Bacheloroppgave i Webutvikling

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Designing and Developing a Custom WordPress Theme for Studentenes Hus i Gjøvik

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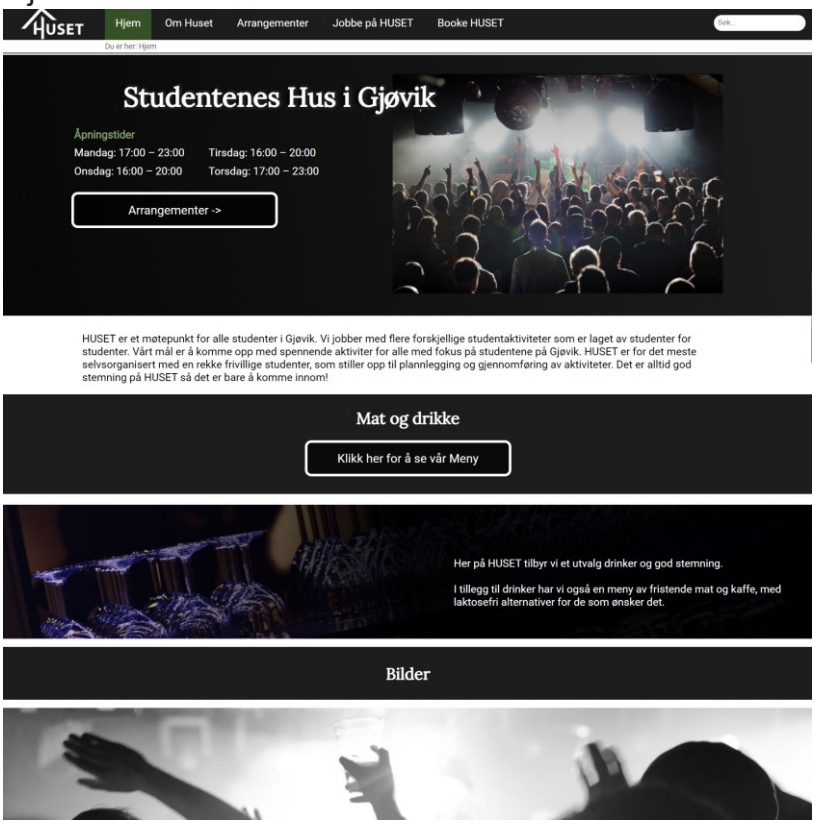

NTNU
Kunnskap for en bedre verden

Bachelor Thesis

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ABSTRACT

During this project we have designed, user tested and developed a new custom WordPress theme for our client, Studentenes Hus i Gjøvik. Their current theme is outdated in terms of design and difficult to manage. Through several rounds of user testing, meetings with the client, and iteration after feedback, we have created a design which is easier to navigate and has higher user satisfaction.

The design has been developed into a custom WordPress theme and deployed on a Google Cloud Virtual Machine running WordPress 7.1.

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Abstract

During this project we have designed, user tested and developed a new custom WordPress theme for our client, Studentenes Hus i Gjøvik. Their current theme is outdated in terms of design and difficult to manage. Through several rounds of user testing, meetings with the client, and iteration after feedback, we have created a design which is easier to navigate and has higher user satisfaction.

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Contents

Chapter 1

Introduction

In this thesis we discuss the process of redesigning a web solution for Studentenes Hus i Gjøvik. Everything from getting the project owners requirements to the development of the final solution, will be clearly laid out in this document. We'll discuss how we started and how we used the available information to create a user-friendly solution, in accordance with the WCAG guidelines and regulations. We will start with an introduction to the project and then present the theories we used and the methods that were implemented. We'll meticulously go through the design and development phase and then discuss their outcomes. The entire process was done in an iterative fashion to ensure that the final product was a result of rigorous testing and improvements. There were a few different phases, all with their difficulties and issues. We'll explain what these issues were and how we resolved them in the following chapters.

1.1 Thesis structure

The thesis consists of seven chapters.

Chapter 1: Introduction Here is where we present the overall thesis content and what we are going to talk about in it.

Chapter 2: Methods and Tools In this chapter we will present our cooperation and development methods. With an emphasis on WCAG compliance and good practises in universal design and responsive design.

Chapter 3: Theory In this chapter we will describe relevant theory for the thesis, such as design principles, universal design, and WCAG.

Chapter 4: Research This chapter will consist of the research and analyses of the current web solution and the target audience. It will include the results from our analysis and user testing of HUSET's website.

Chapter 5: Design In this chapter we will present our design phase and everything we produced during this phase, including results from user testing.

Chapter 6: Development In this chapter we will explain how we implemented our design into a custom WordPress theme and present the results from user testing.

Chapter 7: Results In this chapter we will present a comparison of all user tests and discuss our results.

Chapter 8: Conclusion In this chapter we will conclude the thesis and share some thoughts regarding the entire process.

1.2 Project Background

The project owner is a Representative for an organization of students who manage Studentenes Hus i Gjøvik, hereby referred to as such or just as Huset, where they hold events, quiz, game nights, and social activities aimed at the students in Gjøvik, but none-students are also welcome. The organization has a tree structure from CEO to IR role. Every employee has their own roles to follow. Huset is owned by Studentsamskipnaden in Trondheim(SiT), but most of the employees are students working voluntarily. The exception is the CEO who works for SiT.

Huset offers companies space that can be hired for different events such as Christmas parties and similar. The building has two levels and, according to their website, have enough chairs to accommodate around 200 people at once.

As mentioned earlier, Studentenes Hus Gjøvik regularly hosts events for students, such as concerts. In some cases, it may be necessary with ticket sales and when this happens the tickets are being sold through the service Tikkio. Tikkio is a third-party company, and in this case Huset uses their services to sell tickets for events.

1.2.1 Problem - the employer and their current situation

According to the project owner. The current website has three main problems, it has an outdated and old look, it's difficult to update and change content on the website, and its hard to keep the events synchronized with Facebook.

- An outdated look: Judging the look of the website is always going to be affected by personally biases and whatever the user is accustomed to. However, their current design is too simplistic and boxy with a very bland color palette. We suspect that is why the project owner referred to it as having an outdated look. The project owner assigned us to make them a new and refined website. They were looking for a more efficient and modern looking end product.
- Difficult to update and change content: The project owner uses WordPress as their publisher and Content Management System (CMS). Their current website is difficult to maintain for someone who do not have any prior coding knowledge or experience. While the current website is built using a CMS, it

is not user friendly to update and changing information can be a challenging process. The website must be easy to edit as it is managed by the students working for HUSET. They might not always have someone on hand with the prior knowledge required to edit the information on the page.

- It's hard to synchronize with Facebook API: The current Word-Press theme was designed and developed in 2016 as a student project, including a plugin that utilises the Facebook Graph API which no longer works as intended due to Facebook updates. The goal of the plugin is to collect events from their Facebook page and publish these on the website as well, but currently it does not always collect event information properly. Pieces of information and entire events can be missing. The project owners stressed that if they upload an event on their Facebook page it should simultaneously appear onto their website. The only way to make this possible it thought the use of the Facebook API.

1.3 Elicitment of requirements

The aim of this thesis is to resolve all the issues that were presented to the group by the project owner as well as the implementation of features that the group deemed necessary to aid in solving them. Based on meetings with the project owner the group were provided with an overall description of the desired web solution.

The requirements for this project were divided into two sections, intermediate goals. Meaning milestones and checkpoints throughout the project. These were made to ensure a clear progression and to provide opportunities for review. The other goals are related to development of the final solution. Such as creating specific functionalities to make sure the final solution is satisfactory to the project owners' wishes. Amongst the goals were to create a new theme for the solution using WordPress and coming up with an improved design for the existing solution.

On January 7th we had a meeting with the project owner during which we wrote the following list of features:

- Improve the design, but avoid what the project owner referred to as "Bootstrap look".
- Content must be easy to change even by someone who is not familiar with the system.
- There must be room for sponsors in the footer. A circular logo image is enough.
- Collect information about events from Facebook using the Facebook graph API
- When displaying events from Facebook: don't display the full text. Title and date is enough.
- Should be possible to toggle between English and Norwegian on the "jobbe for huset" page.
- Do not use alcohol related language. The reason for this is explained more

in depth in section 4.2.1 Strategy.
- All images must be approved by André(the project owner).

For clarification on the first item on the list above, Bootstrap is a well known CSS library. Through utilising Bootstrap it is possible to give an HTML element a specific class to apply a set of CSS to it. The "Bootstrap look" can be defined as the look you get when you utilise Bootstrap without writing any custom CSS of your own. The project owner did not wish for the site to look like an out-of-the-box Bootstrap solution, but instead desired a more unique design. In this scenario, utilising Bootstrap as a css framework is not a problem, but he wanted to highlight the need for the design to be more custom and specifically made for Studentenes Hus i Gjøvik.

The project owner also had other, lower priority features. These include the presence of an image carousel somewhere on the site, an integrated map showing the location of Studentenes Hus Gjøvik, and the ability to change information on google or Facebook through the WordPress site(such as the opening hours).

1.4 Result goals and effect goals

We set result and effect goals for the thesis and the product, to help further establish what needs to be done and is the focus of the assignment.

A result goal is defined as what the project, or thesis in this case, aims to achieve and is related to the results and deliverables. Anything related to code that has been written, or a design that has been created, would be part of a result goal. An effect goal refers to a ideal, future situation which would occur through reaching the result goal, but also through further effort from the project owner in this case. A result goal needs to be reachable during the time the project is being done, while an effect goal will be reached after the project has ended (Lindeman, 2018).

Result goals:

- To design and develop a WordPress theme for Studentenes Hus Gjøvik, that is easy to update and maintain for someone with no prior coding knowledge.
- Create a design that is visually pleasing as well as universally accessible. The design needs to be responsive and viewable on phone, tablet, PC and XL screens.

Effect goals:

- The website will communicate its purpose and inform customers about what Huset is and all the different ways to utilise it in a clearer and more efficient manner.

1.4.1 Revision of goals

Two of the goals set at the start of the thesis were not fulfilled due to several reasons. The result goal to develop a new WordPress plugin to collect information about events on their Facebook page did not occur. For this goal we had to utilise the Facebook Graph API, and as we got closer to the development phase we realised developing this plugin from scratch would not be viable. Instead we received the source code for their current plugin, intending to troubleshoot this instead and correct any issues. However, we did not find any problems. The plugin ran well and worked as intended when we used it both locally and when deployed.

We had a second effect goal: To produce a solution that reduces the amount of time the employees at Huset has to spend updating content on the site - in particularly when updating opening hours and changing the members of the board. We realised that in order to do this we would need to either utilise or develop a plugin to help change the items of information that are most cumbersome to change. As we could not find any fitting plugins, nor had the time required to develop one ourselves, this goal was not met. But we tried to utilize the WordPress editor well to ensure that the information on all the pages can be changed as easily as possible without the use of plugins.

1.5 Planning

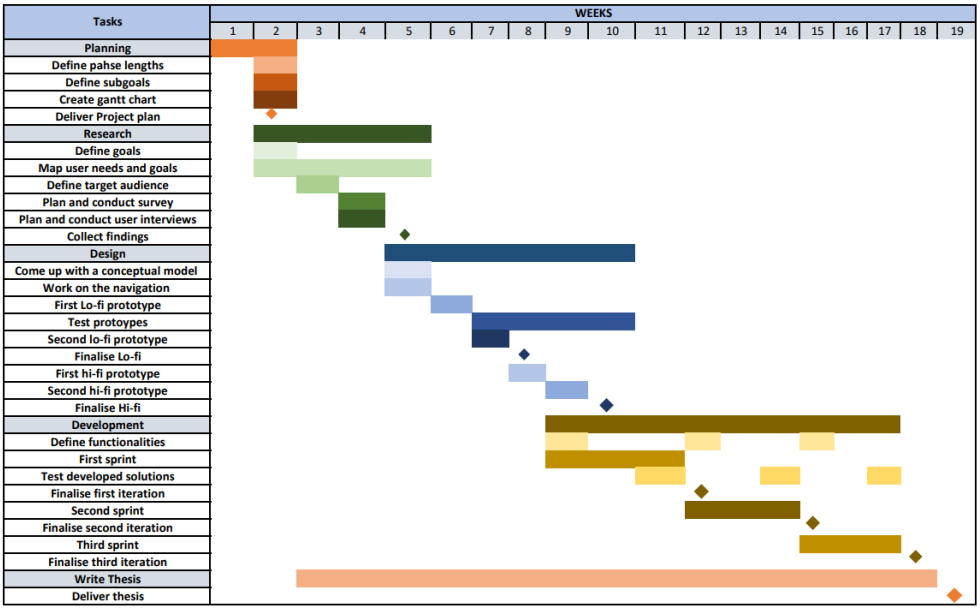

Figure 1.1: *The GanttChart created at the start of the thesis.*

A schedule was created in early January as a Gantt chart. The chart was split into weeks to provide quick readability.

We split the chart into 4 main phases: planning, research, design and development. Each phase is ended with one major milestone, as presented through the diamond shapes on the chart. Some phases, like the design and development phase, also contain more than one milestone. There is also a fifth "write thesis" phase which lasts from the conclusion of the planning phase until the thesis is delivered. Our aim was to add something to the thesis every week, a goal which was successfully met.

Already in the planning phase the schedule got pushed somewhat and it lasted for a week longer than originally planned. The research phase also took more time than we anticipated, as we had no prior experience with redesigning a solution that already existed. We needed to reconsider and do research on how to best approach an assignment such as this, as we only had experience on how to design an entirely new application which did not already exist. Due to this several tasks planned for the research phase never happened, as we learned it would be more beneficial to do other things. As an example: the survey and user interviews did not take place during this phase, instead we spent time analysing and user testing the current solution.

Due to the changes of schedule, especially the design and development phase did not last as long as originally planned. However, we revised our schedule throughout the project and went through all phases and major milestones with few adjustments.

1.6 Milestones

Milestones are a planning tool used to mark important events and deliverables for the project. This is because milestones give a specific point in the project where it is possible to pinpoint a certain goal, result or event that made an important impact on the development.

Milestones are important because it gives a clear indication that something important has happened. By utilizing milestones in our project, the group was able to pin important parts of the project that could be used to set the course for further development, like moving from one phase to another. It is important to note that a milestone is not the same as a goal and therefore not used for setting a direction or giving something to work towards. However, a goal can also be a milestone, but it is then by context of planning used as an important point rather than an actual objective that needs to be followed or reached.

The group decided to not set too many milestones and rather focus on the things that marks a very important change. Setting too many milestones makes the milestones less valuable and their significance will be less noteworthy. This makes it harder to pinpoint what exactly was the important deliveries and events.

1.6.1 Planing-Phase Milestones

The first milestone to be set was to deliver the Project plan. This was a very important milestone because it marked a change from planning the bachelor project to working on the bachelor solution. The project plan marked the end of the planning phase, thus leading the project into the research phase.

1.6.2 Research-Phase Milestones

The second milestone for the bachelor project was the collection of the findings from the research phase. Because of the different activities, tools, and events used in the research phase were completed. Collecting these findings and recognizing those issues made what needed to be done moving forward clearer. This milestone marked the end of the research phase and allowed us to move forward with the Design phase. This milestone was set because it marks a very significant change in focus from finding something and recognizing potential issues that are to be solved in the design phase.

1.6.3 Design-Phase Milestones

The design phase has more milestones than previous phases, because there are more things that the group felt had an important impact on the project.

The first milestone in the design phase is finalizing the lo-fi prototype. This marked the early stages of the initial concept for the solution and once finished, set the standard for what was to be developed.

The second milestone is finalizing the hi-fi prototype. At this point the project had a set idea and concept to develop into a solution. Once the hi-fi prototype was designed and tested, it was a finalized version of the design of the solution and that marked the shift in phases from design to development.

1.6.4 Development-Phase Milestones

After completing the design phase, we started developing the new solution based on the hi-fi prototype. In this phase we plan have three or more milestones depending on how much time we have for the development. These milestones are linked to the number of sprints that are planned. In essence there will be one milestone denoting the end of every sprint. The end of sprints will also mark the finalisation of the different iteration that will be develop. The goal is to improve after every iteration that is why the end of every iteration is important because it show a point from which we can improve.

1.7 Terminology

Since this is a web developments thesis it's important that we establish a certain understanding with the reader regarding the different terminologies that will be

used frequently throughout the thesis.

1.7.1 CMS

A Content Management System is software that allows the user to build web solutions. Often, this is possible without needing to write any code (wpbeginner, n.d.).

1.7.2 WordPress

WordPress is a Content Management System, as well as a hosting platform, allowing users to build websites, host content and publish this on the web.

1.7.3 WordPress Theme

A WordPress theme is "a collection of files that work together to produce a graphical interface with an underlying unifying design for a website" (WordPress, n.d.). It is a template a user can utilize to modify the appearance of a site.

1.7.4 HTML

Hypertext Markup Language is the standard makrup language for creating Web pages (w3schools, n.d.[a]). The structure of a Web page is described through the use of HTML elements.

1.7.5 CSS

Cascading Stylesheets is a language used to define the appearance of HTML elements present on a webpage.

1.7.6 PHP

Hypertext preprocessor, PHP, is a scripting language used to interact with servers. A PHP file can contain text, HTML, CSS, JavaScript and PHP code, but the result is returned to the browser as plain HTML (w3schools, n.d.[b]).

Chapter 2

Methods and Tools

In this thesis we used methods and tools to aid in the development. Methods are systematic procedures used to achieve certain goals and tools are all technologies used to accomplish set goals (Merriam-webster.com, 2019). In this chapter we will describe the methods we used.

2.1 Project organization

In any group project it's important to set clear roles and methods of communication to ensure that everyone is aware of their responsibilities and what is expected of them. In this section we will plot out the group's roles and the different tools that were used to organize the work.

2.1.1 Group/Administrative roles

At the start of the project each member was given their own responsibilities through the project. Zakariya was set as the scrum master of the project, meaning he facilitated and managed the sprints during the development phase. Markus is the design lead, who ensured the design met all set criteria and that the group was on schedule during this phase. Elvedin was the development lead, ensuring the group stayed on track with the development of the solution. He was also the one setting up meetings within the group as well as with the supervisor, Gioele. Elisabet was set as the communication lead as the main contact between the group and the project owner.

On March 16th the group discussed how to further split the assignments, as we were behind schedule and needed to find a way to pick up speed. During this meeting Elvedin and Zakariya got their own tasks to research: the facebook API and CSS frameworks respectively. It was agreed that Markus would take more responsibility of the remaining prototype work and Elisabet would do the same for the thesis.

All members still participated in all parts of the project as well as decision making.

2.1.2 Microsoft Teams

To manage and distribute the group work a Microsoft Teams was created for the group. This platform was used to host meetings, share files, share relevant links, and host the to-do lists.

We operated with two different to-do lists on MS Teams to keep things organised. One for general tasks and one for the project report. The to-do list for the project report was split into the main sections of the report itself: Introduction, Theory, Methods, Design, Development, Results, and Conclusion. Under each section the subsections that needed to be written about were listed. The group used tags to mark the progress of a specific task: red means it has not yet been started, yellow means it is in process, green meaning it is done and ready for review, blue means more cannot be written until we have made further progress on the project. An example of how the to-do list looked like on the 22nd of February can be seen in figure 2.1. Occasionally a member was assigned a specific task from the to-do list during a meeting, but it was also up to each member to grab a task not yet assigned when they had the time to do so.

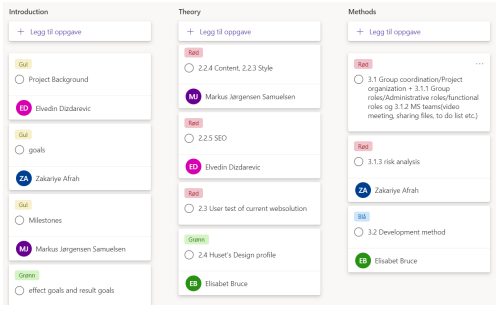

Figure 2.1: *A screenshot of the MS teams to-do list for the project report taken on the 22nd of February 2021.*

When sharing files we operated with a file/folder system within the "files" held in the General tab on the Microsoft Teams page. As we proceeded with the thesis the amount of files to sort through increased rapidly. We made an effort to ensure that the file and folder structure made sense, to increase the ease of which one could find old notes. These folders also included one for notes taken during meetings with the project owner, and meetings with our supervisor.

2.1.3 Group rules and meeting schedule

At the start of the project we wrote a list of group rules and conflict handling plans to help aid organisation and reduce conflicts. The full document can be seen in Appendix A.

At the start of the thesis, we held on average two meetings a week, with the occasional meeting with the supervisor or project owner. The meetings were predominately held online through Microsoft teams or zoom. For each meeting a short meeting log was written, highlighting what we discussed during the meeting and any tasks that needs to be done before the next one.

In week 13 we decided to hold 3 meetings a week to help increase productivity as we were getting closer to the due date. We had fixed meetings every Tuesday, Thursday and Friday, with Sunday as a potential day for a 4th meeting when

necessary.

2.1.4 Risk analysis

At the start of the project the group conducted a risk analysis of all risks we believe relevant to this project, as well as discussed means and methods to prevent these risks from happening or alleviate the consequences once they occurs. The table below shows the different risks alongside the likelihood of it occurring as well as the severity of the consequences. Some risks, like members missing deadlines and not doing tasks, have varying degrees of consequences depending on if a deadline is missed once or repeatedly. We grouped these risks into 5 major categories, which will be further elaborated upon within this section.

Risk	Likelihood	Consequences
COVID-19 preventing physical meetings	**High**	Low
Illness within the members	Low	Low
Long-term illness or loss of a member	Low	**Severe**
Loss of work	Moderate	**Severe**
Risk of solution not fulfilling the criteria	Low	**Severe**
Members not completing their task(s)	Low	Moderate to severe
Members missing deadline(s)	Moderate	Moderate to severe
Conflicts within the group	Low	Moderate
Project owner "disappearing"	Low	**Severe**
Conflicts with project owner	Low	**Severe**

COVID-19

The main relevant risk in these times is restrictions related to the ongoing pandemic, COVID-19. There is also a risk of any members catching the virus. In the case of COVID-19 restrictions preventing the team from meeting physically, Microsoft Teams and its features, such as video conferencing, will be used whenever the group cannot meet physically. Other conferencing software that allows for communication and screen sharing, such as Skype or Discord, will be used for user testing when physical meetings are not possible.

Documentation of work and loss of progress

Due to the nature of the project, a majority of our research and work will exist online rather than physical copies. This includes documents and code. Because of this certain precautions must be considered. In order for all members to have access to these file, cloud storage solutions will be utilised. We will utilise programs such as Git allowing users to rollback changes if mistakes were made and Microsoft one drive for storing documents and papers. Although cloud services can

reduce the risk of losing progress, all groups' members will periodically download a local copy of the most important files.

Development and design issues

There is a risk that the group will by accidentally design and develop something that does not meet the criteria of the solution. This can be caused by lack of work within the group, but also due to misunderstandings and miscommunication. We will use an iterative design process which will include the end-users as much as possible, to ensure that the result is as relevant for the user as possible. We will also make sure to include the project owner as much as he is capable/willing to be included, to ensure that the end product meets their needs.

Risks related to group cooperation

In cases where one or more group members are not able to complete their share for the work, the group will refer to the group rules and conflict handling plans to solve such issues. If the problem persists after that, the group supervisor will be involved to resolve the issue.

Conflicts with project owner

There is a risk of conflicts with the project owner, or the project owner disappearing entirely. When interacting with the project owner, the group's obligation is to fulfil all the clauses mentioned in the bachelor project contract. If any conflicts occur outside of the contract, the group will have a discussion with the project owner and try to resolve it internally. If the group and project owners cannot reach an agreement, the group supervisor will be involved.

2.2 Methods

2.2.1 User testing

Through the project we conducted 3 rounds of users testing. Each round had 3-5 participants each, and were conducted at different stages of development. The results of each round of user testing can be seen in section 4.3 User test of current web solution, 5.3.3 User testing iteration II, 5.4.2 User testing the hi-fi prototype and 6.7 User testing of the developed solution.

Throughout the project several user tests were conducted at different stages. We decided to utilise user testing, and viewed this as a must for the assignment, as it provides valuable feedback regarding a solution. It helps us identify and uncover problems we might not spot ourselves, and through user testing a wider demographic we can learn how different types of users navigate a solution. This will also help us learn how the target audience is likely to navigate the solution, as this method might not necessarily match our own (Moran, 2019).

We followed the recommendations from Nielsen (2000), and aimed to test 3-5 users per test - never more than 5. The amount of tests is capped at 5 due to the lack of new insight that usually occurs past this. According to Nielsen, the more users you test the less you learn as you start seeing the same feedback show up. According to their research, past the 5th user you are unlikely to collect any new information. But this would also assume that our first 5 would consist of people representative of the entire target audience. If, for instance, we were to do 5 tests on relatively young students and then a 6th on someone in their mid-to-late 40's the 6th user test is likely to provide a lot of new data. Due to this it is also important that our test subjects are representative of the target audience from the get-go, both to reduce workload and increase the amount of valuable feedback collected.

We created a set of 7 tasks for the user testing, but added two more after the first iteration of the prototype. The seven original task, as well as a version of the two added later, were:

1. When does HUSET open on Thursdays?
2. At what day and time does HUSET hold Quizzes?
3. Who is the chief executive officer (*daglig leader*) at Huset?
4. Contact Huset to book their location for an event.
5. What is the address to Huset?
6. Can you find the list of technical equipment (*utstyrsliste*) on HUSET's website?
7. How many guests can you host at HUSET's location?
8. Find out if you need a ticket to attend an upcoming event.
9. Find and open the archive of all events held at HUSET. Sort by the category *Årsmøte* (annual meeting).

The tasks were reworked slightly from iteration to iteration, but the page we wanted the user to find was always the same. By the time we tested the low-fidelity prototype, we added a starting point for each task so all users always started their tasks from the same page. The full list of tasks will be presented at the start of each user test result section as seen in 4.3 User test of current web solution, 5.3.3 User testing iteration II, 5.4.2 User testing the hi-fi prototype and 6.7 User testing of the developed solution.

The same 7 tasks were utilised for each user test so the different solutions could be compared with each other, through comparison of time spent to solve a task and amount of clicks it took the user to get to the goal.

A majority of the user tests were conducted online, utilising tools like Zoom or Discord, having the user share their screen while conducting each task. While the user was going through the tasks the tester kept track of how much time the user spent on the task and wrote down notes for the path the user took. The user was also encouraged to think out loud, describe their process and comment on the things they saw on the page while navigating.

Recording the user tests was discussed, due to the large amount of information we wanted to collect during each test(time spent, clicks, the users path, and any

relevant comments or thoughts), but this was not done due to reasons discussed more in depth in section 3.5 GDPR.

2.2.2 System Usability Scale

After completing each user test, the user was asked to fill in a System Usability Scale questionnaire, giving us insight on the usability of the solution. Conducting a System Usability questionnaire after each user test, also gives us another statistics to compare the current solution to the one we're designing.

The reasons we used this usability scale instead of others is due its ease of use to participants, and that it can be used on small sample sizes with reliable results (Usability.gov, n.d.). As we only had 4 rounds of user testing, with 3-5 people each round, our sample size was quite small and would require a suitable usability scale. The System Usability Scale was developed by John Brooke in 1986.

Usability.gov (n.d.) describes it as a "quick and dirty", but reliable tool for measuring usability. The scale consists of 10 questions, for which the user can choose 5 responses ranging from 0(strongly disagree) to 5(strongly agree).

The 10 questions are as follows:

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

As we conducted the user tests in Norwegian, with Norwegian speaking subjects, the questionnaire was translated.

When using this System Usability Scale the scores needs to be interpreted after all the results were in. The process to do so, is to subtract 1 from the score of all odd numbered questions, and subtract the score of even numbered questions from 5. After this you add the score from all questions together and then multiply by 2.5. Then you will have a score between 0-100, where a score of 68 is considered average. A score above 68 does not mean the solution is perfect by any means. Rather, if it is below 68 it means there are severe problems with the usability of the website.

2.2.3 Crazy 8s

For our design phase, we utilised Crazy 8s as a method when entering the initial, sketch phase, as it is a good way to rapidly generate many ideas in a short amount

of times. Crazy 8s is an exercise typically conducted as a part of a Design Sprint, which is a time-limited five-phase process used to design a product. While we did not perform a design sprint for our thesis, we still decided to utilise Crazy 8s due to its efficiency.

Crazy 8s is meant to be done within 8 minutes, although the set up can take longer than this. Each person will fold a paper into 8 sections, but other tools can be used here like sticky notes or 8 frames drawn on a larger piece of paper. Then they will have 8 minutes to generate 8 ideas onto this paper - 1 minute for each idea. After this each person will present their ideas and once this is done, all members will vote on the best one (Chung, 2020). Crazy 8s can be utilised both before and after establishing a clear feature list.

2.2.4 Prototyping

During our design phase we made use of prototyping to rapidly sketch and test different solutions. According to UXPin (n.d.), at its base a prototype is "A simulation or sample version of a final product, which is used for testing prior to launch". A prototype can exist at several layers of complexity, from a very rough sketch to a pixel-perfect rendition of the finished product. Typically one separates between two different types of prototypes: low fidelity(lo-fi) prototypes and high fidelity(hi-fi). As implied, it's the degree of "finishedness" that separates the two types. A lo-fi is typically less detailed, may lack colors, and utilise placeholders for images, icons and text. While the hi-fi prototype will typically resemble the ideal finished product to a high degree and is typically interactive. Our two prototypes will be presented in further details in chapter 5 Design.

The two main reasons for utilising prototypes, which is also why we ensured to utilise this method as much as possible, is related to visualization and feedback (Smith, 2019). Designing a prototype allows both us as the team, the project owner, and the users we test to see a visual representation of the product. The main benefit to this is connected to the "feedback" part. As the idea or design has now been visualised, it allows all involved parties to give feedback to both the features and the design of the product. It is significantly easier to iterate on a hi-fi prototype than it is to iterate on a developed solution, similarly it's easier to iterate on a lo-fi prototype than a hi-fi. By utilising prototypes during the design stage, the group can test several ideas - both in terms of design and feedback - and get accurate feedback on these that will improve upon the developed product.

2.2.5 Personas

When design any consumer grade product it's impossible to design for every single use, therefor we utilised personas to limit the number of users by having a few personas represent the whole target audience.

Personas are a collection of an archetypical user group. They are created based on research in order to represent the audiences of a particular solution. Personas provide valuable information on the target audience. The goal of a persona is to be

a stand-in for an actual user that realistically would use a web solution/product. Considering that all web solutions should be based on user-centered design principals, it is important to have personas so that all the features in a solution can be tailored towards them. Because creating a solution that would fit everyone in a particular group would be near impossible, it is important to narrow down the characteristics of a persona based on research. If the personas are made with many characteristics, it would be difficult to assign them to the target audience. However, if they are too narrow that would make them inadequate as representatives for the target audience. It is a balancing act to create personas that are both authentic, meaning that they feel like actual people, and not to go overboard such that they exceed the characteristic of the target audience.

When designing a new web solution one of the more challenging problems that one comes across is that of empathy. Empathy in design is the capacity to understand the needs and goals of the target audience. It is crucial to put oneself in the final users' shoes to both see the product from a new perspective and evaluate weather a feature is truly useful for the users. Good personas work to bridge the gap between the designer and the final users.

According to Dr. Lene Nielsen, a specialist in personas, there are four types of personas that one should consider when working on a design project (Dam, R. F. and Siang, T. Y., 2020).

1. Goal-Directed Personas

The objective of a goal-directed persona is to inspect the process that a user might take to reach a certain goal. They are created with the knowledge of the needs and wants of a group of users. Though they might all be different people that have the same goal. A few personas can be representative for them based on their common goals.

2. Role-Based Personas

The role-based personas incorporate both the goals of a set of users and their roles. Be it in a company, organization, or corporation. They are created with the use of both quantitative and qualitative data. The purpose of a role-based persona is to ensure that the functionalities in a web solution can fit the need of those in a certain position/role while still taking into account their overall needs.

