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**USER EXPERIENCE TESTING OF TALLINN
UNIVERSITY OF TECHNOLOGY MOODLE
WEBSITE USING HEURISTIC
EVALUATION AND EYE TRACKING**

Bachelor's thesis

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TALLINNA TEHNIKAÜLIKOOL
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**KASUTAJAMUGAVUSE HINDAMINE
TALLINNA TEHNIKAÜLIKOOLI MOODLE
NÄITEL KASUTADES HEURISTILIST
HINDAMIST NING EYE TRACKING
MEETODIT**

Bakalaurusetöö

Juhendaja: Enn Õunapuu
Dotsent, PhD

Tallinn 2019

Author's declaration of originality

I hereby certify that I am the sole author of this thesis. All the used materials, references to the literature and the work of others have been referred to. This thesis has not been presented for examination anywhere else.

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Abstract

Logical and simple user interfaces make the user experience more pleasant and help users to complete their work faster. This thesis provides an evaluation of the user experience of the TalTech Moodle website. There are two methods which were used for testing.

The first method is heuristic evaluation. It has ten principles which describe how to reach good results in making user interfaces. All ten principles were described, and their performance in the tested website was evaluated.

The second method is eye tracking. It is used to get information about where users look at on website while completing their tasks. Each participant had to complete 4 tasks and after that rate their difficulty. Six people were chosen for that test. One half of them have used the Moodle website for studying in TalTech, and the second half have never used Moodle before.

All problems which users had completing tasks and all mismatches with heuristic principles are described in this thesis. There are possible solutions and improvements provided in the end.

This thesis is written in English and is 31 pages long, including seven chapters, 27 figures and three tables.

Annotatsioon

Kasutajamugavuse hindamine Tallinna Tehnikaülikooli moodle näitel kasutades heuristilist hindamist ning eye tracking meetodit

Loogilised ja lihtsad kasutajaliidesed muudavad kasutaja kogemuse meeldivamaks ja aitavad kasutajatel oma tööd kiiremini täita. Käesolev töö annab hinnangu TalTech Moodle veebilehe kasutajamugavusele. Testimiseks kasutati kahte meetodit.

Esimene meetod on heuristiline hindamine. Sellel on kümme põhimõtet, mis kirjeldavad, kuidas saavutada kasutajaliideste tegemisel häid tulemusi. Kirjeldatai kõiki kümnet põhimõtet ja hinnati nende tulemuslikust testitud veebilehel.

Teine meetod on silmade jälgimine. Seda kasutatakse teabe saamiseks selle kohta, kuhu kasutajad oma ülesandeid täites veebilehel vaatavad. Iga osaleja pidi täitma neli ülesannet ja seejärel hindama nende raskust. Selle testi täitmiseks olid valitud kuus inimest. Pooled neist on kasutanud Moodle veebilehe TalTechis õppimiseks ja teine pool ei ole varem Moodle'it kasutanud.

Käesolevas töös kirjeldatakse kõiki probleeme, mis tekkisid kasutajatel ülesannete täitmise ajal ja kõik mis oli heuristilise hindamise põhimõtetega vastuolus. Lõpuks pakutakse võimalikke lahendusi ja parandusi.

Lõputöö on kirjutatud inglise keeles ning sisaldab teksti 31 leheküljel, seitse peatükki, 27 joonist, kolm tabelit.

List of abbreviations and terms

| | |
|-----------------|--|
| Heatmap | Graphical representation of data where the individual values contained in a matrix are represented as colors. |
| Mouseover | An event that occurs in a Graphical User Interface (GUI) when the mouse pointer is moved over an object on the screen such as an icon, a button, text box, or even the edge of a window. |
| TalTech | Tallinn University of Technology |
| Usability | “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” ISO |
| User Experience | “A person's perceptions and responses that result from the use or anticipated use of a product, system or service.” ISO |

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1 Introduction

Nowadays, technologies develop very fast and almost all businesses and schools use different technologies for work. The goal of all technological devices is to make the life of users easier and speed up their work. To make the use of websites easier, they should be designed to be understandable and simple. Software developers and users usually have absolutely different knowledge about how a piece of software works and how to use it, so it is important to test the design of the user interface to see if users understand what developers offer them and if it is logical enough to use without any help. There are a lot of similar websites and applications and if one of them is not simple and comfortable to use customers may simply refuse to use it and choose another one. Because of this, it is important for a company to improve its website to stay in business.

The goal of this thesis is to test the TalTech Moodle website to see whether it meets all user needs and requirements and whether it is easy for students to use it for studying. Two methods are used for testing: heuristic evaluation and eye tracking.

Heuristic evaluation is an unofficial method of usability analysis. There are ten principles offered by Jacob Nielsen, an expert in human-computer interaction, which are essential to follow to have a pleasant user interface. A critical look through the website was done to find mismatches between the rules and the webpage.

Eye tracking is used to see what users pay attention to the most while using the website and how hard it is for them to find elements on a webpage to complete their tasks. The website Eyesdecide.com is used to carry out the eye tracking test. All participants were given four tasks and after completing the test all participants are asked to rate the difficulty of each task. Both people who used Moodle previously and people who do not have any experience with it were asked to participate in that test to see what problems novice users have while using the website and if those problems go away after having used the website for a while.

As a result of this work there will be a list of suggestions for the Moodle website design to improve.

1.1 Thesis content overview

The project is divided into seven parts. The first part gives an overview of the work and describes its goals. The second and the third parts describe the theoretical bases of work. The fourth part shows the results of heuristic evaluation test. The fifth part describes results of eye tracking test. The sixth part gives suggestions for improving the website design, which were formulated based on the results of the testing. The seventh part is the conclusion.

