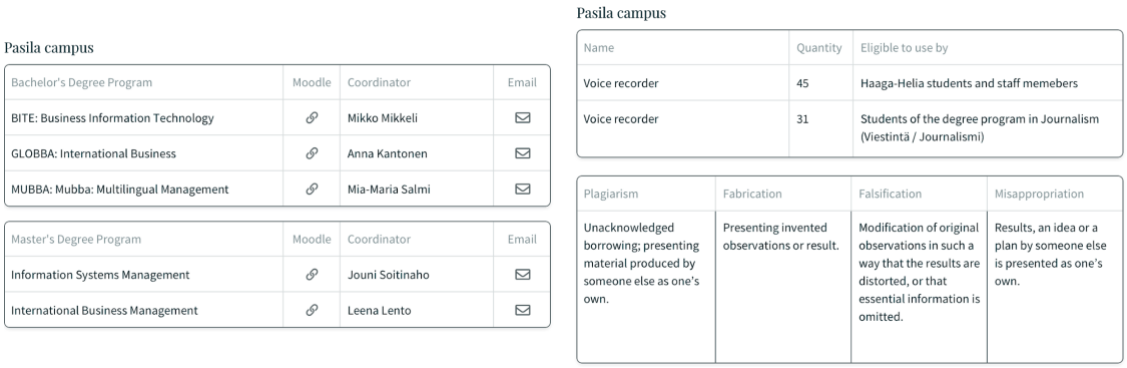

Figure 42. Redesigned tables

7.4.5 Highlights

In order to assist users in managing all the information stored in MyNet thesis pages (and on the portal in general), as well as to pre-select and emphasize certain guidelines, a new highlight feature was introduced in the redesign. Inspired by the blog platform Medium, the feature allows two types of highlights in the text - by the author and by the reader. The highlights function is a mode and can be turned on and off for a browsed page.

Text highlighting, which improves the flexibility and efficiency of use, is introduced as a solution to two challenges. Firstly, the most important information contained on the page can be emphasized by the author of the content. It is the responsibility of the author to identify the most relevant and important piece of information the reader may need. Secondly, readers can leave their own highlights in the text, which they can browse and manage later in their profile.

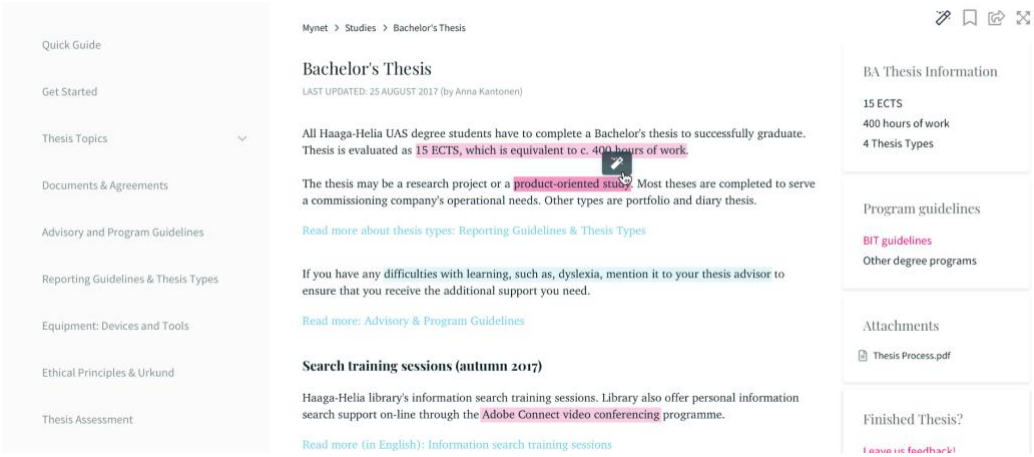

Figure 43. Author and reader highlights: mode on

The page actions were moved on the page area, as discussed in chapter 6.5. Figure 43 shows how the page looks when the highlighting mode is on. The colour of the "magic wand" icon (top-right corner) indicates the status of the feature. Blue highlights are the ones left by the author of the page. A user has no influence on them except turning the mode on or off. The pink highlights are the ones which user has left herself; all the personal highlights can be collected in the profile as bookmarks or even more detailed. To leave a highlight, user needs to select a piece of text and clock on the "magic wand" icon in the appeared tooltip (see figure 43).

7.4.6 "Quick guide" page

Both the survey and the usability testing results confirmed that the "ABC quick guide" page (figure 44) was the most helpful and appreciated by users. Logically structured step by step guidelines relieved students and gave them a feeling of control over the process.