3. Engaging Personas

The purpose of an engaging persona is to create a personal connection between the target audiences and the designer working on a solution. To ensure that all feature and functionalities are optimized for the final users, Dr. Lene Nielsen argues that stereotypical personas cannot be related to or envisioned as real people. Therefore, its important to give the personas character and to understand their psychological background and emotions. The more in touch the designers are with the personas, the easier it would be to understand their motives and their goals.

4. Fictional Personas

Fictional personas are the product of years of experience and designer interactions with typical user of a service. They are normally used to create an early sketch of the personas that are not based on any prior research. There are obvious flaws with this method, but they can get the design process started very quickly. Though they are useful for early sketches, they are not to be used as guidelines for the entire design process.

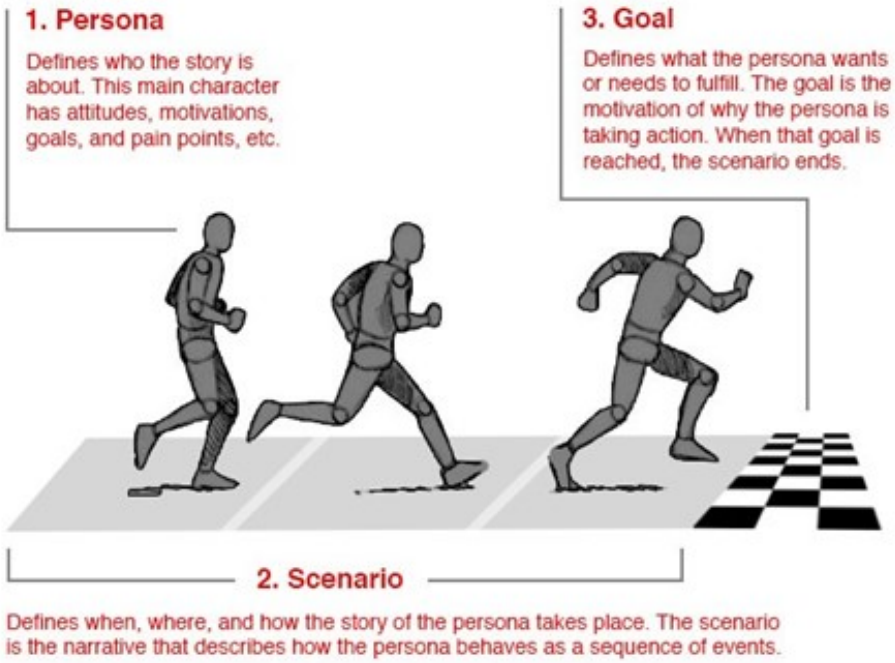

Figure 2.2: *A visual representation of Goal-Directed Personas. Image copyrighted to Smashing Magazine, collected from*

2.3 Tools

Tools are set of technologies used to streamline the whole process, form sketching and prototyping, to writing to development of a final solution.

2.3.1 Figma

For the prototyping we used the online tool Figma, allowing us to work remotely on the same file. Figma is a professional prototyping tool with powerful live test features that allow for user testes on both mobile and PC. Figma allowed us to work as a team in the same document, making it easier to see or help the other

group members. This program works exceptionally well for designing websites and gives a real visual presentation of different devices. This gives a good quality prototyping tool for iterating on prototypes to come up with more improved versions throughout the design phase.

2.3.2 Git repository

When developing the WordPress theme, we shared the code using a Github repository, allowing the team to work remotely. Git is a version control system that allows for work in different branches. There is a main Branch for the full version of the code and then there are working branches where changes can be made for them to later be merged with the main branch. This is done to work out the issues before implementing them into the stable build of the site.

2.3.3 Overleaf

The thesis was written in the LaTex editor overleaf to give better control over the layout of the document. Overleaf also have powerful reference features making it a very good professional alternative to Microsoft Word. Having a custom setup to the whole document makes it possible to ensure good quality and readability.

Chapter 3

Theory

In this chapter we will discuss the different theories and guidelines used throughout the project.

After the initial planning phase we entered the research phase. During this phase the aim was to collect information on the situation of the current theme and what we needed to know to enter the design phase. In this phase we will present a set of rules we utilized during the design and development phases. The chapter begins by introducing a set of design principles, after this we will introduce and discuss universal design, the Web Content Accessibility Guidelines (WCAG), responsive design and we will shortly discuss the General Data Protection Regulation (GDPR) and how it affected our thesis.

3.1 Design principles

Design principles are a set of rules and guidelines passed down by years of experienced designers and is an accumulation of the knowledge honed by a whole industry. In our project we focus on nine design principles first presented by Jeff Johnson (2007, as cited in Nordbø, 2017). These principles focus on creating user interfaces that are understandable and simple to use.

1. Focus on user and their tasks, not on the technologies.

At the start of the design process its important to ask a few key questions. Who are the users, what are the tasks they are trying to accomplish, what are the issues with present solutions, which knowledge do they have, and how do they prefer to work?

2. Consider function first, presentation later.

Focus on the relevant functionalities, rather then final looks of a solution. Get an overview of the data available and consider the possibilities for the users to create an overall model for the solution.

3. Conform for the users' view of the task.

The use of the solution should feel natural to the users and should take into

account the user's previous knowledge and vocabulary.

4. Design for common cases.
Focus on the tasks most commonly used when designing a solution. There will be many different functionalities in any given solution but only the common ones should be prioritised. Don't spend a lot of time on the niche problems for they take more time than they are worth.

5. Don't complicate users' tasks .
The users should be able to focus on the tasks at hand and not be distracted by the design of the solution. The goal is to solve a problem and having a complicated design that works against the user's efficiency, only makes that task more cumbersome and does not provide a meaningful experience.

6. Facilitate learning.
The design should be consistent. Allow the users to identify patters in the design that would help learn and improve. The objective here is consistency not variety.

7. Deliver information, not data.
Allow the users to get out information easily. All the data should be pre-filtered so that the most important information is easily accessible to the users. Make sure that important elements are clearly visible to the users, to reduce confusion provide an overview of the relevant information.

8. Design for responsiveness.
Always provide a status of the task a user is doing and allow for breaks in progress. If a task is taking too long the user should know how long is left and they should be able to stop if they wish. Give constant feedback to reassure the user of the progress that they are making.

9. Try it out on users, then fix it!
The design should be testable and most importantly allow for improvements. Test early and test often. Implement user testing and keep in mind that uses should be the centre of development. Make sure that the solution is helpful and does not hinder the user from achieving their goals.

3.2 Universal design

Universal design is about designing something to work for everyone, as many users might have preferences or disabilities that can cause them to encounter issues when using the product. User experience is a very subjective experience. This means something that works well for one user might work very badly for another as our experience and physical limitations have an impact on how we think and operate. This can, in the worst cases, produce a product that is completely useless for someone with disabilities, effectively making a product that is discriminating.

Discrimination and not considering universal design in web solutions is illegal as of 2014 with Likestillings- og diskrimineringsloven (The Equality and Discrimination Act) paragraph §18.

"*Løsninger for IKT som underbygger virksomhetens alminnelige funksjoner, og som er hovedløsninger rettet mot eller stilt til rådighet for allmennheten, skal være universelt utformet fra det tidspunktet som er fastsatt i § 41.*" (Likestillings og diskrimineringsloven, 2019).

Universal design is therefore meant to take all the good parts of the design that we know works well for everyone and make it into a good website that is easy to use. It is important to note that universal design is not the same as user experience. User experience is subjective and universal design is for everyone. This means that a solution might not always be the best for one certain group of people, but for all the groups of people. However, it is thought that making something that works for people with disabilities will also make a better user experience for people without them. Therefore ensuring that the design is universally accessible to a wide range of users regarding physical or mental limitations will make the website usable for as many users as possible.

By utilizing the WCAG guidelines during the design phase, we ensured this. The minimum requirement for the universal design for websites used in Norway is set and supervised by DigDir. By following the WCAG guidelines while designing the site, we will be ensuring the site is universally designed and approved for DigDir standards as these requirements are based on WCAG guidelines themselves.

3.3 WCAG

To comply with the regulations and laws regarding universal design, the group followed standardized WCAG guidelines and recommendations for the redesign and testing of accessibility. Parts of these guidelines are also required by Norwegian law, and they had to match at least the minimum requirements set by Tilsynet for universell utforming av ikt (uutilsynet). Note that uutilsynet is new for 2021, replacing DIFI.

Web Content Accessibility Guidelines (WCAG) Is a globally standardized guideline for universal design and accessibility. The point of WCAG is to provide a standard web guideline that can be applied on all websites regardless of country or content. The goal of the WCAG guidelines is to make better websites that are more accessible for everyone, therefore making a better total web experience. WCAG is better than having lots of different standards for each country as that would demand a lot of cross-referencing laws and regulations to make something Universally accessible in different countries. WCAG is instead focusing on the web as an entirety. This is the reason Norwegian accessibility laws are based on WCAG. The current WCAG version is 2.1, with 2.2 currently in development.

WCAG is split into different conformance levels. These are A (low) AA (medium) and AAA (high). The requirements vary with the guidelines and the use. An example of this is Small text and large text. WCAG is split into these subcategories.

1. Perceivable
"Information and user interface components must be presentable to users in ways they can perceive." (The World Wide Web Consortium W3C, 2018)

2. Operable
"User interface components and navigation must be operable." (The World Wide Web Consortium W3C, 2018)

3. Understandable
"Information and the operation of user interface must be understandable." (The World Wide Web Consortium W3C, 2018)

4. Robust
"Content must be robust enough that it can be interpreted by a wide variety of user agents, including assistive technologies." (The World Wide Web Consortium W3C, 2018)

Utilizing WCAG guidelines meant that the group could ensure the quality and legality of the design regarding accessibility and universal design requirements set by uutilsynet, as these requirements are based on WCAG guidelines themselves.

3.4 Responsive design

Responsive Web design (RWD) is the application of screen responsive design into a graphical web-based user interface. The idea of RWD is to design a solution that works just as well on smaller screens like a phone as it does on big screens such as a monitor. One of the critical elements of a responsive design is making a scalable solution. Having it scale both up and down makes it possible to create a better user experience across a wide variety of screen sizes (Marcotte, 2010).

In the early days of computers, screen sizes were often limited with a set amount of pixels and aspect ratio. Therefore most computers had the same size standard display and website design reflected this. But with the introduction of more irregular-sized monitors came the need for making websites that could scale to fit the screen, moving away from absolute length units over to relative units (W3Schools, 2021).

Here is an example of an absolute length unit causing an issue: A 1cm margin is a lot on a mobile phone screen, but very little on a big screen tv. A way to fix this is by having a website utilize relative units like vw or em. vw unit will create a margin relative to the size of the screen. 1 vw is equal to 1% of the screen, which differs from small screens such as mobile phones to big screens like a tv. 1 cm is still just 1 cm regardless of screen size.

Today we use a large variety of screens, so responsive design is essential in a modern web solutions. The website should be just as usable on a phone as it should on a desktop pc. In addition, having a responsive design cuts down on building more sites to fit each individual screen and instead, opting for the use of

media queries to alter the CSS rules for different size screens, such as collapsing a margin stacking content over another rather than on the side.

In our solution, the group has utilized relative units to make the website work well on mobile and desktop. The group also used media queries to remove certain CSS rules for small screens, such as margins.

3.5 GDPR

Collecting personal information comes with a lot of responsibility and specific laws regulating how it is used and stored. The Norwegian Centre for Research Data (NSD) for short, is responsible for regulating GDPR and the processing of applicants that want to use this personal information in projects.

Due to a long processing time for applicants, the group won't have enough time to apply to NSD to use personal information. GDPR is something that had to be considered when gathering information on the project. Especially regarding all data that can identify a person, such as names, numbers, accounts, video, or sound. User testing this going forward the group had to make sure the information we gathered could not be traced to a specific person.

Chapter 4

Research

After establishing our goals and creating a schedule, we started on the research phase. This was a two-step process, gathering all existing data and implementing our own tests.

The first step was to obtain all the available data that the project owner could provide, so that there was something to start with. In this phase we focused on researching the current situation, by analysing it.

After that we started user testing HUSET's current website. These findings will be presented in upcoming sections.

4.1 Provided background data

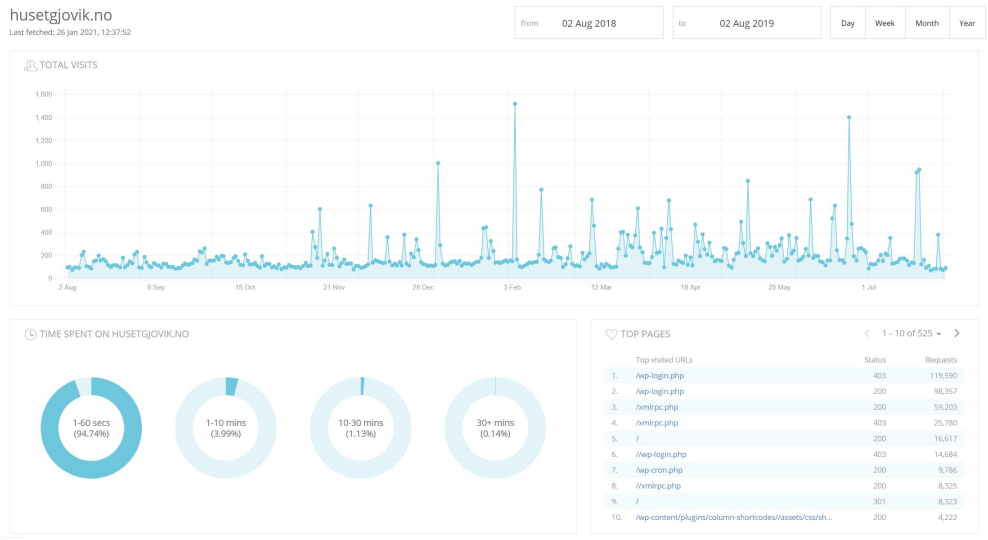

Figure 4.1: *Statistics showcasing total visits, time spent on the webpage and top pages visited on the HUSET website from august 2018 to august 2019. These numbers are slightly skewed due to bots.*

To better understand the current situation, we requested all the available data and analytics that the project owner had access to. Due to the COVID-19 pandemic HUSET has limited statistics from the past year. The activity on the website from 2020 is not an accurate representation of other years, but we were given access to some visitation statistics from 2018-2019.

Most of the statistics are from the web host of the website, one.com. From these it is possible to see top locations, devices, as well as the individual pages that have been visited. These are not entirely representative due to bots visiting the website, as the list of pages visited shows bots trying to access WordPress by going to/wp-admin. Due to this, things such as "top pages" and "time spent on husetgjovik.no" (see figure 4.1) are not entirely representative and it is necessary to keep the presence of bots and scrapers in mind.

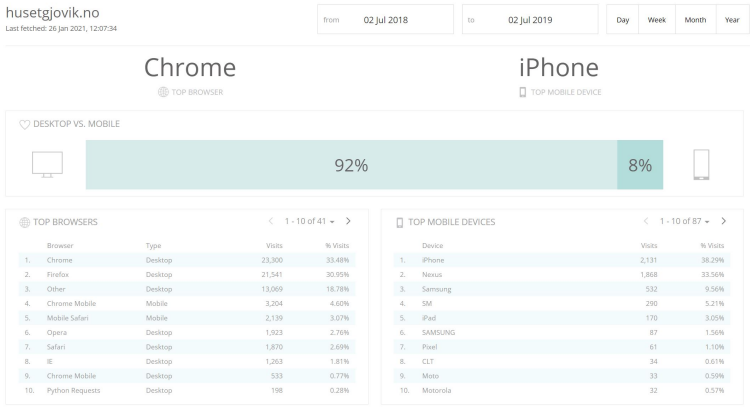

Figure 4.2: *Statistics from HUSET's webhost showing desktop versus mobile as well as most used phones and desktop browsers. Most users visits the page from desktop ahead of mobile, but some of the desktop visitors are likely bots.*

When looking at the statistics of desktop versus mobile, even when keeping bots in mind, users mostly utilize the webpage through desktop ahead of mobile (see figure 4.2). Chrome and Firefox are the most common browsers, but Safari and Opera also have a fair share of users. For mobile it is the iPhone that is most utilized. The reason for desktop being so much more used than mobile is likely due to the site currently being used to fill in the various contact forms present on the site. This being the "book HUSET" form as well as the "would you like to work at HUSET" form. When looking for information on events students are more likely to utilize the Facebook page, but this could partly be because the website does not always post about events due to the outdated Facebook graph API plugin not working as intended.

Through looking at google business statistics it is shown that during the past 3 months, many of the people who find HUSET's website have directly searched for it on google (see figure 4.3). The most common action for a user to do after this is to ask for directions to the location.

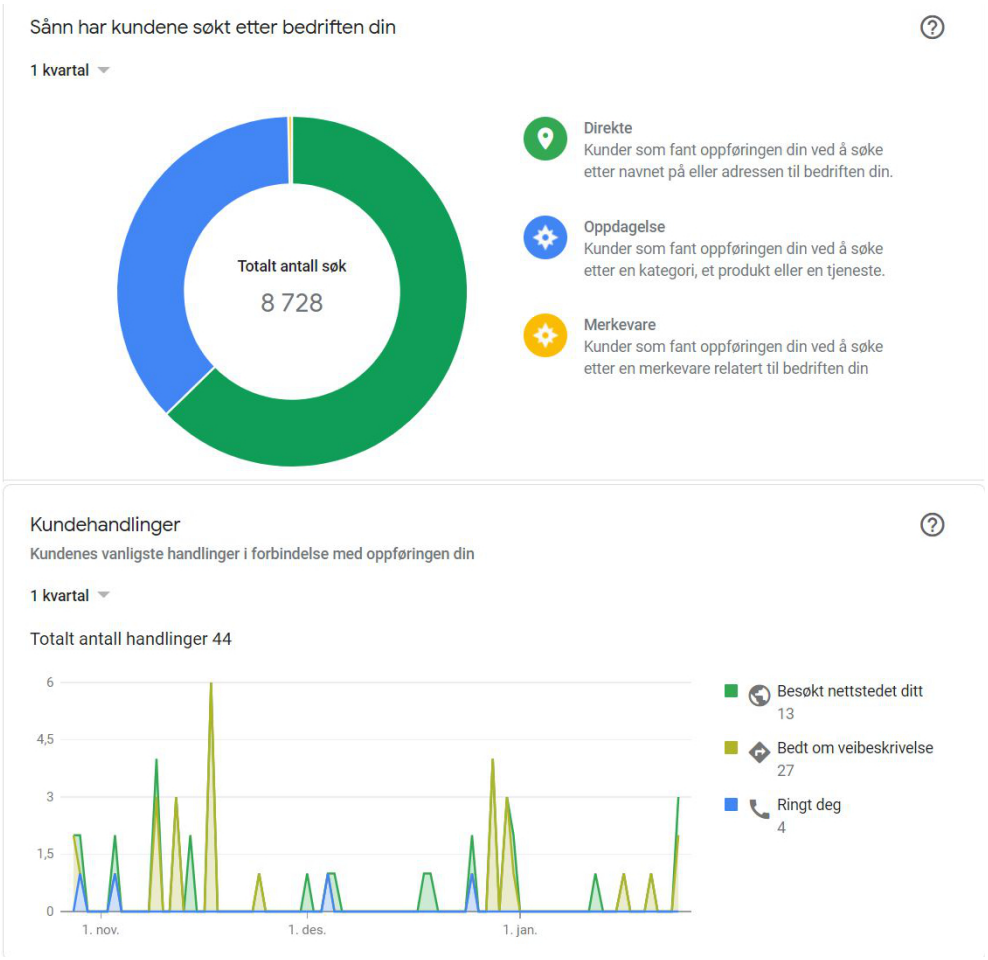

Figure 4.3: *Statistics from google business showcasing how users find HUSET's website, as well as their most common actions.*

4.1.1 Target Audience

During conversations with the project owner the target audience of the website was revealed to be threefold: people who want to book HUSET, people who want to work for HUSET, and people who want to participate in an event.

The first group are mostly businesses and similar who want to book HUSET for hosting events such as a concert or a "julebord" for their employees. University or student association related events are not a part of this group, as HUSET have their own internal system and regulations to handle this. Thus, this section of the target audience is likely to be older than the average student.

The second group are students who may wish to work as a part of HUSET. Using the form present on the site to voice their interest.

The third group are those who visit HUSETs as guests or customers during any of the events hosted at the location and use the site to find opening hours and

information on events.

The second and third group would consist of anyone above the age of 18, since HUSET is mainly aimed towards the University students in the area this group would be around the age of the average student. According to SSB, 50% of university students in 2016 were below the age of 25, and 3/4th is below the age of 30 (Statistisk Sentralbyrå, 2018). This means the latter two target audience groups are likely students from 19 to 30 years of age.

4.2 Analysis of current web solution

We conducted an analysis of the current web solution to ascertain if there is anything of value to bring to the new theme and find what the current pain points were so that they could be avoided. The analysis is based on "5 Ways to Evaluate the Quality of Your Website Design" written by Mallon (2014), and is split into 5 parts: Strategy, Usability, Style, Content, and SEO.

4.2.1 Strategy

When analysing the strategy of the theme, the focus was on seeing if the current design communicate the purpose of the website well. Through analysing the page and conversation with the project owner, we split the goal of the website into four parts:

1. communicate what Studentenes Hus Gjøvik is
2. allow businesses and similar to book HUSET
3. give the necessary information for students to apply to work at HUSET
4. allow guests to find information on events to attend at HUSET

Through a clear and visible navigation bar, a user can find answers to all four goals with a single click. This was further proven through the user tests conducted on the site, which is presented in 4.3 User Test of Current Web Solution.

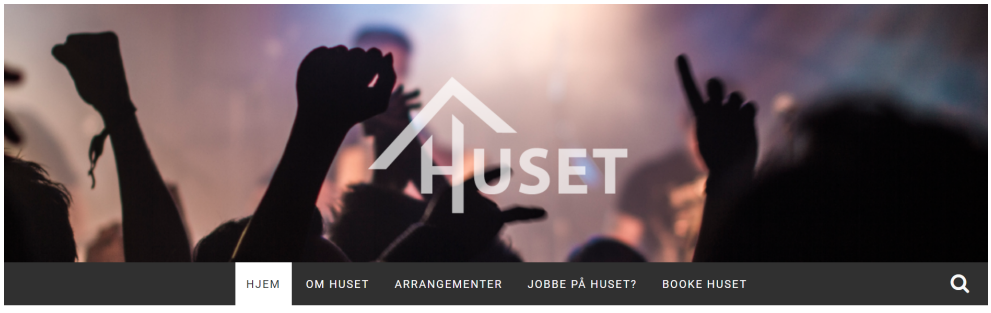

Figure 4.4: *The top part of HUSET's current website. The banner image displays a concert. The navigation bar has very clear titles for its pages, allowing all 4 goals to be reached easily.*

In terms of the design, Studentenes Hus Gjøvik's current design makes an attempt to communicate it's purpose: a bar-like location. When visiting the site at first the only visible image is the header, which in this case accurately conveys one of HUSET's major attractions: that it hosts concerts or similar events. But it is first through going to the "om HUSET" page and looking through the picture carousel at the bottom that the choice of images give a clear indication to HUSET being a bar.

When analysing the design, three other bars' websites where chosen to compare with. These were: `https://vesperbar.no/`, the website of Vesper Bar in Bjørvika, Oslo. `http://www.fahlstrombg.no/`, the website of Fahlstrøm bar & grill in Gjøvik. And `https://cyb.no/` Cybernetisk Selskap / Escape, a student driven café and pub in Oslo.

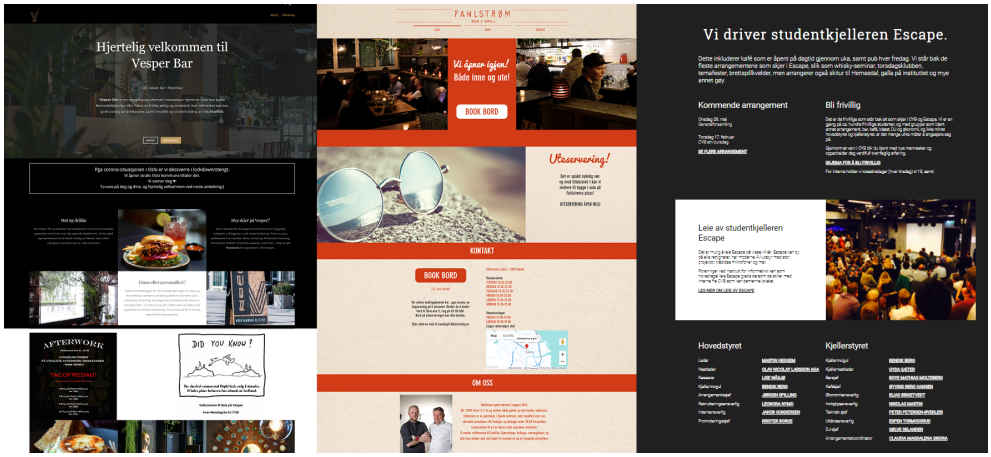

Figure 4.5: *The three websites we compared HUSET against, from left to right: Vesper Bar, Fahlstrøm bar & grill, Escape.* .

Compared to Vesper bar and Fahlstrøm bar & grill, HUSET's homepage leaves something to be desired. The "om HUSET" page, containing an image carousel of pictures taken of the inside the location, is a clearer indication of what goes on at the location. But when compared to Escape, their homepage is equally "vague" in terms of design, but uses more direct language within the text itself.

However, due to Norwegian law it is limited how well HUSET can advertise for some of its main functions. While it is a student bar serving alcoholic beverages, direct mentions of alcohol, as well as images where alcohol is the focus, goes against the Norwegian "Alcohol Act", Alkoholloven §9-1 to §9-3 (alkoholloven, 1989). Due to this the images and content that can be present on the site is somewhat limited and the subject needs to be carefully maneuvered around to clearly communicate to guests what the locale is for while also not violating any laws.

4.2.2 Usability

The usability analysis is done in two parts: a short analysis done by us and through user testing HUSET's old design. In this section we will present the short analysis. The result of the user test will be presented later in section 4.3 User Test of Current Web Solution.

The website does not contain a lot of information and visibly only consists of 5 separate web pages. Due to this, collecting the information needed through the site is a very straightforward process. The website also has a search page, but as this is a native solution from WordPress it also searches through the blogposts that are posted on the front page. It is not as usable if the desire is to find out how to book HUSET or anything present on the webpages, but as the navigation bar is so visible and focused this might not pose any problems.

While analysing usability we also looked at the site using different browsers. The website works and looks as expected on Google Chrome, Safari and Microsoft Edge. The website also works on mobile, but the design leaves something to be desired on this front. However, mobile design has not been a focus for the site, due to most users visiting through a web browser.

Finally, we analysed links and load time of the page. Using Google Page Speed Insights we saw that it takes 24 seconds to load the entire page. This is a long wait, and it is one image in particular that causes it. However, this image is from a post regarding opening hours and events in October 2020. This image taking a long time to appear and is not a big hit for any visitors as they are unlikely to need this information, but can negatively affect SEO. Large images are a recurring problem on the website.

The W3C link checker also revealed several broken links, two of which would require further action (status 404 and 403 respectively). Both of these are links present within the code itself, linking to external font libraries. As these links are not present in the content, but likely a part of the current theme itself, they would be replaced when a new theme is installed on the page. Thus, requiring no further action at this time.

4.2.3 Style and content

The style of a website is essential to capture the attention of potential clients. It's the first thing the client notice when they enter the website, and it only takes a split second to form a first impression of the design. A subpar style can lead to a loss of sales and potential clients if the website is not seen as a credible business place. Therefore a poor first impression may result in a loss of revenue for the company.

A good way of making a design better is to focus on user-centered design, UCD for short. By involving the user in the design process, we can build a site that is more user friendly. The key is understanding how users use the site and what pains they are experiencing with the current solution. By involving the user throughout the design process, the user experience will be significantly improved. However,

people have a different perception of what a good design is based on experience, preferences, and disabilities. Still, there are common qualities that will ordinarily result in an overall better user experience. This is the reason universal design has become so important in recent years, because a website should provide a good experience for everyone, not just the primary user (Nordbø, 2017).

Websites today are often built to be simple and easy for people with disabilities yet be stylish and modern without compromising on functionality. One of the things that can be challenging when designing a website is the use of color. This is because the use of color is something that regular users may not think about but can be crucial for people with reduced color vision. This has a significant impact on whether they manage to use the website or not. An interface based on color may look very nice, but for a person with impaired color vision, it may be challenging to use.

The current design does a good job of taking precautions when it comes to universal design. The site has a very clear use of contrast and color to give the users the necessary information. The website of HUSET Gjøvik uses elements from the logo as part of their color palette and gives the site a more consistent look. The website use harmonies to its advantages, utilizing a monochromatic color palette in the design of the website. That is not to say that HUSET Gjøvik main color pallet is monochromatic, but that is what is visible on the website. The other colors from the palette are not in use or not used in a way that adds to the overall color harmony of the website. See figure 4.6

Figure 4.6: *Image displaying the color of the current solution, monochromatic.*

This works well from the perspective of someone with reduced color vision. There is no conflicting use of colors on their website as of 2021, because the use of color is very limited in itself, only applied to certain images. Because of the color use, it is possible to say that the website's style is in line with the logo and has a

consistent color design language

The main color is the white background color #FFFFFF. The secondary color is the dark gray color #303030, as the green color #4E7434 has no real use beyond a few images. This makes the site reminiscent of a monochromatic website. With only a hint of green from the logo, and the rest of the colors being contrasts of black, gray and white. Meaning it is in a monochromatic color harmony (Rhyneokt, 2016). See figure 4.6.

Because of the color use, it is possible to say that the website's style is in line with the logo and has a consistent color design language.

Layout is also very important, having the information the users need visible and in a place where it makes sense. The website has a few issues related to the layout. The site is set up in a format that is relying heavily on scrolling. This is problematic when it comes to efficiency. An efficient site is essential because an inefficient layout may cause the users to experience problems with finding the information they want. The website should give the user as much relevant information as quickly as possible. Therefore, relying on scrolling to find basic information is a bad idea (Nordbø, 2017).

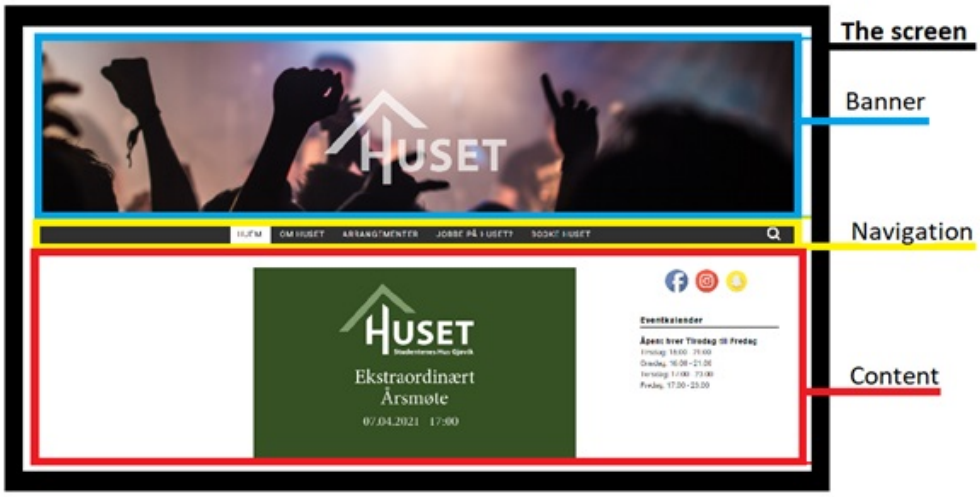

Figure 4.7: *Image shows the layout of the current site.*

The main culprit of this is the banner above the navigation. The banner takes up half the screen on every page of the website. This causes the navigation menu to reside almost in the center of the website. That is consistent with the internal design of the pages because it is the same on every page. The problem with this however, is that this is not consistent with regular website design conventions where the navigation resides at the top. Having it in the middle is giving the site an awkward look.

