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# Case Web pages of SAMMAKKO - testing usability

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Abstract

Student union of Satakunta University of Applied Sciences SAMMAKKO, needed a usability testing on new web pages, both Finnish and English versions. Web pages were updated in 2021.

The purpose of this study was to improve the usability of SAMMAKKO web pages. The aim was to define usability problems of web pages, make suggestions of improvements and when improvements had been made, usability evaluated again.

The study was conducted as qualitative research, using Thinking aloud -method, when participants represented students and university staff. Each participant got three tasks to perform while speaking aloud own thoughts and observations.

As results from first testing, main usability problems were defined: navigation problems, and insufficient information for the university staff. Satisfaction was good. SAMMAKKO received the report along with improvement suggestions based on findings. After conducted improvements web pages were evaluated again.

On second testing conducted improvements turned out a success, satisfaction of web pages increased to laudable/excellent. However, some navigation problems still need to be fixed in the future and web pages should be also evaluated for accessibility.

This study is important for the student union, as usability of web pages have not been evaluated before. A two-part study is unusual with testing of how improvements have affected on usability.

Key words
Usability, usability testing, thinking aloud -method

CONTENTS

# LIST OF SYMBOLS AND TERMS

In this study are used terms “participant” when speaking about person, who participated in the usability testing of web pages of SAMMAKKO. “Moderator” is used when speaking about author of the work. Abbreviation SAMK is used when speaking about Satakunta University of Applied Sciences.

# 1 INTRODUCTION

Student union SAMMAKKO ry is a registered association, which is formed in August 2005. SAMMAKKO has offices on campuses of Satakunta University of Applied Sciences in Rauma and Pori (n.b., 2021). The University of Applied Sciences Act defines that “the purpose of the student body is to act as a liaison between its members and to promote their social and spiritual aspirations, as well as their aspirations related to study and the student’s position in society” (SAMMAKKO, 2020a).

SAMMAKKO has updated web pages in 2020. After updating, there has been no usability testing of web pages. As Jacob Nielsen (2012) states, usability is a quality attribute, that estimates how easy it is to use a product. Usability is about learnability, efficiency, memorability, errors, and satisfaction. On the Web, usability is a vital condition, if people do not find what they are looking for, users leave. The purpose of this study was to improve the usability of SAMMAKKO web pages. The aim was to define usability problems of web pages, make suggestions for improvements and after improvements ~~are done~~, test the usability again.

# 2 USABILITY OF WEBPAGES

## 2.1 User experience

User experience is widely understood concept of qualities, however in definitions made by several professionals have similarities. Peter Morville (2004) explains the user experience as seven facets: usefulness, usability, discoverability, credibility, desirability, accessibility, and valuableness. Norman and Nielsen define user experience as a combination of all points that ~~of~~ the end-user's interaction with the company, its services, and its products. In this perspective user experience is distinguished from usability, as usability is presented as a quality attribute of user

interface. The reason, why Norman and Nielsen want to distinguish usability from user experience, is that product may be usable, but the user experience may be still poor because of other factors that effect on user experience. (Norman & Nielsen, n.d.)

The newest publication of International Organization for Standardization defines user experience as "user's perceptions and responses that result from the use and/or anticipated use of a system, product, or service. Users' perceptions and responses include the users' emotions, beliefs, preferences, perceptions, comfort, behaviours, and accomplishments that occur before, during and after use." The user experience arises from the functionality, product image, system performance, and ancillary features of a service, product, or system. The user's previous experience, attitudes, skills, ability, and personality also affect the user experience. (ISO 9241-11:2018, 3.2.3, 2019)

## 2.2 Usability and utility

Usability is defined by International Organization for Standardization as an "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." The specific users, ambitions and context of use describe to the certain combination of users, aims and context of use for which usability is being considered. The word "usability" can be also used as a qualifier to refer to the design knowledge, competencies, actions, and design qualities that impact to usability, for example usability expertise, usability professional, usability engineering, usability method, usability evaluation, and usability heuristic. (ISO 9241-11:2018, 3.1.1, 2019)

According to Dumas and Redish (1999, p. 5) usability means focusing on users. To make usable product, you need to know and understand the user and work with them. Users think a product is easy to learn and use considering the time it takes to do what they want and success they have in forecasting the right action to take. People connect usability and productivity, as users want to finish their tasks as fast as possible using the product.

Jacob Nielsen (1993, pp. 26-36) has similar definition for usability. Usability has five qualities: learnability, memorability, efficiency, errors, and satisfaction. Learnability means that system should be easy to learn, so user can start performing the task quickly. Learnability is also considered as most fundamental usability attribute, as system needs to be easy to learn, and that is also the first experience of the system. Memorability means, that system should be easy to remember, so a user is able to recall how system works, after some period not using the system. Efficiency means, that since user has learned to use the system, it is possible to achieve a high level of productivity. Errors means, that user should be able to use the system making as little mistakes as possible, and no devastating errors should appear at all. Satisfaction means, that system should be pleasant to use, and users should like it. Also, utility is considered as equally important as usability, as utility means the functionality of the design (Nielsen, 2012).

Nielsen describes utility as the question of whether the functionality of the system can do what is needed, when usability is the question of how well users can use the functionality (Nielsen, 1993, p. 25). For this study is adopted Jacob Nielsen's definition of usability, also utility is included in testing to test if SAMMAKKO´s web page users are satisfied with the functionality of web pages, or if there is something missing.

## 2.3 Improving usability

In order to improve usability, it is essential to define all usability problems by running usability testing. Dumas and Redish (1999) mention about starting to offer different companies help to develop and test products already in early 1980s, when usability testing concept started to evolve. Usability testing brought people from many different fields to work together toward shared goal which was to make products usable.

Nowadays there are several different ways to test usability, as heuristic evaluation, thinking aloud, performance measures, observation, questionnaires, interviews, focus groups, logging actual use and user feedback. All listed methods have their own

advantages and disadvantages and are suited for different stages of the lifecycle of a product design. (Nielsen, 1993, p. 224)

Khajouei and Farahani (2020) used both Thinking aloud- and Heuristic evaluation -methods to compare if there would be different findings between these two methods. In total 423 usability problems that they recognized, of which 75% varied between the methods. Thinking aloud method seems to detect better problems related to effectiveness and efficiency attributes, however both methods detect similar usability problems and there is no significant difference between these two. Study shows that these two methods can be used to complete each other.

Liu (2014) studied usability of web pages of CheapSleep Finland Oy, using firstly Heuristic evaluation -method and then Think aloud -method. In this study Heuristic evaluation was conducted by one evaluator – author of the study and been completed with Thinking aloud -method. According to Liu (2014, p. 57) Thinking aloud -method brought deeper investigation in usability problems spotted by Heuristic evaluation and spotted more user related usability problems.

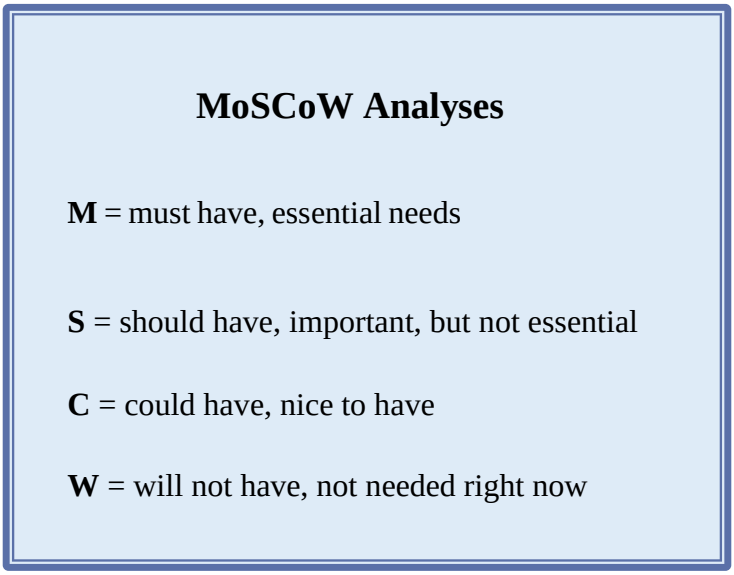
A usability study of a web-based methotrexate decision aid for patients with rheumatoid arthritis were conducted using Thinking aloud -method and System Usability Scale (SUS) to assess overall usability. Results showed, that even though the SUS score showed great usability before and after main modification, findings from the Thinking aloud test sessions demonstrated areas that needed additional improvement. Results of the study underline the meaning of formative evaluation in usability testing. (Li et al., 2013) Also in a usability study of a computer-based self-management system for older adults with chronic diseases (Or & Tao, 2012) conducted a heuristics evaluation and end-user testing with a Thinking aloud -method. It suggests that this usability testing approach can be used to test fast and effectively identify usability problems in early stage of product design.

Usability testing studies that contain usability testing, suggesting improvements and new usability testing are not many available. However, a Complex Clinical Decision Support Tool in the Emergency Department was tested for usability using Thinking

aloud -method. Improvements based on results were made and second usability testing showed improved usability. (Press et al., 2015.)