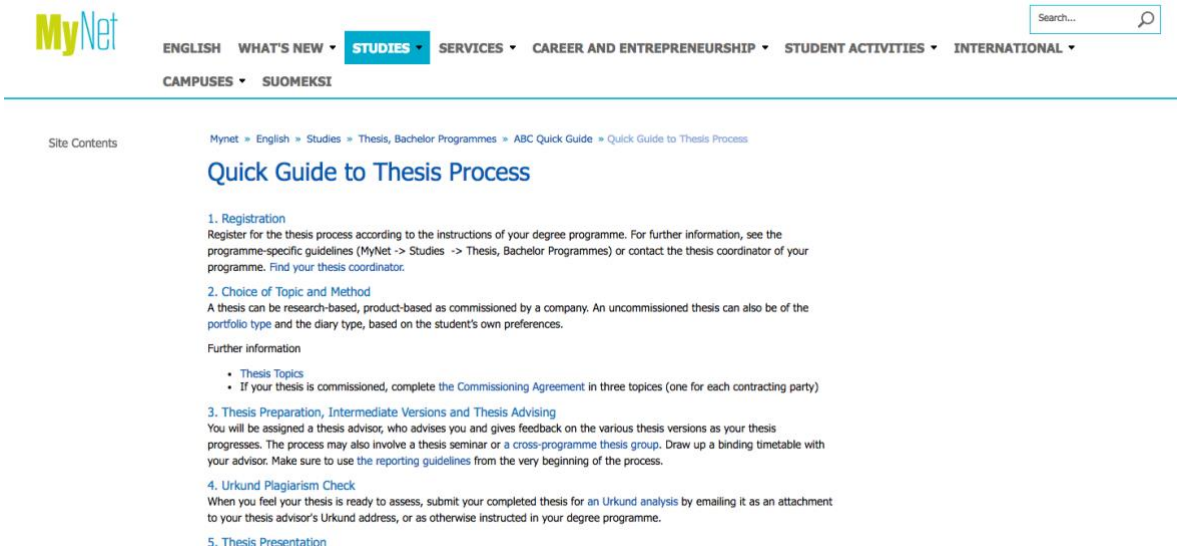

Figure 44. “ABC Quick Guide” page (original design)

The structure and the wording of the guide were slightly changed: the step names were formulated as imperatives, indicating what to do next. The redesigned list (see figure 45) looks more as checkpoints, each leading to a relevant page.

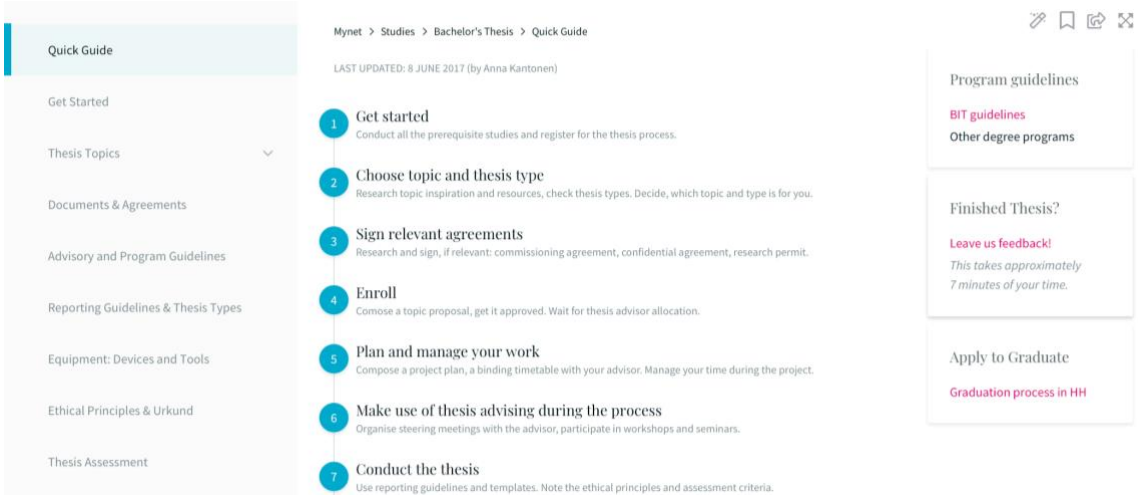

Figure 45. Quick Guide (redesign)

7.4.7 "Get started" page

Users often mentioned that they would like a clear indication of where to begin their research about the thesis process. The new “Get started” page was created in order to improve and maintain the information scent (see appendix 24).

The page contains information about the pre-requisite courses and activities accomplished prior starting a thesis. Moreover, thesis dictionary with the terms and concepts which can be ambiguous to the students is presented on the page to welcome

the writers in the process. An overview of the ethical principles and thesis assessment allows preparing users to the writing regulations and requirements. A link to the "Quick Guide" page directs students to continue the investigative process.