As shown in the figure 4.7, the navigation ends up almost in the middle of

the screen. There is an image visible, but no information about the image itself is visible. This page has a feed so that the images will change over time, and not all pictures have information stored in them as this green one has. This is very apparent on pages where the image is not changed out frequently, like the site (Om HUSET) where there is no helpful information visible without scrolling. Having a scrolling feature on the main page to set the site's mood is acceptable, but it has not been framed correctly, having some information partially visible. Having to scroll on subsequent pages on the website is unnecessary, and therefore, it makes it less effective. Another issue with the layout is that it does not give a feeling of being aligned correctly. The main content is only taking up 1/3 of the available space due to excessive use of margins. The margins are not used correctly, as content have their own padding surrounding it. See figure 4.8

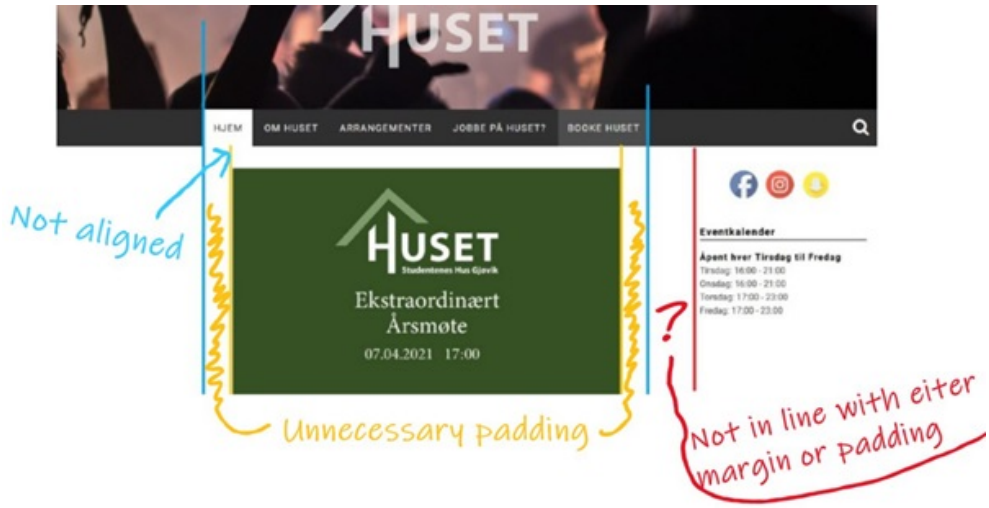

Figure 4.8: *Image of the margins of the current site.*

The site is cramped and is not taking advantage of the screen real-estate that it has available. There is also no need to put padding on the side of the content when there are already margins on the side. This makes the content of the site take up more vertical space, causing the need for even more scrolling to view the content. Having the site set up like this is very inefficient and it makes the layout feel unorganized.

Making the pages very long like this also results in the users not being shown the information they need without having to scroll. This is distracting for the design and it is affecting all the pages. At the booking page there is no information at all about the booking without scrolling. Its just a header and a picture because the banner and the navigation take up half the screen. Therefore the best word to summarize the old design is inefficient.

4.2.4 SEO

When creating a website its important that the targeted audience visits the website, and to optimize the traffic to HUSETs website we decided to utilize the SEO strategy and analysis of current website, to look for any flaws at the current website and see any potential improvements. So we did a Search Engine Optimisation (SEO) analysis of HUSET's current website and theme. The analysis looked at how visitors found the site and then analysed several factors on the site that will affect how it appears on search engines. This list includes alt-text, title tags, meta description, URL, broken links, page speed, and keywords. We found some flaws with current website, and two of them are pictures missing alt tags, and current traffic is lacking due to content missing targeted keywords. But to overall improve the SEO from today's situation should be achievable.

Google Search Console

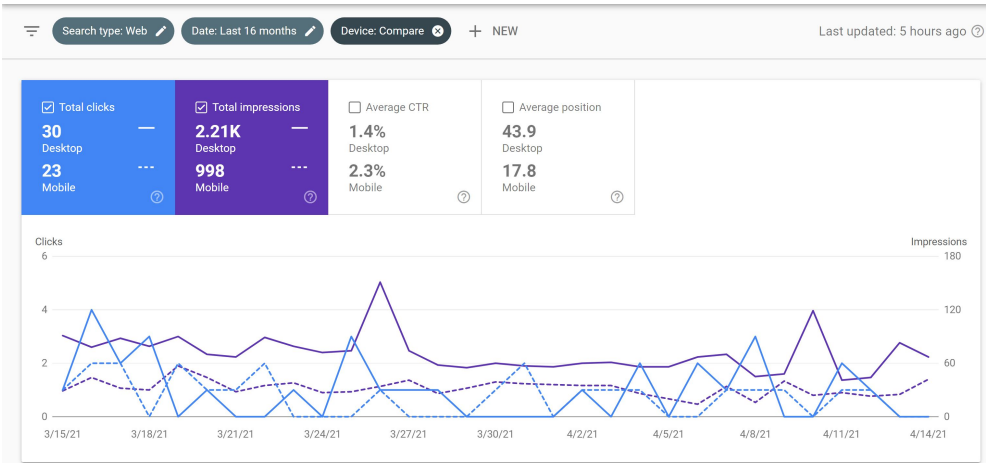

Figure 4.9: *Image from HUSET's google search console, displaying the amount of times the websites has appeared on web search.*

The google search console gives the admin of the page an easy way to overview the total stats of visitors and detailed data, monitor the progression with traffic, and security issues (Google, n.d.[a]). With all the free tools and reports that can be found within the console, it is possible to track progress in the future, analyse data back in time, and use this information to improve the SEO of the website. Before we started this project our client did not utilize the google search console to track visitations and other data regarding the site, so we requested they install it and recommended the project owner to become familiar with the basics of the console.

The console includes handy tools for improvement. Some of this data will point out what needs to be done to make the google search engine crawl easier through HUSET website. It gives back feedback in form as errors and warnings.

Errors are considered critical and should be solved as soon as possible, as HUSET's website will rank lower on google search engine if they are not solved.

On figure 4.9 it's possible to see the performance comparison between desktop and mobile for HUSETs website. It shows that on desktop devices the website appeared last 16 months on google 2.21 thousand times and 30 of them clicked into the page. The average position is 43.9 for desktop, which means HUSETs website appears as number 44 in results. On the other hand, the mobile version ranks higher than desktop and achieves more click than desktop does.

Figure 4.10 displays that the majority of searches came through direct search for "HUSET". Only approximately 24% of total searches was discovery where the user searched for a specific category, product or service and HUSETs website appeared.

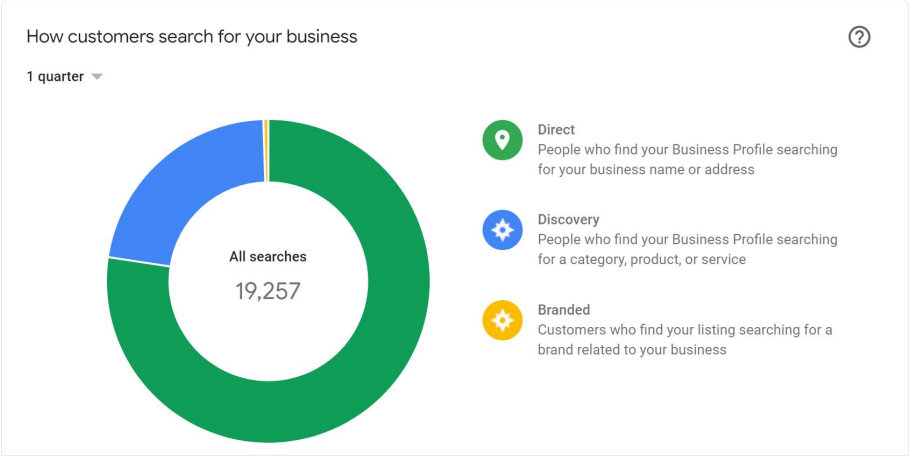

Figure 4.10: *Google business insight search displaying how customers searched for HUSET on google.*

Alt-text

Alt-text is short for alternative text, and is text connected to an image. If an image does not load, or a user is utilising a screen reader, the alternative text which will be shown or read out loud. Using alt attributes on image elements is also a part of the WCAG 2.0 success criteria.

On HUSET's current website there are images on the homepage where they don't have ALT tags at all, and many are short and do not describe the image well. An example can be seen in figure 4.11 where there are students sitting at the tables enjoying a show or quiz night. Here the given ALT tag is alt=”04-mj”, which does not describe the image or situation.

The best way to write your alternative text, is to describe it as specifically as possible. If you were to close your eyes and someone read the alt text to you, it should give you enough information that you're able to imagine the product or

scenario in the image (MOZ, n.d.[a]). So, for example the picture from the earlier example would be something like alt=” group of happy students at their tables enjoying standup”.

In some cases, if the description is too long you can use the longdesc=”” tag.

Figure 4.11: *An example of an image from HUSET’s current website and its alt text, which does not accurately describe the image.*

Title tags

As the title tags are such an important part of search engine optimization and benefits user experience, we analyzed this to see if there is room for improvement (MOZ, n.d.[e]).

Currently, HUSET’s title tags don’t completely follow recommendations. The title for the "Arrangementer" (events) page is "Arrangementer | HUSET Gjøvik", but the recommended format is "Primary Keyword - Secondary Keyword | Comapny Name". Following this, the title would be "Arrangementer – Kommende | Huset Gjøvik". However, some developers also use the "Company Name | Primary Keyword" format, due to personal, visual preferences.

Other recommendations is to avoid all capital words and instead use pascal

case - "Huset Gjøvik" instead of "HUSET GJØVIK", and also to ensure each page has a unique title tag.

Meta Description

The meta description in the head(part of the code) is an important factor to increase the click rates from google (MOZ, n.d.[c]). After reviewing the website of HUSET, it's been found that they already have good meta description in the code.

But there are two pages which contain over the recommended limit of characters for meta description, its recommended that the characters should be between 50-160. Below we can see the meta description of the homepage, which is too long. It contains 365 characters.

<meta property="og:description" content="Studenthuset HUSET på Kallerud er et sosialt samlingspunkt for studenter på Gjøvik. HUSET er eid av Studentsamskipnaden i Trondheim, SiT, som også står for bardrift. Studentaktivitet organiseres av styret og en rekke frivillige som arbeider med bardrift, vakthold, teknisk utstyr og alt annet som må til for å holde utestedet og konsertarenaen gående. Alt som skjer [...]">

However, the "Arrangementer" page has a good, descriptive meta description at a nice length of 91 characters.

<meta name="description" content="På HUSET er det faste arrangementer hver uke. Her er noen av de vanligste som gjennomføres.">

URL

URLs were designed to be read by humans, replacing the numbers (IP addresses) that computers use to communicate with servers. Since a URL is quite specific it was clear that we had to have a look at the website to determine if it was suitable for the site (MOZ, n.d.[f]).

After some inspection, there was some minor errors in the website's URLs. Pages "Arrangementer" and "Jobbe pa HUSET?" both had a number 2 at the end of the URL, ex: `https://www.husetgjovik.no/arrangementer-2/`, whereas the other pages didn't have this. This is likely caused by their WordPress database having two pages with the same title. Even if a page is deleted, it is only moved to the bin and not permanently deleted which can result in URLs like the one below (Warner, 2020).

Broken Links

Broken links can affect the user experience if some pages are totally removed, or if the domain name has been changed to a specific event, or site (MOZ, n.d.[f]). If there are too many broken links this may also affect the reputation of the company and be extension their revenue.

One case how this can affect the SEO is when a user enters the site and gets the result 404 the user will immediately leave the site within seconds and that will cause the search engine to assume your site does not provide the correct content or information which can result in lower rankings on google.

To check all the broken links, we used `www.brokenlinkcheck.com`. And found there is 7 links that server response is 404(page not found). One way to solve this would be a plugin for WordPress named RankMath, which is a free plugin. This plugin offers the user to customize the SEO and and also manage broken links by redirecting them (Rank Math, n.d.). Redirection means when the user and search engine request a specific URL we can send them to a different URL instead.

#	Broken link [you can scroll this field left-right]	Link Text	Page where found	Server response
1	https://www.sit.no/%E2%80%A6/sit-stenger-alle-kanter-treningssent%E2%80%A6	https://www.sit.no/.../sit-stenger-alle-kanti	url src	404
2	https://www.ticketmaster.no/event/cascada-billetter/341367	Kjøp billetter	url src	404
3	https://www.sit.no/%E2%80%A6/sit-stenger-alle-kanter-treningssent%E2%80%A6	https://www.sit.no/.../sit-stenger-alle-kanti	url src	404
4	https://www.sit.no/%E2%80%A6/sit-stenger-alle-kanter-treningssent%E2%80%A6	https://www.sit.no/.../sit-stenger-alle-kanti	url src	404
5	https://www.ticketmaster.no/event/donkeybox-pa-huset-sommerevent/utning-billetter/534351	http://www.ticketmaster.no/event/donkeyb	url src	404
6	https://www.ticketmaster.no/event/jas9-omtip-tickets/509273	billettservice	url src	404
7	https://www.ticketmaster.no/event/stand-up-pa-huset-billetter/511937	billettservice	url src	404

Figure 4.12: *A list of all broken links found using `www.brokenlinkcheck.com` on HUSET's current website.*

Page Speed

To check the speed of loading, we used a tool from Google named Page Speed Insights (Google, n.d.[c]) to measure the page speed (MOZ, n.d.[d]). The page speed and performance of website is important because is that google has a ranking factor for this, and fast loading times improves the user experience. If the website is too slow and not fully interactive, the users may leave.

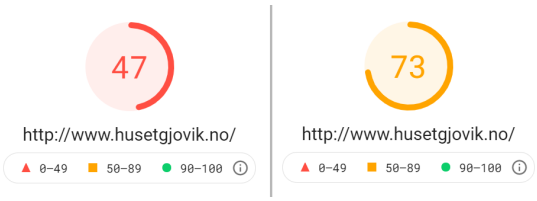

Figure 4.13: *Showing total score on mobile (left) and desktop (right) on Page Speed Insight. Desktop does better than mobile, but neither are at the ideal score of 90-100.*

Here we found that the client scores a 48 out of 100 on mobile device and 73 out of 100 on desktop as seen in figure 4.13. We need to aim for at least 90 out of 100 to optimize the loading time.

The results seen in figure 4.14 show that it takes 8,4s for the website to be fully interactable for user on a mobile device, which is not good enough as it should be between 0-3.8s. It takes 3,5s for the First Contentful Paint(FCP) measure on a mobile device, FCP tells us how long it takes for the browser to render the first piece of content to the user (Google, n.d.[c]).

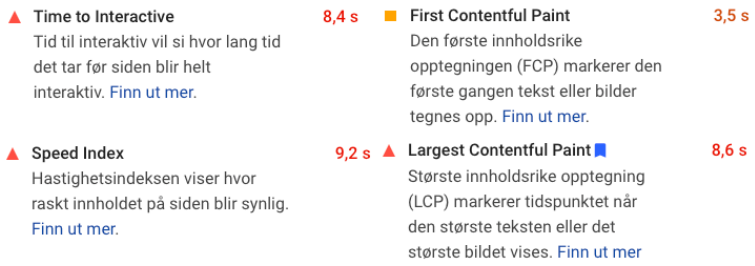

Figure 4.14: *A screenshot of the results from the Google PageSpeed Insight, showing the data for how long it takes for the website to become interactable, the loadtime for the first contentful paint, the Speed Index, and the load time for the largest contentful paint.*

One other metric that showed poor results was speed index, which shows that it takes 9,2s to show the content of the page on a mobile device. The last metric we looked at was the Largest Contentful Paint(LCP) that had a result of 8,6s on a mobile device, which tells us it takes 8,6s for the browser to render the large elements in the viewport, like images and videos (Google, n.d.[c]).

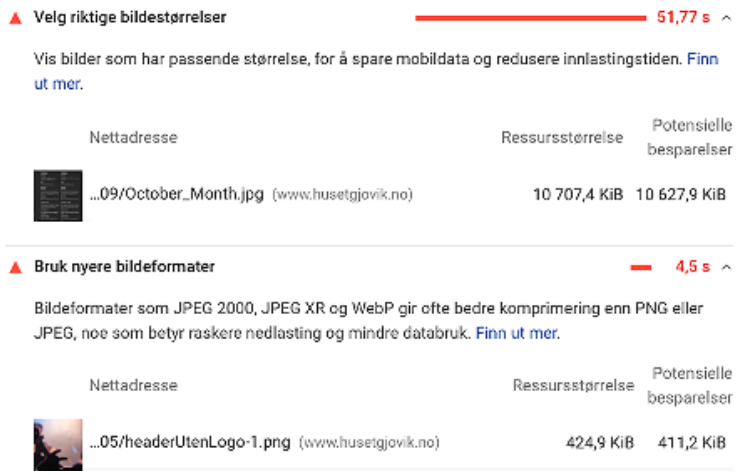

Figure 4.15: *Screenshot from PageSpeed Insight showing detailed data for the images loaded on the mobile version. It shows that one image takes over 51 seconds to load, due to it being over 10 000 KiB in size.*

So, to solve most of these problems the page speed insight shows us what we can do to improve the total score.

After reviewing we can see there are some images that are way too big and also old formats. So instead of using PNG or JPEG images, we need to aim for JPEG 2000 or JPEG XR format (Google, n.d.[c]).

Also, if the WordPress theme and plugin is not optimized it can affect the loading time of the website which result in lower score.

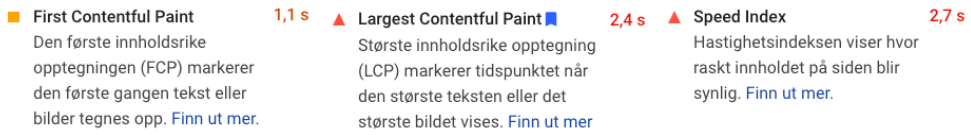

Figure 4.16: *Feedback on specific results for the FCP, indexing and LCP result on desktop version.*

For the desktop version the results were different in a better ways, as seen earlier in figure 4.13 the total score was 73 out of 100.

After reviewing the scores, it shows same problems on the mobile version where the images are too big and old formats even though the desktop browser renders quicker as seen in figure 4.16.

Picture below shows where the potential improvement that can be done, as for example by reducing the sizes of the images.

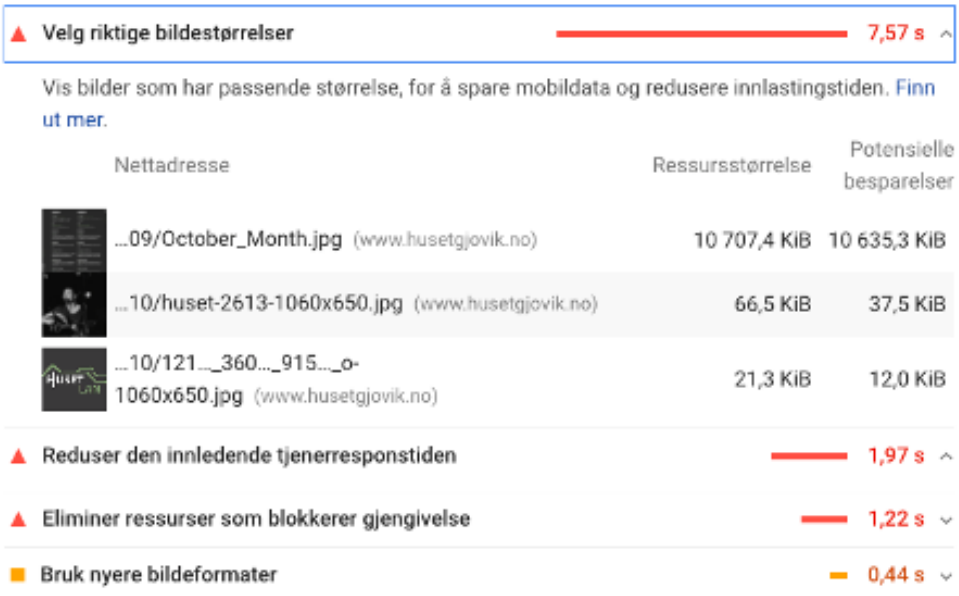

Figure 4.17: *Screenshot of a more detailed feedback for desktop version showing what content takes too much space and makes the website slower.*

Keywords

After reviewing the clients results on google search console for queries we can see that they appeared multiple times on some keywords but the searcher didn't actually click on their link. As shown on figure 4.18 below we can see that HUSETs website appeared on google results on few of the keywords but as mentioned earlier, they don't receive the direct click to the website. The reason why may be that the visitors directly click on HUSETs facebook page instead of retrieving that information from HUSETs website.

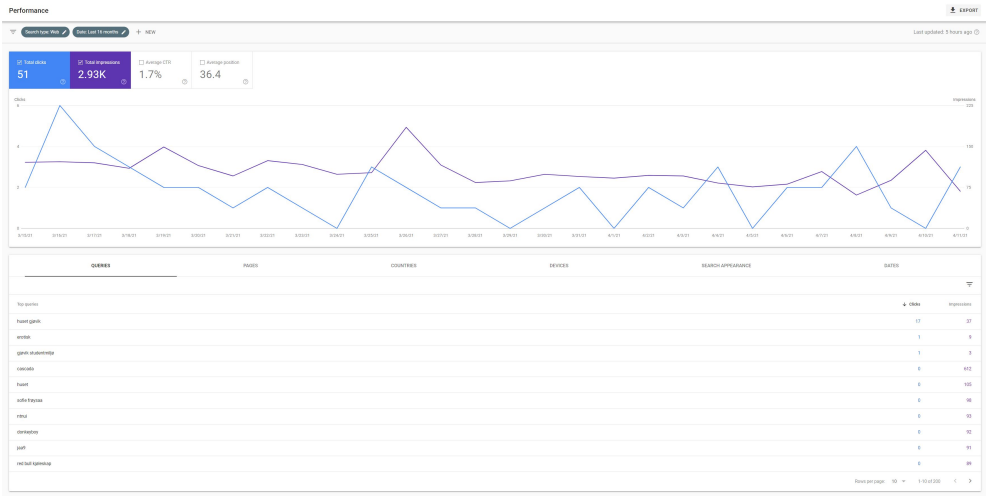

Figure 4.18: *Queries Results on Google Search Console the last 16 months*

Results from Google My business on figure 4.19 show that these last six months few keywords returned HUSET as result on google. As the results show unsurprising the keywords hus, and huset were top two results, as we continue karaoke is third, and ntnu gjøvik fourth.

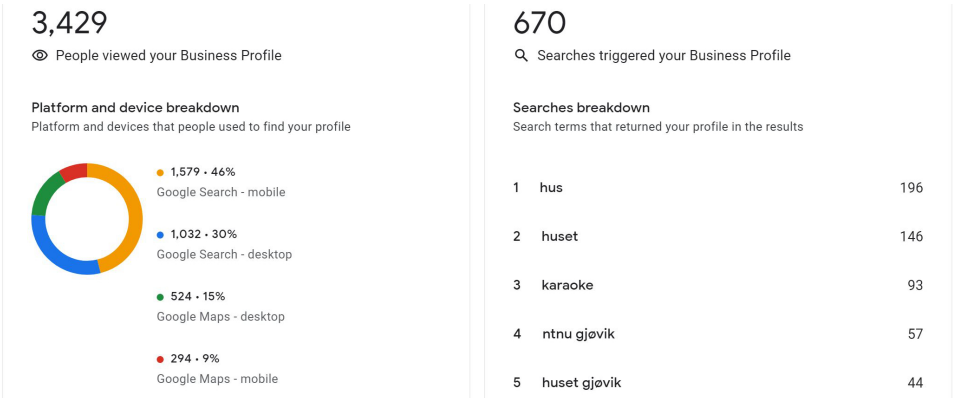

Figure 4.19: *Results from Google My Business*

All pictures on the website need to be saved with correct keywords and not

just give them random names (MOZ, n.d.[b]). Keywords need to be targeted all the time and planned, also in the future. For better SEO the client needs to be consistent with adding content to their page.

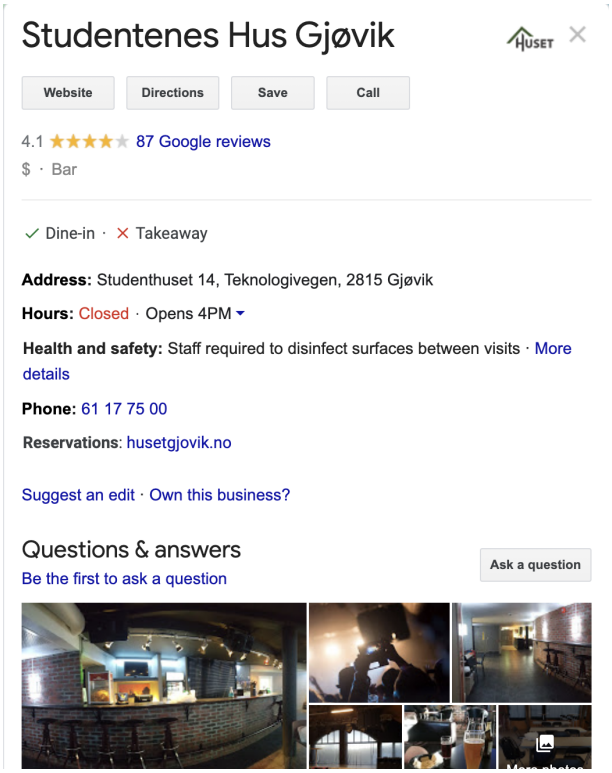

Figure 4.20: *HUSETs My Business profile on Google*

After analyzing what keywords are needed for our client, we can target over a thousand keywords, but it is important to ensure that the keywords are relevant to our client's niche. At least 5 strong keywords are needed to be targeted that describe what our clients provides to the users. For example such keywords in Norwegian can be student, arrangementer, universitet, Gjøvik, and NTNU.

4.3 User test of current web solution

We user tested HUSET's live website to acquire a better view of the current situation, as well as collect data we could use to compare to our developed solution.

We user tested the website as it appears on a desktop or laptop.

We asked the users to solve these 7 tasks:

1. When does HUSET open on Thursdays?
2. At what day and time does HUSET hold Quizzes?
3. Who is the chief executive officer (*daglig leader*) at Huset?
4. Contact Huset to book their location for an event.

5. What is the address to Huset?
6. Can you find the list of equipment (*utstyrsliste*) on HUSET's website?
7. How many guests can you host at HUSET's location?

4.3.1 Desktop website

When testing the desktop website we user tested four subjects on their personal computer. While the user completed the tasks, the tester measured the time each task took and wrote notes on the path taken. The users were encouraged to think out loud and comment on the things they saw.

This round of user testing was done online, through Zoom or Discord. The user shared their screen during the test.

The 4 users tested for the first round is as follows:

- User 1: A 22 year old male student.
- user 2: A 31 year old female worker/employee.
- User 1: A 23 year old female student.
- user 2: A 23 year old male student.

Time spent on tasks

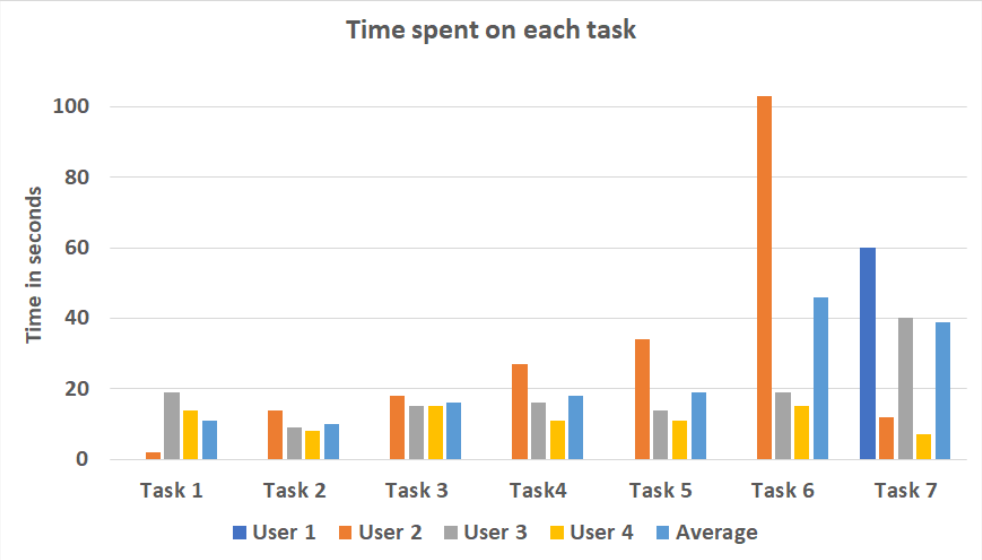

Figure 4.21: *A table displaying the time each of the 4 users spent on each task.*

The time each user spent on each tasks can be seen in graph 4.21. The time is measured in seconds. For user 1 the time was not measured properly, so only the time spent on task 7 is included in the graph. But the user spent around 20 seconds on average.

As seen in table 4.21 the most time consuming task on average was task 6, but a majority of the time spent was spent by user 2 who is also the oldest and

only non-student tested. This task asked the user to find the "utstyrsliste" present on their site, a list of all technical equipment HUSET has available for people to rent or borrow. A part of the reason for user 2 spending more time on this task is due to her confusing a paragraph of text on the "booke HUSET" site as the list of technical equipment, but what we wanted the users to find was a link present within the footer. This task was discussed within the group after conducting the user test, as the task in the test uses the word "utstyrsliste" while on the website itself it's called "teknisk utstyr". After some discussion we decided to not change the wording of this task when we later reworked the tasks, as they are synonyms and the other 3 users did not display any noticeable difficulty finding this list.

Another noticeable task is task 7, which asked the user to find out how many guests HUSET is capable of hosting. Here one user commented that the language on page is not clear as it states they have "200 chairs", but that does not necessarily translate to 200 guests. Through these tests we saw that it is not just the interface NS design that can be improved, but also the composition of the text itself.

4.4 HUSET's Design Profile

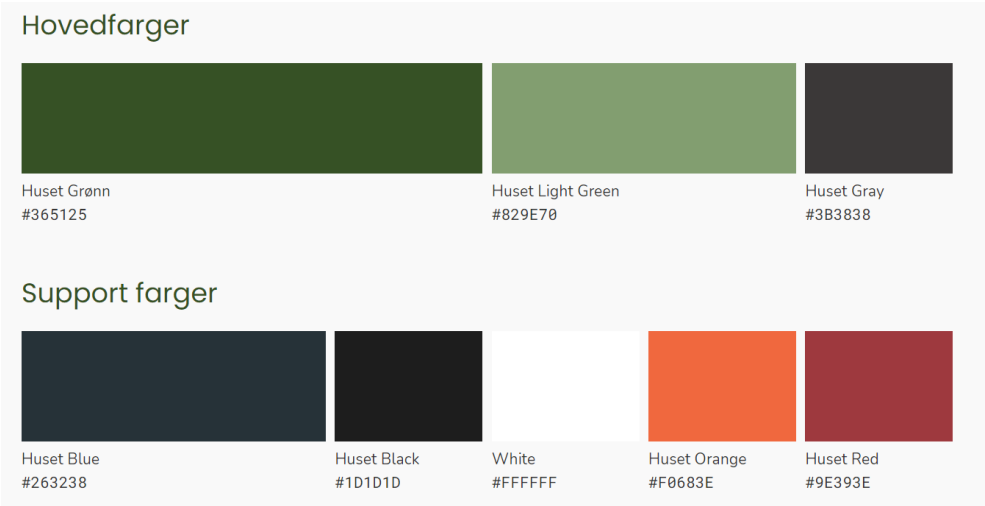

Figure 4.22: *A screenshot from `http://www.husetgjovik.no/presse/index.html#/colors` showing Huset's design system colors. However, the information we got from the project owner differ slightly, as he listed some hovedfarger(main colors) as support farger(support/accent colors) and vise versa.*

HUSET has their own design profile as viewable through the "presse and logo" link in the footer of the site. This includes a list of logos as well as a collection of colors approved for use on the site and to advertise for HUSET.