2 The theoretical bases of heuristic evaluation

In the early 90's Jakob Nielsen, who holds a Ph.D. in human-computer interaction from the Technical University of Denmark in Copenhagen, and Rolf Molich, who owns and manages DialogDesign, a small Danish usability consultancy developed a heuristic rate method for User Interface Design. The main idea of it is that the interaction between users and computers is rated using the 10 most important principles. Those principles are called "heuristics" because they are not specific usability rules and are instead some aspects that come from common sense and make user experience more pleasant.

The Ten main principles of heuristics are:

- Visibility of system status

The System should always give information about what is going on in the moment. This constant feedback helps users to understand if the system understood what they wanted it to do and is in progress, or if it was busy with different task and ignored this one. That knowledge would prevent users from pushing the same button a lot of times. This visibility can be reached, for example, by changing the color of a pushed button or giving a progress bar while one process is loading [1].

- Match between system and the real world

Developers should understand that their ability to read information from websites and users' abilities are totally different. To make it easier for users the system should speak the users' languages. The words, images and concepts should be familiar for users and follow real-world conventions. That would make users feel like the system cares about them and that would help to build trust and lead to loyalty [2].

- User control and freedom

Users tend to make mistakes while using websites, so they need an "emergency exit" to discard their changes. This principle gives people freedom to surf through

pages and perform actions or undo actions which were made by mistake. That principle can be reached by simply asking users if they actually want to delete an object or if the button was pushed by mistake [3].

- Consistency and standards

This principle helps users to reduce the amount of unnecessary learning and confusion by making design of websites simple and similar with what the user has experienced before. That doesn't mean that all websites should have absolutely the same design, but rather the idea is that some main components like logos or the search field would be located in the same area of each website to make it easier for users to find it. The colours and fonts also should be consistent across different screens to make the user experience more pleasant [4].

- Error prevention

Although a good system should allow users to fix mistakes that they did made, it is even better if the system can reduce or eliminate opportunities for the problems to occur. The idea is to make it hard for users to make errors. For example, making users double-check before completing an action which will make some changes to their work or offer an autocorrect function to help with typos and offer possible endings (i.e., AutoComplete) during the search process [5].

- Recognition rather than recall

The difference between recognition and recall is that recognition involves a larger number of cues which make it easier for users to recall an answer. It is hard to refrain from using recall at all as it is needed, for example, to login into a system where users get very few cues to help them remember the right password. An example of a recognition in a UI can be a menu system. It shows to users all possible actions they can do, so they do not need to remember the name of a seldom-used feature. In a good interface it is important that users should not have to remember information while moving through the website. All the needed information should be easily accessible whenever needed [6].

- Flexibility and efficiency of use

This principle is about making UI appropriate for both novice and advanced users. For example, to reach both flexibility and efficiency systems should have menu bars with logically-named command buttons for inexperienced users and shortcuts for expert users which can make their work much faster. Some of those shortcuts are similar for different programs, while others are unique and need some time and experience to learn [7].

- Aesthetic and minimalist design

Minimalism in design means that only important and relevant information should be listed on a page. Using a website, users can see only one screen at a time so all the important information should be there and should not be covered up, especially by additional elements which are non-essential. If some additional colours or art elements are used, they should have meaning and serve some purpose [8].

- Help user recognize, diagnose, and recover from errors

To be understandable and useful for users, error messages should be written in a plain language that people can read, rather than a code which would be meaningless for non-programmers. It should be visible and noticeable that something went wrong, but messages should not blame users for making mistakes. The error messages should give a description of the problem(s) and provide solutions to fix them. This message also can be used to educate users about how the system works and how to make future experiences better [9].

- Help and documentation

Even though an ideal system should be easy enough to be used without a manual, if users get stuck somewhere, they need documentation to support their actions. Documentation should not be a huge stack of pages. It should be small, easy to read and give concrete solutions for the problems. Great documentation not only helps users, but also can save companies money on tech support [10].

3 The theoretical bases of eye tracking

Eye tracking is a system for recording eye position and gaze direction. The first eye tracker was made in 1920-1930 by Edmund Huey. It had lenses with holes for pupils which were connected to the plotter and all pupil movements were displayed on it. That method was painful for participants, because there was physical contact between the device and their eyes. The accuracy of the first eye tracker was low, but it was the first step towards the modern devices. Nowadays, eye tracking is a popular way of doing marketing research due to the advances in technology which have significantly increased both the speed and the ease of using such devices [11].

In marketing, this technology is used to obtain data on where and for how long subjects look. It helps to find the blind spots of a website and to understand what attracts the most attention. The advantage of this research is that the device captures the reaction of a person that cannot be faked. The modern eye tracker device can be worn on the head or mounted in a stationary position like on the table in front of the monitor. Due to modern technology even a webcam can be used for eye tracking if special software is used [12].

In this work, eye tracking is used to evaluate the usability of the Tallinn University of Technology Moodle website. It helps to understand the efficiency of the interface and find out how easy it is for users to get their work done. This study utilizes the eye tracking system offered by website eyesdecide.com.

This website allows researchers to make prototype webpages with clickable hotspots, which bring participants to other pages. A webcam on a device is used to record the location of participants' gazes during testing. No special hardware is required. There is a calibration before and after each test. Participants should find and click 30 dots on the screen while looking at them. Using proprietary algorithms, the program mathematically determines the location of participant's gaze on a two-dimensional image. The technology is provided by xLabs Pty Ltd [13] [14] [15].

During the research, participants are given tasks which they should complete on a website, while the device registers what they looked at the most and makes a heatmap. After completing the tasks, each participant is asked to rate the difficulty of each task individually. This will be compared to the heatmap created by the device for each participant during the research.

4 The results of heuristic evaluation

The next chapter describes a critical look at the website studied in this paper. Based on the ten principles of Jacob Nielsen's heuristic method, the positive and negative aspects of this website are described.

- Visibility of system status

The website responds to user's actions. For example, as shown on Figure 1, the system shows whether or not the task is submitted for grading. Also, buttons change their color or border in response to a mouseover event (Figure 2, Figure 3). The website shows if a person is logged in as a registered user (giving full access to all appropriate features) or as a guest (giving limited access).