8 Conclusion

Usability evaluation is recommended as an essential step for a product creation and improvement. However, despite the usefulness of the practice being continuously acknowledged, many companies still struggle to adjust their workflow and to embed usability evaluation into their core design and development processes. Lack of studies based on observations of direct user interaction with MyNet can result in severe usability problems, as investigated during this thesis project.

MyNet is an intranet portal, which provides students with the university regulations and guidelines. Therefore, it is crucial to ensure that the portal represents and reflects the core values of the organisation itself. Students expect to see the best practices which they are taught during the classes to be implemented inside the university' technical solutions.

A usability testing framework was developed and implemented in the course of this study. Methods employed during the evaluation allowed to investigate, define and analyse the problems connected with the ease of use, findability, and learnability of MyNet thesis pages. An empirical, cost-effective and efficient framework included direct testing of the portal with the novice users in the university's media lab. Additionally, surveying allowed pre-collecting the background information about the target audience and getting an overview of user satisfaction with MyNet portal, as well as about the problematic areas regarding the usability of the product.

The conducted study has two main outcomes which are directly beneficial for the commissioning party and the technical team. Firstly, various problems were found and justified by the observation of user interaction with the thesis pages. The suggestions were formulated and classified into groups, so it is more convenient to address them during a redesign. Moreover, the solutions were visualised in order to assist the ideation process. Secondly, the developed testing framework can be further utilised, adjusted and refined by the team to fit the specific roadmap, objectives, and other influential factors. Effectiveness and cost-effective manner of the framework allows to adapt it widely to evaluate more Haaga-Helia UAS' technical solutions.

It is advised to pay attention to the demonstrated usability problems by undertaking work to improve the current state of the portal. The redesign principles based on careful content management and refinement, particularly its consistent categorisation and organisations are highly recommended for this specific product scope. Enhancement of navigation principles, facilitation of the more prominent information scent, improved verbal communication with users via wording and refined visual interface elements are

considered to be of the high focus for the potential redesign. Moreover, the recommendation is to continue doing usability evaluation iteratively and to embed it into the core design and development processes. As the tested participants belong mainly to only one of the segmented user groups, further usability testing addressing users from the other segments will predictably yield curious and fruitful results. Furthermore, Information Architecture improvement is regarded as essential in order to make the structure of the pages clearer. Various content management system exists for this purpose; Enterprise Content Management (2007) for MS SharePoint can be of particular interest in this case.

Moreover, this thesis project proved to be highly beneficial for the author from the learning perspective. Also, the experience of organising such a sizable study, as well as personal and remote communication with its participants was the first time the author was involved in such practices. The empirical part greatly stimulated the development of various competencies in the areas of usability testing, interviewing, session arrangement, and time management. Additionally, various methodologies for measuring and evaluating usability were discovered and had assisted the author later in her working life in a role of a user researcher.

Usability of a product is tightly connected with the user experience and, consequently, various other factors such as user productivity, acceptance, and satisfaction etc. As people are susceptible to a constant change, the products they are using should be continuously adjusted to fit their needs better. Therefore, a continuous and iterative process of usability evaluation is one of the numbers of the essential practices to help to bring true value to the users, which ultimately should the main purpose of why any product exists.

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Appendices

Appendix 1. Questionnaire script for the student group (Bachelor's & Master's degree students)

Screening
– Are you a student at Haaga-Helia UAS?
– Your relation to the thesis writing process:
– Are you familiar with MyNet portal?
– Have you ever used MyNet pages, which contain information about the thesis process for bachelor or master students?
Demographics
– Your age group is:
– You are doing your:
– Which of these study-related goals do you consider as your personal target right now (multiple answers possible)?
– In Haaga-Helia you have a student status of:
– You have been living in Finland for:
– You are fluent in (multiple answers possible):
– How many connections do you have in your university environment?
– Your relationship status is:
– Do you have children?
Experience & skills
– Do you have any previous experience with student web-based portals (besides Haaga-Helia UAS services)?
– Do you have any previous experience with thesis process (besides your experience in Haaga-Helia)?
– How often do you normally surf the Internet?
– How do you usually browse the Internet (multiple answers possible)?
– How do you assess your expertise in using the Internet and its services?
Usage of the studied product and feedback
– Please, assess your overall satisfaction rate of MyNet student portal (in terms of quality, ease of use, content etc.):
– How often do you normally use MyNet?
– You normally use MyNet for (multiple answers possible):
– What interface language do you normally use for MyNet web pages?
– You have used MyNet thesis pages for checking (you can skip it if you do not have any experience with these pages):

- With the help of which device do you usually browse MyNet (multiple answers possible)?
- How easy to use is MyNet for you?
- How helpful do you find MyNet in the sense of content?
- How often do you base your study-related decisions on the information, which you have found from MyNet?
- Do you have any other way to accomplish study-related goals besides using MyNet (any substitutional service or way)?
- How well was MyNet explained to you?
- Please, assess to which extent you are familiar with the functionality of MyNet:
- Any comments about MyNet?
- Any comments about MyNet thesis process dedicated pages?
- Any general comments you would like to leave?