After usability testing is conducted and analysed, it is time to decide, what usability problems should be improved and what should be left like it is. Steve Krug (2006, pp. 158-159) recommends considering carefully, if findings should be improved, as everything effects on everything. A designer may want to help users to use the web site and fix every problem, that users are having, but when a designer increase something, it should be investigated first, what the improvement will decrease. Ergo Krug recommends fixing obvious problems and as easily as it is possible and react cautiously to user´s requests to add something, as mostly is better to remove a distraction.

Sometimes after usability testing, there are plenty of ideas, what could be done to resolve problems. But like in all projects, it is reasonable to prioritize. MoSCoW Analysis was originally designed by Dai Clegg and is used in many Agile frameworks by many professionals. MoSCoW represents four groups**: Must have**, **Should have**, **Could have** and **Will not have**. MoSCoW analyses is represented shortly in Picture 1. Must have -group represents items that are essential for the project to happen. Without these there is no point to continue and product will not work. Group Should have represents items, which are important for the project, but are not compulsory. These items support the product, but it still will work without. Group Could have represents items, which are not mandatory, but are nice to have. There will be only small impact, if decided to be left out. And group Will have not represents items that are not considered necessary. They don’t present enough value and can be deprioritized and dropped. (Gibbons, 2021)




Picture 1. MoSCow Analyses. (Gibbons, 2021)

# 3 RESEARCH METHODOLOGY

## 3.1 Thinking aloud as method in usability testing

Thinking aloud -method is considered to be one of the most valuable methods for usability engineering. Essentially a thinking aloud test is having a participant using the system while continuously thinking out loud. Speaking aloud their thoughts, participant enable a moderator to understand how the participant view the system. Performing the test requires from three to five participants. Thinking-aloud method is good for finding user's misunderstandings and considered to be a relatively cheap test to conduct. As main disadvantage for the test Nielsen states, that test may give false impression of the cause of usability problem, if moderator pays too much attention to participants' own theories of what caused the problem and what would be a solution for it. Ergo the moderator should pay more attention at what participant was doing when the problem occurred. Also, the method seems to be very unnatural for the most people, and some people have great difficulties in verbalizing their thoughts. Ergo using eye-tracking system during the test enable more higher validity. However, comments of participants help moderator to know **why** participants are doing **while**

they are doing is a strength of the test and enable avoiding later rationalizations. (Nielsen, 1993, pp. 195-196)

Also, Krug describes usability testing method, with same content as Nielsens's Thinking aloud -method: simple, easy, and cheap usability testing for web pages with only from three to four participants. Testing can be done in any kind of office and can be done at any time, with almost anyone who has any skills of using internet. As an exception, if you have web pages, that require some certain knowledge, then participants should be selected more carefully. However, in generally web pages should be made so anyone could use them. (Krug, 2006, pp. 131-155)

## 3.2 Testing usability of web pages of SAMMAKKO

For usability testing was chosen method Thinking aloud because of its advantages to explore what difficulties participants have while performing their tasks and what caused it. The first round of testing was conducted on 29.3.-20.4.21 and second round on 13.-31.1.22. All testing sessions were conducted remotely by using a platform for communications - HILL -environment, which is widely used in Satakunta University of Applied Sciences. This decision was taken keeping in mind at the time prevailing Covid19 situation and recommendation to avoid all unnecessary contacts in person. Also, this way of conducting testing imitate better the natural situation of person visiting a website and recording of testing session became easy.

## 3.3 Recruiting participants

Recruiting participants for the first testing started by sending an invitation in SAMMAKKO weekly newsletter (Appendix 1), but this did not bring enough participants. Recruitment continued by asking one of teachers to convey the invitation for IT-students, with assumption, that usability testing may be more familiar for students of IT and would bring more participants this way. Also, communication office of university was contacted and asked to convey an invitation and it was sent between moderators' own study group via WhatsApp. One representative of university staff was asked personally to participate in testing because of one's expertise in usability

testing. Two of participants were not students or a staff of the university at the moment but are potential SAMK's students and been asked personally by moderator, as seemed that not enough participants will be recruited. Eventually in total 10 participants tested webpages of SAMMAKKO, both Finnish and English versions, five participants for each. Any personal data was not collected during the testing sessions. Among the participants were both men and women, in age over 18-years old. All participants were familiar with using internet generally.

For the second testing were chosen five participants, of which two were representatives of university staff and three university students. All participants were asked personally by moderator. Two representatives of university staff were asked because of their specialty in usability and accessibility testing and familiarity with students. Also, negative feedback of utility of web pages from first testing regarding the content needed to be explored with more representatives of university staff. One of students participated in the first testing, so it became interesting to examine, how improvements will impact, when there is an experience of web pages before conducted improvements. Also, like in first testing became clear, there will be much more advantage, if participant is chatty and extrovert by nature, so student-participants asked personally keeping in mind this kind of character.

### 3.4 Testing session

All testing sessions were held one by one, and participants were not aware of each other. Testing session started by personal email and scheduling a suitable time for participant and moderator. Moderator sent a link for joining in moderators' personal HILL-room. Each participant was informed about recording a session for later analysis already in invitation and reminded in the beginning of the testing session. All participants were also assured, that recording will be kept safe and not shared anywhere. At the beginning of the testing session all participants and moderator had a small talk to become more familiar to each other and encourage a participant to share his/her thoughts. Also, in 14 of 15 sessions both participant and moderator cameras were on for fluent communication and viewing participants moods about web pages. The testing session itself started by moderator explaining to participant what is going

to happen, and about the testing method – Thinking aloud (Nielsen, 1993, pp. 195-196), and what it means for participant. Participant was informed about getting three tasks during the testing and moderator may ask some refine questions. Also, in beginning of testing participant was asked, if he/she has visited web pages before for defining, if learnability and memorability are possible to study.

Testing session itself started by asking participant to share the content, so moderator may see, what participant is viewing. Firstly, participant got to view the front page and talk about first expressions, observations, and opinions. Then participant got three tasks to perform: 1. Find out how you can get a student card. 2. Find out, where can you find the actual location of student union office. 3. Find out, what kind of services SAMMAKKO offers to their members. These three tasks were selected because of moderator's own assumption as a student itself, that these things may interest students the most about student union, and are probably things, which are most searched on a web page. After performing tasks moderator asked participant open questions about participant opinion in overall of web pages. Also, some refining questions were asked, if utility and qualities of usability (satisfaction, memorability, learnability, efficiency, and errors) did not come up other way while participant was expressing his/her opinions and observations. As all participants are unique persons, each testing session was unique and did not go by exact pattern. In testing sessions was used mostly Finnish language for communication, as most of participants experienced Finnish as more natural to speak. Participants fluent English skills were known to the moderator before testing session or came up in email-contacts.

### 3.5 Analysing testing sessions

As was planned, first three testing sessions were transcribed using verbatim transcription for conveying the feeling of how things were said. During transcribing however was noted, that transcribed testing sessions are not serving its purpose and to understand the transcription there is a need to watch the recording. Also, transcriptions seemed strange without the videorecord. Ergo transcribing of testing session was abandoned and said things had been extracted from each testing session into its own file. Participants' observations and opinions were divided into positive or negative

aspects and into section of suggestions for improvements or changing something. From each testing session were picked up all utility and usability qualities and how they are met. Files were sent to each participant for clarification, that all participants had said, was understood correctly.

During analysing testing sessions from video became clear, that camera usage brought very little use for examining participants' first expressions, as for some technical reason on recorded testing session video participants' picture disappears, when participant was not speaking.

All collected data was analysed by using thematic analysis with deductive approach for assessing Nielsen's (2012) usability qualities and utility of web pages of SAMMAKKO, and inductive approach for defining all findings on the web pages. Thematic analysis is a method suitable for analysing qualitative data and usually applied for set of texts, like interview transcripts. The researcher examines the data carefully to identify common themes - recurring themes, ideas, and patterns of meaning. Thematic analysis is well suited for cases where one wants to explore people's opinions and experiences (Caulfield, 2019). Deductive approach was a natural selection for assessing usability qualities, as deductive approach starts always with existing theory. Inductive approach was selected, as it allows data to define themes, and in usability testing was a purpose to define usability problems on a web page. (Streefkerk, 2019.)

All recorded testing sessions were watched thorough several times for familiarizing with data and notes made about what participant was doing at the time some problem occurred or what feelings it evoked. Data was codified ergo codes as "*Overview of web pages*", "*Information*", "*Findability*", "*Colours*", "*Headings and body text*", "*Pictures*", "*Navigation*", "*Links*" and "*Buttons*" were made. All codes were generated into themes as "*Content of web pages*", "*Visual entity*", and "*Links and navigation*". For each participant, utility and usability aspects were assessed, and the results were put together, forming a coherent assessment of the usability and utility of the web page. Also, participants gave plenty of suggestions for improvements and solutions for problems they have discovered, that may be found as list in Appendix 2.

# 4 RESULTS OF THE FIRST TESTING

## 4.1 Identified frames

In overall, participants were mostly satisfied with web pages of SAMMAKKO, most common comment was “colourful”, in a positive way. Participants mostly found what they were looking for, but some aspects got some criticism, and few clear mistakes were found.