During a meeting with the project owner he explained the use of the colors, but his list of main and accent colors varies slightly from what is present on HUSET's online color profile. We chose to take the project owners feedback over the color

specifications on their website.

He listed HUSET Grønn and HUSET Orange as accent colors that should not be used as main colors. He said HUSET red has not been approved for use yet and should be avoided. Either HUSET Blue and HUSET Black can be chosen as the main dark color present on the site.

Chapter 5

Design

Figure 5.1: *A visual representation of the work done during the design phase.*

In this chapter we will present all work done during our design phase, from the creation of sketches using the Crazy 8s methods, to designing a low fidelity and high fidelity prototype. This also includes the results of the user testing we conducted on the two prototypes. Finally, we will describe our choices made regarding the placement of content, including both images and text.

Our design phase consists of two major sub-phases: the design of the low fidelity prototype, and the design of the high fidelity prototype. Both of these sub-phases ended with user testing. The project owner was also consulted during both phases and gave feedback that the group used when iterating on the lo-fi

prototype. The project owner was also presented the hi-fi prototype, but we did not create a second iteration of this prototype.

As the amount of pages on the site was fairly low, 5 at the beginning of the project and growing to 7 at the finishing of the lo-fi prototype, we did not design a sitemap.

The design phase was started in week 10, 5 weeks behind our initial schedule, and ended in week 14. It lasted for 4 weeks instead of the planned 6, as we needed to reduce the time spent in order to reach our goals. We reached all planned goals in this time period.

5.1 Personas Implementation

A persona is a tool to help represent the target audience in a more bite-sized portion, making it easier for designer to plan for the user as well as remember who their core target audience is. Due to this, we started the design phase by creating these personas, based on HUSET's target audiences.

Figure 5.2: *An example of one of the Personas. The image is an auto generated image from* `https://thispersondoesnotexist.com/`

The personas are based on the goals that users want to accomplish. In other words, we created goal-directed personas as described in section 2.2.5 Personas. In the research phase we had conversations with project owner about the target audience and what he thought their goals were. In section 4.1.1 Target Audience, we divided the target audience into three categories: Businesses, students that were interested in upcoming events, and students that wanted to work for HUSET. Knowing this provided valuable information about the needs of the target audience and thereby their goals.

Before starting with the personas, the group had gone through the current web solution and noticed that there were some pages that had very narrow and specific uses. This includes the "booke huset" page and the "jobbe på huset" page. With this in mind, the question was who are these pages designed for, and whose goal is it to reach these pages. For instance, the "booke huset" page would only interest people that want to book HUSET's location for an event. And the "jobbe på huset" page is for users that are interested in working for HUSET.

Based on these pages and the information provided by the project owner, the group came up with 4 goals that the target audiences would like to accomplish. The first goal is to find upcoming events in the area. Second is to find a book a location to host an event. Third is to work for HUSET. And the fourth is to borrow

music and lighting equipment - as this is also a service HUSET offers. Based on this we worked our way backward to pinpoint what kind of people would have these goals.

The first persona, which can be seen in figure 5.2, had a goal of finding an upcoming event in the area. This narrowed the users that this persona would represent into students, because HUSET's events are mainly aimed at students in the Gjøvik area. Now knowing this is a student narrows the age range to 18-25 and the location to be in the Innlandet municipality. After that, we asked what type of personal characteristics do people that frequent social events have. They might be extroverted, social, and enjoy being around other people. Their motivation can be that they are bored, or they feel lonely on a particular evening or simply want to meet new people. Using this process; where we start with the goal and from there decreasing the number of users that one persona could represents. We had all that is necessary to create the personas that were both useful and that felt like people. All 4 personas we created can be seen in Appendix B.

5.2 Crazy 8s

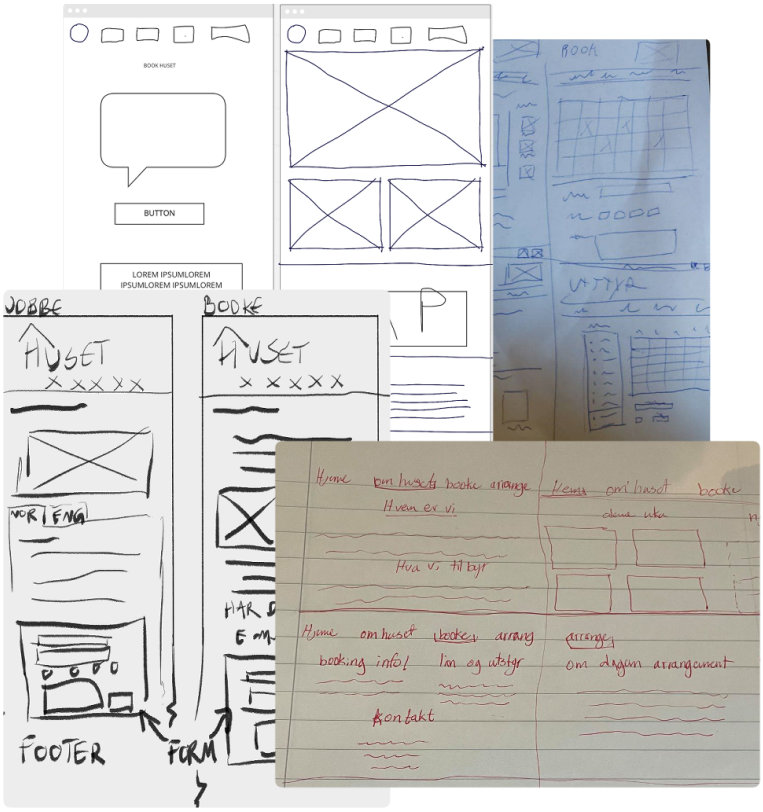

Figure 5.3: *A collection of several of the sketches generated through the Crazy 8s exercise.*

The group used Crazy 8s exercise to rapidly generate ideas in the form of sketches. This method is further described in 2.2.3 Crazy 8s. Our utilisation of this method varies slightly from originally described, however. As we were working remotely, each person did the exercise on their own separately from the group. The tools used to perform the exercise also varied slightly, from paper to a digital tablet and pen. We also already had an established feature list, so the Crazy 8s exercise was mainly used to generate ideas for the design of the various pages rather than feature ideas. It's also worth noting some members created more than 8 ideas, but we still tried to limit the time spent on each sketch to only 1 minute(save for drawing the "frame"). The full result of this exercise can be seen in Appendix C, and these were used as our starting ground once we begun developing the lo-fi prototype.

5.3 Low fidelity prototype

After collecting information about our target audience and generating ideas through the Crazy 8s exercise, we had enough information to start the designing of the low fidelity prototype, from now on referred to as the lo-fi prototype. The prototype was designed using the prototyping tool Figma, as presented in section 2.3 Tools. This tool allowed us to work online from separate location, as has been recommended by the government due to the ongoing pandemic.

During the lo-fi design process the focus was on visualising the ideas generated through the Crazy 8s exercise, but we also designed several new ideas during this period. By the time we put together the first iteration of the prototype, we already had several versions of some of the pages.

The full prototype for iteration I can be seen in Appendix D. Iteration II can be seen in Appendix E. The alternative designs created during this period can be seen in Appendix F

5.3.1 Iteration I

The lo-fi prototype was made entirely in figma. As we designed the first iteration of the prototype we took inspiration from the sketches created from the Crazy 8s methods, as well as a prototype the Project Owner himself had already designed, alongside a list of websites belonging to places offering similar services as Huset. The first iteration of the lo-fi prototype can be seen in Appendix D.

As it is "only" a lo-fi prototype it mostly contains placeholder text, images, and colors. The three colors utilised in the lo-fi is black, grey and white, to provide clear contrast between all components.

After this iteration was done, we had a meeting with the project owner where he gave us feedback and comments. The changes made will be discussed in section 5.3.2 Iteration II.

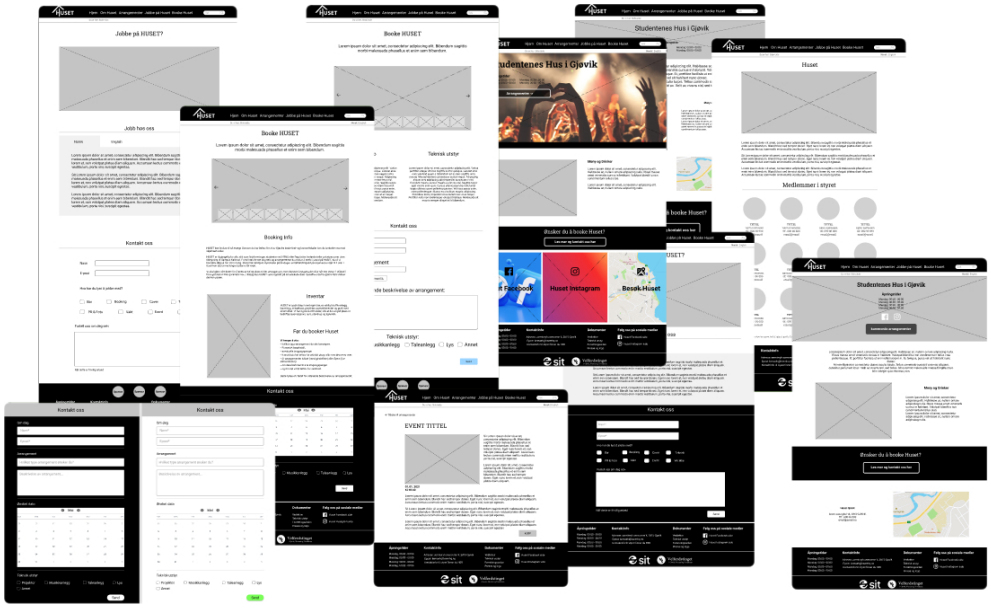

Figure 5.4: *A collection of some of the designs created while working on iteration I of the lo-fi prototype.*

Header

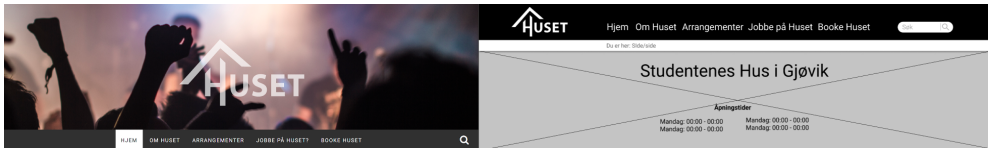

Figure 5.5: *HUSETs current header on the left, with our lofi prototype on the right.*

The header has received some changes from the current design, by moving the order of the banner image and the navigation, as well as making the opening hours easier to find by displaying them up top.

Footer

We made very few changes to the footer, as the current footer seems to follow common design standards and we unveiled no issues with it during our analysis and user testing. But as per the requirement from the project owner, we added space for sponsor logos.

Design proposal for individual pages

For this iteration we did not add any extra pages than what is currently on the live website. Instead the focus was on improving the 5 pages that already exist. We did however, move some information around.

Home

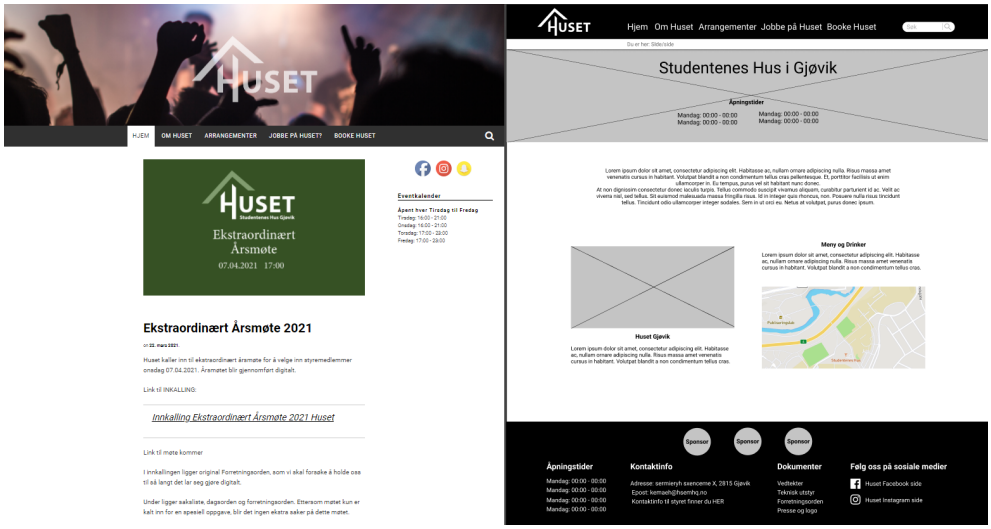

Figure 5.6: *HUSETs current homepage on the left, with our lofi prototype on the right.*

On the current solution the "home" page only displays a list of all the posts posted on the WordPress site. For our prototype we moved these posts to the "arrangementer" site, allowing room for other things on the homepage. Inspired by similar solutions, the homepage now has a banner area with an image and the opening hours. There is more room to write information about HUSET and its services, like its menu and location - also displayed on a map.

Arrangementer

The list of weekly events was then pushed down to the bottom half of the page to make room for the event post list. It is possible to navigate within the event list, which displays 3 events at the time. There are two different design suggestions for this: one horizontal and one vertical.. More images were added to the weekly events section, to give more visual cues to the reader.

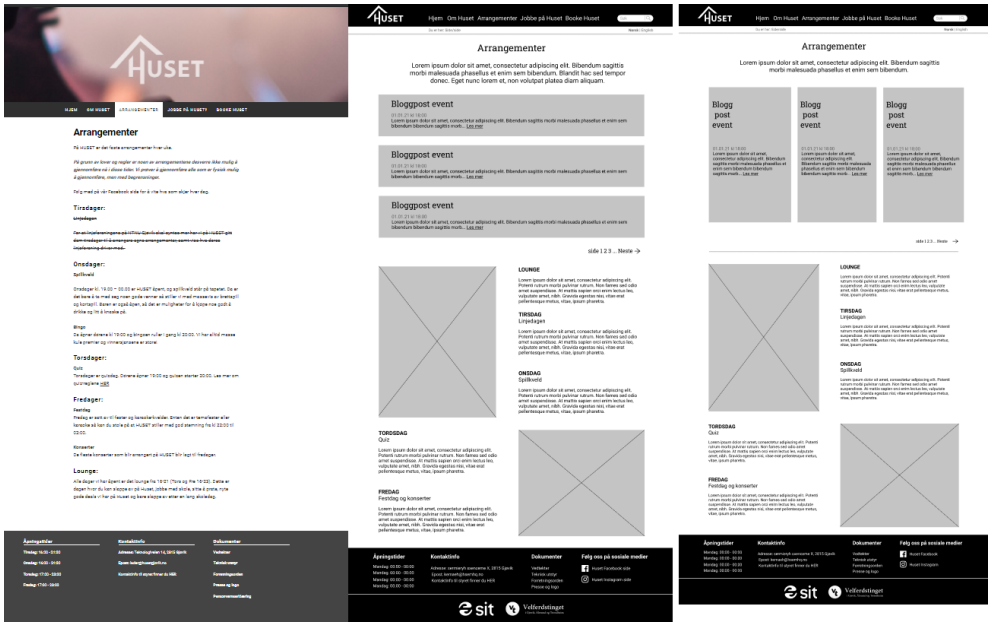

Figure 5.7: *HUSETs current "arrangementer" page on the left, with our prototypes on the right. The central image has a vertical event list and the right image has a horizontal list.*

Post page

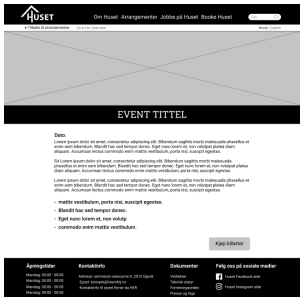

Figure 5.8: *The lo-fi design for the post page.*

When opening a specific post regarding an event, the user is taken to an event page. All information on this page will be collected from the corresponding Facebook Event and published on the WordPress site.

Due to this, the header on the blog post will be the same as the Header image on facebook, and thus need to have somewhat similar proportions as Facebook Event header images. Currently, facebook event cover photo size is 1920 x 1080px, a 16:9 aspect ratio which is the same as set on most monitors (FB pages: Sizes & Dimensions, 2017). Due to this we had the cover photo also cover the full width of the screen.

The "Buy ticket" button will only appear if a tikkio link is present within the post, as the plugin will listen to the text to see if it is there or not. But it will also be possible to manually add this button if desired, as they might not always use Tikkio.

Booke Huset

For the titles and some text we did utilise real text, typically the text present on the current live solution, as we noticed some problems during our initial user tests

regarding the readability. Some users said finding some information, particularly on the "booke Huset" page, was difficult as there were several long paragraphs under a singular header. For our lo-fi prototype we tried to separate these long paragraphs into several shorter sections, and split it into three parts: general information, inventory information, and a list of things Huset needs to know if you want to rent the location.

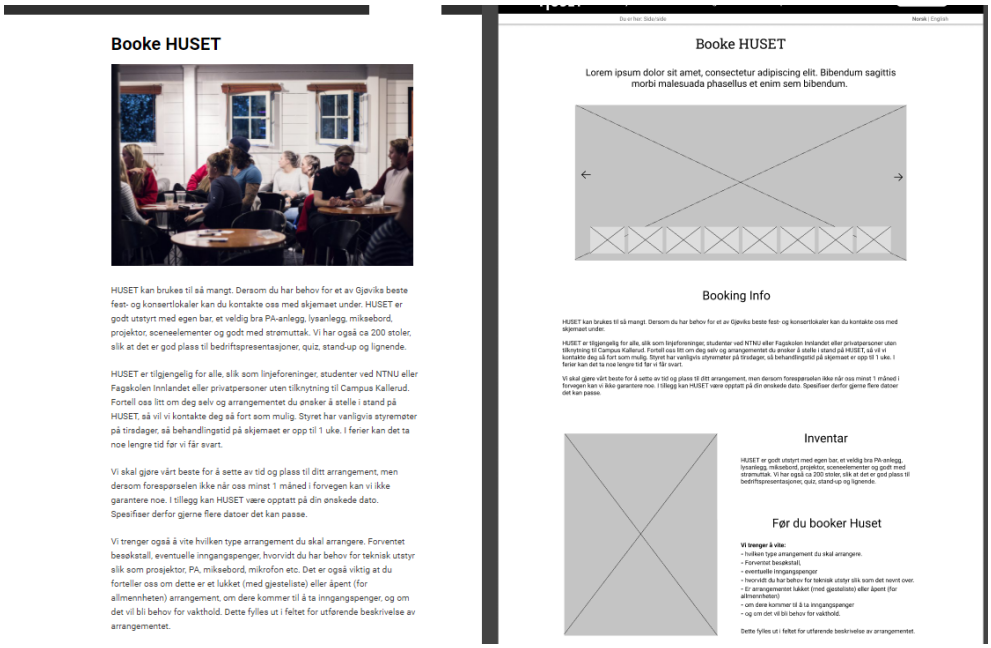

Figure 5.9: *A comparison of the two "booke HUSET" pages, where left is HUSET's current design and the right is our lo-fi design proposal.*

5.3.2 Iteration II

Figure 5.10: *A collection of some of the designs created while working on iteration II of the lo-fi prototype.*

After completing iteration I we had a meeting with the project owner. We handed him the link to the prototype before the meeting so he could look through it and give us feedback. He gave us valuable pointers and advice, so a majority of the changes made in iteration II was due to his feedback.

The full version of iteration II can be seen in Appendix E.

Footer

We moved the location of the sponsor logos after feedback from the project owner.

Figure 5.11: *First iteration of the footer on the left, second iteration on the right.*

Home

The homepage changed a lot between the two iterations. We added more images, including an image carousel, and social media buttons on the bottom of the page next to a map. The banner image was moved, and a link to the "arrangementer" page was added. We also added a link to one of the new pages created during this iteration: the "meny" page.

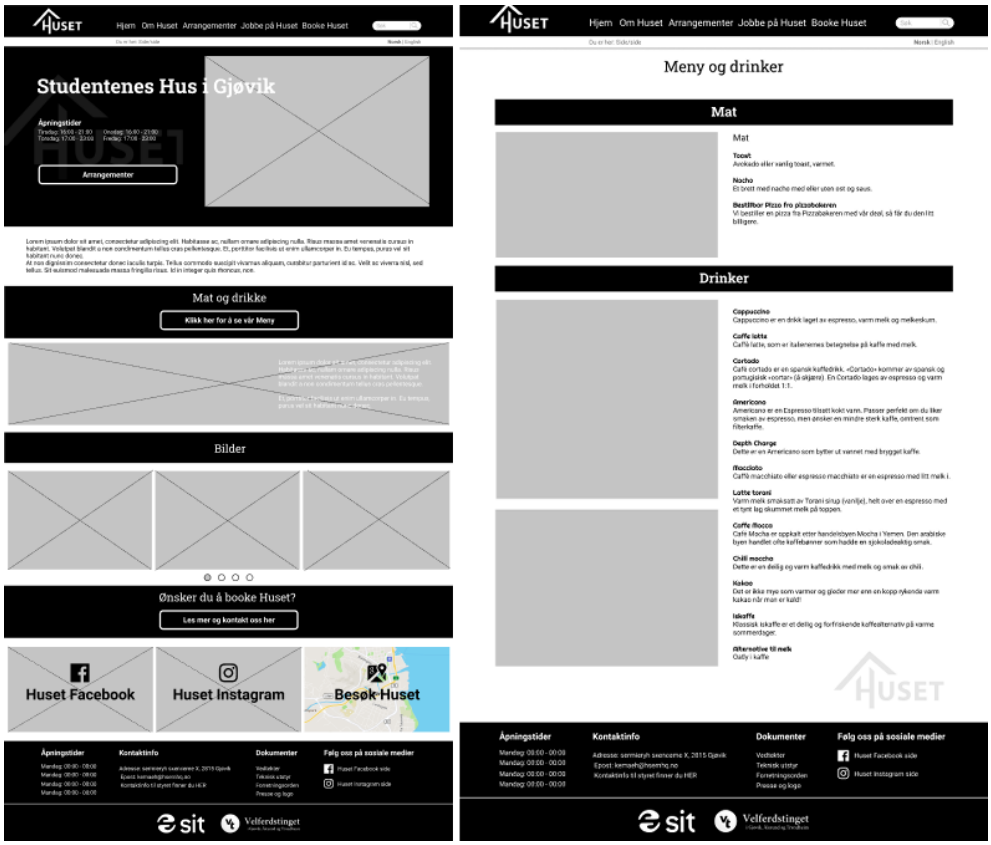

Figure 5.12: *The second iteration of the homepage on the left and the new "meny" page on the right.*

Meny - new page

We created a design for an entirely new page for the website, which displays the currently available menu at HUSET. The content is split in the same way as their menu which is currently only viewable at the physical location, with one section for food and another for drinks. There is room for images displaying the food/drinks available on the left side of the screen, with the items and a description on the right side. The menu was provided by the project owner André.

Om Huset

Made some visual, aesthetic changes to the page to make it fit more with the rest of the pages. The project owner felt the first iteration was very plain, so we made some adjustment to counteract this and to make it look more visually in-line with the other pages.

Arrangementer

After feedback from the project owner we decided to continue with the vertical design for the post list. A link leading to the second new pages created for this iteration was also added, leading to the post archive.

Arkiv - new page

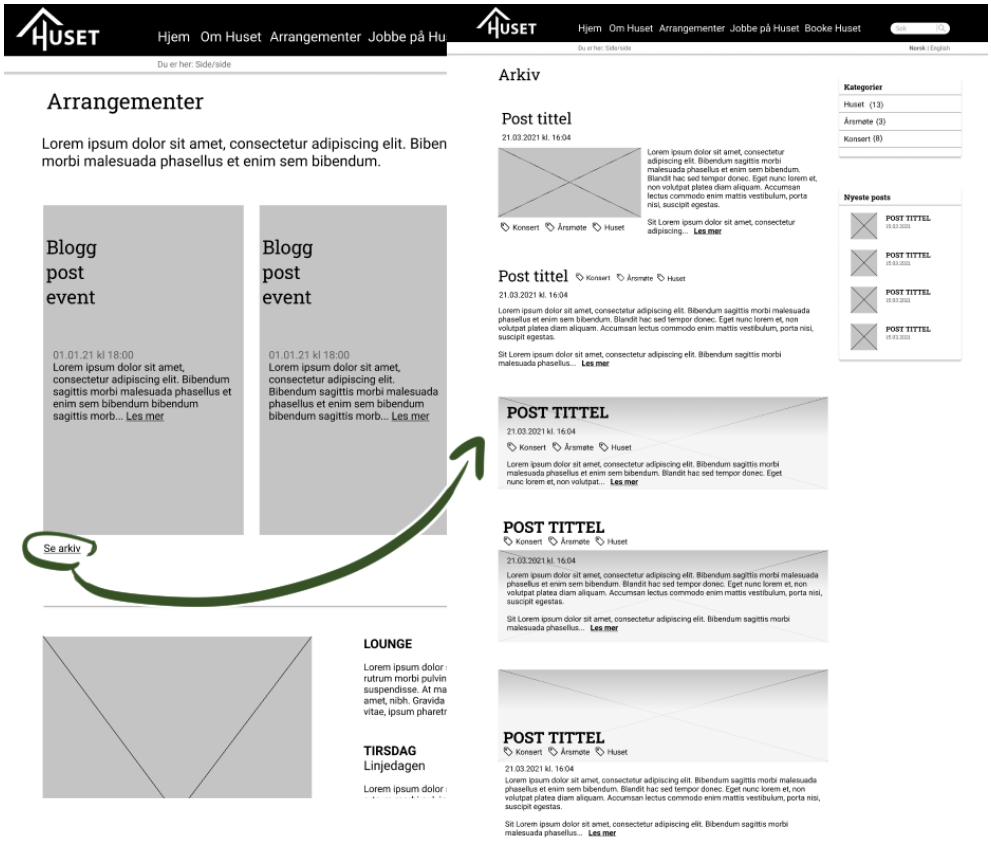

Figure 5.13: *A new link under the event list, saying "se arkiv"(show archive), takes the user to the new archive page on the left.*

Designed a new, 7th page, for the solution. This is an archive where the user can see more of the events done in the past. Here it is also possible to sort the posts through the category tags - a feature native in WordPress. The category list

was placed on the right side of the screen, as this is a typical place for such a feature on blog sites. This page also includes five different design proposals for the preview of the posts. These five designs were tested during the following user test round, to help us decide which one to carry forward to the hi-fi prototype.

Post page

For the post page the "buy tickets" was moved to the top of the page.

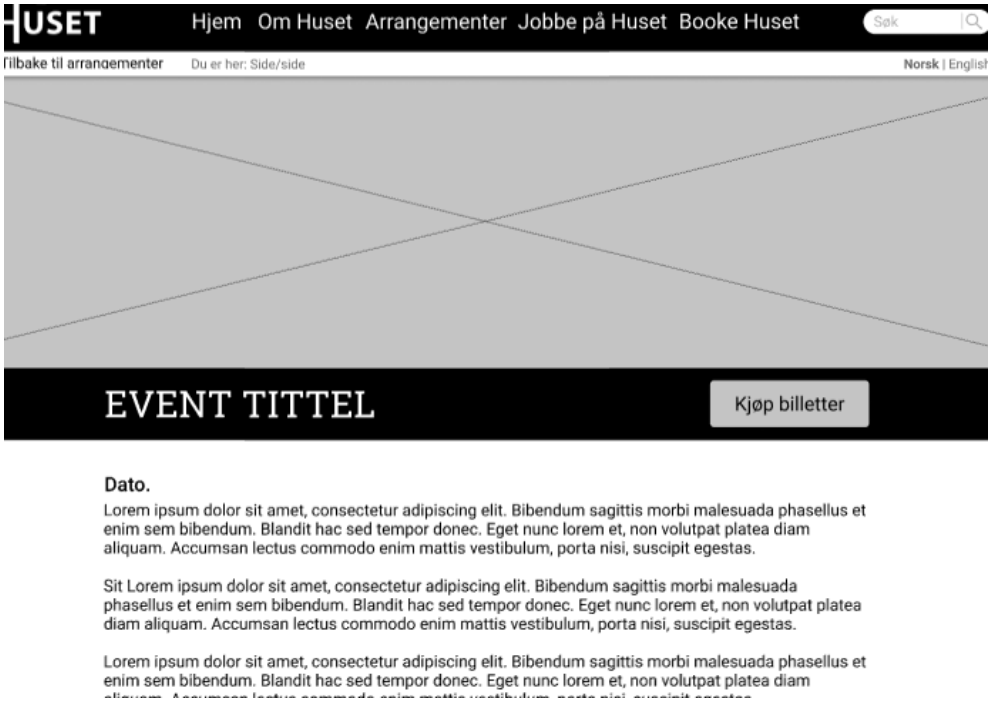

Figure 5.14: *The buy tickets button sits vertically with the event title in the second iteration of the lo-fi prototype.*

Forms

There are two forms present on Huset's site. One to apply to work there, and one to contact Huset asking to book the location. After some feedback from the project owner we decided to make this into a step-by-step process, with each form split into 3 steps.

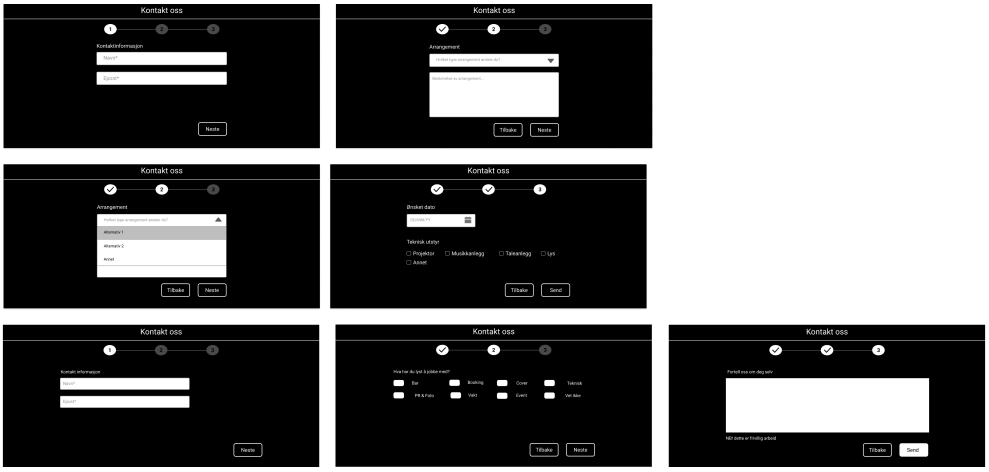

Figure 5.15: *The design proposal for the step-by-step forms, with 3 steps each and one having a drop-down menu.*

5.3.3 User testing iteration II

After we finished the second iteration of the prototype we conducted a round of user testing. Due to the amount of new pages and features that are not present on the current website, we had to rewrite the tasks somewhat. We kept the original 7 tasks and only rewrote the wording slightly to match the content on the lo-fi prototype, but also added 2 entirely new tasks.

The tasks for this round of user testing were:

1. Start from the homepage and find out when HUSET opens on Thursdays.
2. Start from the homepage and find out at what day and time HUSET holds Quizzes.
3. Start from the *Arrangementer* (events) page and the list of board members at HUSET.
4. Start from the homepage and find out how to contact HUSET to book their location for an event.
5. Start from home and find out how to get to HUSET's physical location - either the address or a map.
6. Start from home and find the list of technical equipment (*utstyrsliste*) available on HUSET's website
7. Start from home and find out how many guests you can host at HUSET's location.
8. Start from home and find out if you need a ticket to attend an upcoming event.
9. Start from home and find and open the archive of all events held at HUSET. Sort by the category *Årsmøte* (annual meeting).

At the end of the testing we also asked the user to compare and choosing a favourite out of 5 different designs for the event posts that will be present on the

new "archive" site.