Appendix 2. Questionnaire script for the thesis advisor group (thesis advisors & coordinators)

Screening – Are you a teacher of Haaga-Helia UAS? – Are you a member of Haaga-Helia UAS thesis coordination group? – Are you a thesis advisor? – How frequently do you surf the Internet normally? – How do you usually browse the Internet (multiple answers possible)? – How do you assess your expertise in using the Internet and its services?
Usage of the studied product and feedback – Usage of the studied product and feedback: – How often do you normally use MyNet? – What are the most common tasks you perform with MyNet? – Do you use MyNet thesis dedicated pages? – What tasks do you usually perform with MyNet thesis pages (those who are familiar with them)? – How often do you receive requests for additional help and support from students regarding the thesis process? – Please, assess in overall, which degree students are asking for your guidance more often: – In which cases do students request your additional help and support regarding the thesis process (if they do)? – In your opinion, what is the percentage of students' requests to you, which are already answered particularly in MyNet thesis pages? – Please assess how explicitly the content of MyNet thesis pages describes the process and various aspects of thesis writing. – Is there any specific frequently-requested information, which should be included in MyNet thesis pages? – Any comments about MyNet thesis pages? – Any general comments you would like to leave?

Appendix 3. Statistics from the survey responses

Diagram 1. Student group responses: general. Have you ever used MyNet pages which contain information about the thesis process for bachelor or master students?

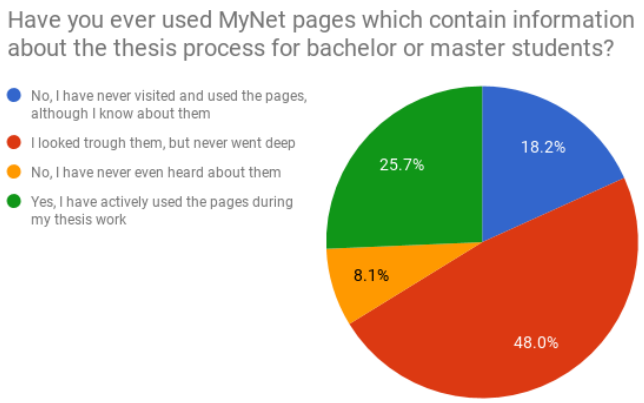


Diagram 2. Student group responses: N_Prep. Have you ever used MyNet thesis pages?

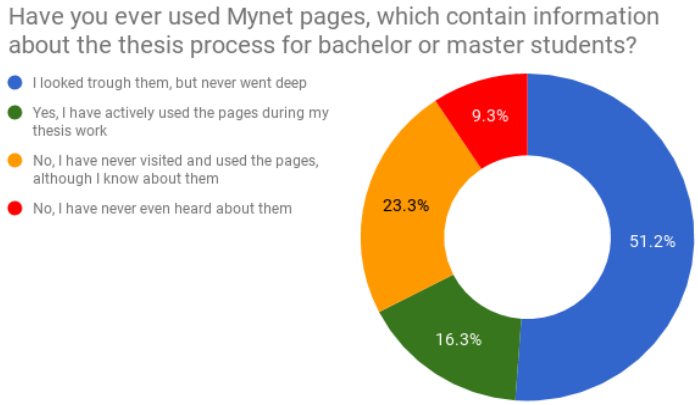


Diagram 3. Student group responses: E_CW. How often do you normally use MyNet?

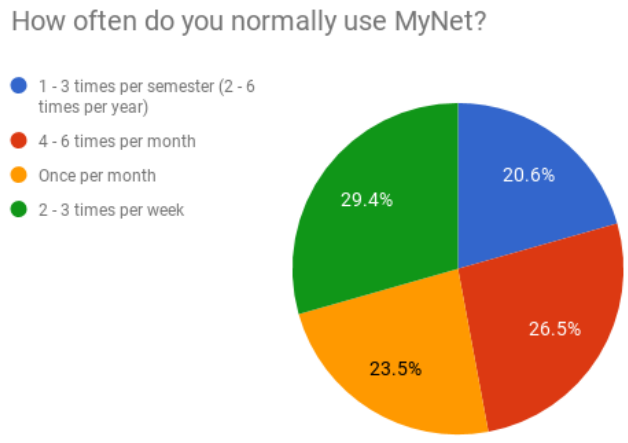


Diagram 4. Thesis advisor group responses: In which cases do students request your additional help and support regarding the thesis process (if they do)?