During analysing testing sessions came up most frequently frames as “*Content of web pages”, “Visual entity”,* and *“Links and navigation*”. Frame “*Content of web pages*” includes all comments and experiences, that participant had regarding any content that is or is not on web pages of SAMMAKKO, as services, information, news etc. Frame “*Visual entity*” contains everything about colours, headings, body text or images. Frame “*Links and navigation*” contains all participants experiences about naming links, links or buttons placement and colours, interactions. Analyses of the data is presented in Tables 1-3, that are formed from simplified expressions, which are codified and generated into frames. Simplified expressions on the left of the tables are divided into positive and negative expressions and are placed on green background (= positive) or red background (= negative). Numbers in parentheses are amounts of participants that have experienced similar or exact feeling.

### 4.1.1 Content of web pages

Most of participants assessed web pages as clear and simple, and most searched things as joining the student union, updating information, and continuing membership may be found easily. Participants assessed insufficiency in information about how to get to the student union office and what are open hours. Also, participants would want to have more information about services and how to get them, together with more reasons to joining the student union (more benefits of joining). Seven (7) of ten (10) participants assessed finding information about student card as difficult and cases, when web pages open as mobile version (without the top bar) are very difficult to

navigate on a computer screen. On a mobile version top bar is replaced with “hamburger icon”, that is unnoticeable in the right corner of the screen. Seven (7) of ten (10) participants assessed finding services as easy but heading “Services” on English pages is more understandable than “About SAMMAKKO”. In Table 1 are presented simplified expressions that are codified and created a frame Content of web pages. Numbers in brackets represents number of participants that expressed the same or similar feeling.

Table 1. Simplified expressions, codified and generated into frame Content of web pages.

| | | |
|---|---|---|
| Clear and simple frontpage (3) | Overview of web pages | Content of web pages |
| Looks, that everything important is available (1) | | |
| May find easily most searched things: Join, update information, continue membership (3) | | |
| Fun slogan, humour used. (1) | | |
| Online form to contact also anonymously, well done (3) | | |
| (Right now) looks dynamic (1), dates on news. (2) | | |
| Good site for the target group. Joining to SAMMAKKO succeed if desired (1) | | |
| (Front page) First view is restless: picture, colours, text, button. Too many things on top of each other. (1) | | |
| (Student card page) problems with slice should have a link, now it only says read FAQ (1) | | |
| No slogan of SAMK, and no link to SAMK pages (1) | | |
| No Swedish language pages. (1) | | |
| Enough information, what is Sammakko (2) | Information | |
| (Wellbeing) information about FSHS (2) | | |
| Nice that they have the listing of all the representative councillors on the additional. (1) | | |
| No info about office open hours/ not updated (6) Need more instructions to get to the office (3) | | |
| Cannot find reasons why to join (3) | | |
| Narrowed info about wellbeing, want to see info about what exercise, where, when, some discounts? (2) | | |
| Very narrowed info about overalls, no info where to get them (2) | | |
| Not sure where may get services, too much text (1) | | |
| No info about what kind student card is or what benefits it gives. Would like to have more information, before joining (2) | | |
| Wants an archive of old news (1) | | |
| Info about parking should be more visible (1) | | |
| Services are easily findable (8) English page heading ’Our Services’ is more understandable! (2) | Findability | |
| Address of the office is easily findable (7) | | |
| Information about thesis binding findable, where to get and how long does it take (1) | | |

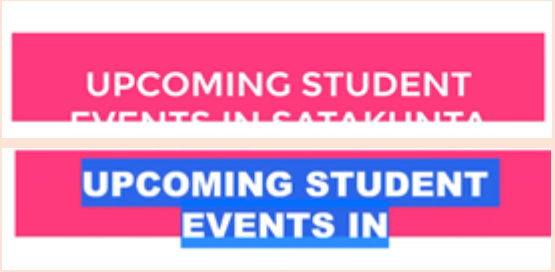
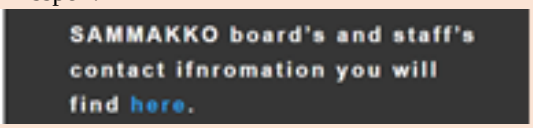
| | | |
|---|---|---|
| The mobile view is made just fine and responsive, but you must browse for a long time before finding anything related to the student card. (1) | | |
| Information about student card is hard to find (7) ”After clicking on everything, it has to be somewhere” Participant seems frustrated (1) | | |
| Web pages opened as mobile version, no top bar-> very difficult to navigate (2) | | |
| (Mobile view) Difficulties to find office placement. After long browsing found in the bottom (1) | | |

### 4.1.2 Visual entity

As Table 2 presents, most participants were very pleased with colours on web pages, several participants said, that colours make them feel happy. Participants assessed headings and body text style and size mostly suitable and clear. All ten (10) participants opened joining form while searching the information about student, but six (6) of participants did not notice information on the joining form. Participants assessed pictures on web pages as good and suitable. One participant suggested that pictures of students from different cultures may make students feel more welcomed.

Table 2. Simplified expressions, codified and generated into frame Visual entity.

| | | |
|---|---|---|
| Good colours and contrasts (6) colours make you feel happy (2) | **Colours** | **Visual entity** |
| (Right now) News about survey looks much more stylish with fewer and softer colours. (1) | | |
| Visually beautiful (1) | | |
| Glaring colours (2) | | |
| (Services page) Colours of Service links used (almost) same colours as background, gets the feeling that link are pairs with each other’s. (1)  | | |
| Clear headings (2) | **Headings and body text** | |
| News is readable easily; heading is easily noticeable. Simple and suitable (2) | | |
| Body text could be bigger, but is clear, no distractions (1) | | |
| Large body text (1) | | |
| (Student advocacy page) text is very brief, does not make feel that there is a huge block of text and I do not want to read it. (1) | | |
| (FAQ page) link for every question, and question bolded, that helps reading (1) | | |
| (Joining form) Not noticed information about student card (6) | | |

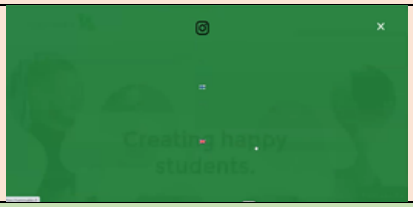
| | | |
|---|---|---|
| (Front page) text boxes seem to be cut off (2)<br>  | | |
| (Materials page, English) heading is in Finnish (2) | | |
| (Our Services page) Harassment link is difficult to read, as white text on light background (1) | | |
| (Front page) text on the picture does not pop up well (1) | | |
| Wording in English partly wonky, may improve with someone native speaking (1) | | |
| Misspell: (1)<br>  | | |
| (Contact us page) Leave a message field is too low, participant notices it after visiting for several times. (1) | | |
| Good and positive pictures (5) | **Pictures** | |
| (Thesis binding) Image is good, even with text on it, but there is no frame, like on front page image. (1) | | |
| The logo of SAMMAKKO was not instantly understood as a link (1) | | |
| The symbol of SAMMAKKO looks weird at first, distracts from the information on the page (1) | | |

### 4.1.3 Links and navigation

Most of negative findings were affiliated with the frame Links and navigation, which are present in Table 3. Participants were pleased with the interaction in the top bar on Finnish pages, so you know what page is browsed at the time. However, the coding fail (no interaction under link *Events*) was noticed. Also, slight interaction (links becomes bolded) on English pages remained unnoticed. Some participants did not like the case, when joining form opens in the own tab, as there is no *Back* -button. Two (2) of ten (10) participants missed Search -field on pages, as was not able to find what they were looking for. Link *About Sammakko* caused wondering in participants and several participants said, that they thought the link would take to page with description

about what SAMMAKKO is or a history. Some buttons also got negative feedback with being black and unnoticeable.