The 5 users tested are as follows:

- User 1: A 21 year old male student.
- User 2: A 31+ year old male.
- User 3: A 26-30 year old male.
- User 4: A 25 year old female student.
- User 5: A 22 year old female student.

Time spent on tasks

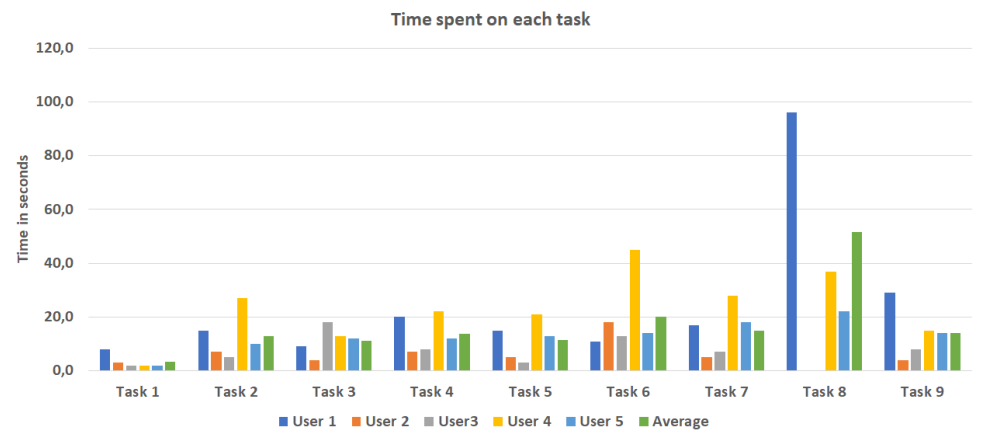

Figure 5.16: *A graph displaying the time each of the 5 users spent on each task, measured in seconds, during the user tests conducted on the lo-fi prototype.*

Figure 5.16 displays the time each user spent on the 9 tasks, measured in seconds, as well as the average time spent. There are noticeable improvements spent on particularly tasks 6 and 7, which asks for the user to find the technical equipment list and the amount of guests there is room for at HUSET. But while we managed to cut down on the time spent on these two tasks respectively, the 8th task - which asks the users to find out if an event requires the purchase of ticket - takes a noticeably longer time than the others. This can be partly explained by a comment discussed later in this section, which says the list of events on the "arrangementer" page is not as visibly clickable. The full comparison of the results from each user test will be discussed further in depth in the results sections.

Amount of clicks to solve each task

For this user test we also made note of the path the user took to solve the tasks, and used this to count the amount of clicks each user took. The results, as well as the average amount of clicks, can be seen in figure 5.17.

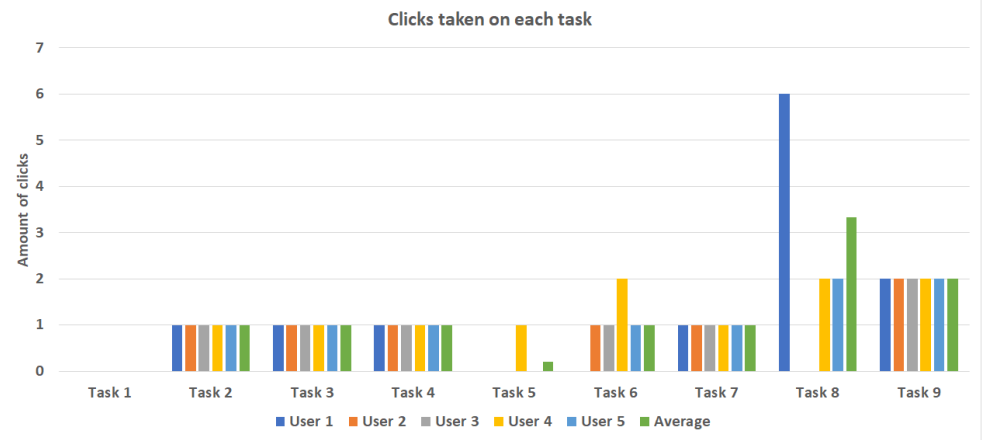

Figure 5.17: *A graph displaying the amount of clicks each user took to solve each task. For some tasks the user used 0 clicks to solve it.*

System Usability Score

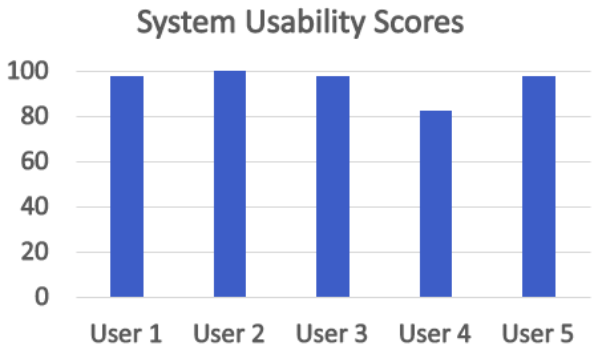

Figure 5.18: *A graph displaying the System Usability Score of each user. A score of 68 is considered average and 100 is the best possible score.*

After the end of each user test, the users were handed the System Usability Scale questionnaire. An "average" score on the SUS test is quoted as 68 points. After calculating the answers from the questionnaire, the SUS scores can be seen infigure 5.18

Archive site design comparison

We asked each user to comment on each design alternative for the event posts on the Archive site. The votes were as follows:

- Design #1: 2 votes.
- Design #2: 0 votes.
- Design #3: 0 votes.

– Design #4: 1 vote.
– Design #5: 3 votes.

Some noticeable comments were how design #2 was quite easy to read, and the image and category tags are visible. Design #2 and #3 received complaints related to lack of image(#2) and poor readability. Design #5 was an overall favourite, also among the members of the group, due to it's modern design, high readability and visible category tags.

Comments from users

Here we will discuss some other noticeable comments received during the testing. 2 of the users tested criticized the placement of the map, as for this prototype it was only present on the "Hjem" page. They instead wanted this on the "Om Huset" page and this is where they went to look for the address and location of Huset. 2 users also commented that the map on the "Hjem" page was not very visible and should be present higher up on the site. For task 6, where the user is asked to find the list of "teknisk utstyr", 2 users found this through its new location on the "booke Huset" site, improving the time spent on this task drastically.

As mentioned earlier, on task 8 we had some problems on the "arrangementer" page, as the lists of the 3 most recent events did not look clickable to some of the users we tested. It's also worth noting that for 2 users it seemed more natural to contact Huset through their contact information in the footer, than go to "booke Huset" and fill in the form.

We got a comment on the "kjøp billett" button on the top of the event pages, saying that it might be good to also put this on the bottom of the page if the information/post is very long. This is to prevent users having to scroll all the way back up again to purchase a ticket(see figure 5.19). One user also admitted to rarely scrolling down on the "home" page of websites, as they typically assume the bottom half does not contain much information of import.

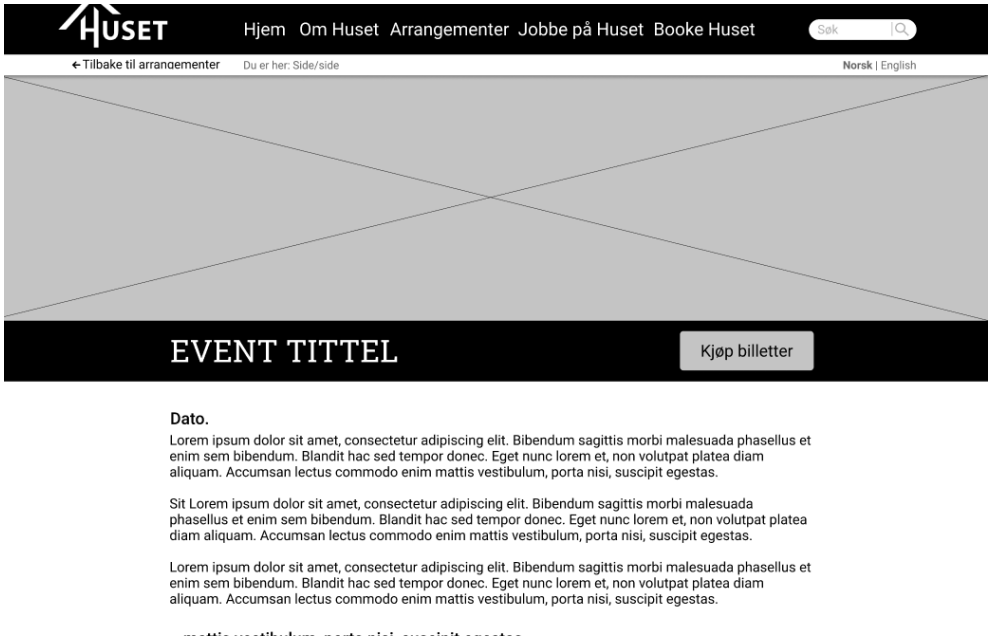

Figure 5.19: *In the 2nd iteration of the low fidelity prototype, the "kjøp billett" button is only present on the top half of the page - at the same line as the post title. A user commented that it should also be on the bottom of the post, as the post information might get quite long.*

5.4 High-fidelity prototype

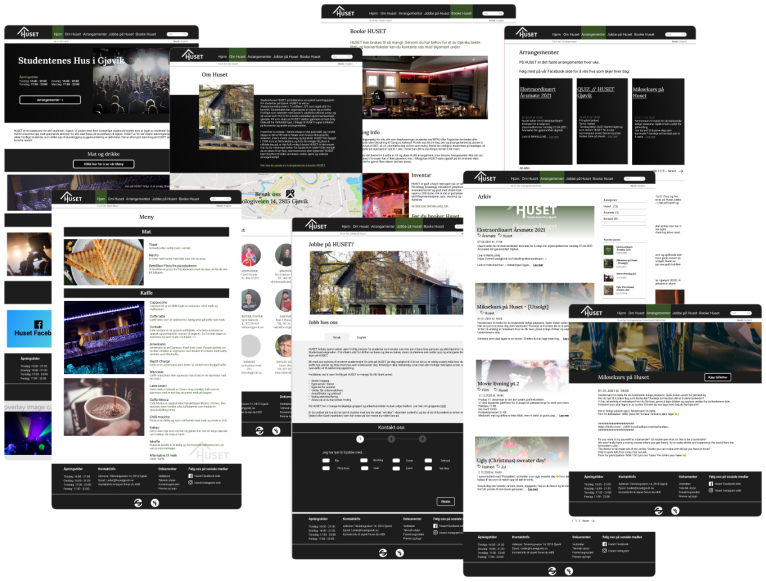

Figure 5.20: *The high-fidelity prototype.*

The hi-fi prototype was developed using Figma, allowing remote cooperation. There is no placeholder images or text in this version, making it look like a live website. The focus was on the colors and the visual design.

The full version of the hi-fi prototype can be seen in Appendix G. The alternative design suggestions created during this phase can be seen in Appendix H.

Some changes were made to placements based on the feedback given on the user tests of the 2nd iteration of the lo-fi prototype. The functionalities were also expanded upon and links would now give visual feedback on hovering. Everything with link functionality became clickable and took the user to its proper location. There were also adjustments made to the margins. Forms would also be working more efficiently to use within the prototype.

A :hover effect was added on all the buttons, turning the background color green.

Figure 5.21: *The black background on buttons go green when the user holds their pointer over it.*

Changes were made to the website breadcrumb bar that formerly stuck with the navigation on scroll. After some feedback, it was changed so that it would no longer stick to the navigation on scroll.

When we started the prototype, we copied over iteration II of the lo-fi prototype and begun replacing the placeholder images, text, and colors. As HUSET as their own design profile and list of colors for use, these were referred to in this phase of the process.

5.4.1 Iteration I

We designed one iteration of the hi-fi prototype and will present this and the choices made here.

The full hi-fi prototype can be seen in Appendix G.

Colors

For the hi-fi prototype we used 4 of HUSET'S brand colors. HUSET Gray and white for main colors, and HUSET grønn and HUSET Light Green for accent colors on some pieces of text, titles, links, and for hover effects.

Font

For the hi-fi prototype we defined a font and font size. On the current solution, HUSET uses Roboto as its font family, with 18px set as the base font-size in their

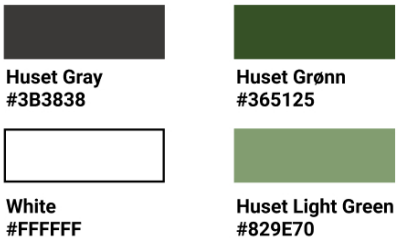

Figure 5.22: *The colors used for the hi-fi prototype.*

CSS. For our design, we decided to keep Roboto as the font for the body/main text. For titles and subtitles we decided to use the font Lora. As written by Google (n.d.[b]), Lora is a serif font and is optimised for screen appearance. With Lora as the title font and Roboto as the font for the main text creates a fitting font duo together. The serifs present in Lora creating contrasts against the sans-serif font Roboto.

For the base font size we decided to use 20px, as this is recommended for websites viewed on desktop (Kennedy, E. D., 2020). We created a font guide for the prototype which can be seen in figure 5.23.

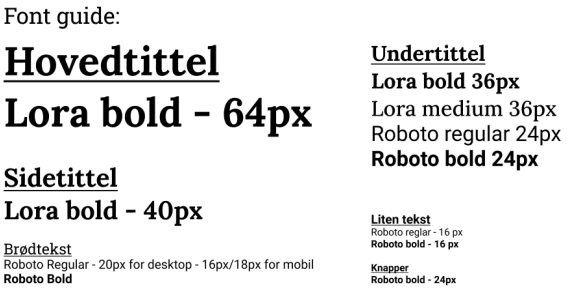

Figure 5.23: *The font guide created for the high fidelity prototype.*

Hjem

No text or placement changes were made between the lo-fi or hi-fi prototype. We only turned the design into a hi-fi prototype by adding color, images and text.

For the colors, we also used a black gradient on the top banner as pure dark grey appeared flat. When choosing images we focused on ensuring that they visually fit together and accurately portrayed the activities at HUSET.

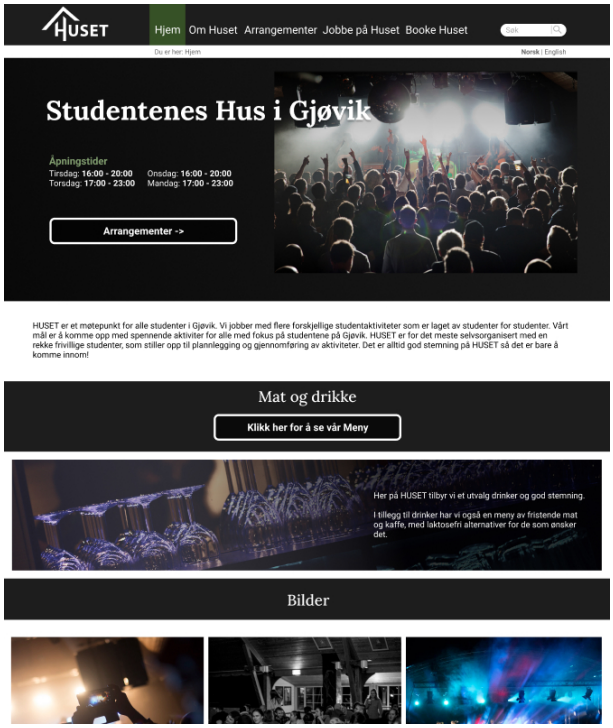

Figure 5.24: *Hi-fi prototype of the homepage.*

Meny

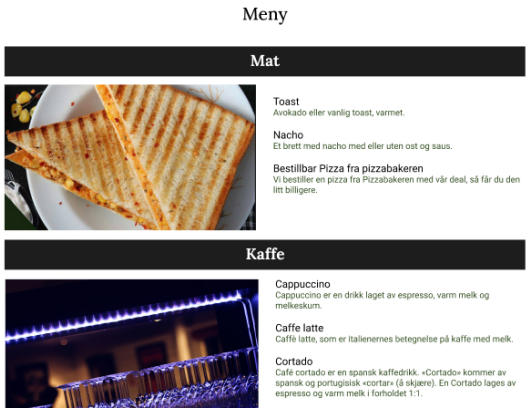

Figure 5.25: *A crop of the hi-fi prototype of the Meny page.*

No changes made to placement. Used HUSET Grønn as an accent color on the description of the menu items. We had problems finding images of food and coffee for the page using HUSET's collection of images. We used an image from unsplash of a cup of coffee as a temporary solution and contacted the project owner.

Om Huset

After feedback from the user testing, we added a map on the Om Huset page. HUSET Green was used as an accent color for links and the titles of the board members. The grey background on the header section of the page was given a black gradient, as pure dark grey appeared flat.

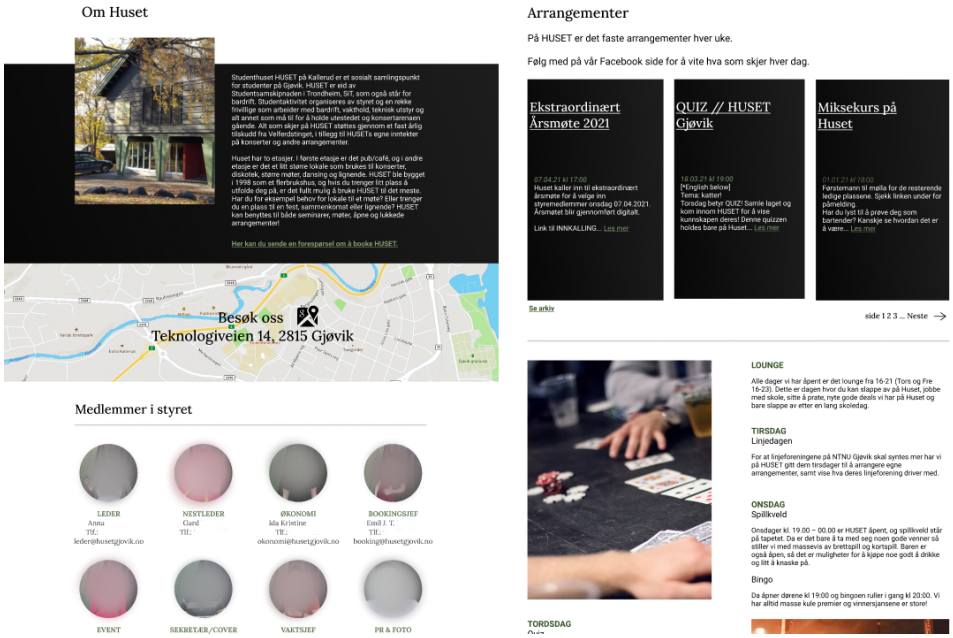

Figure 5.26: *A crop of the hi-fi prototype of the Om Huset page and arrangementer page.*

Arrangementer

We used HUSET Grønn as an accent color for links, the date on the post feed, and the days of the week on the list of fixed events. We chose images that represent all events happening at HUSET - from concerts to calmer activities like card games.

Arkiv

Figure 5.27: *The design chosen for the post preview on the Arkiv page.*

Chose a design for the post preview, based on feedback from the user tests.

Post page

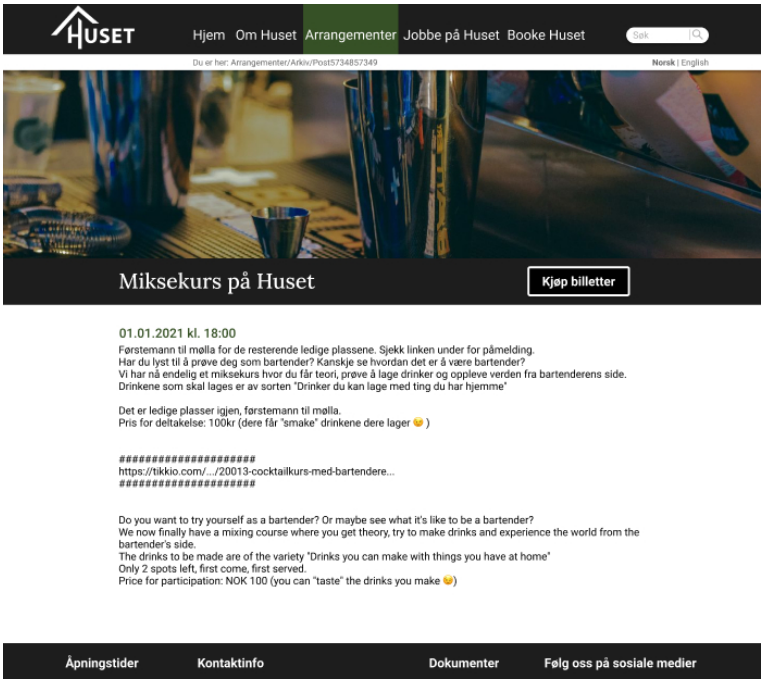

Figure 5.28: *The hifi prototype for an event post.*

Designed a hi-fi prototype for the post page, with images and information collected from an event held previously at HUSET.

Jobbe på HUSET

No placement changes made, but the order of the steps on the form changed.

Booke HUSET

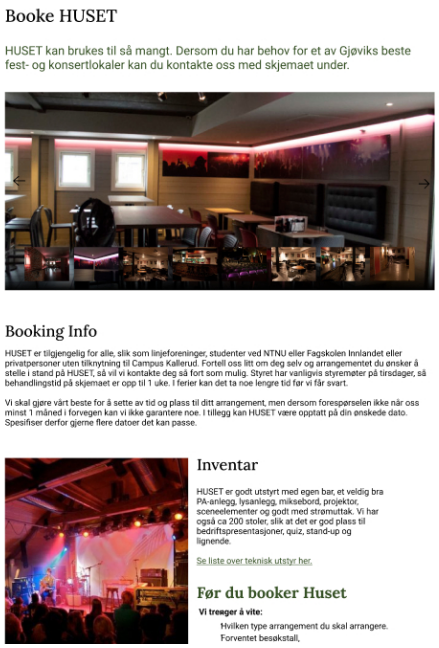

Figure 5.29: *The hi-fi prototype for the Booke Huset page.*

In the image carousel we chose the same images present on the image carousel on HUSET's current "booke Huset" page, as they represent the location quite well.

HUSET Green was used as an accent color on links, the first paragraph of the page, and on the "Før du booker huset"(Before you book Huset) header - to make this section stand out.

Forms

The order of the steps on the forms were changes, after a discussion with the project owner. The old form had the user fill in their contact info before filling in the information specific for the form - why and what they want to work with at HUSET and what they want to book HUSET for. Now this information is filled in first, with the contact info being the last, third step. It makes more sense for the user to first fill in the relevant information from the form itself, so they can first see the options and then decide if they'd like to fill it in. With the old order there is a risk that a user would fill in their contact information, but then realise none of the options for volunteer work actually interests them.

5.4.2 User testing the hi-fi prototype

After finishing the high fidelity prototype, we conducted a new round of testing. We kept the same tasks used during the testing of the second iteration of the low fidelity user test, but edited Task 8 slightly to fit the content of the hi-fi prototype.

The tasks for this round of user testing were:

1. Start from the homepage and find out when HUSET opens on Thursdays.
2. Start from the homepage and find out at what day and time HUSET holds Quizzes.
3. Start from the *Arrangementer* (events) page and the list of board members at HUSET.
4. Start from the homepage and find out how to contact HUSET to book their location for an event.
5. Start from home and find out how to get to HUSET's physical location - either the address or a map.
6. Start from home and find the list of technical equipment (*utstyrsliste*) available on HUSET's website
7. Start from home and find out how many guests you can host at HUSET's location.
8. Start from home and buy a ticket for *Miksekurset* (mixology course) at HUSET.
9. Start from home and find and open the archive of all events held at HUSET. Sort by the category *Årsmøte* (annual meeting).

For this round of testing we tested 3 users:

- User 1: A 23 year old male student.
- User 2: A 26-30 year old male.
- User 3: A 31+ year old male student.

Time spent on tasks

Figure 5.30 displays the time the users spent on each task. The users spent about the time expected, with some noticeable improvement, on all tasks, except for 2, 7, and 9.

Especially task 5 and 8 showed some noticeable improvement, as we had made changes based on feedback from the lo-fi prototype resulting in the users spending less time to solve each task. This includes adding a map on the Om Huset page, and changing the appearance on the lists of event posts on the Arrangementer page.

The increase of time on task 2, is caused by a user going a path we did not expect. This task asked the user to find at what time and day HUSET hosts Quizes. As this is a fixed event it's listed on the bottom of the Arrangementer page, but one user instead went to the archive and found a listing for a Quiz there. The user did find the correct information, as HUSET also posts about Quizes on their Facebook

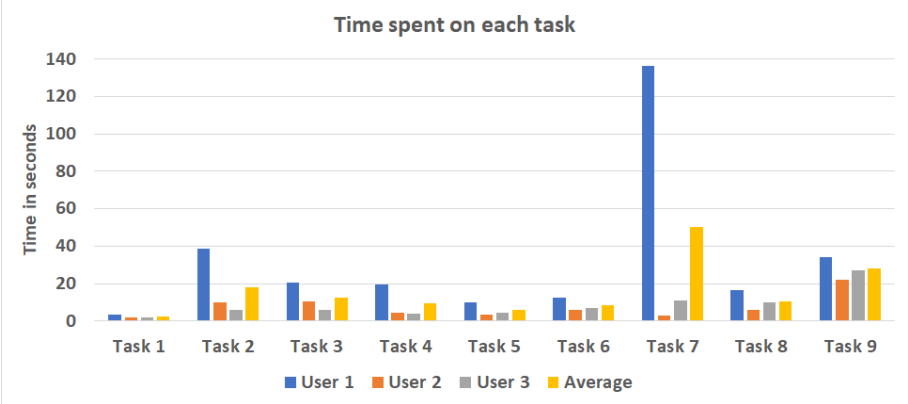

Figure 5.30: *A graph displaying time each of the users spent on each task, measured in seconds.*

page so they end up in the archive as well, but going this route takes more time and clicks.

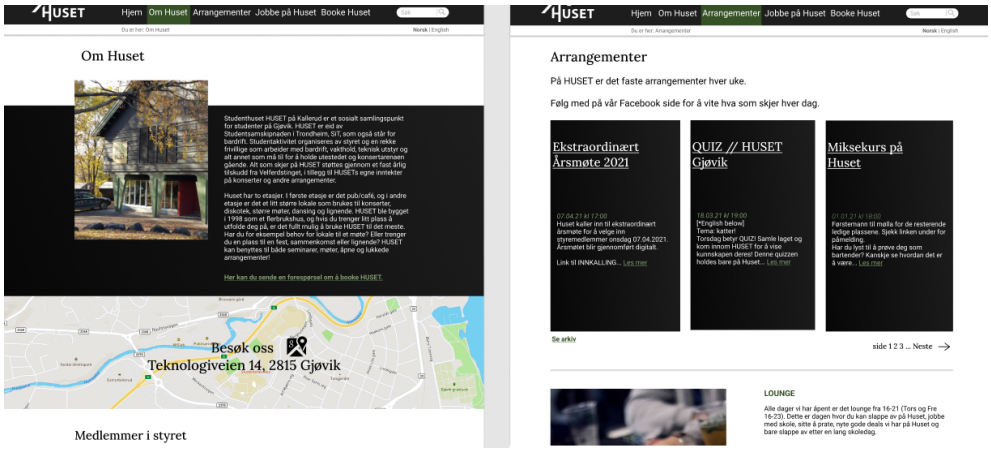

Figure 5.31: *By adding a map on the Om Huset page and changing the design on the event list of the Arrangementer page to make them look more clickable, we reduced the time users spent solving task 5 and 8.*

There was a substantial increase in the time spent on task 7, from an average of 15 seconds during the lo-fi prototype testing, to an average of 50 seconds. This was caused by user 1 spending over 2 minutes to solve the task. The question was to find out how many guests HUSET can host at the time and the confusion was caused by a problem we were already aware of: the text on the site is vague. The user commented that he saw the "200 chairs" in the text, but did not equate this to mean 200 guests. This word choice has been brought up to the project owner.

There was also an increase of 13 seconds on task 9, which asks the user to find the event/post "archive". Here all 3 users spent around 20-30 seconds to solve the task. One user commented that the link to the archive was small and difficult to

find.

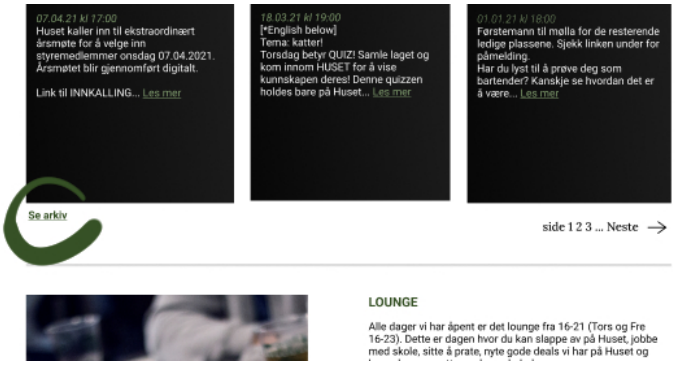

Figure 5.32: *The link leading to the archive on the Arrangementer page is both in a smaller font than the rest of the text on the page and somewhat overshadowed by the items around it. This causes it to be difficult to find.*

Amount of clicks to solve each task

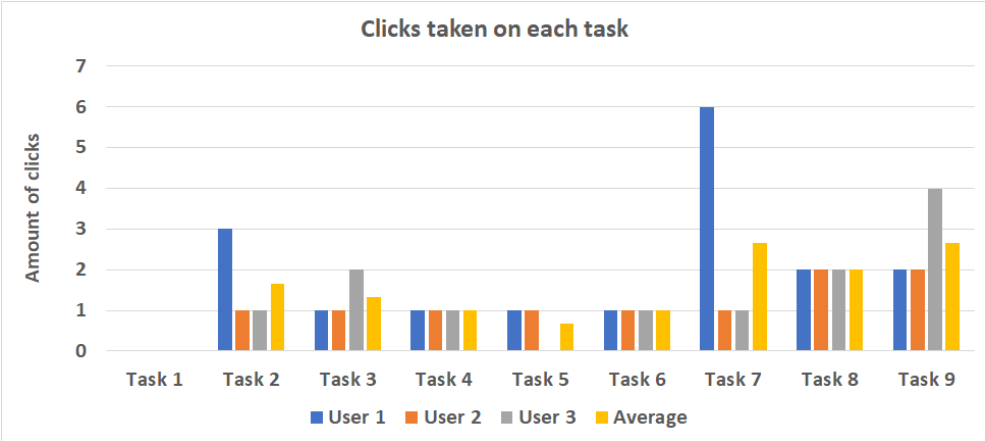

Figure 5.33: *A graph displaying the amount of clicks each user took to solve each task. For some tasks the user used 0 clicks to solve it.*

The clicks taken to solve each tasks can be seen in figure 5.33. For this the users mostly followed the expected path, save for one user each on task 3, 7 and 4. The largest increase was on task 7, which was caused by unclear language resulting in the user not believing they had found the correct answer.

System Usability Score

As during previous user tests, the users here were again asked to fill out the System Usability Questionnaire. Keep in mind a score of 68 is considered average. The scores can be seen in figure 5.34

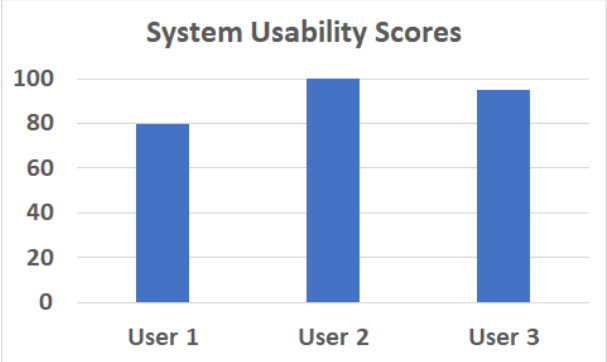

Figure 5.34: *A graph displaying the System Usability Score of each user. A score of 68 is considered average and 100 is the best possible score.*

All scores are above the "average" set for this test - 68. However, user 1 gave us the lowest score we had given yet and overall the scores were slightly lower than we had previously. In order to help find out what might be the problem, we went through the SUS reply done by user 1. Here we found one slightly confusing choice of scores for question 5 and 6. Question 5 got a score of 4(implying they agree with the statement), but yet question 6 got a score of 3(implying neutrality). Some questions in the System Usability Scale questionnaire is put together so two questions mirror each other, alternating between asking if the user finds something good or bad. The content of 5 and 6 somewhat mirror each other, and typically a user who chose "Agree" with question 5, would "disagree" with question 6. This users answers here imply they find the system to be well put together, but yet illogical or inconsistent. As we did not question the user for their scores after taking the tests, we cannot know for sure what caused the user to believe this. This could be caused by the sheer amount of differing content on the site due to its wide target audience, or it could be a result of inconsistent design choices on our part.