As the simulated slow internet test shows, there is no progress bar during page downloading (Figure 4). The user has no feedback as to whether the content does not exist or the page simply has not yet downloaded.

Submission status





| | |
|---------------------|--|
| Submission status | Submitted for grading |
| Grading status | Not graded |
| Due date | Wednesday, 6 February 2019, 11:55 PM |
| Time remaining | Assignment was submitted 3 days early |
| Last modified | Sunday, 3 February 2019, 11:14 PM |
| File submissions |  Mina ja turunduskommunikatsioon.pdf   Export to portfolio |
| Submission comments |  Comments (0) |

Figure 1. Submission status.



Figure 2. Before mouseover.

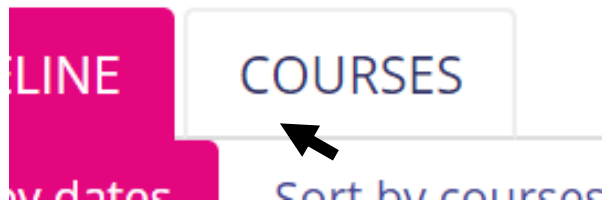


Figure 3. After mouseover.

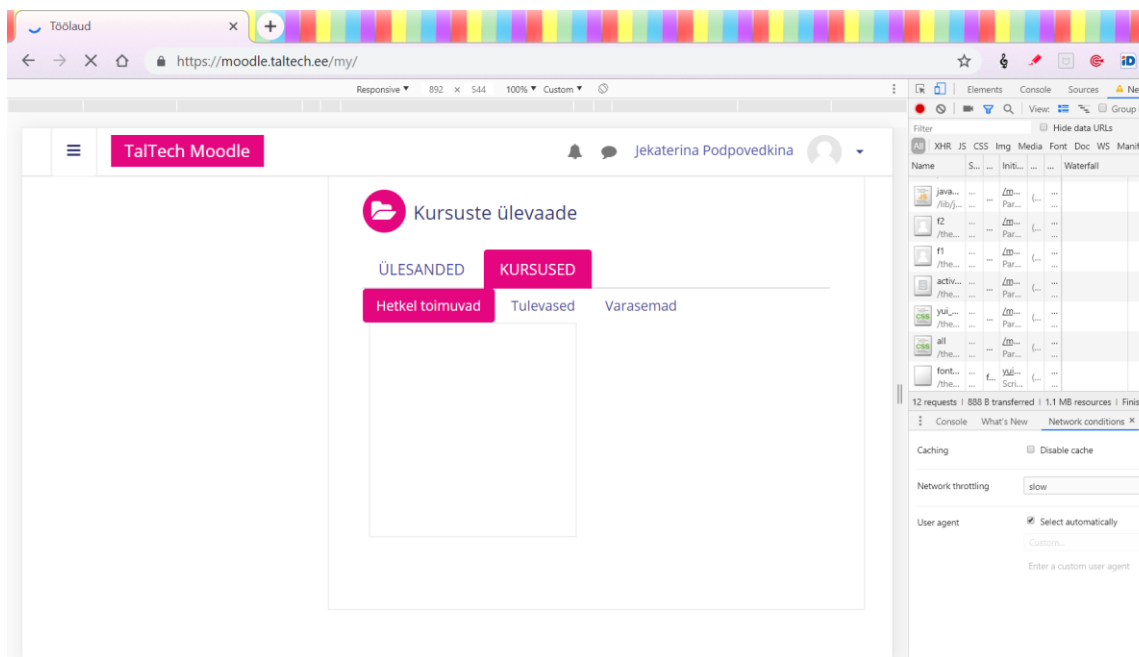


Figure 4. Simulated slow Internet.

- Match between the system and the real world

In general, this website uses words, phrases and iconography that are generic or well-accepted enough for all users to understand (Figure 5).

However, the biggest problem discovered during the testing was that when changing the language of the page not all words are translated. As shown on Figure 6, when the page

is translated into Russian it still has some parts in English and Estonian. This happens with all languages except Estonian.



Figure 5. Quick access bar.

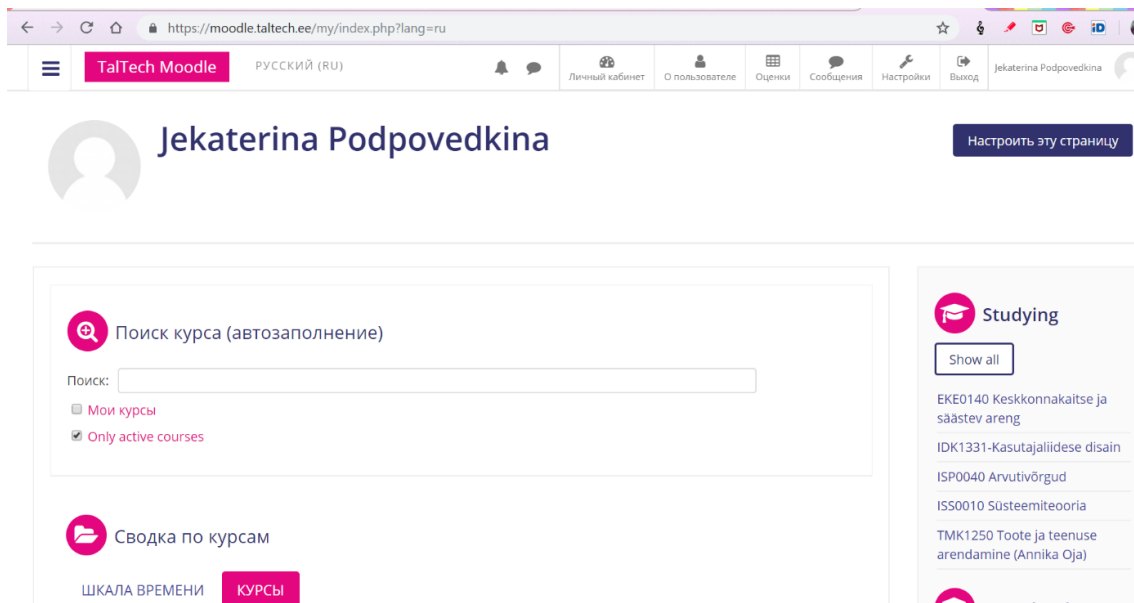


Figure 6. Page translation into Russian.