Table 3. Simplified expressions, codified and generated into frame Links and navigation.

| | | |
|---|---|---|
| Recent posts on the side of news are good, no need to go back to read next one (3) | Navigation | Links and navigation |
| Links get highlighted when pressing or taking the cursor on them, helps in navigation (2) | | |
| Joining form opens in a new tab (2) "The opened tab stays inconveniently open, no button to navigate back" | | |
| For foreigners may be difficult to navigate to the page, as some have difficulties writing double consonant. (2) | | |
| No Search on site. (2) Would want to search who does what (1) | | |
| (About Sammakko/ Services page) Have to go back, to see other services, inconvenient (2) | | |
| Top bar: nothing about services or student card (2) | | |
| Top bar (Finnish page): no interaction under Events link (1) | | |
| (Mobile view) hamburger icon does not reveal any new links, and language icons looks silly on whole screen wide menu: (1)  | | |
| Social media and language links on their own place (3) | Links | |
| Links on the top bar are visible fast. The same links in the bottom, and services are specified (2) | | |
| (Services page) nice, that links are on different coloured background (2) | | |
| About Sammakko link refers to the description about SAMMAKKO or history, but not a word what SAMMAKKO is. Link guides to services, and this is illogical. (4) | | |
| Links in the bottom do not fit on own row, words cut in the middle, at weird place (2) | | |
| (Page Advocacy, FI) More about decisions link doesn't take anywhere (2) | | |
| (About Sammakko, FI) Contact us link doesn't take anywhere (2) | | |
| (Student card page, FI) Join here link takes to a joining form and doesn't open new tab. No link at all to joining form on English page (1) | | |
| (Bottom bar) Feels, that thesis binding link does not belong with others. (1) | | |
| About Sammakko English -> Contact us-> brings to Finnish page (participant very annoyed) (1) | | |
| Student associations page: last link opens a new page with a list of student associations. Meriko Ry link doesn't work. (1) | | |
| Join button opens a new tab with joining form (6) This is a success! (1) | Buttons | |
| On English pages, in the bottom link Materials (1) | | |
| Buttons change colours, helps to realize, it is a button (1) | | |

| | | |
|---|---|---|
| Join -button in several places (1) | | |
| In the right corner Contact us button unnoticeable, as in that corner pop up notifications (3) | | |
| (Front page) What is Sammakko button is black and not so splashy. Does user understand instantly, it is a button? Also Join button lower is black. (1) | | |

## 4.2 Usability qualities

Some of participants expressed their assessments for each of usability qualities by themselves, and some needed to be encouraged to express their feelings. All of assessments been grouped together. In original plan for this study, were decided to exclude learnability, as Norman and Nielsen (2012) define, that learnability means "How easy is it for users to accomplish basic tasks the first time they encounter the design?", and assumption was, that all participants would have been visited web pages of SAMMAKKO before. However, in testing session came up, that new, updated web pages are unfamiliar for nine of ten participants, ergo learnability could be analysed as well. Although for the same reason memorability could not be assessed for most of participants.

**Learnability:** Eight (8) of ten participants (10) described performing tasks for the first time as easy, while two (2) participants found searching information about student card as complex and hard. From analysing participants performing tasks, been noticed, that seven (7) of ten (10) participants had difficulties in performing task 1 (searching for information about student card).

**Efficiency:** Nine (9) of ten (10) participants assessed, that after surfing on a web page of SAMMAKKO for a while, finding things gets easier. The same phenomenon may be seen in the recordings. One (1) participant commented:" There is plenty of useless stuff on a frontpage, before you may find links in the bottom". For this participant web page of SAMMAKKO opened as mobile version, so participant did not see links on the top.

**Memorability:** Nine (9) of ten (10) participants have not visited new updated web pages before, when one (1) participant said, that visited web pages some time ago, but

does not feel, that it helped finding information on web pages. One (1) of participant clicked three (3) times link '*About Sammakko'* during testing session and expected to find some history of SAMMAKKO. This suggests illogicality in naming the link.

**Errors:** seven (7) of ten (10) participants had difficulties in performing first task (Find out, how you can get a student card). There are several ways for searching this information: there is some information about student card on joining form and some more information about student card in the link in the bottom or also in services. All ways of finding information were accepted as correct. However, six (6) participants made 1-3 errors while finding information about student card. Six (6) participants clicked firstly on *Join* -link and got to a joining form but did not see information about student card there. Three (3) participants found information about student card without any errors but spent much more time reading all the text on a web page. One (1) participant made six (6) errors while performing task 1 and got frustrated. One (1) participant made one (1) error while performing task 2 (Find out, where can you find the actual location of student union office), when clicked first *About Sammakko*. Two (2) of participants made two (2) errors while performing task 3. (Find out, what kind of services SAMMAKKO offers to their members). Participants clicked first *What is Sammakko*, then *Join.* Both errors were made while testing Finnish pages.

**Satisfaction:** Participants assessed satisfaction of using web pages differently, some gave numerical grade and some assessed web pages in words. Two (2) participants assessed web pages as ok, glaring, and seven (7) participants assessed web pages as good. One (1) participant experienced the front page as too colourful and restless, not good, but experienced 'Our services' page as good, if it would be very easy to get there.

**Utility:** Nine (9) of ten (10) participants assessed that web pages does what participants needs, two (2) of nine (9) participants mentioned, that web pages do what they need, but things are hard to find. One (1) participant experienced, that web pages does not do what participant needs. Participant, that represents staff of university experienced, that there are not many things for the staff of the university, web pages are clearly meant for students.

### 4.3 Discussion

Results of this usability testing give an answer for the first research question for the study: What kind of results from usability perspective there are on the webs pages of SAMMAKKO, English and Finnish versions? As results infer, usability of web pages of SAMMAKKO is quite good as it is, with some small problems. Most participants assessed pages as easy to use, though for participants, who got to test mobile view, showed more problems in navigation. Most problem was a link in the top bar *About Sammakko*, participants thought first it means some description about student union or its history. Most participants experienced hard to find information about student card, even if they navigated first to a joining form, with association, that you need to be a member if you want to get one. Most participants experienced pages very colourful in a good way. As Nielsen (2000) states, it is enough to test with only 5 participants, as the number of new findings lower with each participant, seems to be correct: most difficulties from usability perspective were found by most of participants.

Results of this study are not suitable for evaluating usability of mobile view of web pages of SAMMAKKO, as there were only two participants, who tested mobile view on their computer. Also, mobile view is meant for smaller screen. One participant wanted to check quickly, how do pages look on the mobile.

# 5 SUGGESTED IMPROVEMENTS ON WEB PAGES OF SAMMAKKO

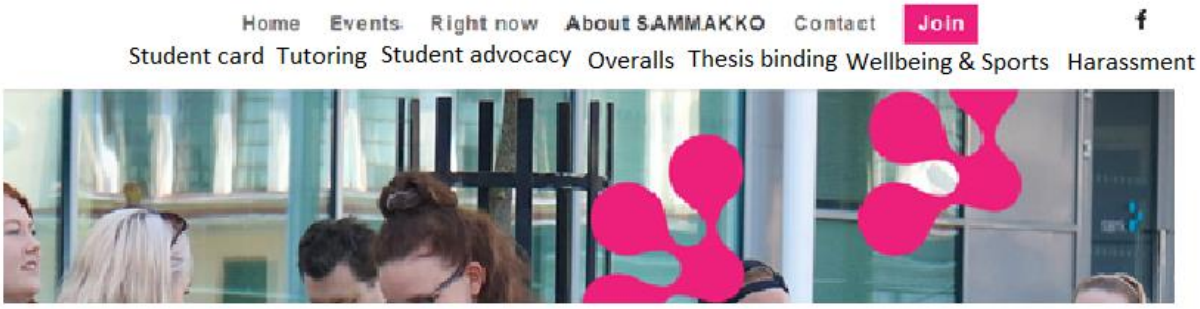
Suggestions for improvements are based on participants' comments and analyse of testing sessions. As the final decision of improvements for web pages of SAMMAKKO will be made by student union, suggestions may be divided into four sections to help decision making using MoSCoW -analyses (Gibbons, 2021): Must, Should, Could and Do not. Section Must include improvements to resolve problems that most participants experienced during testing session and obvious errors. Section Should include improvements, that some participants experienced, when section Could

include suggestions, which could be made if there is time, and it does not bring too much effort, these are only ‘may be nice to have’, but not necessarily improve usability. Section Do not include a list of some suggestions came from participants, but that sounds good only at first. To help choosing elements into different sections, MoSCoW Analyses was used.

## 5.1 Must improve

- Top bar: link *About Sammakko/Sammakosta* would be beneficial to rename into *Services/Palvelut*. Page contains services and renaming the link would be more logical and informative.

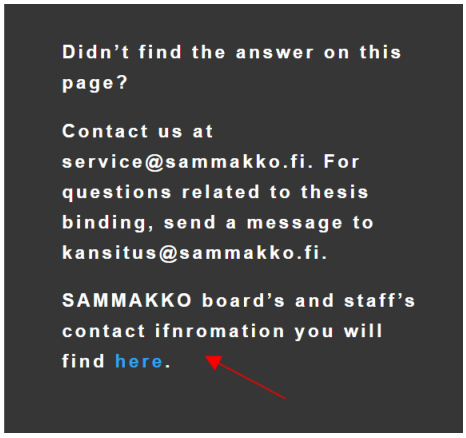
- Top bar: when pressing links as (current) *About Sammakko*, under top bar could appear tab menu, which would contain all services. Picture 2 represents an example of implementation.




Picture 2. Example of a tab menu

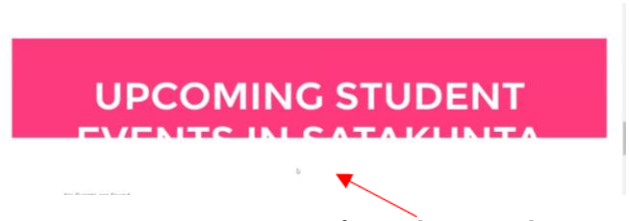
- Interaction used on Finnish pages (underlining) is more noticeable than on English pages (bolded), ergo could be used also on English pages. Tab menu would remove most participant experienced problem to find info about student card and inconvenience, that some participants experienced with having to go back to see other services, as may just click on the next one from tab menu. Tab menu should be more colourful than on example Picture 2, like the rest of the page. Similar kind tab menu should be made also for link *Right now*. Also, this kind of listings makes Search field useless and advertises to students why they should join student union.