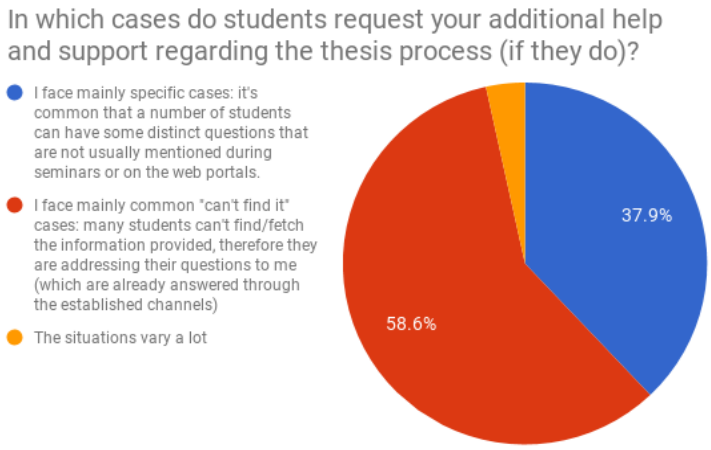
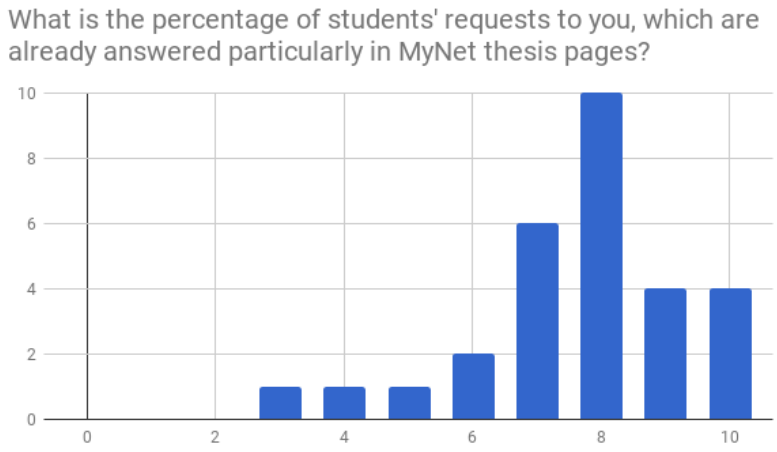


Diagram 5. Thesis advisor group responses: What is the percentage of students' requests to you, which are already answered particularly in MyNet thesis pages?



Appendix 4. Usability testing questions

Questions list 1. Usability testing scenario question

Task code	Question
T1	You need information about thesis writing process in Haaga-Helia. Please, try to find guidelines for it.
T2	Please find out the steps of the thesis process you need to follow.
T3	What documents you need to sign before the beginning of the work?
T4	Can you find a template for your thesis?
T5	Find a thesis coordinator's name of your program
T6	Find a thesis coordinator's name of MUBBA's program
T7	What are the different forms of thesis?
T8	What would be your steps during the thesis writing?
T9	To whom you can write, if you need help?
T10	Investigate the steps to take when your thesis is written already? What do you need to do to finalise the process?
T11	Check, how will your thesis be graded? (Scale, areas etc.)?
T12	How to submit your thesis for Urkund check?
T13	Where can you get a voice recorder or other equipment in order to conduct an interview for your thesis?
T14	Whom you should contact, if you want to get information about "Mission Goes Global" thesis group?
T15	What are the options of the databases for publishing your thesis, when it will be done? What's the difference between them?
T16	In what language should you write your maturity examination? What are the options?
T17	Is it possible to retake a maturity test?
T18	Find a thesis topic, proposed by a company for Haaga-Helia's students.
T19	When is the next thesis evaluation seminar?
T20	To whom you should send your abstract for a language check?

Questions list 2. The two open-ended question in the post-test

1. At the beginning of the test, the following question about MyNet thesis pages was asked: "What tasks it's possible to perform with these pages"? As you now have gone through almost all the functions of the pages, please assess the level of the exposed essential information available from the first sight. Which important content needs more attention and should be exposed more properly during the first browsing of the pages?
2. Please, give us the final feedback about the product you have just tested. How do you feel about it, what emotions you had during the testing and what are your impressions?