- User control and freedom

The website saves the history of a user's path to the certain page which is deeper than the main page. Each level of the directory is a link to step back to that page (Figure 7).

One problem found during testing is that when clicking the button «Reset page to default», the system does not ask if the user actually wants to make the change and there is no way to cancel it (Figure 8). Another problem is that not all pages have a search bar, so user has to go to the main page each time he wants to find something.

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Dashboard / My courses / Tallinna Tehnikaülikool / Schools
/ School of Information Technologies / Department of Computer Systems
/ ISS0010

Figure 7. Navigation history.

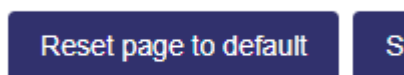


Figure 8. Reset page to default button.

- Consistency and standards

There are two ways in general that a website can be consistent: externally and internally. Internally would mean having the same colors and fonts between pages of the same site, whereas externally would be having similar icons, placements, etc. to other websites for smooth transition between websites.

On the TalTech Moodle website the colors, fonts and styles are generally internally consistent across different screens, with a few small exceptions, as described later in section Aesthetic and Minimalist Design.

Icons are also generally similar to what users can see on other websites. Testing showed that the grades icon is not representative to what users think of grades making it require more time for them to find the button.

- Error prevention

When users try to delete a file, the system confirms if the action is correct and gives opportunity to cancel if it is a mistake (Figure 9). When users try to leave a page where some changes were made, system prompts the user to confirm the choice or cancel (Figure 10).

In case users miss the link while trying to click on an event in the calendar, system creates a new event without asking if user wants to create it, there is no cancel button on the “new event” pop-up window and clicking of off the window does not close it either.

There is only a small X in the corner which is hardly noticeable compared to the bold save button (Figure 11).

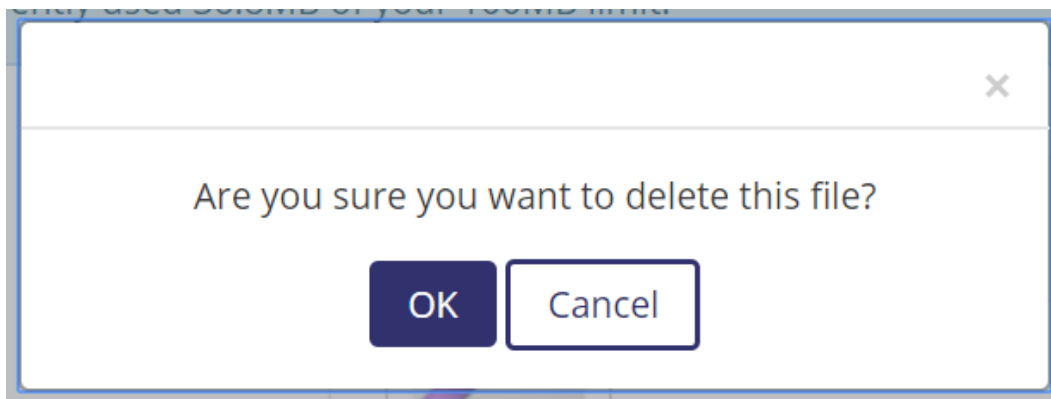


Figure 9. Message box before deleting file.

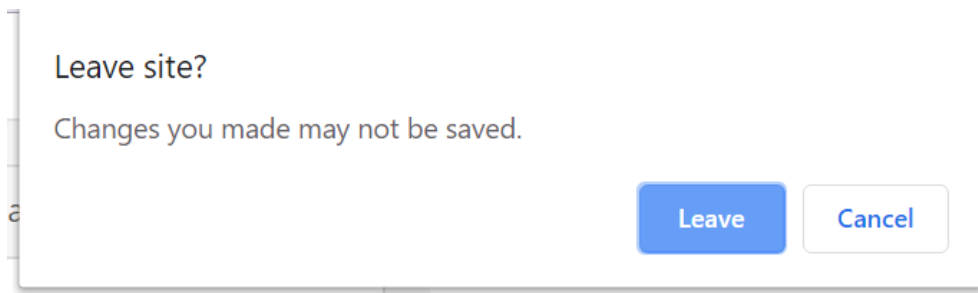


Figure 10. Message box before leaving web page.

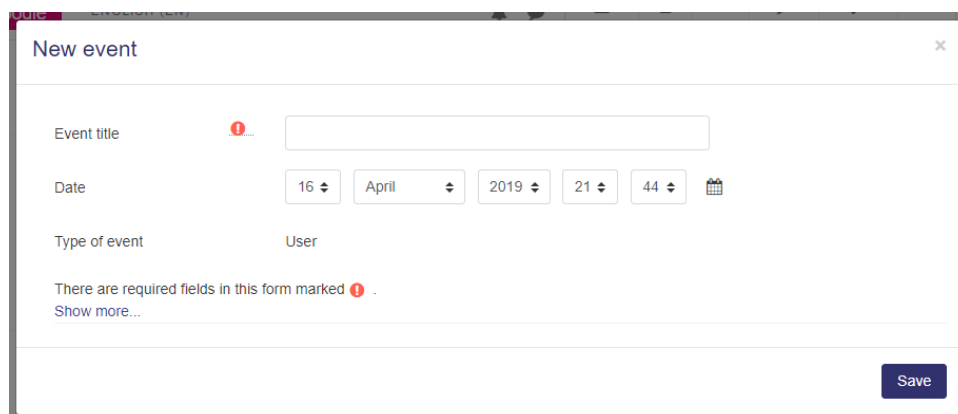


Figure 11. New event window.