- Correct misspell showed in Picture 3. Grammatically correctly compiled pages give a better impression




Picture 3. Print screen picture of misspell on a web page.

- Text boxes like in Picture 4, should be remedied, as it gives more finished impression:




Picture 4. Print screen picture of a text box on web page.

- Finnish page *Advocacy*: *More about decisions* -link takes to the original page. *Student associations* page: last link opens a new page with a list of student associations. *Meriko Ry* -link does not work. *About Sammakko -> Contact us* -> brings to Finnish page (*Student card page*, Finnish) *Join here* -link takes to a joining form and not open new tab. No link at all to joining form on English page. These should be checked, and inconveniencies fixed.

- In the top bar (Finnish page) no interaction under *Events* -link.

- Reasons why web pages open for some users as mobile version should be investigated, as it complicates navigation a lot. In testing sessions used browser Chrome and Edge.

## 5.2 Should improve

- Several participants would like to know more about services, and one suggested to add more information, without making text blocks too large. Could be beneficial to add more information (as availability of services and possible prices), but using link *Read more…* in the end of small amount of text, so the link would reveal more information. This would give users more information for them who wants it without making users feel, like there is too much text at a first glance.

- At the time of testing sessions, Office open hours said, 'Closed until 19.3.'. All testing sessions were implemented after that date, and participants noted, that open hours are not updated. When office opens again, would be beneficial to have open hours listed in the bottom bar, so users would not have to search for them too much.

- As the representative of university said, web pages as they are now, not considering university staff, pages are clearly meant for students. Ergo if pages are meant to serve also the university staff, would be beneficial to make a link into the top bar like *SAMK's staff* or *For the staff*, which would present something, that representatives of university staff may need. At least contact information and clear presenting of who is charged of different tasks. Also, this page could have some calmer colours, as would be meant for other than students. This link could be placed for example in a top bar to be easily findable, instead of link *Home*.

- Some users would have wanted to know what kind of benefits they would get by having student card or Slice. Pages says now "you will have access to the amazing local and nationwide Slice.fi benefits." SAMMAKKO web page

(SAMMAKKO, 2020), but examples of benefits would attract more student to join, if users would have concrete example of what they would gain.

## 5.3 Could improve

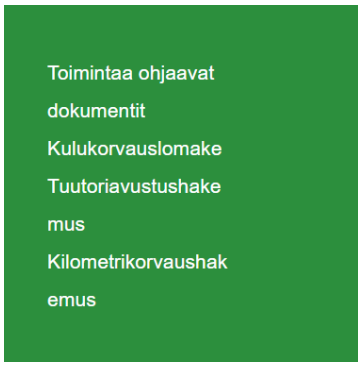
- One of participants suggested, that mascot of SAMMAKKO, a frog would be lurking behind the *Join* -button in the top bar, when cursor touches it. This is not improving usability anyhow but would be fun detail and represent a fun student life.

- Link to web pages of university is one of 'nice to have', although it would not increase usability of web pages of SAMMAKKO either.

- One participant mentioned, that SAMMAKKO helps students to settle down to a new town, SAMMAKKO might want to consider whether this is a service they wish to provide. If so, it should be listed on pages as well. Perhaps it could be named as 'Survival package' and contain some information about applying to university.

- A comment from one participant, that images of student from different cultures may make foreign students feel more welcomed, sounds reasonable. This may be applied on English pages, as probably a lot of foreigner students use English pages.

- Some links in the bottom bar are not fitting, depending on resolution. Picture 5 represents an example of how links looks with resolution 1920x1080. Words are cut off from weird part. Is it necessary to have all these links listed separately? Perhaps, bundling up links to forms and documents would be beneficial to have as 'Materials'.




Picture 5. Print screen picture of web pages.

### 5.4 Do not change

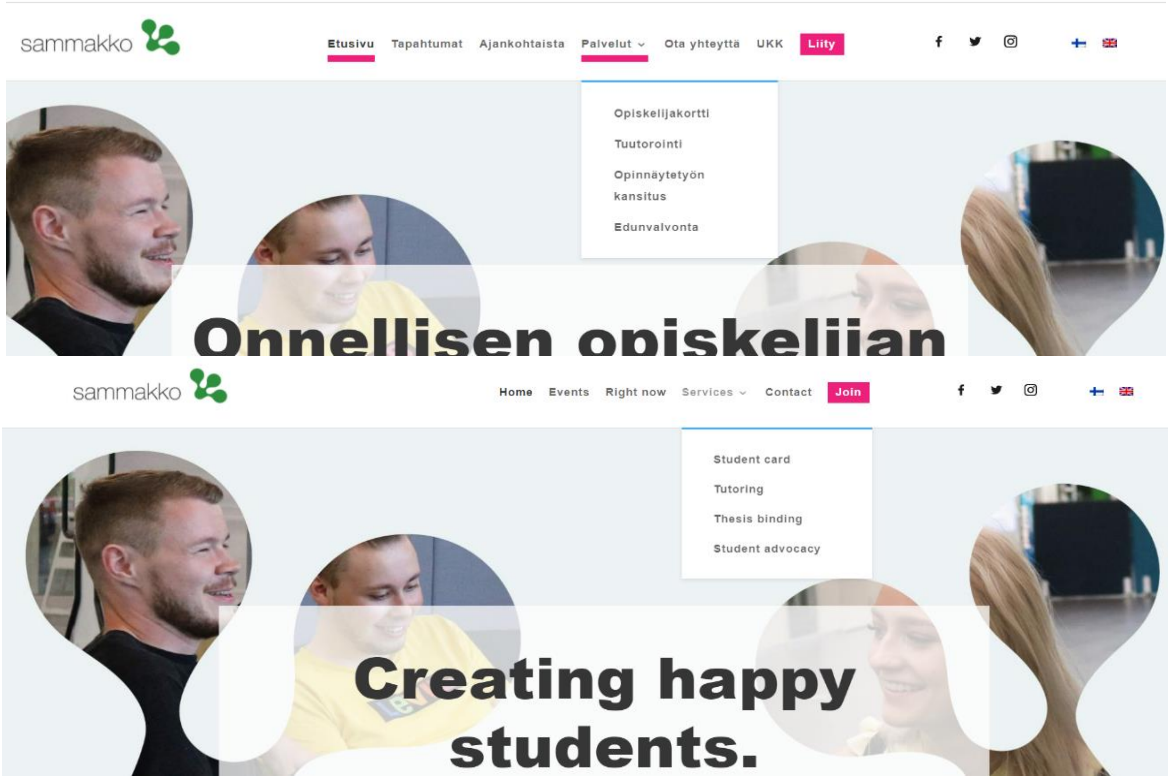
- Pages should stay as colourful as they are now. Most participants assessed colours as a good thing that makes feel happy, also as one participant said: “Student life is colourful”.

- Some of participants would want *Search* -field to help navigating. This is due to inconvenient link names in the top bar for one participant, and no top bar at all (used mobile view) for another participant. As most participant stated, pages are simple. If suggestions about renaming link *About Sammakko* and making drop menu under the pressed/or cursor touched link will be realized, *Search* -field will be unnecessary. Also, suggested link for university staff would help.

## 6 IMPROVEMENTS IMPLEMENTED BY SAMMAKKO ON WEBPAGES

Improvements based on the report were conducted in December 2021 by SAMMAKKO. Biggest change conducted was changing a top bar as suggested: changing link *About SAMMAKKO* into *Services* and adding a drop menu, where user

may find most used services, as student card, tutoring, thesis binding and student advocacy. Changes are visualized below, in Picture 6.




Picture 6. Updated top bar on SAMMAKKO web pages, Finnish and English versions.

Also, smaller improvements were made, like correction of misspells and updated student union office open hours. As improvement work is never finished, SAMMAKKO will consider suggestions for improvements for web pages for year 2022, as:

- logo of SAMMAKKO, a frog would be lurking behind the Join button in the top bar, when cursor touches it
- ‘Survival package’ for a new student
- images of student from different cultures, may make foreign student feel more welcomed
- ‘SAMK’s staff’ or ‘For the staff’ – section (Pullinen, 2021)

# 7 SECOND TESTING

## 7.1 Recruiting participants

The number of participants for the second testing reduced to 5 participants as usability specialists (Nielsen, 1993; Krug, 2006) advice to test with only few participants. However, participants were selected of two representative of university staff because of their specialty in usability and accessibility testing and familiarity with students. Usability specialists recommend also conducting an expert review whenever it is possible, as it may reveal different usability issues than other methods (Harley, 2018; Jesmond & Chudley, 2013). Ergo for the second testing were asked in addition to the two lecturers, three university students. One of these students participated in the first testing, so it became interesting to examine, how improvements will impact, when there is an experience of web pages before made improvements. Also, like in first testing became clear, it is beneficial if participant is chatty and extrovert by nature, so student-participants asked personally keeping in mind this kind of character.