Questions list 3. The two open-ended question in the post-test

1. I think that I would like to use this portal frequently.
2. I found the portal unnecessarily complex.
3. I thought the portal was easy to use.
4. I think that I would need the support of a technical person to be able to use this portal.
5. I found the various functions in this portal were well integrated.
6. I thought there was too much inconsistency in this portal.
7. I would imagine that most people would learn to use this portal very quickly.
8. I found the portal very awkward to use.
9. I felt very confident using the portal.
10. I needed to learn a lot of things before I could get going with this portal.

Appendix 5. Basic demographic information about usability test participants

	User 1	User 2	User 3	User 4	User 5	User 6
Occupation	Student	Freelance web designer with his own studio, student	Bartender (part-time), student	Student	Bartender (part-time), student	CEO of the fashion brand company, student
Place of study	HH full-time student, have been studying in HH before	HH full-time student, have been studying in HH before	HH full-time student, have been studying in Vietnamese UAS before	HH full-time student, first university experience	HH full-time student	HH full-time student, have completed Bachelor's and Postgraduate degree in fashion
Degree	Bachelor's degree	Bachelor's degree	Bachelor's degree	Bachelor's degree	Bachelor's degree	Bachelor's degree
Semester	1st semester	1st semester	1st semester	1st semester	1st semester	1st semester
Experience with Mynet	Experienced with Mynet	Familiar with Mynet	Sightly familiar with Mynet ("use it for 2 weeks or so")	Sightly familiar with Mynet	Sightly familiar with Mynet	Sightly familiar with Mynet ("use it for around 4 weeks")
Experience with Thesis pages	Experienced with Thesis pages - the content has changed since he used it	Have never visited Thesis pages	Did check Thesis pages, thesis format. But just skimmed through the pages	Have never visited Thesis pages	Have never visited Thesis pages	Have never visited Thesis pages
Experience with thesis process	Has conducted a thesis for HH previously	Has not engaged with the thesis process yet	Has conducted thesis for the previous UAS in Vietnam	No experience with thesis process	No experience with thesis process	No experience with thesis writing process. Experience with more practical graduation project
Frequency of the Internet use	Frequent Internet user ("Only time I'm without the Internet is when I sleep")	Frequent Internet user (approx. 5 hours / day)	Frequent Internet user (approx. 8 hours / day)	Relatively frequent Internet user (approx. 4-5 hours / day)	Relatively frequent Internet user (approx. 4 hours / day)	Relatively frequent Internet user (approx. 4-6 hours / day)
The most popular websites	Search engines (Google), communication platforms (Whatsapp), email (Gmail), Google Maps and entertainment websites	Information guidelines and documentation for tools, news websites, entertainment (Youtube). Favourite: engadget.com	HH related: moodle, emails. Social networks (Facebook, Instagram), news. Favourite: Facebook, New York Times app	Browses mostly HH related websites: moodle, office tools. Google drive, Google search, Instagram, Netflix, Whatsapp. Favourite: Netflix	Social media, football news, newspaper websites. Favourite: Facebook, Instagram	Browses HH related websites: moodle, HH Launchpad. Work related websites, social media (Facebook, Instagram), communication apps (Facebook messenger, Whatsapp).
Devices for browsing the Internet pages	Desktop, mobile	Desktop, mobile	Desktop	Mobile, desktop	Desktop	Desktop, mobile
Browsers	Chrome (sync between devices)		Chrome, Microsoft Edge			
Language (mother tongue, English competency)	Russian (English on the professional level)	Russian (English on the professional level)	Vietnamese (English on the professional level)	Estonian (English on the professional level)	Estonian (English on the professional level)	English, Finnish
Usability testing experience	Never participated in a usability test before	Never participated in a usability test before	Never participated in a usability test before	Never participated in a usability test before	Never participated in a usability test before	Never participated in a usability test before

Appendix 6. Scores for each task for the usability testing sessions

Session 1. Task scores

SESSION 1

Average score of tasks by the success rate and difficulty

Task	Success	Difficulty	Score
T1	3.00	1.00	10.00
T2	3.00	1.00	10.00
T3	1.00	2.00	7.00
T4			0.00
T5	3.00	3.00	8.00
T6	3.00	2.00	9.00
T7	0.00	5.00	**3.00**
T8	3.00	5.00	**6.00**
T9	3.00	1.00	10.00
T10	3.00	3.00	8.00
T11	3.00	1.00	10.00
T12	3.00	1.00	10.00
T13	3.00	1.00	10.00
T14	3.00	3.00	8.00
T15	3.00	1.00	10.00
T16	3.00	1.00	10.00
T17	3.00	2.00	9.00
T18	3.00	1.00	10.00
T19	0.00	5.00	**3.00**
T20	1.00	6.00	**3.00**
Average			8.11
Low average			3.75