Comments from users

For this test we had less comments from the users than earlier iterations, but we did have one user comment on the archive page in particular. On the top right side of the archive page is a list of all "categories" used on the event post. The idea here is that the user can press one of these links and then the posts will be sorted by this category. One user expressed a wish to instead have a checkbox system, allowing a user to search by more than one category at the time.

5.5 Text and information on the website

As this is a redesign of an existing website, a lot of information was already provided through the currently live site. This consists of the amount of pages and

Figure 5.35: *In their old/current solution HUSET has one long block of 4 paragraphs on thier Booke HUSET page. In our design suggestion, this text has been split into 4 parts, each with its own header, and the final paragraph became a list.*

the text itself. However, during the initial user testing of the site we saw that some text was not as descriptive as it could be, and took measures to re-represent some pages.

This problem is particularly present on the "booke Huset" page, where we added more headers and split the content. On this page the several long paragraphs were split into separate sections, while one in particular was turned into a list. This was done as short lists are generally easier to read than paragraphs (The Office of Disease Prevention and Health Promotion, 2016). A user might end up skipping the text if it is found to be difficult to read, or may miss crucial information. Through the use of a header "før du booker huset"(before you book Huset) and a list, a user is less likely to miss this important information before they send a form to book Huset.

5.6 Images on the website

Images were provided by HUSET and its many photographers. We were given access to a google drive library and were allowed to choose images from here. We could also collect images from their Facebook page and current website, but we

had to be mindful of not including images were you could easily identify specific individuals - unless they are part of a crowd - due to GDPR (General Data Protection Regulation).

There was some trouble finding fitting images for all sections of the site. This includes images for the meny page, as well as images of the exterior of HUSET. The same exterior image was utilised twice on the hi-fi prototype, as well as the developed pages, as there were no other suitable images for these areas. The project owner was contacted regarding this and made aware of the issue.

5.7 Plugin design

The design proposal for the Huset Styret plugin, intended to help them update the members of the board easily. Currently they have to fiddle with html inside the WordPress editor to do so, risking breaking the appearance if anything is done wrong. Two designs were proposed for the plugin, but these designs were not tested or iterated upon any further. This was not done because we realised we would not have the time to develop the plugin. The design proposals for the plugin can be seen in figure 5.36.

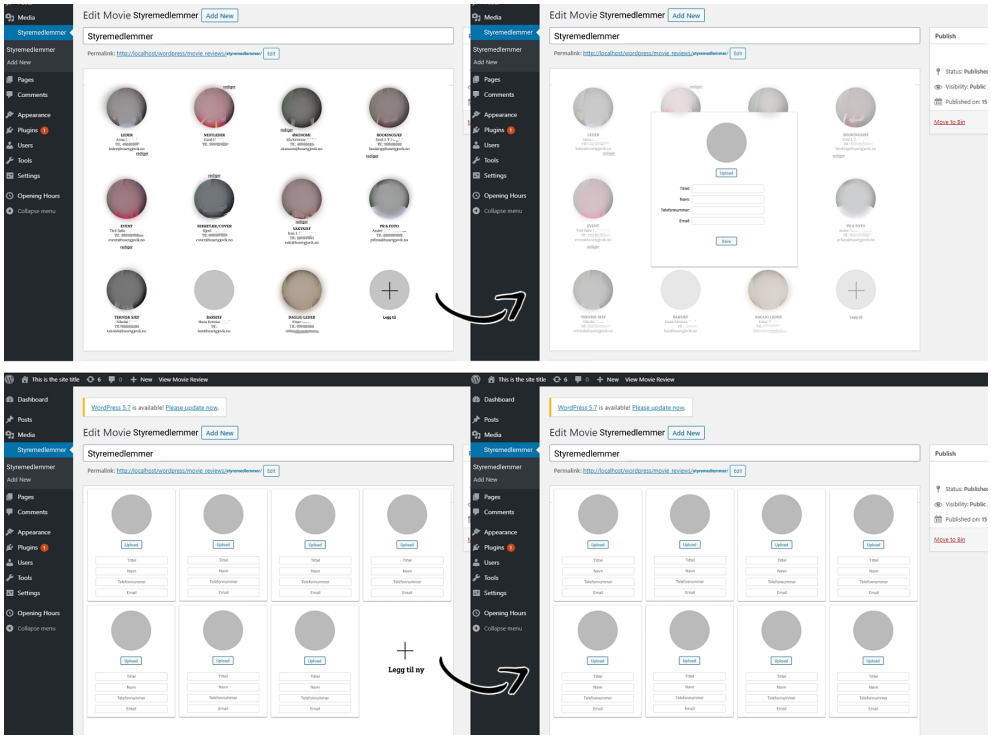

Figure 5.36: *The two design proposals made for the HUSET Styret plugin. The board members have been blurred due to consideration of their privacy.*

Chapter 6

Development

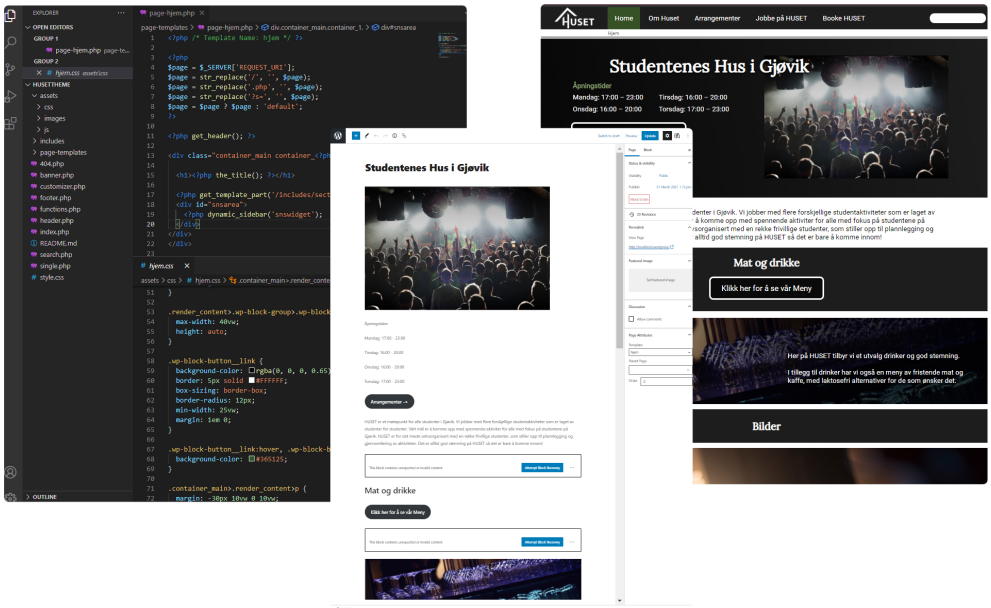

Figure 6.1: *A visual representation of the work done during the development phase.*

In this chapter, we will present our development phase and discuss choices made. We will start by introducing our development process framework, Scrum, and how we used this framework. After this we will present our development environment and our repository: which we used to share code with each other, then we will present the file structure within the repository. After this we will discuss how we developed the custom WordPress theme and present some key parts related to this, including presenting code snippets and images from the WordPress admin panel. We will discuss how we ensured our developed product adheres to the WCAG requirements and is user friendly. Finally, we will present the results from the user testing of the developed theme and discuss this.

6.1 Development process framework

We used the development process framework Scrum to plan our development process to ensure high efficiency, reduce conflicts or problems to occur, and increase the chance of delivering a high quality product. In this section we will present our development process framework, scrum, and how we used Scrum.

6.1.1 Scrum

Scrum is an agile development process framework which we chose to use due to its adaptivity and ability to deal with unpredictability in a more controlled manner.

When using Scrum, the development phase is split into several, short Sprints, with each Sprint having the goal to develop a deliverable MVP. By having smaller Sprints with smaller goals it's easier to reach our goals within a realistic timeframe. As mentioned in Product Plan (n.d.), Scrum allows for rapid feedback through the daily scrum, meaning problems can be brought up swiftly and dealt with accordingly. A drawback that we as a group had to keep in mind during our development phase is the risk of a "scope creep", meaning the scope for a certain Sprint might end up too big. But by keeping this drawback in mind when planning our sprints, we managed to reduce this.

Scrum is also, as mentioned earlier, an agile framework. Meaning it allows for an iterative approach, with a focus on satisfying the customer rather than the tools or processes used. We believed that by utilising Scrum as our development framework, we would be able to do a better job during our development phase and thus deliver a better product.

Each Scrum Sprint consists of three events: Sprint planning, the Daily Scrum, and the Sprint Retrospective. The sprint planning occurs before the beginning of a Sprint and consists of the scrum team deciding what is to be developed during the sprint. The daily scrum is a 15-minute meeting where each team members say what they got done the day before and what they intend to do today. Finally, the sprint retrospective occurs after a Sprint has been completed and involved the team discussing if there is anything to improve upon for the next Sprint (Scrum.org, n.d.).

Scrum also makes use of three Scrum Artifacts. The first of these is the product backlog, a prioritised list of features received from or written during conversations with the project owner. The second artifact is the sprint backlog, which contains the stories from the product backlog that the scrum team intends to develop during the next Sprint. The third artifact is the burnout chart which shows the completion of tasks from the sprint backlog (Uzility, 2014).

When using the Scrum development framework, there are three main roles. The project owner, which in this case is André Tørlen Lønvik. The Scrum Master, who will ensure the Scrum process is followed. And finally, the Scrum Team.

6.1.2 How the group used Scrum

We had 4 1-week long Sprints during our development phase. We had the two sprint artifacts, the product backlog and sprint backlog, inside the same to-do list for ease of finding. At the start of each sprint we moved tasks from the "backlog"(representing the product backlog) to the "to do" list(representing the sprint backlog). A screenshot of our task list for the Sprints can be seen in figure 6.2.

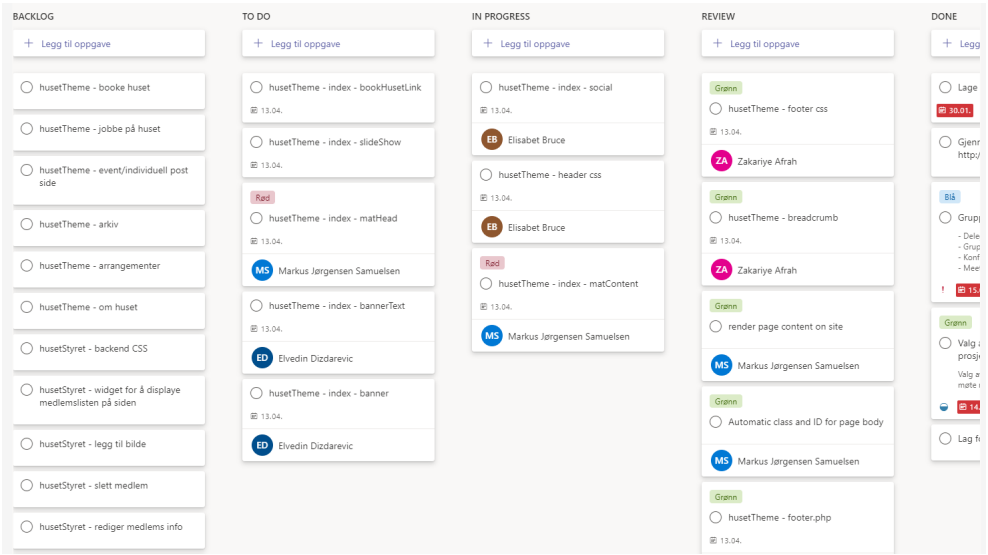

Figure 6.2: *Our development task list in MS teams. The backlog represent the "product backlog" and the to do list represent the "sprint backlog".*

As is the nature of a Scrum sprint, we tried to minimise the size of each task into smaller chunks. But as we later only had two people on development, and had to work on our own local copy, we instead allocated individual pages to each person on the development team and it was their task to split their page into several, smaller tasks and plan their development.

We conducted daily Scrums 3 days a week, at the start of each of our meetings.

At the end of each sprint we conducted a sprint review, looking at what was done the previous sprint. A recurring theme during out sprint reviews is that we did not complete all tasks from the previous Sprint, needing to carry these tasks over to the next one. We also repeatedly found other things that had to be prioritised more, resulting in planned tasks not being done. Through the use of Sprint Retrospective, by discussing what went well and what could be done better for the next Sprint, we managed to reduce the amount of tasks that had to be carried over for each Sprint. And by the time we finished the 4th Sprint, we had reached our goal of developing a working MVP.

6.2 Development environment

The development environment consisted of WordPress running locally on Windows and Apple operating systems. These operating systems were running the same versions of WordPress (5.7) and XAMPP the local server. XAMPP would later be replaced with a google cloud virtual machine. See 7.2 Deployment. The WordPress theme was connected to git see 2.3.2 Git repository.

The local WordPress database of each group member was set up in MySQL, running on the software XAMPP. This is a software that lets the user run a local server on the machine. XAMPP simulates a web service while not being connected to anything, being stored on the computer locally. Utilizing XAMPP meant that the databases also were local. Because the MySQL database where WordPress stores pages were not connected to the git repository, group members had to export and import pages to share them as there was no way to update the database with GitHub as seen in figure 6.3

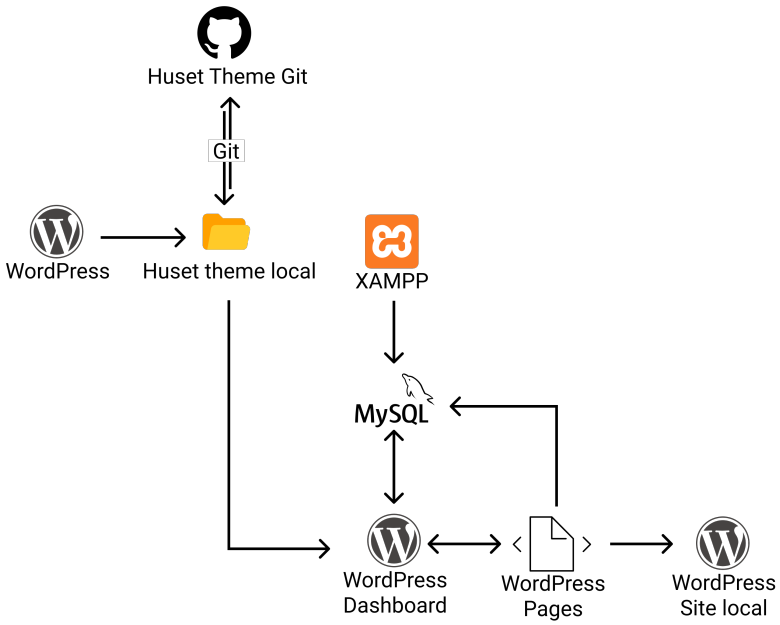

Figure 6.3: *Figure showing how the development environment was set up. The theme is hosted in a git repository and could be updated here, but the WordPress pages were all saved in each persons local MySQL database.*

To fix this in the later part of the development phase, the WordPress theme was moved to a google cloud virtual machine. See 7.2 Deployment. Doing so made WordPress accessible over the internet. Having WordPress accessible over the web removed the need to import and export WordPress pages and other things from the database. Such as images from the local database, as the changes were made

directly to the live web version.

6.3 Repositories

We used a git repository hosted on GitHub to host our code, as it provides version control and allows us to easily share and edit code while in separate locations. We had to clone the repository to our locally hosted WordPress folder, inside the wp-content/themes folder specifically. This was done so WordPress would register the theme and allow us to view it on our locally hosted website, without having to manually re-upload the theme every time a change was made in the repository.

There was a master Branch and a working branch where changed were pushed before being merged. Most of the coding work would be done locally and the pushed to the version and then the group members had to pull the code to get the latest theme. This would not work with the pages as pages is part of the database and not the theme. Therefore there is no pages in the GitHub repository see figure 6.4.

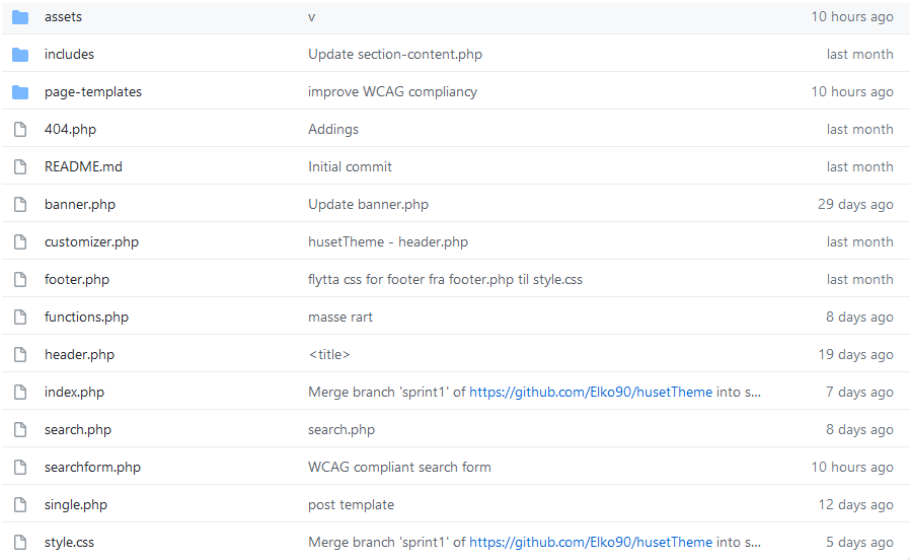

Figure 6.4: *File structure as seen in GitHub*

6.4 File structure

Due to the nature of WordPress we had to follow their conventions.

Main folder contained general components like footer.php, header.php, index.php, functions.php, 404.php, search.php and style.css. See figure 6.4.

style.css contains information about the theme and its authors.

404.php is the page that will appear if a user tries to enter a url on the site which does not exist.search.php is the template page displaying the search results

when a user uses the "search" widget inside the navigation. As we were building a custom theme, these two template files needed to be developed by us from scratch. 404.php and search.php do not need to be connected in any way using the WordPress admin panel, as they utilise the appropriate file names for its function. WordPress will automatically use search.php for its template when a user uses the search widget. Similarly, it will do the same for 404.php.

we created page templates for most pages, as some of them needed unique items such as widget spaces. see figure 6.5.

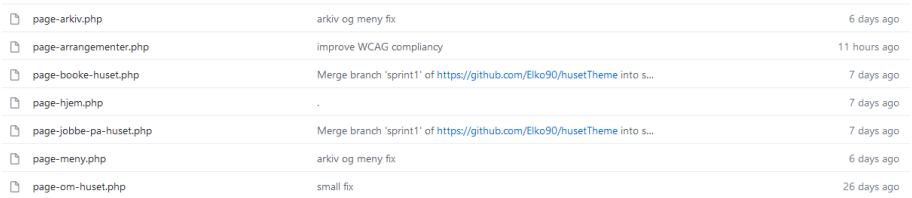

Figure 6.5: *The custom template files as seen in GitHub*

All css files exists inside the assets folder, except for style.css which needs to be in the main theme folder as according to WordPress documentation.

6.5 Development of custom WordPress theme

In this section we will present snippets of code and images of the developed custom theme, as well as arguments on why we took some of the choices that we did. The section starts by presenting some of the template files required by WordPress. This list includes header.php, footer.php and single.php. We will discuss WordPress page templates, as well as present some of the key parts of several of the page templates we have developed. And finally we will discuss the stylisation done through CSS, how we connected the CSS to the theme and what we did to ensure a responsive design.

6.5.1 Development of header.php

The header.php file contains the top part of the website. It declares the !doctype, containts the <head> element as well as all relevant <meta> elements within it and it opens the <body> tag and contains the <nav> element. Inside the <nav> there is a php function to collect the logo and the navigation list which can be set inside the WordPress admin panel.

```
1            <nav>
2            <button id="menutoggle">Meny</button>
3                <img src="<?php echo get_theme_mod('pdn_logo_img_settings'); ?>" />
4                <?php // renders navigation
5            wp_nav_menu(array(
6                'theme_location' => 'custom-nav',
7                'container_class' => 'custom-navigation'
```

```
8             ));
9             ?>
10                <!-- creates area for widgets -->
11                <?php dynamic_sidebar('search');  ?>
12            </nav>
```

Code listing 6.1: the <nav> element inside the header.php file.

The logo and the pages for the navigation can be set inside the Appearance> customise menu inside the admin panel.

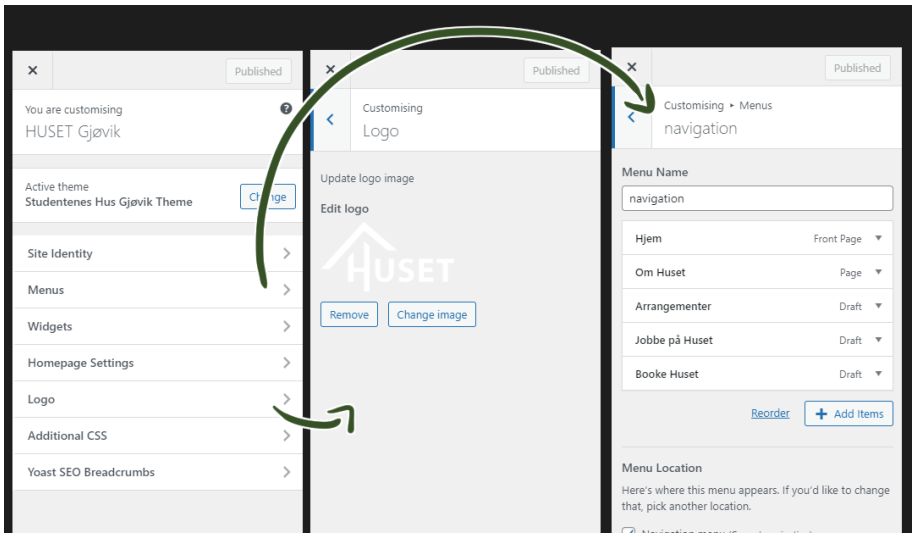

Figure 6.6: *Inside the Appearance> customise screen in the WordPress admin panel, the user can set the logo as well as the pages to be displayed inside the navigation.*

6.5.2 Development of footer.php

As required we also have a footer.php file which contains the <footer> element and closes the <body> and <html>. The footer.php file has no content directly inside the file, but instead renders two widgets, one for text and one to display the sponsors, which have been declared in the functions.php file.

```
1  <footer class=footerContainter>
2
3      <div class="textContainer">
4          <?php dynamic_sidebar('textfooter'); ?>
5      </div>
6
7      <div class="sponserContainer">
8      <?php dynamic_sidebar('sponsfooter');  ?>
9      </div>
10
11 </footer>
12
```

```
13 <?php wp_footer();?>
14 </body>
15 </html>
```

Code listing 6.2: the footer.php file.

```
1  register_sidebar(array(
2    'name' => 'Sponsor Footer',
3    'id'   => 'sponsfooter',
4    'description'   => 'Sponsor bildene i footeren.',
5    'before_widget' => '<div id="%1$s" class="widget %2$s">',
6    'after_widget'  => '</div>',
7    'before_title'  => '<h2>',
8    'after_title'   => '</h2>'
9  ));
```

Code listing 6.3: a code sample of one of the widgets being declared in the functions.php file.

The content of the widgets can be edited inside the Appearance>Widgets menu accessible in the WordPress admin panel. We planned for the footer to contain 4 of WordPress' default text widgets and 2 of their default image widgets for the sponsors. The client can use these widgets to edit the information inside the footer, including adding hyperlinks.

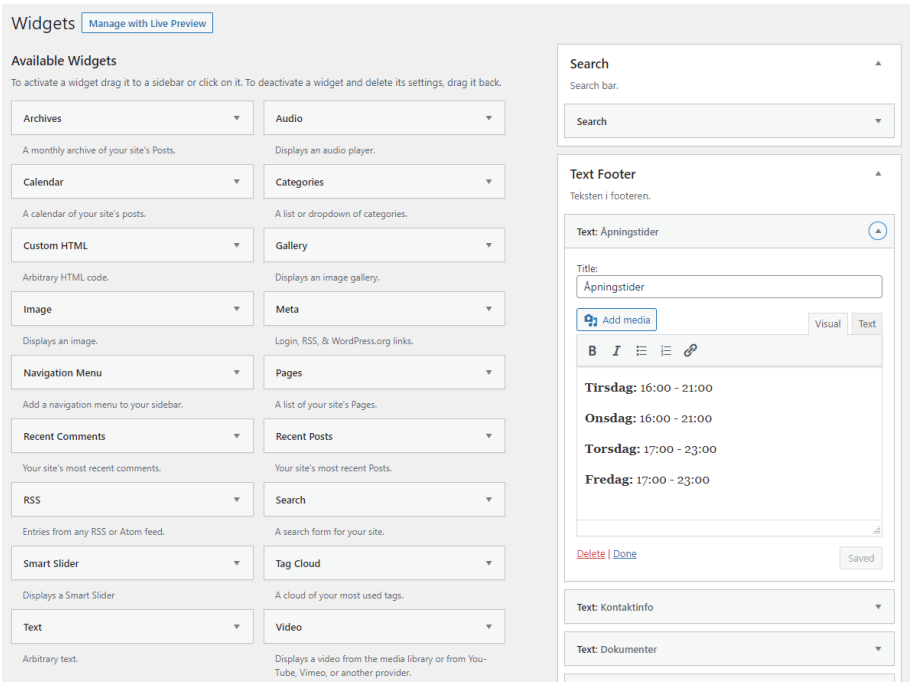

Figure 6.7: *On the widget page the client can drag one of WordPress' default widgets over to the desired widget menu and edit the information there.*

Figure 6.8: *How the footer looks on the website with all required information added.*

6.5.3 Development of the post template: single.php

single.php is the template file for singular post files. It is named as such due to the WordPress documentation. This template opens and ends like the page template, by getting header.php and footer.php. As we did not develop our own plugin to collect event information, we instead got access to and used the one HUSET already has to generate the posts, as we needed to know which shape the plugin stores all the information in so we could display it correctly.

The header image from the facebook event is saved as a feature image in the WordPress post. in order to display this right we first had to add a function to the functions.php file allowing the theme to support featured images on posts. In the single.php file it calls the post_thumbnail(if it is present on the post), the title and the date using WordPress' own functions, and then finally the includes/section-content.php file to display the content. By putting the title and date inside their own elements <h1> and <p id="date"> respectively, they become easy to target inside the CSS file.

We did not develop the feature for a "buy ticket" button to automatically appear on the post page, due to a lack of time. The original plan was to write a function, likely using JavaScript, that would comb through the post_content looking for a word starting with "https://tikkio.com/". If present it would display a "kjøp billett"(buy ticket) button on the top and bottom of the page - as we got feedback during user testing that it would be valuable to have the button on the bottom as well because some posts are very long - with the full link to the ticket location.

```
1  get_header(); ?>
2
3  <div class="container_main single_post">
4
5    <?php
6    if (has_post_thumbnail()) {
7      the_post_thumbnail();
8    }
9    ?>
10   <h1><?php the_title(); ?></h1>
11   <p id="date"><?php the_date('d.m.Y'); ?></p>
12
13   <?php get_template_part('includes/section', 'content'); ?>
```

```
14
15 </div>
16
17 <?php get_footer(); ?>
```

Code listing 6.4: The single.php file.

6.5.4 WordPress page templates

Each page on the theme utilises a page template. When using page templates WordPress has their own hierarchy for which template a page will be used. It will initially use the slug of the category the page has been given, and if there is a match within the page-template files then this template will automatically be assigned to that page or post. If there are no slug matches, it will look for slug-idnumber. Then a generic category file. Then a generic archive template. and in the end it will use index.php for all pages.

Due to this we created a simple, basic index.php file which only displays the content and title with no widget areas or anything special. This functions as a fallback for any new pages created by HUSET.

It is possible to choose which specific template to use inside the WordPress page editor, under the "page attributes" options which can be seen in figure 6.9.

All page templates opens by calling the header.php file and close by calling the footer.php file. The content is displayed by calling the include/section-content.php file which has a function in it to render the content present on the page currently open.

We used the Gutenberg editor, which is the "new" WordPress editor that released with version 5.0, so write content for the pages. As it is important that the content is as easily editable as possible, it was necessary for us to utilise this editor rather than writing static .php pages. The biggest difference between the 5.0 Gutenberg editor and WordPress' classic editor from earlier iterations of the CMS, is what they call Blocks. Blocks allow the user to "insert, rearrange, and syle multimedia content with very little technical knowledge" (Wordpress, n.d.). This means that each element in the editor is a Block and using the Gutenberg editors features it is also possible to group several elements together into one parent Block. An example of this can be seen in figure 6.10. Here the blue line is surrounding one Block, but each element inside there like the image and each individual line of text is another Block. Each of these blocks are given a class allowing us to target them when working on the stylisation.

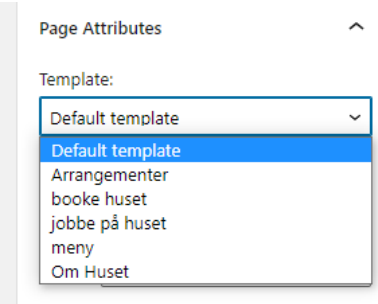

Figure 6.9: *On the right side of the WordPress editor, the user can use the dropdown menu to select the page template to use for the current page.*

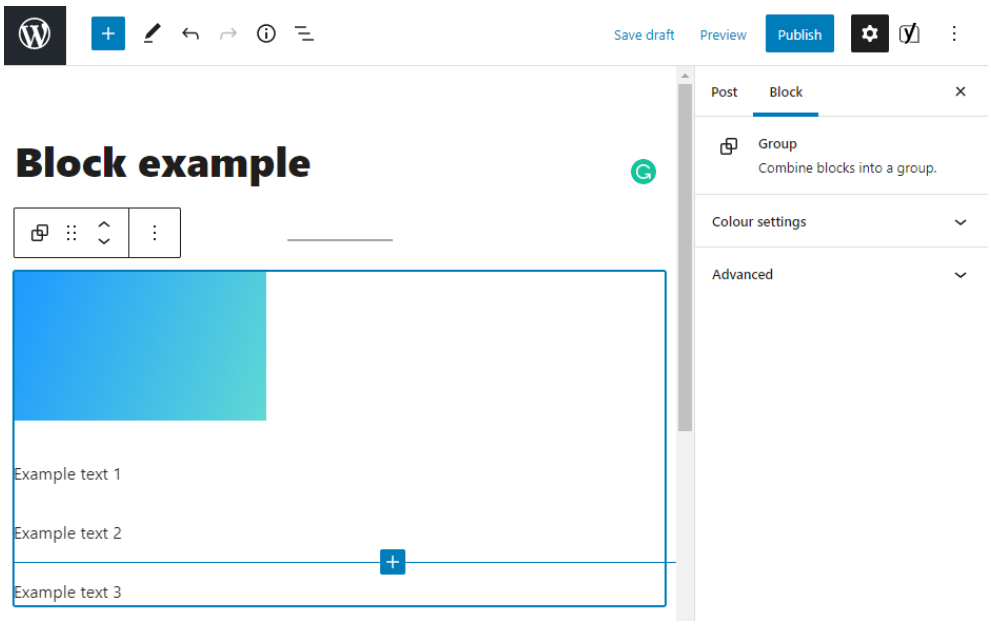

Figure 6.10: *The WordPress 5.0 Gutenberg editor, showcasing a grouped Block containing 4 Block children.*

6.5.5 Development of the page template: Om HUSET

For this section we will present how we developed the "Om Huset" page, both inside the WordPress editor and in the .php file.