## 7.2 Analysing testing session

Analysing second testing sessions went by the same pattern as in the first testing: all said comments had been extracted from each testing session into its own file. Analyses of the data is presented in three tables in section “Results of the second testing”, that are formed from simplified expressions, as well codified and generated into frames. Simplified expressions on the left of the tables are divided into positive and negative expressions and are placed on green background (=positive) or red background (=negative). Numbers in parentheses are number of participants that have experienced similar or exact feeling. From each testing session were picked up all usability qualities and how they are met. Files were sent to each participant for clarification, that all participants had said, was understood correctly by moderator.

All collected data was analysed by using thematic analysis with deductive approach for assessing Nielsen's (2012) usability qualities and utility of web pages of SAMMAKKO, and inductive approach for defining all findings on the web pages.

All recorded testing sessions were watched thorough several times for familiarizing with data and notes made about what participant was doing at the time some problem occurred. Data was codified ergo codes as "*Overview of web pages*", "*Information*", "*Findability*", "*Colours*", "*Headings and body text*", "*Pictures*", "*Navigation*", "*Links*" and "*Buttons*" were made. All codes were generated into themes as "*Content of web pages*", "*Visual entity*", and "*Links and navigation*". For each participant, utility and usability aspects were assessed, and the results were put together, forming a coherent assessment of the usability and utility of the web page. Also, participants gave plenty of suggestions for improvements and solutions for problems they have discovered, may be found as list in Appendix 3.

# 8 RESULTS OF THE SECOND TESTING

## 8.1 Identified frames

Most common comment about SAMMAKKO web pages was "nice and colourful". In its entirety participants liked web pages and assessed pages as excellent or laudable. As one of participant is specialized in usability and accessibility testing, more aspects of accessibility also were brought up, as these interfere normal usage of web pages and influence on usability as well. In second testing two (2) of five (5) participants got to test mobile version of web pages, which does not contain a top bar at all, but has a "hamburger icon" that contains same links as a top bar. Both participants found the mobile version very difficult to use. For these two participants a moderator made an exception, and after participant was done testing web pages, moderator showed participant a normal version of the web pages of SAMMAKKO from own screen. Both participants assessed the normal view with the top bar as much better and easier to use. All five (5) participants assessed top bar very good and logical, where you can find

links to the information and most used services. The one participant, who took part in first testing, noticed the change in the link *About SAMMAKKO* into *Services*, assessed it as good and logical. Two (2) participants commented the failure in coding in the top bar, the interaction (underlining) does not work in link *Events* and *UKK*, and in drop menu underlining goes on the word, what makes very difficult to read.

### 8.1.1 Content of web pages

Participants were pleased with amount of *Join* -buttons on web pages and the top bar, which contains most searched services. Two (2) of five (5) participants missed the picture of the student office and more specific guiding to find the place. Like in the first testing, the problem that there is insufficient information for the university staff on web pages came up again. In the second testing there were two participants, whose pages opened as mobile view, ergo both participants commented the findability on web pages as poor. In Table 4 are presented participants simplified expressions, which are codified, and a frame *Content of web pages* made. Numbers in parentheses presents the number of participants, which expressed the exact or similar feeling.

Table 4. Simplified expressions, codified and generated into frame Content of web pages

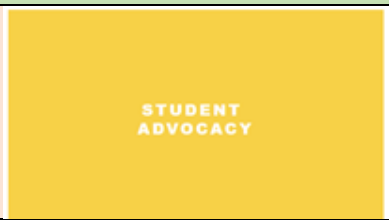
| | | |
|---|---|---|
| It's nice, that co-workers (Vuokralukaali, Saikku etc.) are clearly visible (1) | **Overview of web pages** | **Content of web pages** |
| Very clear pages, in totally very good (2) | | |
| Possibility to leave a message is good (2) | | |
| There are most searched services in the top bar. (1) | | |
| There are plenty Join-buttons on pages, which is probably the point of the pages. (2) | | |
| Finnish version UKK (FAQ) comes to mind something completely different than Frequently Asked Questions. (1) | | |
| Finnish pages: Application for mileage allowance is confusing. Is it for everybody? If it is only for some parties, it could be somewhere else, then in the bottom of the page, where everyone can see it. There are plenty students in university from elsewhere, they may fill the application. (1) | | |
| Page Right now: disposition of news is wacky: On the left is Tutor search is on, on the right Tutor search is approaching. In the middle news about county elections. (1) | | |

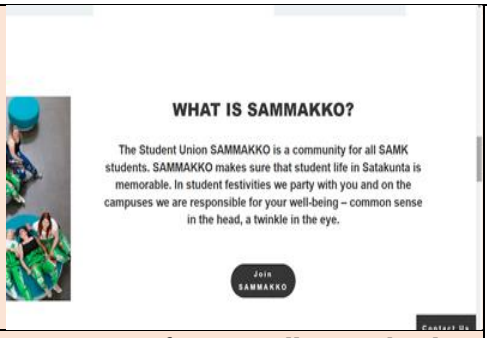
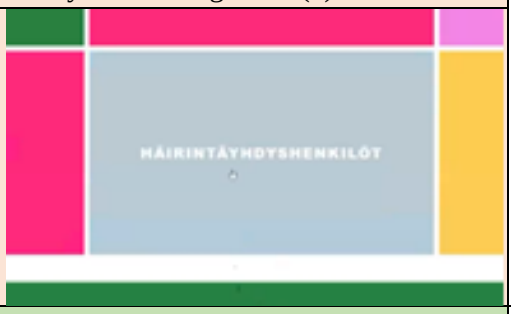
| | | |
|---|---|---|
|  Coding fail, front page. If there are no events, the advertisement should not be here (1) | | |
| On the Right now page there are listed resent news (1) | **Information** | |
| Task 2: Office of SAMMAKKO is found easily from the bottom (mobile version). Participant misses a picture of the office or more accurate description about where office is at the campus. (2) | | |
| On the front page there is nothing for not-student (nothing for the university staff!). No information about teacher-tutor. Could there be a mention, who are? (2) | | |
| Participant wants more guidance on pages: where to press, where to go… (Mobile version) (1) | **Findability** | |

### 8.1.2 Visual Entity

As in the first testing, participants were pleased with colours and pictures of web pages. A participant that is specialized in usability and accessibility noted, the white text on a light background does not meet accessibility requirements. Table 5 presents simplified expressions that are codified and made a frame *Visual entity*.

Table 5. Simplified expressions, codified and generated into frame Visual entity.

| | | |
|---|---|---|
| Nice, colourful, and happy pages (4) | **Colours** | **Visual entity** |
| In the bottom of the page: Text Don't be a tadpole – has right and pleasant font, contrast is suitable, nice to read (1) | | |
| White theme is clean (1) | | |
| White text on the yellow background does not meet accessibility requirements (1)  | | |

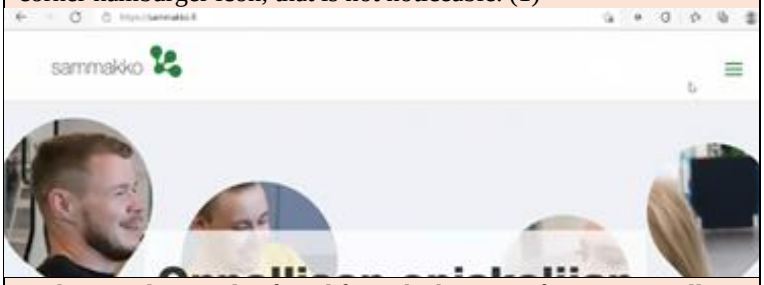
| | | |
|---|---|---|
| On the front page What is SAMMAKKO? Is less colourful, wishy-washy (1):   | | |
| SAMMAKKO staff page: contact of Laura Pullinen is hard to read, as white text on the yellow background (1) | | |
| Bad contrast ratio (1):   | | |
| On the Finnish site Events: Events-heading is easy to read even if it is big, because it is short (1) | **Headings and body text** | |
| Text is easy to read (2) | | |
| Headings are possibly slightly too big, smaller text is easier to read. | | |
| Thesis binding page: very small text size, and text should not widen so much, maximum 700 pixels, now it widens 1600 pixels. (Unpleasant to read) (1) | | |
| The text on the front page "Creating Happy Student" is terribly dark, not noticeable. The text could be in the colours of the SAMMAKKO, e.g. green, making it much more noticeable (1) | | |
| Pictures convey a lot of fun. Adequate number of pictures. (4) Funny detail of frog legs in the pictures (2) | **Pictures** | |
| Interactive pages, rotating images/links are fun and nice (1) | | |

### 8.1.3 Links and navigation

Participants were pleased with the top bar, which turned out to be vital to navigation. In the second testing two (2) of five (5) participants got to test the mobile view of web pages, which does not contain the top bar. Both participants expressed frustration and were about to give up in performing tasks, as could not find what they were looking

for. Three (3) of five (5) participants, who got to test the top bar, were pleased with interaction, so you know what page you are browsing at the moment. However, a coding fail in the new drop menu is very unfortunate, as it makes reading links difficult. Table 6 presents simplified expressions, that are codified and created into frame *Links and navigation*.