Session 2. Task scores

SESSION 2

Average score of tasks by the success rate and difficulty

Task	Success	Difficulty	Score
T1	3.00	1.00	10.00
T2	3.00	1.00	10.00
T3	1.00	2.00	7.00
T4	3.00	1.00	10.00
T5	3.00	4.00	7.00
T6			0.00
T7	0.00	7.00	**1.00**
T8	1.00	1.00	8.00
T9	3.00	1.00	10.00
T10	3.00	1.00	10.00
T11	3.00	1.00	10.00
T12	3.00	1.00	10.00
T13	3.00	3.00	8.00
T14	3.00	1.00	10.00
T15	3.00	1.00	10.00
T16	3.00	2.00	9.00
T17	3.00	1.00	10.00
T18	3.00	1.00	10.00
T19	0.00	7.00	**1.00**
T20	3.00	1.00	10.00
Average			8.47
Low average			1.00

Session 3. Task scores

SESSION 3

Average score of tasks by the success rate and difficulty

Task	Success	Difficulty	Score
T1	3.00	2.00	9.00
T2	3.00	5.00	**6.00**
T3	1.00	2.00	7.00
T4	3.00	5.00	**6.00**
T5	3.00	7.00	**4.00**
T6	1.00	2.00	7.00
T7	1.00	5.00	**4.00**
T8	3.00	3.00	8.00
T9	3.00	1.00	10.00
T10	3.00	4.00	7.00
T11	3.00	2.00	9.00
T12	3.00	2.00	9.00
T13	3.00	1.00	10.00
T14	3.00	1.00	10.00
T15	1.00	1.00	8.00
T16	3.00	1.00	10.00
T17	3.00	4.00	7.00
T18	3.00	4.00	7.00
T19			0.00
T20			0.00
Average			7.67
Low average			5.00

Session 4. Task scores

SESSION 4

Average score of tasks by the success rate and difficulty

Task	Success	Difficulty	Score
T1	3.00	1.00	10.00
T2	3.00	1.00	10.00
T3	1.00	4.00	**5.00**
T4	3.00	1.00	10.00
T5	3.00	5.00	**6.00**
T6	3.00	7.00	**4.00**
T7	1.00	7.00	**2.00**
T8	3.00	1.00	10.00
T9	3.00	1.00	10.00
T10	3.00	1.00	10.00
T11	3.00	1.00	10.00
T12	3.00	1.00	10.00
T13	3.00	1.00	10.00
T14	3.00	2.00	9.00
T15	3.00	1.00	10.00
T16	3.00	2.00	9.00
T17	0.00	7.00	**1.00**
T18	3.00	1.00	10.00
T19	1.00	3.00	**6.00**
T20	0.00	6.00	**2.00**
Average			7.70
Low average			4.57

Session 5. Task scores

SESSION 5

Average score of tasks by the success rate and difficulty

Task	Success	Difficulty	Score
T1	3.00	1.00	10.00
T2	3.00	2.00	9.00
T3	0.00	7.00	**1.00**
T4	3.00	1.00	10.00
T5	3.00	1.00	10.00
T6	3.00	1.00	10.00
T7	1.00	4.00	**5.00**
T8	3.00	1.00	10.00
T9	3.00	1.00	10.00
T10	3.00	1.00	10.00
T11	3.00	1.00	10.00
T12	3.00	1.00	10.00
T13	3.00	2.00	9.00
T14	0.00	7.00	**1.00**
T15	3.00	1.00	10.00
T16	3.00	1.00	10.00
T17	3.00	2.00	9.00
T18	3.00	1.00	10.00
T19	0.00	7.00	**1.00**
T20	0.00	7.00	**1.00**
		Average	7.8
		Low average	1.80