- Recognition rather than recall

The website has a menu system, which shows all possible actions which the user has available. When searching for a subject, the autocomplete function is available (Figure 12).

Recognition asserts that information should be easily accessible. This implies a universal search bar. As previously mentioned, none exists on the Moodle website, requiring the user to first search for a search bar to use for searching.



Figure 12. Search bar (Autocomplete).

- Flexibility and efficiency of use

The website has a menu bar with universal pictures and understandable words which is easy to use for both advanced and novice users. As shown on the picture (Figure 13), the main page has a default layout for novice users, which can be customised by dragging and dropping individual sections to make it more suitable for advanced users.

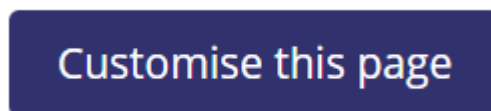


Figure 13. Customise page button.

- Aesthetic and minimalist design

The design in general is minimalistic and pleasant. Colors work well together and there are no non-essential elements. Disparate elements are separated into boxes based on their subject and user can move or delete boxes which are not needed.

The problem which was found during the testing is that as shown on pictures below there is little consistency when it comes to buttons (Figure 14, Figure 15, Figure 16,

Figure 17, Figure 18, Figure 19). Also, as it was mentioned before, not all elements change their language when the main language of the page is changed.

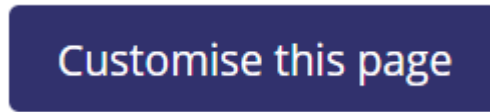


Figure 14. Customise this page button before mouseover.



Figure 15. Customise this page button after mouseover.

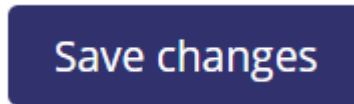


Figure 16. Save changes button before mouseover.

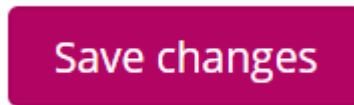


Figure 17. Save changes button after mouseover.



Figure 18. Show all button before mouseover.

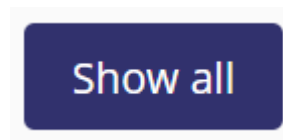


Figure 19. Show all button after mouseover.

- Help user recognize, diagnose, and recover from errors

In general, there are very few ways to get error messages while using the website, and there do not seem to be any unrecoverable errors that a user can make.

However, during testing an error was found whose message gives no indication of what caused the problem and how to recover from it. Also, there is no way to send an error report and the error message itself is poorly formatted with text exceeding the message box boundary (Figure 20). This problem occurred while trying to move page elements around.

When using the browser back button during testing, another error message with no explanation at all (Figure 21).

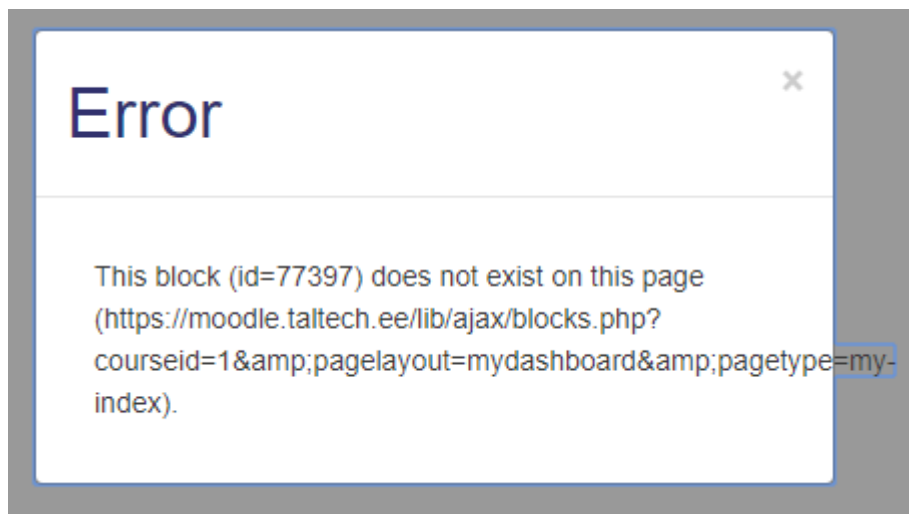


Figure 20. Error message 1.



Figure 21. Error message 2.

- Help and documentation

During testing no obvious place for help was found. As shown on a picture (Figure 22), there is an opportunity to have a tour on the page, however not all pages have it. The name of the function, "Reset user tour", is awkwardly phrased in multiple languages.

When clicked, a window appears containing buttons in the user's selected language, but the message text appears only in Estonian regardless of language selection (Figure 23).

In addition, some pages have features that are not explained and have no apparent use. For instance, on the preferences page is a section for "Badge preferences" (Figure 24) and "Backpack settings", but there are no explanations or help features for what these functions do or how to utilize them. Another example is the "Data Retention Summary", which gives vague examples of data which may be retained like "Site" or "Users" but then leaves the "Purpose" and "Retention Period" undefined for every category. The user is left with no knowledge of what personal or anonymous data the site may gather, how or for what time period it may use this data, nor does it give the user a way to opt out or choose what the site is allowed to do with it.

Reset user tour on this page

Figure 22. Reset user tour link.