Table 6. Simplified expressions, codified and generated into frame Links and navigation.

| | | |
|---|---|---|
| Student card is easily findable from the top bar (3) This is now much better! (1) | **Navigation** | **Links and navigation** |
| SAMMAKKO Office is easily findable from the top bar (2) | | |
| Task 3: Services are found easily from the top bar. (3)<br>Participant imagined finding services also on the from page. (1) | | |
| Joining form opens in a new tab. (2) | | |
| Interaction in the top bar (Finnish pages), so you know where you are right now (3) | | |
| Participant used mobile version, after moderator showed top bar: "Extraordinary good!" (1) | | |
| English pages: no interaction in the top bar at all, pages seem to be separate from Finnish pages. (1) | | |
| Participant got a mobile version of pages: no top bar, in the right corner hamburger icon, that is not noticeable. (1)<br>  | | |
| Task 2: Student card is found from the bottom, after some scrolling, mobile view. (1) | | |
| Task 3: (Mobile version) Services are not found. From the bottom of the page participant found some, but then participant get frustrated and wants a spot, where all the services would be found. With help of moderator, participant found hamburger icon from the right corner and finds services. (1) | | |
| Things are findable, when you have time and patience to dig it up. These pages are not anything to just go and look in a minute. (Mobile version) (2) | | |
| Same links are listed in the bottom of pages (1) | **Links** | |
| (Finnish site) Top bar: code fail in the Services -drop menu: pink strikethrough on the link, hard to read. This is annoying and horrible. (2)<br>  | | |

| | | |
|---|---|---|
| Student card -page: Join -link does not stand out from the background: light blue text on a white background doesn't work, and could be bigger (1) | | |
| On the Student card page: Join-link does not open new tab, takes the participant directly to the joining form (1) | | |
| Coding fail in the top bar (Finnish page): No interaction under Events-link and UKK-link: difficult to know, on that page are you now. There is interaction (underlining) under other links, which is good. (2) | | |
| Logo of SAMMAKKO is understandable as Home-button (2) | **Buttons** | |
| Switching languages is smooth and happens without problems (2) | | |
| Tutor search -button is in different style than others, not fitting (1) | | |

## 8.2 Usability qualities

As student union just updated web pages before the second testing, these pages came to all participants as new, ergo in second testing was also possible to study learnability.

**Learnability:** three (3) of five (5) participants assessed performing all tasks as very easy. One (1) of five (5) participant assessed two first tasks (student card and student union office) as easy, but the last one (find out, what services SAMMAKKO offers to their members) as very complicate. One (1) participant of five (5) assessed as difficult performing all tasks. For both participants that had difficulties in performing tasks, web page opened as mobile version, without the top bar.

**Efficiency:** for three (3) of five (5) participants finding things on web pages was easy or very easy. Two (2) of five (5) participants, that had a mobile version of web pages, assessed finding becoming easier, after surfing on web pages for a while, but after seeing a top bar showed by moderator in the end of testing, both participants assessed finding things much easier.

**Memorability:** as these updated web pages were new for all participants, it is impossible to test, how fast a participant can re-establish proficiency after being away for a while. One (1) of (five) participant estimated, that finding on web pages will become easier on the next time, as remembers already where things are.

**Errors:** three (3) of five (5) participants performed all tasks without any errors. Two (2) participants of five (5) performed two first tasks after some scrolling at the bottom of the pages. Third task turned out as difficult to perform without a top bar, as both participants got frustrated and needed help of moderator to perform this task. One (1) participant of five (5) was about to give up with the third task, to find services of SAMMAKKO. Both participants that had problems with performing tasks, had to test the mobile view of web pages.

**Satisfaction:** one (1) participant of five (5) assessed web pages as excellent. Three (3) participants of five (5) assessed web pages as laudable, of which two (2) participants would rice the evaluation to excellent, if would have a top bar or with fixing small coding failures in top bar and headings. One (1) participant of five (5) assessed web pages as good, but would rise it at least to laudable, if would have a top bar.

**Utility:** All five (5) of five (5) participants assessed web pages as very good for a student. Plenty of useful information presented, especially for a new student. However, one (1) participant of five (5) mentioned, that there is nothing for university staff.

## 8.3 Discussion

In the second testing became clearer, that the top bar is essential in navigation on web pages of SAMMAKKO, as both participants, who had the mobile version of web pages (without the top bar) experienced navigation as very poor. Also, the failure in top bar coding with interaction raised up again in second testing. Unfortunately, the coding failure appeared also in the new drop menu, when interaction reading links makes difficult. Coding the same interaction in top bar on English version of web pages would also reduce the feeling of separateness between Finnish and English versions. Despite of some listed faults, participants assessed web pages of SAMMAKKO as pleasant, useful, and colourful. Like several participants said: when you open web pages, it looks, like an effort been put in these. These results answer the second research questions: How implemented modification effected on usability problems?

For the continuous improvement with usability would be beneficial to inspect, if there would be possible to eliminate cases, when visitor of web pages opens a mobile version on a computer screen. The reason is probably in too wide top bar. One way for narrowing the top bar may be, as one of participant suggested: to merge links *Events* and *Right now*. Also, like in both, first and second testing raised up some points of accessibility in colours, would be beneficial to inspect the accessibility of web pages.

The results obtained in the tests from the mobile version of the web pages cannot be used to evaluate the mobile version of the web pages, as tests have been performed on a computer screen. The mobile version is usually designed for a much smaller screen, which changes the whole layout.

In this study some participants noticed some points of accessibility, but participants of this study did not bring up any limitations in vision. One participant informed having a dyslexion, but with this small sampling it is not possible to draw any assumptions about how the condition effects on using web pages.

### 8.4 Evaluating the effect of improvements on usability

Based on results of this study, usability of web pages of SAMMAKKO has improved with conducted improvements. Most participants assessed performing tasks as easy and after seeing the top bar, all participants assessed web pages as laudable or excellent. None of participants experienced link naming as illogical or any misspells were found. Participants were also pleased to find most searched services in a drop menu from the top bar. Also, satisfaction of web pages raised from ok/good/glaring/not good to excellent or laudable, which infers a project to improve usability of web pages of SAMMAKKO was successful, and answers the third research question: How modified version of web pages is corresponding to usability requirements?

# 9 RESEARCH ETHICS AND VALIDITY

According to Finnish National Board on Research & Integrity TENK (2019), when research is conducted with human participants, the research must follow ethical guidelines. Guidelines states, that all participants should take part completely voluntary and may cancel participation at any time. Participant must not afraid any negative consequences because of the research. Participant may receive the information about research, its aims and purpose in language, that participant understands.

In this study all participants were over 18-years old and were recruited completely voluntary. An invitation letter (copy of invitation letter may be found in Appendix 1) for the research stated, that testing session will be recorded and by signing up for testing participant agrees for recording. Invitation letter also ensured, that any personal data was not gathered during the research, and all recording were saved safely on authors own computer, until recordings were extracted into text files and anonymised. All recordings from testing sessions were destroyed permanently. All recorded session was extracted into text file, with moderator's own notes about what caused problems in testing, and what feeling it raised in participant. File was sent to each participant via email, for confirmation, that moderator have understood participant correctly. For increasing reliability of results. Each participant got a chance to correct if some misunderstanding happened. All participants either contacted a moderator to participate or been contacted by moderator, however participants are not aware of each other’s, as all testing sessions have been conducted one by one. To reduce participants possible fear of negative consequences, all participants were ensured, that all results was gathered together and presented in a way, that participants will not be recognisable.

For this study was chosen qualitative research, as this type of research collects non-numerical data, as audio, video or text, to understand experiences, opinions and concepts (Bhandari, 2020). As Nielsen (2012) states, qualitative usability testing is best for discovering problems. This research is valid, as during both testing participants

found most essential problems on web pages of SAMMAKKO, that was also combined with expert review. Nielsen's (2012) statement, about five participants being enough for usability testing seems to be correct also in this study, as most problems have been spotted with five people, and after that number of new findings decrease dramatically. However, in addition to test reliability of this research by repeating this study with different participants, will not produce exactly same results, as web pages of SAMMAKKO are updated with improvements.

Nielsen (1993, pp. 169-170) mentions about typical validity problem with using wrong users or giving them wrong tasks to perform. To resolve this problem, for this study were involved specifically the target group of web pages – students and staff of university. Participants also got to perform tasks, that were searching for mostly searched information on web pages. Of course, joining the student union would be one of most conducted actions on web pages, however that would not be appropriate for test sessions because of ethical reasons, and it would be gathering personal data of participants.

# 10 CONCLUSION

The purpose of this study was to improve the usability of SAMMAKKO web pages. The aim was to define usability problems of web pages, make suggestions of improvements and after improvements are done, test the usability again. There were three research questions for this thesis: What kind of results from usability perspective there are on the SAMMAKKO's webpage, English and Finnish versions? How implemented modification effected on usability problems? How modified version of web pages is corresponding to usability requirements?