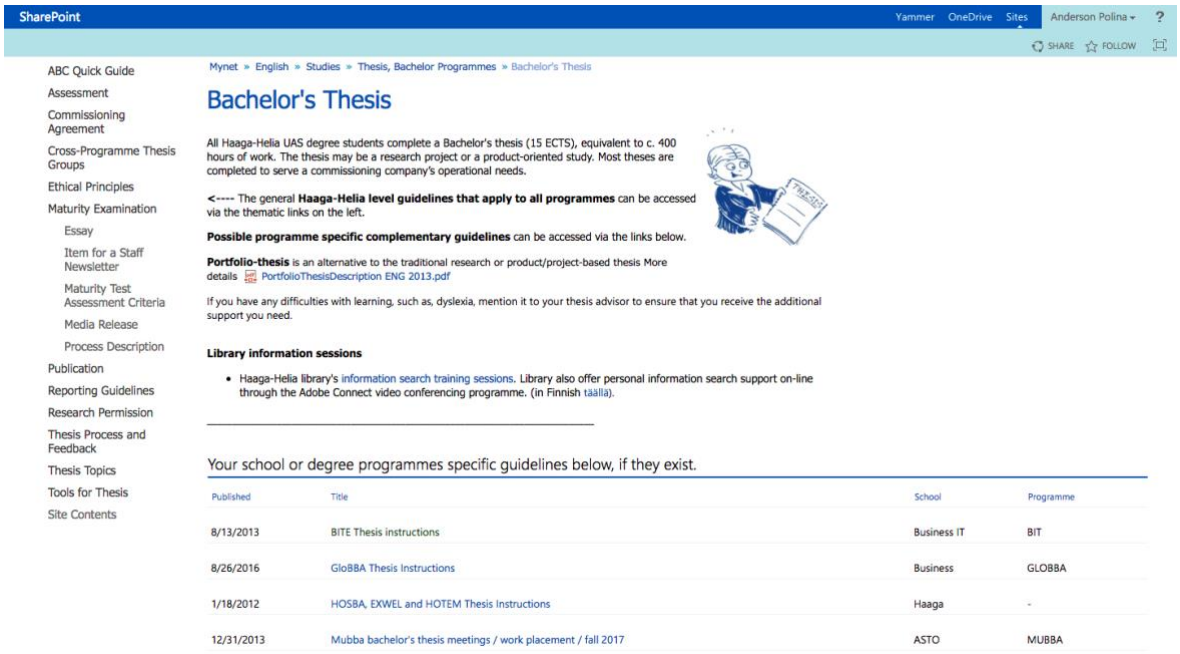
Session 6. Task scores

SESSION 6

Average score of tasks by the success rate and difficulty

Task	Success	Difficulty	Score
T1	3.00	1.00	10.00
T2	3.00	5.00	**6.00**
T3	1.00	2.00	7.00
T4	3.00	5.00	**6.00**
T5	3.00	1.00	10.00
T6	3.00	2.00	9.00
T7	1.00	3.00	**6.00**
T8	3.00	7.00	**4.00**
T9	1.00	1.00	8.00
T10	3.00	1.00	10.00
T11			0.00
T12	3.00	1.00	10.00
T13	3.00	1.00	10.00
T14	3.00	1.00	10.00
T15	3.00	1.00	10.00
T16	3.00	2.00	9.00
T17	3.00	1.00	10.00
T18			0.00
T19			0.00
T20	0.00	6.00	**2.00**
		Average	8.06
		Low average	4.80

Appendix 7. Specific program guidelines are visible only after scrolling down



Appendix 8. Ambiguous wording

List 1. Ambiguous terms for the users inexperienced in the thesis process:

- Tools for Thesis. Tools were commonly interpreted as a set of the most important practical “helpers” during the thesis process - templates, methods, information about the writing process etc.
- Minutes of Steering Meeting (it was proposed to be changed to “Report from thesis advising meeting” or similar)
- Commissioning agreement
- Evaluation seminar
- ABC quick guideline (proposed to be changed to “Getting started”)
- Abstract
- Theme group.

List 2. Ambiguous differences between the terms for the users inexperienced in the thesis process:

- Thesis advisor vs. Thesis coordinator
- “Normal” thesis process vs. portfolio thesis process
- Thesis evaluation meeting vs. Thesis seminar
- Theseus vs. HHThesis.

Appendix 10. Redesigned headers for left navigation and pages

1. Quick Guide (former "ABC Quick Guide")
2. Get Started (new page)
3. Thesis Topics
    1. Commissioning Announcements (former "Thesis Topics")
    2. Cross-Program Thesis Groups
        1. Cross-Program Group List
4. Documents & Agreements (new page, combines "Commissioning Agreement" and "Research Permit" page)
5. Advisory and Program Guidelines (new page, includes "Thesis process and feedback")
6. Reporting Guidelines & Thesis Types (new page, combines "Reporting guidelines" and dispersed information about thesis types)
7. Equipment: Devices and Tools (former "Tools for Thesis")
8. Ethical Principles & Urkund (former "Ethical Principles")
9. Thesis Assessment (former "Assessment")
10. Publication
11. Maturity Examination (combines "Maturity Examination" and "Process Description")
    1. Essay
    2. Item for a Staff Newsletter
    3. Media Release
    4. Maturity Test Assessment Criteria

Appendix 11. “Get Started" page