As all the other pages the Om HUSET page uses a page template called page-om-huset.php. Like all the other page templates it opens with the get_header() function and closes with get_footer(), displaying the header and footer on the page. The other common content is the rendering of the title through using WordPress' the_title(), function inside an <h1> element and using the template part section-content.php to render the content from the WordPress page "Om HUSET".

On figure 6.11 you can see how the "Om HUSET" page looks inside the WordPress editor. On the bottom half of the page there is a block saying "This block contains unexpected or invalid content". This is an HTML block, created so you can directly write HTML inside the editor when necessary. While the new Gutenberg editor is powerful and provides a lot of useful functionality, it was difficult to develop the exact design we created without utilising some HTML blocks. The block not loading is due to it containing invalid HTML, as the HTML block's design requires it to contain entirely valid HTML on its own. So while the HTML on the rendered page is valid, the HTML in this singular block is causing it to give a warning. It is, however, possible to edit all other content on the page without breaking the , but pressing the "Attempt block removal" will make it close the and break the layout of the page.

We tried to limit the use of HTMl directly in the editor, but in some cases it was either this or putting the content inside so many groups and blocks it would

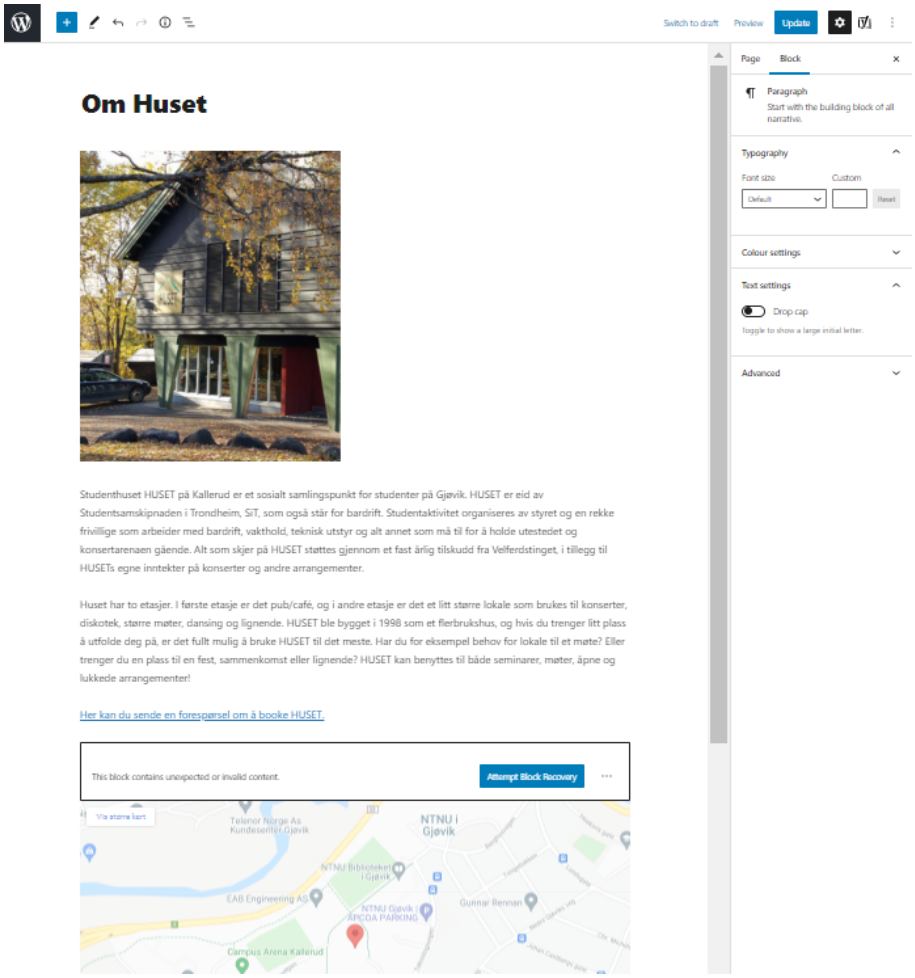

Figure 6.11: *The Om HUSET page as seen in the WordPress editor.*

become difficult to edit - thus going against one of our goals saying the content should be as easy to edit as possible.

HUSET Styret

What is unique about the Om HUSET page is the list of board members. When the project owner showed us their current solution, we noticed the list of board members at HUSET is present in its own post rather than a part of the "om HUSET" WordPress page. When developing this page we decided to do the same here, as the board list is so long that the page itself would become very big and cumbersome to edit. With this much info in a single file, it only increases the chance of something being done wrong when editing. Originally, we wanted to develop a small custom post plugin to do this part, but as this was not possible we instead choice to do it in the same way as the current solution.

Inside the page-om-huset.php file there is a query searching for all posts with the category name "HUSET Styret". The content of this post will then be displayed on the bottom of the Om HUSET page, after the content but before the footer, if it exists. If it does not exist, a message saying "Det er ingen innlegg fra kategorien: HUSET Styret" will be displayed instead. Naturally, this means the post with the board members needs to be given the category "HUSET Styret" to appear.

```
1        <?php if ($the_query->have_posts()) : ?>
2            <?php while ($the_query->have_posts()) : $the_query->the_post(); ?>
3                <h2><?php the_title(); ?></h2>
4                <?php the_content(); ?>
5
6            <?php endwhile; ?>
7            <?php wp_reset_postdata(); ?>
8
9        <?php else : ?>
10           <p><?php __('Det er ingen innlegg fra kategorien: HUSET Styret'); ?></p
                 >
11       <?php endif; ?>
```

Code listing 6.5: The function that uses a query defined earlier in the file to find and display a post.

The HUSET Styret post uses the column feature inside the WordPress editor, with 4 columns added. Inside each column is a group of 4 Blocks: an image and three lines of text. The first row of board members can be seen in figure 6.12. The images are the placeholder images used by HUSET when a particular board member post is not occupied.

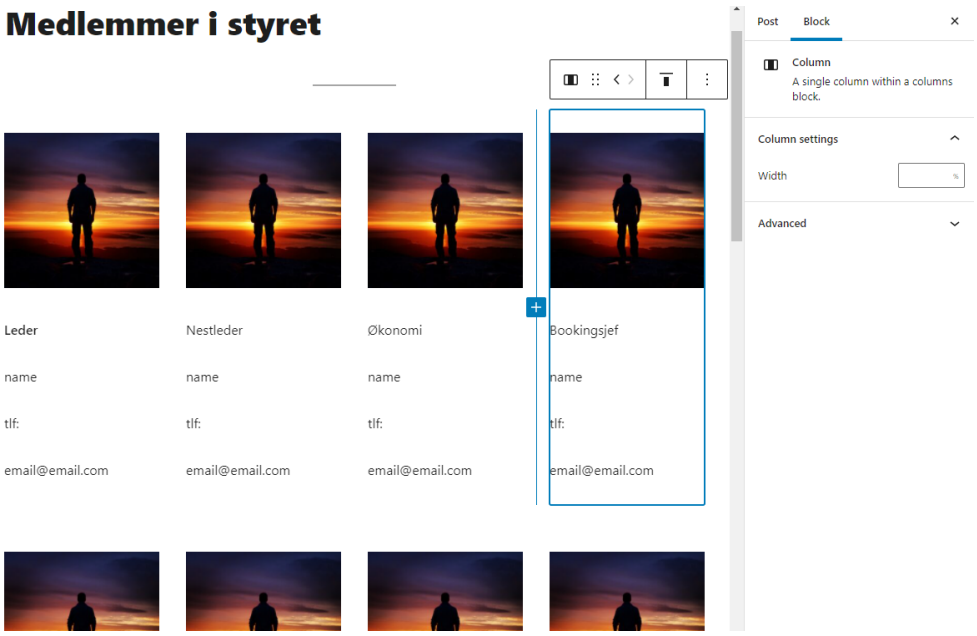

Figure 6.12: *The HUSET board members post with placeholder images and text.*

6.5.6 HUSET Meny

The Meny (menu) page for displaying food and drinks is a very simple page. like all other pages it gets a footer and a header. The Meny page also has its own custom CSS loaded through the page-meny.php template in the WordPress theme. The Meny page consists of 2 sections. These are: Mat (food) and Drikke (drinks). Each one of these sections has a header and 2 columns. the left one containing an image, and the right one containing a list. Due to WordPress not having a description list configuration for their lists blocks, this list is made using HTML. The items can be added or removed in this HTML code seen in figure 6.13. The list is set up like shown below:

```
 <dl>
  <dt>Item</dt>
  <dd>Item description </dd>
</dl>
```

Code listing 6.6: The description list syntax.

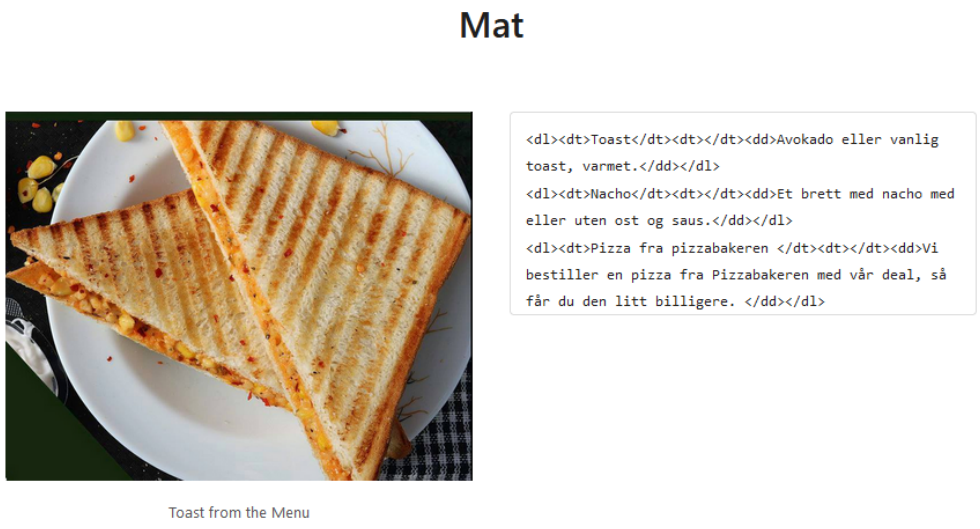

Figure 6.13: *Meny page mat section as seen in the WordPress editor.*

Therefore, to add a new item to the list a new dt (the item) and dl (item description) element is needed. It could be argued that the same things could be done with a unordered list, but the description would not be semantically related to the item, so doing that would be wrong. The Meny page is a static page that does not need to be changed regularly. In the future this solution could be expanded upon with a custom WordPress block. It might also be implemented in future versions of WordPress, but as of now it is not possible to do so without a plugin or HTML code in the gutenberg editor. There is no point in installing a plugin just to do this simple task, as the plugin it self might stop working after a while. However, this code should work just fine and it is correctly set up, so there is no risk of it

not working in the future.

6.5.7 HUSET Jobbe på huset

Jobbe på huset (work at huset) is the page for job applications for HUSET. The page is built up like the other pages with a header and custom CSS loaded in through a template. The Jobbe på huset page is unique in that it has a dedicated English translation that is possible to activate with a button. This is not auto generated English by a translator app, but its own text. The translation button is handled by JavaScript. The English translation and the Norwegian translation are in a div with separate classes that are displayed or hidden depending on which of the classes is active.

```
function Englishtranslation() {
  var x = document.getElementById("english");
  if (x.style.display === "none") {
    x.style.display = "block";
document.getElementById("norsk").style.display = "none";
document.getElementById("norsknap").classList.remove("activebuttonnotsk");
document.getElementById("engelsknap").classList.add("activebuttonnotsk");
  }
}
```

Code listing 6.7: The translation script.

This script is loaded when the page Jobbe på huset is loaded. And it is activate by pressing the English translation. The Norwegian translation is active when the page is loaded so the user will always either have English or a Norwegian text.

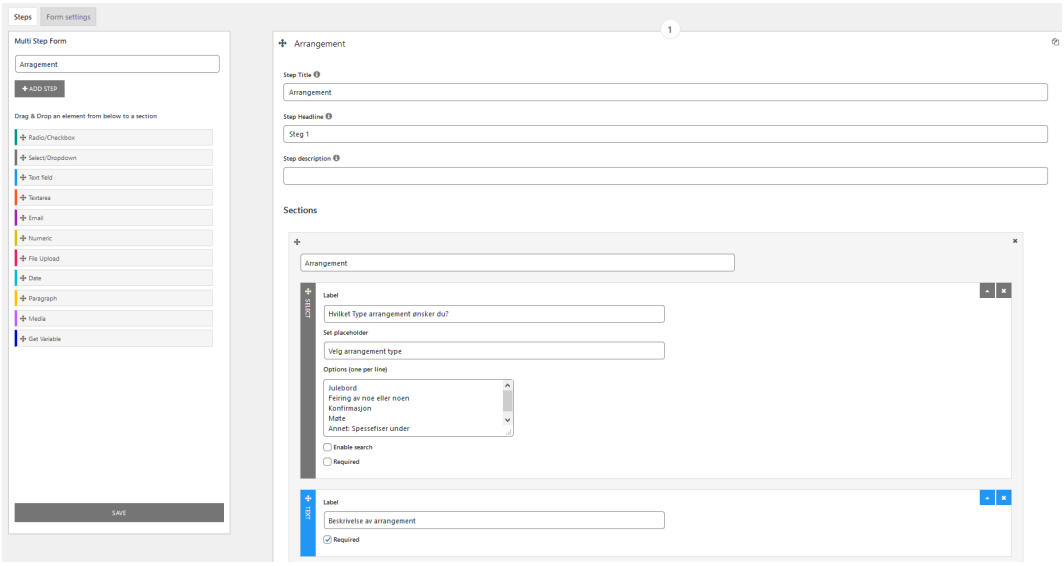

Figure 6.14: *The admin panel for the Multi Step Form plugin*

To build some of the more advanced features of this page as quickly and reli-

able as possible we used a plugin. The plugin used on this page is the Multi Step Form plugin. This plugins used because it is easy to operate by the project owners and its is free. They also provide very good administrator tools to make changes quickly. see figure 6.14 By utilizing these plugins we can ensure that the project owners have the ability to easily make changes in the form. The form is called on by using shortcode. This shortcode can be put inside an HTML element in a WordPress page. The short code for the form looks like shown below:

```
1 [multi-step-form id="3"]
```

Code listing 6.8: The shortcode for the multi step form.

6.5.8 HUSET Booke huset

Booke huset page is also a simple page. It also shares the navigation and footer with the other pages of the website. Booket huset has a contact form used for booking and this form is made with the plugin Multi Step Form. The same plugin used for the Jobbe på huset page. The form is set up differently. focusing on booking rather than a job application. These fields are very simple to edit in the plugin admin panel as seen in figure 6.14. The form has the same look and design as the one on Jobbe på huset. The form is added with shortcode.

There is also some text explaining how to book HUSET and what information HUSET are looking for in the form. as well as a link to the technical equipment amiable.

Smart Slider 3 is a free plugin for WordPress that offer a number of free templates, but also some that cost money. The one used to make the image slider on the Booke huset is free to use. This plugin gives the ability to change out pictures and animation in its own tool as show in figure 6.13. The image slider is inserted into the WordPress page using a shortcode that can be put into a HTML element. the short code for the image slider by Smart Slider 3 is as shown below

```
1 [smartslider3 slider="3"]
```

Code listing 6.9: The shortcode for the image slider.

In the admin panel of Smart Slider 3, see figure 6.15. This admin panel allows for easily swapping out images with new ones. The images are from the media library of WordPress. There are brake points set up to help the slider to conform to universal design. This make sit work well on both desktop and phones.

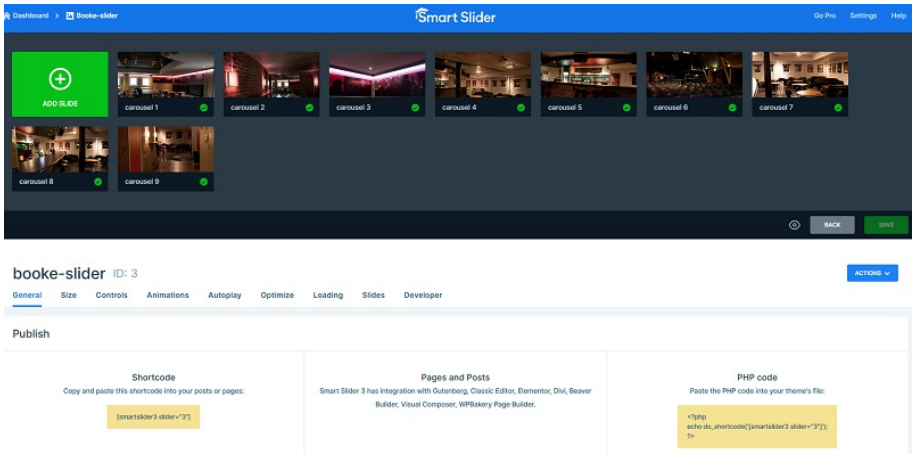

Figure 6.15: *Smart Slider 3 admin panel*

6.5.9 Development of the page template: page-arkiv.php

The archive page shares some concepts with the single.php page, but instead of rendering a single post it renders a certain amount of posts in chronological order. Despite not having its own content, besides the title of the page, the archive page is still a page template and needs to exist alongside the other pages in the WordPress admin panel and be assigned the correct template.

The page-arkiv.php file consist of 2 major parts: the first part it shares with the other page templates, it renders the header, footer and the title of the page. The second part is unique for the archive page and renders 4 posts as well as pagination, by giving the argument 'paged' to the query as seen below.

```
1        $paged = (get_query_var('paged')) ? get_query_var('paged') : '1';
2        $args = array(
3            'nopaging'               => false,
4            'paged'                  => $paged,
5            'posts_per_page'         => '4',
6            'post_type'              => 'post',
7        );
```

Code listing 6.10: the WordPress query allowing for pagination.

The rest of the file consists of the function running the WIP_Query in the same method as can be seen in the single.php file.

The archive page also has room for one widget location, which is intended for the list of categories and the 4 newest posts.

6.5.10 Stylising our custom theme - CSS

There is a universal CSS file, called style.css containing CSS that is used on all pages. The content in this file is mostly related to the header and footer, as well as information regarding the font family, font size and body margins/paddings.

This style.css also contains the name of the theme, the authors of the theme, its description and the version of WordPress the theme is compatible with. This is required as per the WordPress documentation.

Alongside this, each page template has its own CSS file with the styling unique to this template. Inside the functions.php file there is a function which loads in the correct CSS file depending on which template is in use. For this part we utilise WordPress' wpse_enqueue_page_template_styles(), which is a function that enques and loads CSS files for a particular page template. Inside this function there is an if else if function which uses the is_page_template() function to check if a page uses a specific template, and if it does it uses the wp_enqueue_style() and get_stylesheet_directory_uri() to load the correct CSS file.

```
1 function wpse_enqueue_page_template_styles() {
2   if ( is_page_template( 'page-templates/page-hjem.php' ) ) {
3       wp_enqueue_style( 'page-template', get_stylesheet_directory_uri() . '/assets/
            css/hjem.css' );
4   } else if ( is_page_template( 'page-templates/page-om-huset.php' ) ) {
5     wp_enqueue_style( 'page-template', get_stylesheet_directory_uri() . '/assets/
          css/om-huset.css' );
6     }
7 }
8 add_action( 'wp_enqueue_scripts', 'wpse_enqueue_page_template_styles' );
```

Code listing 6.11: the function to load the corresponding css file for a page template.

Making the navigation menu responsive

As the screen goes down to 900px the menu also changes, and becomes a dropdown list toggled by a toggle. The breakpoint being 900px was chosen for a similar reason as above, as this was when the navigation menu started breaking visually. As the menu is toggled, a dropdown list of all the pages as well as the "search" widget will appear as seen in figure 6.16. The logo is also hidden from the navigation bar on screens smaller than 900x to save space and ensure a cleaner design.

This function is done using JavaScript present in the assets/js/nagivation.js file, which is loaded through a function inside the function.php file. This javascript file has several functions with its own purpose: toggleMenu() is the toggle function, listening to presses on the "Meny" button and then either giving or removing the "menuhidden" class to the relevant items depending on whether it is visible or hidden upon toggling.

hideMenuOnSmallScreens() will hide the large screen menu and instead display the mobile menu if the screen is 900px or smaller upon loading the site. This function will run as the site is initially loaded, but it will also run when the browser window is resized after loading.

Finally there is a jQuery event which will give event handlers "passive: true" or "passive: false" to prevent a browser warning from occurring. If this is not done

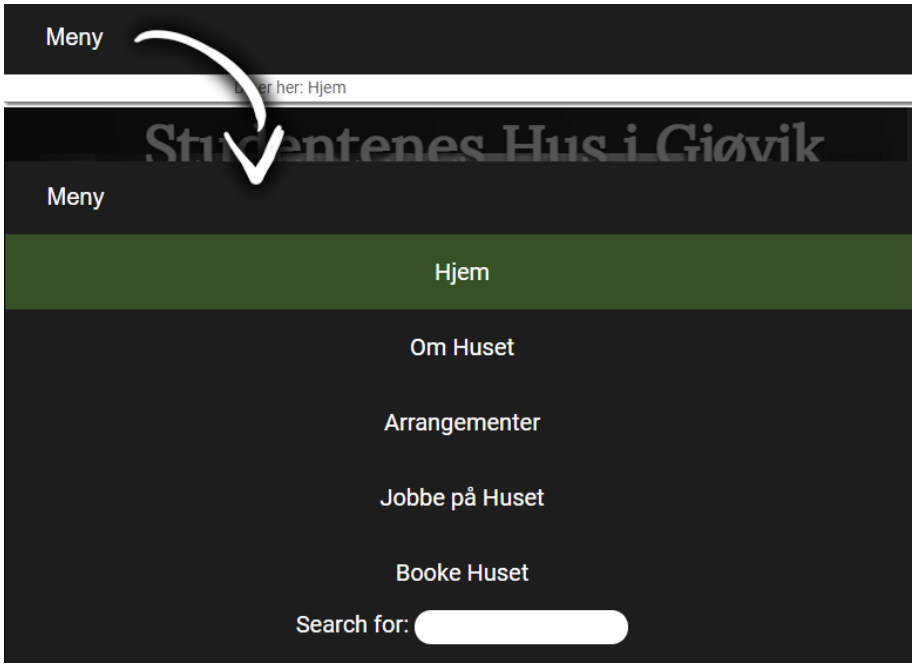

Figure 6.16: *As the menu is toggled, a drop down list of all pages and the searchbar will appear.*

several violations will appear in the console of the browser, saying "Added non-passive event listener to a scroll-blocking 'touchstart' event". This is a result of passive event listeners, a featured shipped in chrome 51 and Firefox 49.

The violation occurs as the page utilises some Jquery, which then calls functions that are not yet updated to accommodate this new update. Adding the following function to the bottom of .js file fixed this issue, by adding passive: false or true to event listeners depending on whether they use preventDefault() or not.

```
jQuery.event.special.touchstart = {
  setup: function( _, ns, handle ){
    if ( ns.includes("noPreventDefault") ) {
      this.addEventListener("touchstart", handle, { passive: false });
    } else {
      this.addEventListener("touchstart", handle, { passive: true });
    }
  }
};
```

Code listing 6.12: the jQuery code snippet that fixes the "Added non-passive event listener to a scroll-blocking 'touchstart' event" violation.

This particular piece of code was collected from `https://stackoverflow.com/questions/46094912/`, from the answer written by Stackoverflow user Sergio.

6.5.11 Development of a responsive design with media queries

We utilised two major breakpoints for the CSS: screen max-width of 1200px and 900px. Standard breakpoints are, as according to Eygi (2020), 320-480px, 481-768px, 769-1024px, 1025-1200px, and 1201px and higher. 1200px is a standard breakpoint for the difference between extra large screens and desktop screens. 900px was chosen ahead of the more common 1024px as this was when the design often started to break. The design would look fine and readable on a width of 1024px, but not on 769px, so due to this we chose a breakpoint somewhere in the middle.

6.6 Testing universal design and WCAG

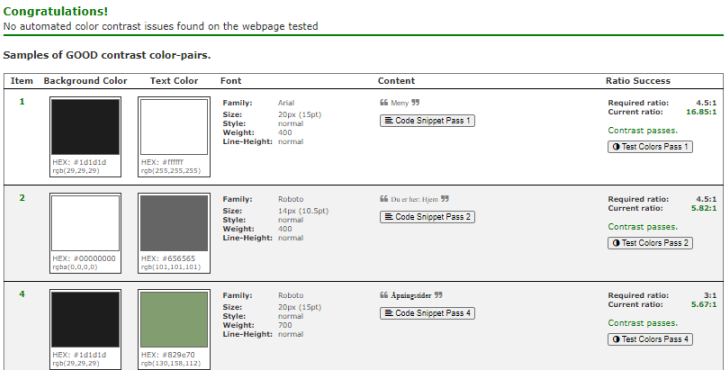

Figure 6.17: *According to `https://color.a11y.com/Contrast/` we pass WCAG requirements regarding color contrast. However, this tool does not check contrast with text on top of images, which we needed to look at manually.*

We knew it is important to ensure that the website follows the WCAG requirements, as breaching these can have serious ramifications in Norway. In order to ensure this we made use of several tools and we will present those tools and our results here.

We used `https://color.a11y.com/Contrast/` which is a tool that checks automated color contrasts, meaning the colors that are present within the code itself. Here we passed.

Figure 6.18: *By adding a grey border around the title text, it passes the WCAG criteria even when the title ends up on top of the lighter parts of the banner image.*

Especially the dark green text on top of the dark grey background is something we needed to be aware of, as this contrast does not pass for regular sized text. However, we had a default size of 20px and gave font-weight:bold to all green text in question, allowing it to pass the criteria for larger text - which states it needs to be at least 18.5px and bold.

However, this tool does not check the contrast of text placed on top of images, so this we checked manually using color contrast analyser. After our first few tests, we saw there were two breaches on the homepage as the images were very light in certain areas: the title text on top of the banner image and the text on top of an image of wine glasses.

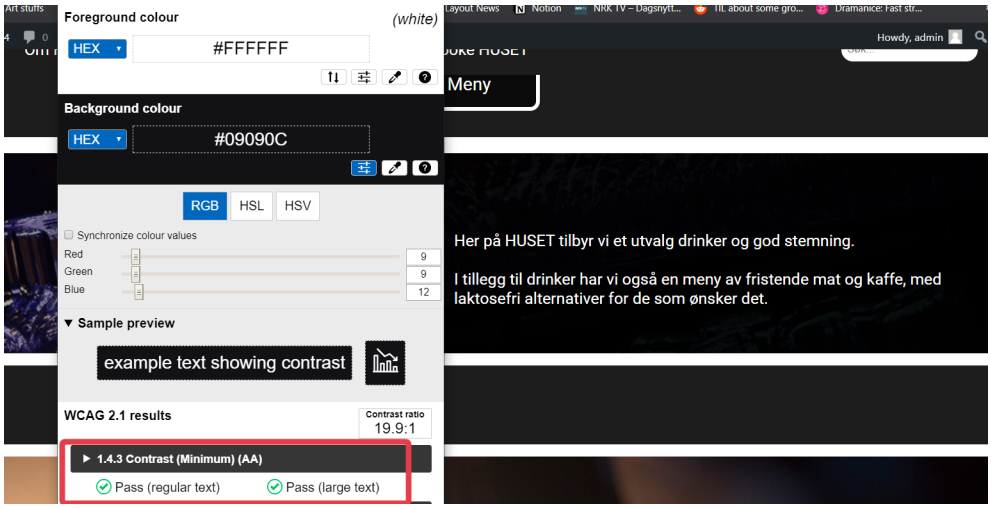

Figure 6.19: *By darkening the gradient on top of the wine glass image, we increased the contrast between the image and the text to pass the WCAG contrast criteria. We tested that it passed by finding the lightest part of the image and measuring its contrast against the text.*

The banner image text we fixed by adding a grey border around the text itself, so when the title overlapped with the lighter portions of the text there was still clear contrast.

For the text on top of the wine glasses we decided to make the gradient even darker to increase contrast and ensured compliance by measuring the contrast between the now lightest part of the image against the white text.

We ran the site through `https://www.webaccessibility.com/` several times to check for errors. At our final scan we had four violations, but as this is an automatic tool these violations appear regardless of context.

Among these violations we found an image lacking alt text, but this image is decoration only meaning it falls under the "sensory" exception under Success Criterion 1.1.1 Non-text Content level A.

Similarly, it alerted of a violations for the search bar as it has placeholder text, telling us that placeholder text should not replace a label. However, our search bar has a label attached to it with an appropriate descriptor.

6.7 User testing of the developed solution

We conducted a new round of user testing on the developed custom theme, hosted using google cloud virtual machine. We kept the same tasks as during during the testing of the lo-fi and hi-fi prototype.

The tasks for this round of user testing were:

1. Start from the homepage and find out when HUSET opens on Thursdays.
2. Start from the homepage and find out at what day and time HUSET holds Quizzes.
3. Start from the *Arrangementer* (events) page and the list of board members at HUSET.
4. Start from the homepage and find out how to contact HUSET to book their location for an event.
5. Start from home and find out how to get to HUSET's physical location - either the address or a map.
6. Start from home and find the list of technical equipment (*utstyrsliste*) available on HUSET's website
7. Start from home and find out how many guests you can host at HUSET's location.
8. Start from home and find out how much a student ticket for the HUSET LAN event costs.
9. Start from home and find and open the archive of all events held at HUSET. Sort by the category *Årsmøte* (annual meeting).

For this round of testing we tested 4 users, who are as follows:

- User 1: A 22 year old female student
- User 2: A 25 year old female student
- User 3: A 30 year old male student
- User 4: A 23 year old male student

Time spent on tasks

Figure 6.20 displays the time the users spent on each task. They spent around the same time as we expected, with some noticeable improvements on Task 7 and 9 compared to the hi-fi prototype testing. These tasks asked the users to "find how many guests HUSET can host at once" and "find the archive of all event posts" respectively.

The route and goal on task 7 has not changed, so any improvement here is likely not caused by a design improvement. Task 9 on the other hand is due to the archive link being a little bit bigger than previous iteration, as we have gotten feedback on this. Despite this, however, some users did still comment that it should be a bit more visible. In the results section we will also discuss feedback from the project owner, who mirrored this sentiment.

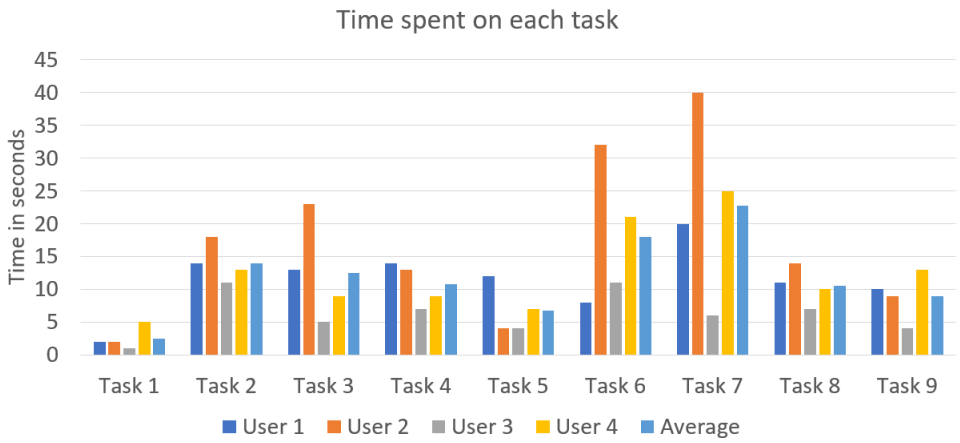

Figure 6.20: *A graph displaying time spent on user test of the developed theme.*

Amount of clicks to solve each task

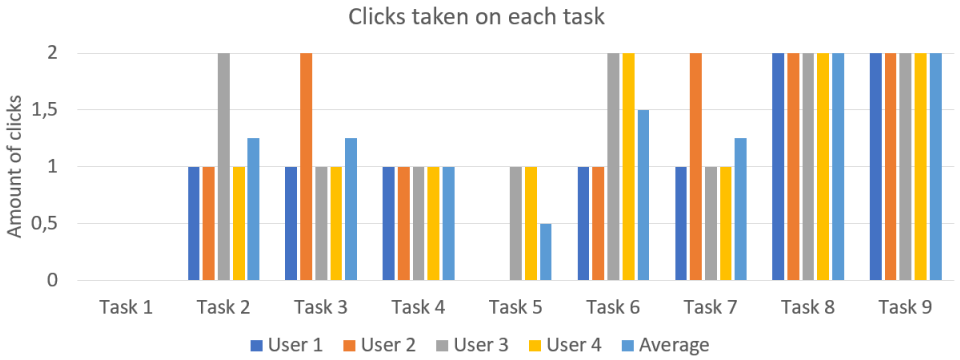

Figure 6.21: *A graph displaying clicks taken on user test of the developed theme. For some tasks the user used 0 clicks to solve it.*

Figure 6.21 displays the amount of clicks each user took while solving each task. They spent more or less the same amount of clicks as expected, with noticeable improvement on Task 7 compared to the hi-fi prototype.