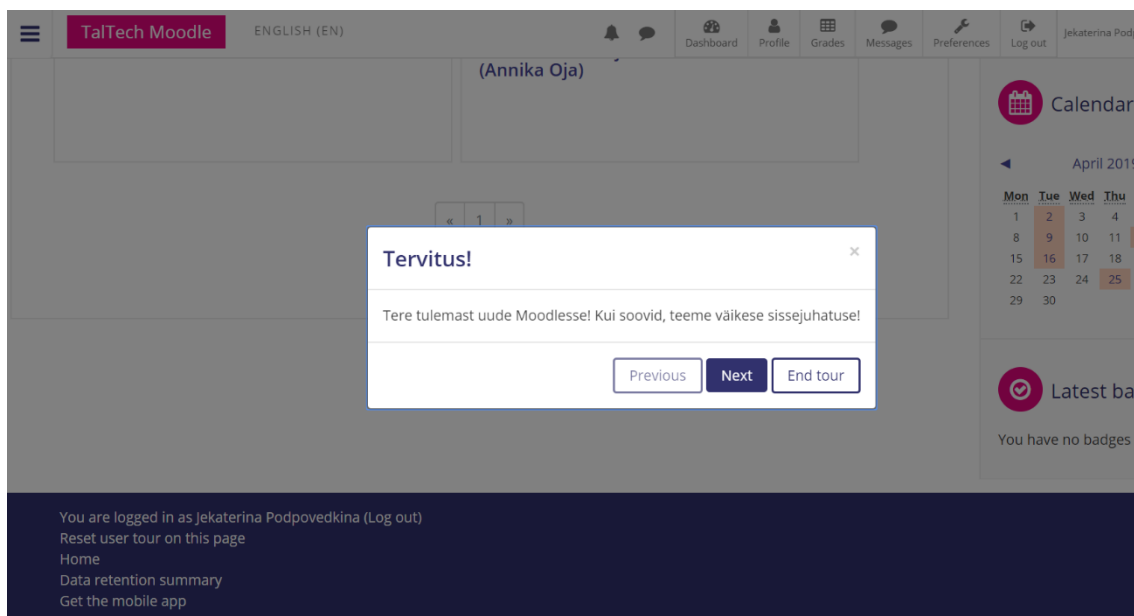


Figure 23. Reset user tour message.

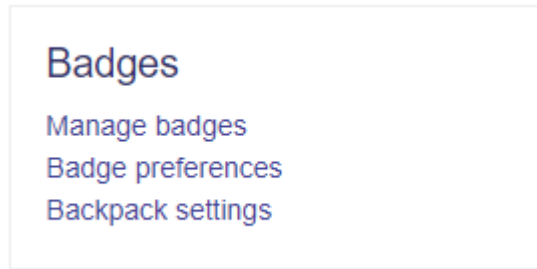


Figure 24. Badges.

5 Analysis of results of the eye tracking method

There were six people chosen to participate in eye tracking test; all six are students. Half of them have never used Moodle before since they do not attend TalTech and the other half use Moodle daily in their studying at TalTech. All participants are between 19 and 22 years old. Each person received 4 tasks, which were chosen as the main actions to do on the Moodle website for students. The Website eyesdecide.com gives participants only one minute to complete all four tasks. Since it wasn't enough for novice users, it was decided to give them the opportunity to do the test twice, continuing the second try from where they left off.

The tasks were as follows:

1. Find what test will be open on the 7th of May using the calendar
2. Find the registration page for the subject HLI0070 English for Academic Purposes
3. Find what grade was obtained for the subject TMO3171 Organisatsiooni juhtimine (Virve Siirde)
4. Choose any subject from the user's list of classes and open its page

After completing the tasks, users were asked to rate the difficulty of each task through five grades of difficulty from very easy to very hard.

The table with results is presented below (Table 1). The left column shows the number of the task as described previously. The next five columns are the actual rankings as chosen by the participants. The results show the combined numbers of users ranking each task as that level of difficulty (i.e., a “3” means three participants chose the same rank).

Table 1. Participant's difficulty rate responses.

| Task | Very Easy | Easy | Medium | Hard | Very Hard |
|------|-----------|------|--------|------|-----------|
| 1 | 3 | 2 | 1 | | |
| 2 | 2 | 1 | | | 3 |
| 3 | 1 | 2 | | | 3 |
| 4 | 3 | | 2 | | 1 |

Since participants had different experience levels with Moodle, the results of novice users and experienced users were split into two different tables (Table 2, Table 3), in order to more easily describe what difficulties those who have never used the Moodle website have compared to people who have used it.

5.1 Persons who have not used Moodle before

As it can be seen from Table 2, the most difficult tasks for novice users were finding the registration page for HLI0070 and finding what grade was obtained for TMO3171. All three participants rated those tasks as being very hard.

Table 2. Novice user's responses.

| Task | Very Easy | Easy | Medium | Hard | Very Hard |
|------|-----------|------|--------|------|-----------|
| 1 | 2 | | 1 | | |
| 2 | | | | | 3 |
| 3 | | | | | 3 |
| 4 | | | 2 | | 1 |

Since all tasks were given sequentially, finding the registration page was the second task. It started not on the main page, where the search bar is located, but rather on the calendar page which lacks a search bar. It was difficult for novice users to understand that it was necessary to go to the main page first to complete the task, and they tried to find the search bar on the calendar page. Some participants were then told to go to the main page, so they could continue completing tasks. As shown on the heatmap below (Figure 25), while trying to find how to register for the new subject, and now being on the main page, the novice users tried looking through the menu bar on top to find the search window and through the "Studying" block. One participant mentioned the button

“Show all” seemed to be logical for showing all subjects which are available for registration, when in fact it only shows subjects for which you are already registered.