In first testing were discovered main problems in navigation. Participants assessed pages as good, colourful, and nice. Findings from the first testing answer the first question for this study, what kind of results from usability perspective there are on the SAMMAKKO's webpage, English and Finnish versions? The number of participants

for this testing was ten in total, that was five participants for each version of web pages (English and Finnish). Usability experts as Jacob Nielsen (1993) and Steve Krug (2006) suggest testing with only few participants and conduct many testing rounds, seems to be reasonable. During testing became clear, that most usability problems were found in few first testing and the number of new findings decreased dramatically after that. Although every testing session was interesting and cannot be called 'useless', but in a business world, when money and time talks, testing with more than only few participants per round would not be effective. It would been beneficial also for this study, if testing would be conducted for example with only five participants, that would test both, English and Finnish versions, major usability problems fixed and would conduct two more rounds of testing. This way there would not be too many changes at one time on web pages, and if some new usability problems would appear (as coding failure in new drop menu) the problem could be fixed, and usability tested again.

A report with suggestions for improvements was made and delivered to a student union. Suggestions were divided in four sections*: must improve, should improve, could improve,* and *do not change,* to help choosing what to conduct, as Krug (2006) mentions, make as little changes as possible and try to fix only major usability problems. The decision of choosing improvements from suggested was completely student unions.

Student union SAMMAKKO conducted suggested improvements, which were renaming link *About SAMMAKKO* into *Services*, fixing misspells and creating a drop menu for services. Also, student union took into consideration some suggested improvements for year 2022. Second testing of SAMMAKKO web pages been conducted in January 2022 with five participants

Second testing showed that conducted improvements, especially renamed link affected very positively on usability, as all participants who saw the top bar, found information about student card and services right the way. Also drop menu got acknowledgement by listing most used services. However, the coding failure, which was present in the first testing in the top bar interaction, turned out as a difficulty to read links in drop

menu, when cursor touches the link. The problem with mobile version was present also in second testing and got this time bigger attention, as missing top bar clearly affected very negatively on navigation on web pages, and hamburger icon that reveal same links as the top bar, remained very unnoticeable and frustrated both participants, who had to test the mobile version. Also in second testing aspect, that pages are meant for students only, and there is not much for university staff, was brought up again. In total, satisfaction of web pages increased from good to laudable/excellent, though the problem with mobile view and coding failure fix in the top bar and drop menu should be added to improvement list for this year. These findings answer to second and third question of this study: How implemented modification effected on usability problems? How modified version of web pages is corresponding to usability requirements?

Nielsen (1993) have listed some disadvantages for the Thinking aloud -method, as speaking own thought aloud is quite unnatural for many people seemed also to be correct. Especially during the first testing, author of this study, which operated also as moderator of testing, got to remind from time to time and encourage participants to speak their thought out loud. For higher validity of results would be beneficial to use eye-tracking system, like Nielsen (1993, pp. 195-196) suggests. Recorded testing session would be in theory a perfect situation to take time of how long it takes to perform tasks, however it would not give reliable result, as different people need different amount of time to put own thoughts into words while they are doing something. Ergo if efficiency would be desirable to measure by taking time, it would make sense to choose another method for the reliability of results.

In many previous usability studies, like Khajouei and Farahani (2020), Liu (2014), Or and Tao (2012) has been conducted a combination of two usability testing methods, heuristic evaluation and Thinking aloud -methods to increase an amount of detected usability problems. This study invests in Thinking aloud -method and completes with usability professional testing in second testing round. Studies with combined testing methods as Press et al. (2015) rarely take in account testing how conducted improvements have been affected on usability, by testing the usability again, ergo it shows the need for this study. In this study usability professional spotted most usability

problems that have been spotted by other participants, therefore heuristic method could be used to replace one round of testing, if there is no need to test utility of all target groups.

For the upcoming studies would be beneficial to study accessibility, which could be conducted with heuristic method or a combination of heuristic and Thinking aloud -methods, like Khajouei and Farahani (2020) suggests. Additionally, may be interesting to study, how the quality of usability problems are distributed among different participants: is there any difference in what usability problems people from different fields find mostly? Do people from the IT field find more technical usability problems, or do people for example from social or business fields, also find technical usability problems, but are not bothered with them to mention about?

Thinking aloud -method suited well for this study, as aim of the study was to define usability problems of web pages. In this study were also defined situations, when problems emerged and what feelings it evoked, which helps finding the solution for problems. Purpose of this study has been fulfilled: usability of web pages of SAMMAKKO has been improved.

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APPENDIX 1 Invitation letter for usability testing, Finnish and English versions

Osallistu SAMMAKON kotisivujen käytettävyystestaukseen! Testaus toteutetaan opennäytetyönä kaksivaiheisena ja osallistujiksi toivotaan sekä opiskelijoita että oppilaitoksen henkilökuntaan kuuluvia. Testaus toteutetaan kokonaan etäyhteydellä, henkilökohtaisessa HILL-huoneessa ja tarvitset vain hyvän internetyhteyden, tietokoneen, mikrofonin ja kameran. Mitään henkilötietoja ei kerätä. Ilmoittaudu mukaan tatjana.makela@student.samk.fi niin sovitaan sopiva testausaika! Ilmoittautuessasi hyväksyt, että testaus nauhoitetaan analysointia varten.

Participate into usability testing of SAMMAKKO web pages! The testing will be carried out as a thesis in two rounds and both students and the staff of the university are expected to participate. Testing will be implemented remotely in personal HILL-room, and you will need good internet connection, computer, microphone, and a camera. No personal information will be collected. Register at tatjana.makela@student.samk.fi and let's book appropriate time for testing! By registering, you agree that the test session will be recorded for analysing.

APPENDIX 2. List of participants' suggestions for improvements, first testing

- Would be nice to have a link for Additional information on the student union, perhaps, or their next meeting, which can be attended (specially student advocacy page) (1)
- For students may be beneficial to have more information about advocacy, as a victim of for example harassment, may not feel comfortable just going into the office and asking. Could be a link to harassment liaison officer? (1)
- More information, without making it overwhelming or to text. (Maybe a link, which opens more info, like Read more...)
- Link About Sammakko could be Our Services. Because that would tell me more about if it is just About Sammakko, I would think that it would be something about their history. And so, it does not make me think that that's where I would be able to receive their services or get links to their services or anything like that. (2)
- If you would not know what Sammakko is, it could say little higher, what it is. People, who use pages more, will find news lower. (Front page) (2)
- Bottom bar: Do these links needs to be so separated? Could they be under one link, like Materials? (2)
- Could be some information about applying to university for new students. Sammakko also helps new students to get home and explore a new place. Could there be a link where to find an apartment? (1)
- Top bar: Join button could change the colour, when cursor touches it. For example, a frog could be lurking behind it. (1)
- Student card page: Joining link could be a button and bigger, right now link stays hidden, if you do not read whole text. (1)
- Headings could be in different colours, because they draw attention. Body text could stay as black. (1)
- Navigation could be improved with drop menu in the top bar, and you could find everything in there. (1)
- Could be separate menu, what does it means to be a member, reasons, why should I become a member (2)
- Not sure about needing Home-link in the top menu, as there is Sammakko logo, which takes to home page, place of HOME link could be used for something more informative
- Information about thesis binding: (Participant is not sure in what form thesis needs to be taken to an office) Would it be good to add 'printed'? (1)
- Advocacy liaison officer is findable, but could advocacy and harassment put together? (1)
- Direct link to contact person in different matters. (1)
- Right now link could be also named as News or Info (2)
- Would be nice to know more about services (1)
- Is there done some analytics, about what things are being searched on what time of the year? Do pages show right, what people are searching at the time?

Could prioritise joining buttons to the front page, when a lot of students are starting at university. Do joining links needs to be always there? (1)

- Could there be some map, where offices are placed on a campus? Or could page guide to a main entrance in Pori campus? (2)
- There could be different page, something for university staff, who to contact. (1)
- Pages could have calmer colours, but student life is colourful. Pages are clearly meant for students, and there is not much for university staff. Could there be some page for university staff? Pages as they are now, not taking staff into account. (1)
- Could Contact us button in the right corner be in the left corner? All notifications open right on top of it. (1)
- Could there be on English pages images of students from different cultures? Could bring more welcomed feeling to foreigner students.
- People probably are searching from pages more than joining forms. Too much joining links (2)

APPENDIX 3 List of participants' suggestions for improvements, second testing

- Events and Right now pages could be combined, so there will not be a situation, that there are no events.
- Perhaps there could be some direct links to SAMMAKKO staff, and there would not be any extra clicks.
- For a new student would be beneficial to have some more direct guidance where office of SAMMAKKO is on campus
- A list of the benefits, why should join SAMMAKKO
- Headings on pictures: black headings and white boxes, colours could change into white headings and black boxes, so text would attract more attention
- On the Right now -page there could also be a News feed -function. Reachability could be better, and this would be interesting addition.
- In the mobile version, in menu could be interaction, that changes background colour into dark, when cursor touches it.
- Would be nice to know, how will the plastic student card will look
- Would be nice to have a map, where the student office is
- Maybe some links to some gyms, swimming pools etc., on a wellbeing-page. A new student from elsewhere may miss these