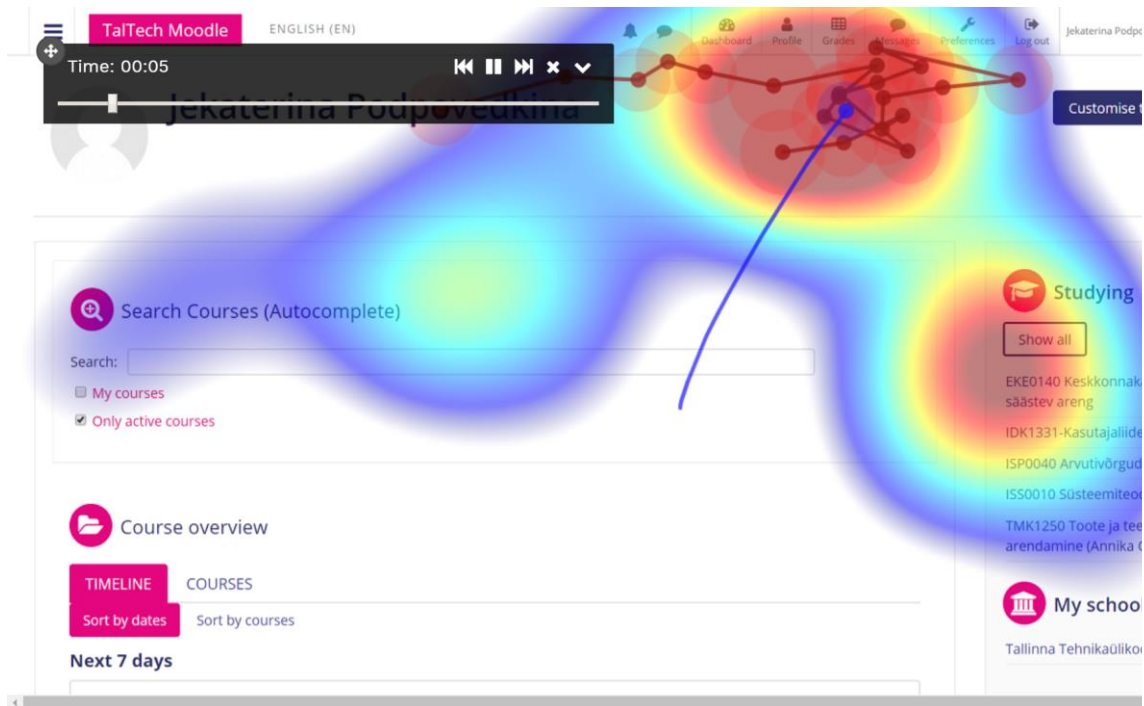


Figure 25. Heatmap during finding the new subject by novice user.

The next major problem for novice users was finding the grades for the existing registered subjects. As shown on the heatmap below (Figure 26), participants mostly looked through the menu bar on top; even though it was the right area, finding the icon was difficult. Participants commented that menu label's size is very small, and this icon was not familiar.

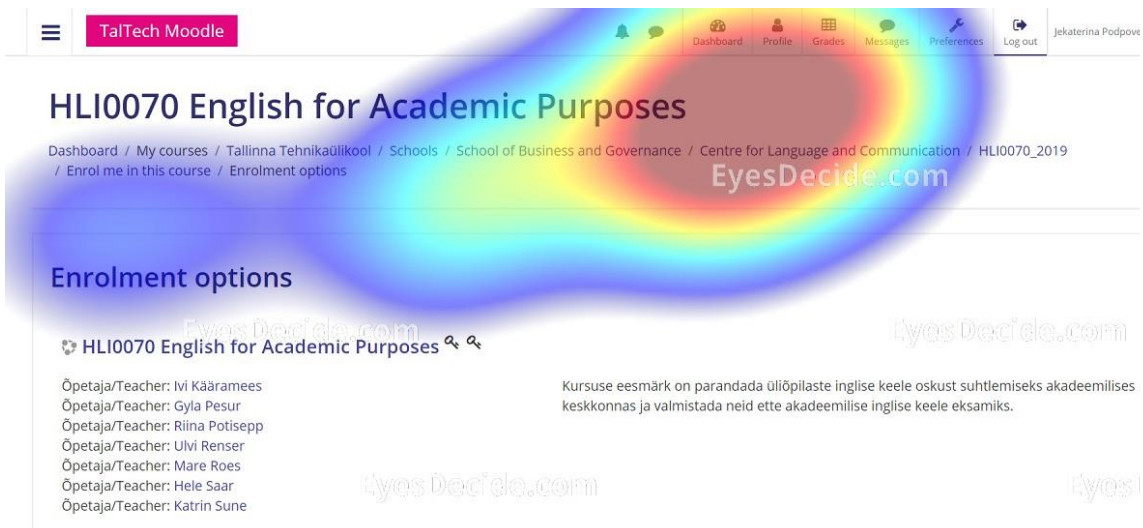


Figure 26. Heatmap during finding the grades page.

Two of the three novice participants rated finding the calendar as very easy. All participants used the calendar on the bottom of the main page. When starting the test, the menu bar on the left side of the page was hidden as it usually is when users open the website. None of the participants tried to open it, so they did not see the opportunity to open the calendar faster by using it.

Choosing a subject from the list of the user’s subjects was rated as very hard by one respondent and medium by the other two participants. Just like with task of finding the registration page for the new subject, the difficulty with this task was that participants did not think to go to the main page and instead tried to find the listing through the menu bar.

5.2 Persons who have used Moodle before

Participants who have used Moodle website before rated all four tasks as easy and very easy (Table 3).

Table 3. Experienced user’s responses.

| Task | Very Easy | Easy | Medium | Hard | Very Hard |
|------|-----------|------|--------|------|-----------|
| 1 | 1 | 2 | | | |
| 2 | 2 | 1 | | | |
| 3 | 1 | 2 | | | |
| 4 | 3 | | | | |

As with the novice users, none of the experienced users opened the hidden menu bar on the left side and all of them used the calendar on the bottom of the page. Participants commented that they would want to see the calendar in the menu bar on top. As shown on the heatmap below (Figure 27), the menu bar area was the place where participants looked first few seconds when they first received the task.

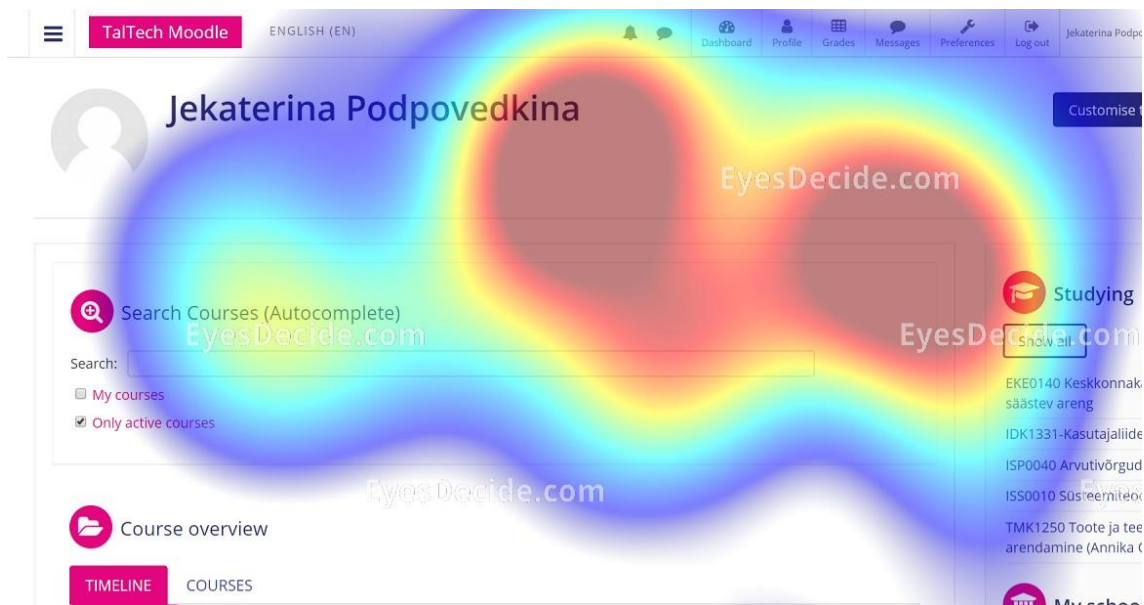


Figure 27. Heatmap looking for calendar by experienced users.

Finding the grades page also took some time for experienced Moodle users. One participant even went to the main page hoping to find it there. Even though all participants have used the website at for least two years, they remark that it always takes some time to find this page.

All participants also noted that it would be convenient to have a search bar on every page, so users would not have to remember that it is necessary to go to the main page to find a new subject or any other information they need from the website.

Based on eye tracking test results and users' feedback, to make the website more comfortable a universal search bar should be added to the menu bar on top, so it would be accessible from all pages not only the main page. The menu bar should be changed to become more functional in general: the label sizes should be bigger and the color brighter to make it more noticeable. Also, the Grades icon should be changed to something more associated with grades to make it easier to recognize. Additionally, the calendar and "studying" are commonly used tools that people expected to find on the

menu bar on top and spent a lot of time searching for, so including those functions there would save users a lot of time and meet their expectations for consistency and standards across other websites.

6 Suggestions for improving the design of the Moodle website

Heuristic evaluation and eye tracking testing both showed that TalTech Moodle website is comfortable and understandable for people to use; even novice users can deal with main tasks. However, there are places which should be changed throughout the site to match all heuristic evaluation principles and become easier to use.

Features that need improvement:

- Add a progress bar during page loading to show if a page has finished downloading
- Change all page elements into the language which has been chosen by the user
- Add global search bar to the menu bar on top
- Confirm with the user if he/she actually wants to reset the page to default before doing it
- Change the grades icon to a symbol more closely associated to grades
- Ask if a user wants to create a new event in case he/she simply missed the link while tried to click on an existing event
- Add a “Cancel” button on a new event pop-up window or make the X in the corner bigger and more noticeable
- Add more consistency to the button colors across all pages
- Make error messages more informative; add what caused the error and how to recover from it
- Change the formatting of error messages to fit into the message box boundary
- Give the opportunity to send an error report for errors that do occur
- Make user tour available in all languages, not only in Estonian, and add it to every page
- Explain all features like “Badges preferences” and “Backpack settings”
- “Purpose” and “Retention Period” to “Data Retention Summary” are currently unused and confusing. Either complete these sections or remove them.
- Make menu bar icons and labels bigger and more noticeable
- Add the studying block to the menu bar so it is accessible from all pages

- Add calendar to the menu bar on top

Those are all problem places which were found during analysis of TalTech Moodle website. It is possible that other testing methods will show more problems. This author believes that making those changes will help to make students' work faster and easier.

7 Summary

The main goal of this thesis was to evaluate the user experience of the TalTech Moodle website and give suggestions on how to improve the design to make it more comfortable for users. Two methods were used for testing: heuristic evaluation and eye tracking.

The heuristic evaluation test showed that there are several mismatches between the Moodle website and the principles which should be completed in website design for good performance. The eye tracking test showed that novice users encounter significantly more problems with completing tasks on the website than experienced users. This indicates that the design of the site is not simple and does not match standards. Users need time to learn how to use the website, which contradicts one of the heuristic principles: “Consistency and standards”.

The goal of this thesis was achieved because the website was tested, and a lot of problem areas were found. The thesis contains suggestions for design improvements. Those suggestions can be used to update the TalTech Moodle website to make it simpler and more pleasant for users.

According to this author, the most important changes that should be made are:

- Add a global search bar to the menu bar on top
- Change all page elements into the language which has been chosen by the user
- Add a calendar to the menu bar on top
- Change the grades icon to a symbol more closely associated to grades
- Add more consistency to the button colors across all pages
- Add the studying block to the menu bar so it is accessible from all pages

Almost all of those changes were discovered during the eye tracking test and are connected with a menu bar on top of the page, which could have more elements so they would be accessible from every page not only from the main page of the website. Changing the language of all elements on the website is essential, because there are students from different countries in TalTech, and they also should be able to use the

Moodle website for studying. Adding consistency to the button colors across different pages will make the website better-looking and pleasant for users and also will help them to more easily understand that they are dealing with buttons and find it faster on any page.

In the future, after all suggestions and improvements from this thesis are implemented, other tests can be held to find out if made changes helped to improve the user experience or if there also exist other design problems.

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