System Usability Score

Figure 6.22 displays the System Usability Scores from this round of user testing. On average they improved slightly from the hi-fi prototype.

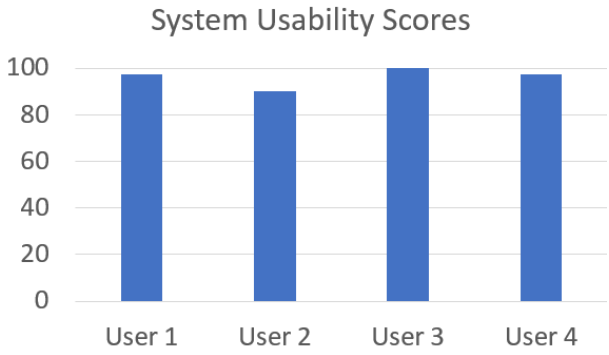

Figure 6.22: *A graph displaying the System Usability Scores from the user testing of the developed theme.*

Comments from users

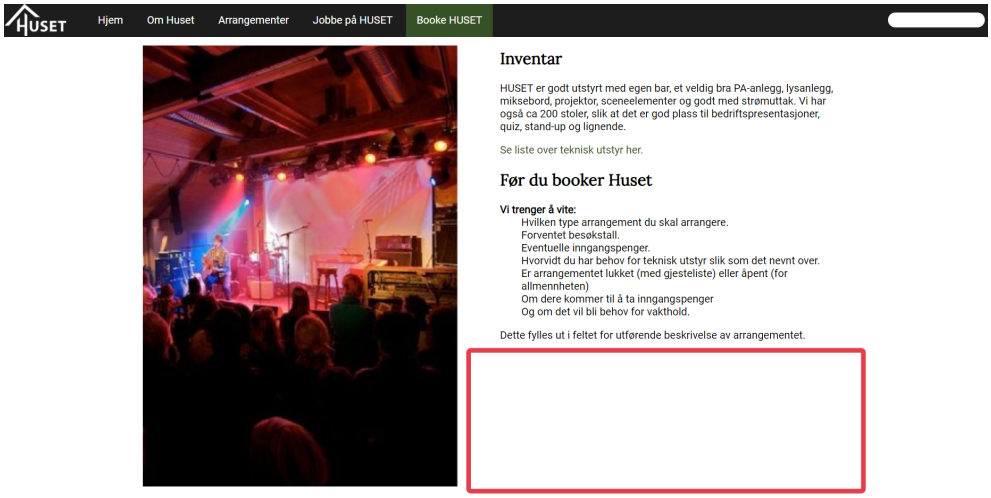

Figure 6.23: *When vieweing the Booke Huset page on larger screen, the text takes less place vertically but the image stays the same height. This creates blank space below the text. A user commented that this made it appear as if there was no more information and this is the bottom of the page.*

During the testing we encouraged the users to share their thoughts as they navigated the page. Overall they seemed very pleased with the placements of maps, especially its presence on two different pages. They also made positive comments about several of the images, stating they fit the website and its theme well.

However, we did get some feedback which would be valuable to consider for any potential, future changes. One user commented that one of the images on the Booke HUSET page is very long in comparison to the text next to it one larger screens. Due to this, the large amount of blank space under the text gives the implication that there is no more information on the page - but the form to book

HUSET is below.

We continued to get feedback on the language on the booke HUSET page, as it says "200 chairs" instead of how many guests there is room for. Finally, we got a comment that the link to the archive is a bit small and could be difficult to find.

Chapter 7

Results

Over the course of this thesis we have done a complete redesign of HUSET's website and provided them with a functional and tested MVP of a custom WordPress theme.

We have gone through several rounds of user testing and will here present those results and show that our design has an improved easy of use. We have implemented our design as a custom WordPress theme, and we have deployed it using a Google Cloud Virtual Machine.

In this chapter we will present the results from all the user tests, discuss the deployment of the theme, discuss our goals, and the final feedback from the project owner.

7.1 Feedback from the target audience

Through our design and development phase we have done four rounds of user testing, on HUSET's old solution, on the second iteration of our lo-fi prototype, of our hi-fi prototype, and of our fully developed solution. In this section we will present these results.

Overall our tests show that the users have a better experience using our design than HUSET's current one. This is most evident in the reduced amount of time spent navigating the page.

7.1.1 User test comparison

Time spent on tasks

Through looking at the time spent solving each task, our solution shows an overall decrease in time which was our goal. While our design is slightly more complicated due to the increase of pages and text and images on certain pages, we have still shown that users spend less time finding crucial information.

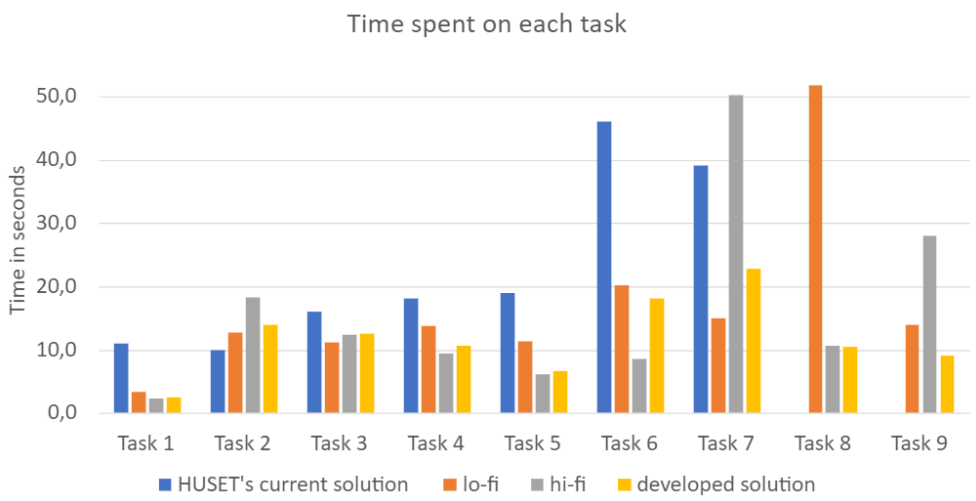

Figure 7.1: *A graph comparing the average amount of seconds spent on each task during each round of user testing. Task 8 and 9 were not a part of the user testing of HUSET's current solution.*

Amount of clicks to solve each task

As we did not have data on the amount of clicks users spent to solve each task on HUSET's current solution, we could not compare these. However, we can use the our data to say that on average each user spent very few clicks to complete their task. In most scenarios they spent the exact amount of clicks we expected them to, meaning they went our intended route.

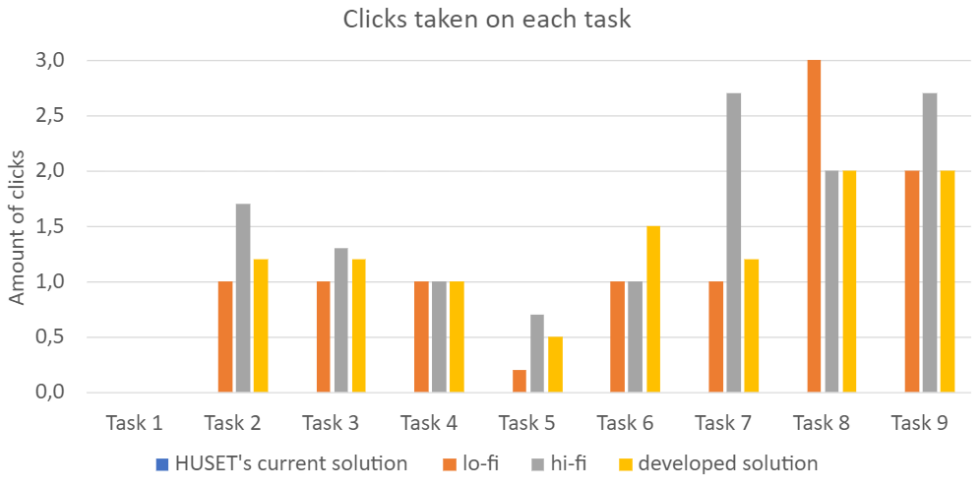

Figure 7.2: *A graph comparing the average amount of clicks taken on each task during each round of user testing. We did not have data on the amount of clicks for the user testing of HUSET's current solution. On some tasks users spent 0 clicks to solve the task.*

System Usability Score

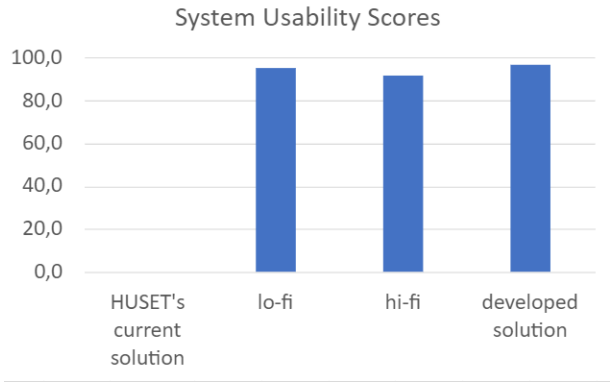

Figure 7.3: *A graph comparing the average System Usability Scores from each round of user testing. We do not have the System Usability Scores for the user test of HUSET's current solution. A score of 68 is considered average and 100 is the best possible score.*

As we did not originally plan to use a System Usability Scale at the start of the thesis, we do not have this data to compare to. However, we can still say with certainty that users have a good experience with our solution. A score of 68 is considered "average" for the system usability scores and we show no scores below 80 during any of our tests.

7.2 Deployment

The custom theme has been deployed using Google Cloud Platform Virtual Machine. The site can be reached through `https://folk.ntnu.no/ethoyer/EZME.html`.

The Virtual Machine hosting the site is running WordPress 7.1, PHP version 7.4.9, MySQL-Client and Server 5.7.31, and phpMyAdmin 5.0.2. The custom theme itself runs on WordPress 5.5, but it was upgraded to 7.1 due to one of the plugins we used, Yoast SEO, requiring this.

The information of the board members, as well as their images, have been replaced with placeholder information due to consideration of their privacy.

7.3 Goals

For the theme we reached the following goals:

- we created a unique design for HUSET, utilising their colors as well as modern, standard design choices without having it look like a standard template site.

- There is now room for the sponsors in the footer. The design is also made in such a way that several sponsors(more than the current 2) can be added if this is necessary.
- The full text from events posts is no longer displayed on the preview page, resulting in a cleaner design.
- it is now possible to toggle between Norwegian and English on the "jobbe for HUSET" page.
- we did not use language directly related to alcohol, as per Norwegian law.
- all images used were collected from HUSET's own archive, save from one image collected from unsplash. We made sure to not use any images with easily recognizable people, as per Norwegian law.

We did not manage to make all information easier to edit than the current theme for HUSET, as we prioritised the experience of the visitors of the site.

We also did not redevelop the Facebook graph API for a similar reason. We intended to test and problem shoot the current plugin instead, but were not successful in reproducing any errors. During our testing the plugin worked as intended.

7.3.1 Result goals

We designed and developed a new custom WordPress theme for HUSET. The design is universally accessible and "visually pleasing" as according to the project owner. It is unique and not a template design, utilising HUSET's brand colors for easy recognize-ability.

7.3.2 Effect goals

We were not able to reach our first effect goal, as the current custom theme does not provide any easier methods to edit the content on the site. But nor is it any more difficult to edit than the current theme.

Through our user testing we have seen that our design improves the user experience of the site significantly, reducing the amount of time spent navigation and looking for information. The users also commented that our design is more pleasing and modern, resulting in higher user satisfaction. Due to this we can say that we fulfilled our second effect goal: to communicate HUSETs purpose and inform customers in a clearer and more efficient manner.

7.4 Feedback from the project owner

After completing the MVP, we presented it to the project owner and asked for his feedback. This was done to both gauge the project owners' overall satisfaction with the product and to ensure that there were no major flaws that we missed.

He was positive towards the final result and pleased with the overall design but had some feedback along the line of inconsistent margins and text placements

on the site. The full list of feedback he gave can be seen in Appendix I. While we did not have the opportunity to make these changes, the MVP was accepted by the project owner. The rest of this section will exclusively focus on the project owners' thoughts.

The project owner seemed satisfied with the final product, but he had some thought about the process. He would have preferred it if we had meetings more often to give a statues report on our progress. We on the other hand did not want to be too demanding of the project owner's time. In retrospect we probably could have done with more meetings but in general this was not a major issue.

He also had a few questions about our choice of styling. Specifically, why we did not use a framework such as React or Vue. He said that a lot of the small issues with the styling would have be easily avoided if we implemented a framework to ease the challenges we experienced in the development phase.

We had previously discussed the use of a frameworks to handle the styling of the website, but as we had varying degrees of experience with it we decided against it. We believed familiarizing ourselves with WordPress would be a large enough task on its own.

The project owner said that most of the functionalities were there and that he was impressed that we manged to do it all in such a short time. The only things that are missing are a few style changes as well as the features that he had hoped we could develop. Overall, he thought that this was a great product, and it would serve as something future developers could work on and improve if needed.

Chapter 8

Conclusion

Studentenes Hus i Gjøvik had an old, custom WordPress theme for their page, with what the project owner coined as an "outdated design" and is difficult to update. During the course of this thesis we have designed and developed a new custom WordPress theme for HUSET, following current design standards. Through several rounds of user testing we have iterated upon and improved our design and can say, through looking at the results, that we have created something with a higher user satisfaction than HUSET's previous theme. While it is still lacking in terms of ease of editing the content, users now spend less time navigating the site to find the information they desire.

8.1 What could be done different

We planned the thesis process at the beginning of the project to the best of our abilities, but naturally things will always occur to shift the schedule.

As we were unfamiliar with how to plan a design process for a re-design, the research phase took longer than expected. This cost us some time, but is not something we would have been able to foresee without experience from a similar project.

We also should have spent more time at the start familiarising us with WordPress, which would've made the development process proceed smoother. The scope of the development was not entirely clear to everyone and this resulted in too little time being set aside for the development phase itself and also any preparation that could have been done beforehand. Learning the big scope of developing a plugin beforehand might have also allowed us to realise that our goals were too big a bit earlier.

Due to falling behind schedule the development phase also ended up being significantly shorter than planned. But despite this we still delivered a finished custom theme and spent the time we had efficiently.

The COVID-19 pandemic also impacted the project in different ways. Although this was planned for and considerations were taken, there is no getting away

from the impact corona has had on the project. This meant that a lot of the tools designers and developers typically use that are dependent on interaction with others were no longer suitable, with not much good quality information on how to work around a pandemic other than using online tools instead. This caused the group to have to use creative methods of solving these obstacles.

One thing is using remote tools to work on a project, but being dependent on it has some very negative side effects with technical problems out of our control. Because online tools are excellent until someone loses their network connection, then the online tool is useless.

It pandemic particularly affected the user testing, as the regulations limiting physical contact and ability to meet. Due to this it was especially difficult to find and test users who fit in the older age bracket of HUSET's target audience. We tried to work around this as best as we could, but fell somewhat short on this aspect.

However, this has given the group valuable experience in remote working and dealing with problems while being hundreds of miles away.

8.2 Future development

After the current MVP was developed, we look at what could be done better. While our user testing show that the design is user friendly and easy to navigate, there are a few design inconsistencies.

The most important thing for us to change would be the inconsistencies regarding the margins and padding. Because of the varying sizes the titles and text are not positioned at the same spot on all pages. The titles and paragraphs below them are also not always placed the same vertically, which results in a somewhat strange appearance.

Similarly, we would have liked to make the design more friendly for wider screens. As it is currently, there are no max widths to the text so on very wide screens the page appears very stretched out and difficult to read.

Figures

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Appendix

Appendix A

Group rules and conflict handling plans

1. All members must contribute to the project.
2. All members must attend the meetings, if certain members can't attend, they must give notice to the group 12 hours before.
3. All members should finish their part of the project.
4. All members should respect other group members.
5. All decisions will be voted by all the members, if split results occur then the leader of the group will make the last call.
6. All members should feel free to express their ideas and meanings.
7. If a group member is ill over 3 weeks, the group will arrange a meeting with the supervisor and see what can be done to facilitate work for the member.
8. All rules can be edited/modified in case of need. This decision must be voted by the majority of the group.
9. If multiple rules get violated by any group member continuously creating problems. The group should schedule a meeting with the supervisor to discuss how to resolve the problem.
10. If nothing helps, and the problem continues a vote will be held that may result in termination of the members contract with the group.

Appendix B

Personas

Martin Stålnes

Age 23

Nationality Norwegian

Location Gjøvik

Status Single

Occupation Student at NTNU, Electronics Engineering

BIO

Martin Stålnes is a first-year student at NTNU Gjovik and he is studying as electronics engineer. Martin is very future oriented young person with big plans within his field in electronics. He grew up outside of Gran in Innlandet.
He comes from a family of 5 people and they like to spend time at their cabin when they can find time. Martin likes to ski and be out in the wilderness when he is not tinkering with electronics. He also likes to fly drones in his free time.

Tech

Martin is very tech savvy person. He studies as electronics engineer, so he knows his way around technology. Martin prefers to use his desktop computer to surf the internet. He also dislikes facebook and would rather not use it.

Pain Points/Frustrations

Martin gets frustrated when he cannot find information or when web pages are not updated with the correct information.

Wants and Needs

Wishes to find and meet new people in Gjøvik and know what there is to do around town. He would like to find students to hang out with.

One of the four personas created at the start of the design phase.

Andrew Lewis

Age 55

Nationality Canada

Location Oslo

Status Married, 2 children

Occupation Siv. Ing for Aker Carbon Capture

BIO

Andrew is a family man with 2 children who he spends a majority of his time with when not at work. He is the production manager at Aker Carbon Capture and has worked there the past 10 years.
He has a Siv. Ing degree from the University of Toronto. This is where he met his Norwegian wife who he later decided to move to Norway with.
Andrew and his family are concerned with the environment and sustainability. This is one of the reasons why he works for his current company, as they share his values and vision.
Andrew is very interested in technology and has an eye for innovation.

Tech

Andrew is familiar with how to use computers and mobile devices. He has experience with technology.

Pain Points/Frustrations

Andrew's day to day life consists of mostly work and family time, so he gets easily frustrated when he deals with bad websites with poor usability.

Wants and Needs

Andrew wants to rent premises to hold a "julebord" for the company, consisting of 70 employees.
They would need enough tables for everyone and a stage with good enough sound equipment for the band they are going to rent.

One of the four personas created at the start of the design phase.

Elisha Kante

Age 20

Nationality Congo

Location Gjøvik

Status In a relationship

Occupation Student at NTNU, Siv. Ing.

BIO

Elisha is Siv. Ing at NTNU Gjøvik. He is from Stavanger but has moved to live with his girlfriend. He is enjoying life in Gjøvik and likes that the city is quieter than Stavanger. In his free time, he likes to draw, but lately he's been feeling like he's got too much free time.

As he is new to Gjøvik he does not know many people aside from his girlfriend and her friends. He's trying to be social, but it's harder than he thought to get new friends.

Tech

Elisha has only lived in Norway for 10 years and ever since arriving he's been fascinated by all the technologies that exist here. During his first years he was very fond of using the PC, phone and game consoles. Now he is following all the latest technological inventions.

Pain Points/Frustrations

When Elisha moved to Gjøvik, he thought he would meet and befriend people through the university. But he is very school oriented than finds it difficult to speak to people before and after classes. He wonders if it would be easier to meet people in a more social setting.

Wants and Needs

Elisha is usually very outgoing and enjoys being out with friends, but since he has moved to Gjøvik he does not have many friends to hang out with. He'd like to join some social activity to meet new people and create new relationships.

One of the four personas created at the start of the design phase.

Emilie Johansen

Age 18

Nationality Norwegian

Location Hunndalen, Gjøvik

Status Single

Occupation Student at Gjøvik Videregående Skole

BIO

Emilie is a young, Norwegian girl attending her third year at Gjøvik Videregående Skole. She is born and raised in Hunndalen, Gjøvik, and lives there with her mother, father and younger brother.

Emilie is active on social media like Instagram and TikTok, but does not create much content herself. She is in a band with several of her friends, and spends most of her time with them, practicing and writing songs, and listening to music.

Tech

Emilie has a lot of experience navigating social media sites, but no in-depth technological knowledge.

Pain Points/Frustrations

Emily would like to pursue her dream job in working as a social media coordinator but still stay in touch with her band.

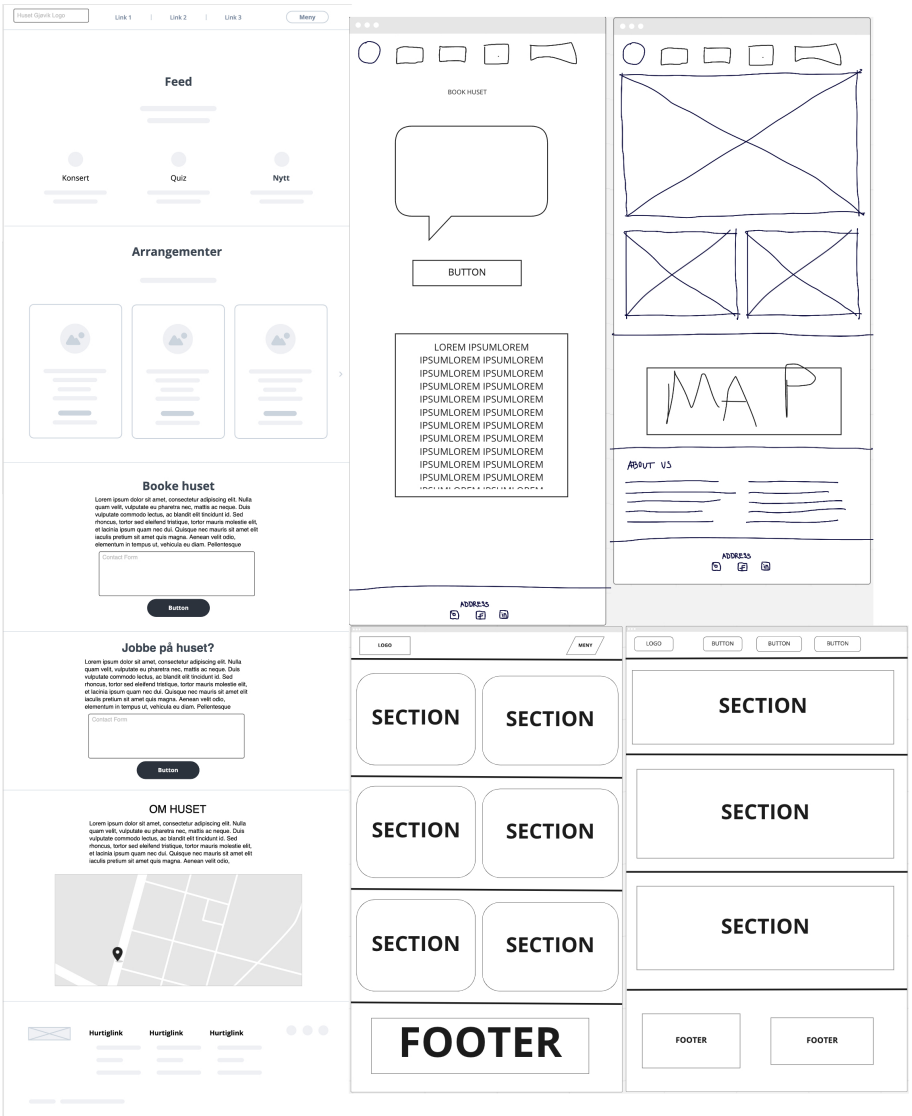
Wants and Needs

Emilie wants to find a place in Gjøvik where she can perform with her band in front of others.
She would also like a place to have fun with her friends, without it being at any of their homes.

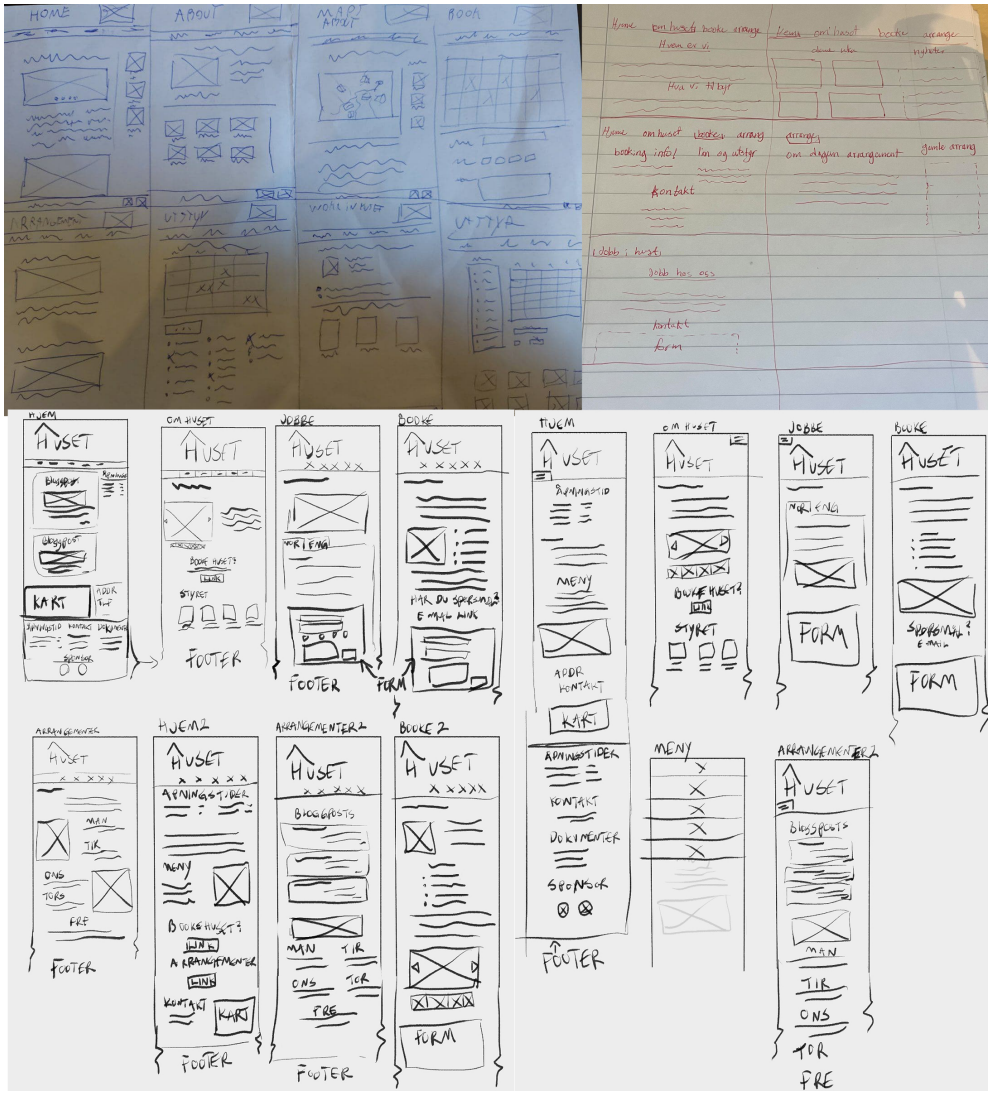
One of the four personas created at the start of the design phase.

Appendix C

Crazy 8s



Part 1/2 of the sketches generated during the crazy 8s exercise.

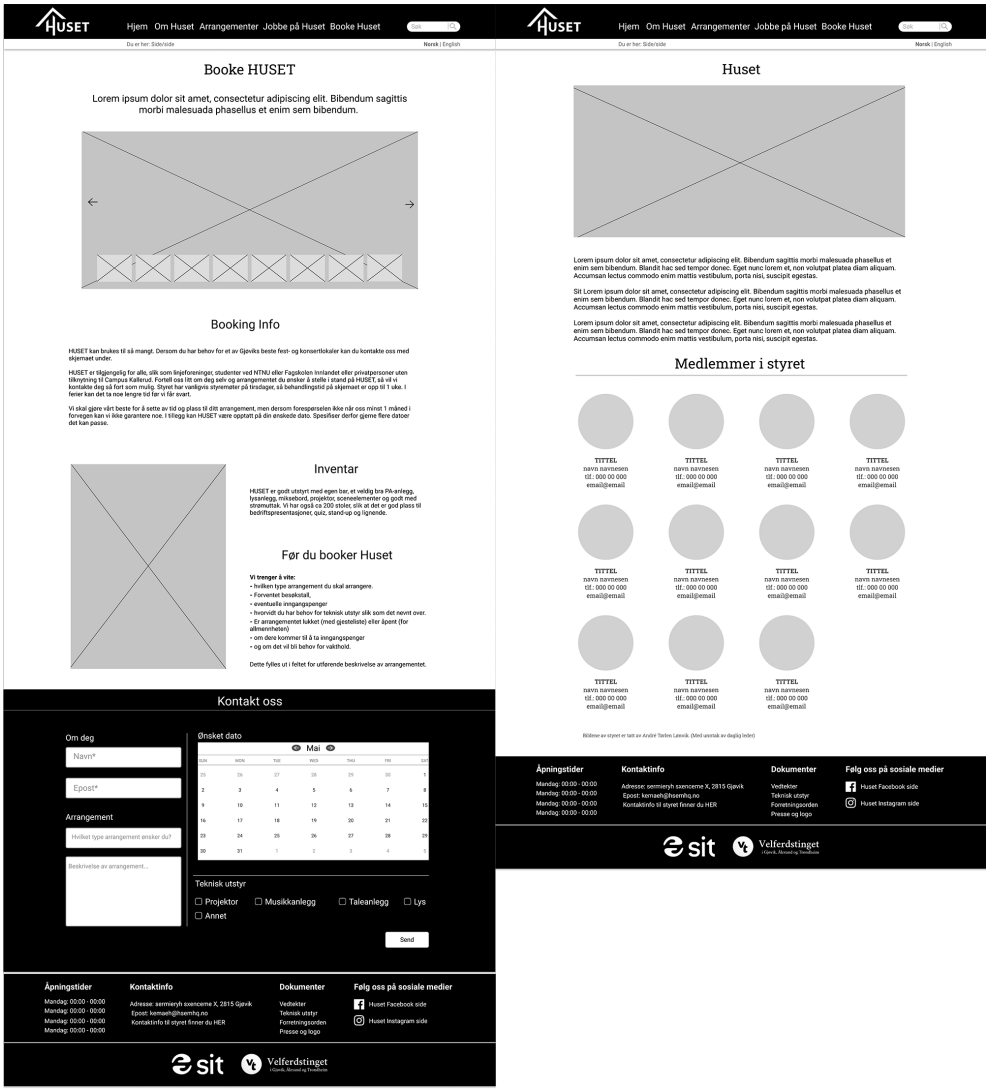


Part 2/2 of the sketches generated during the crazy 8s exercise.

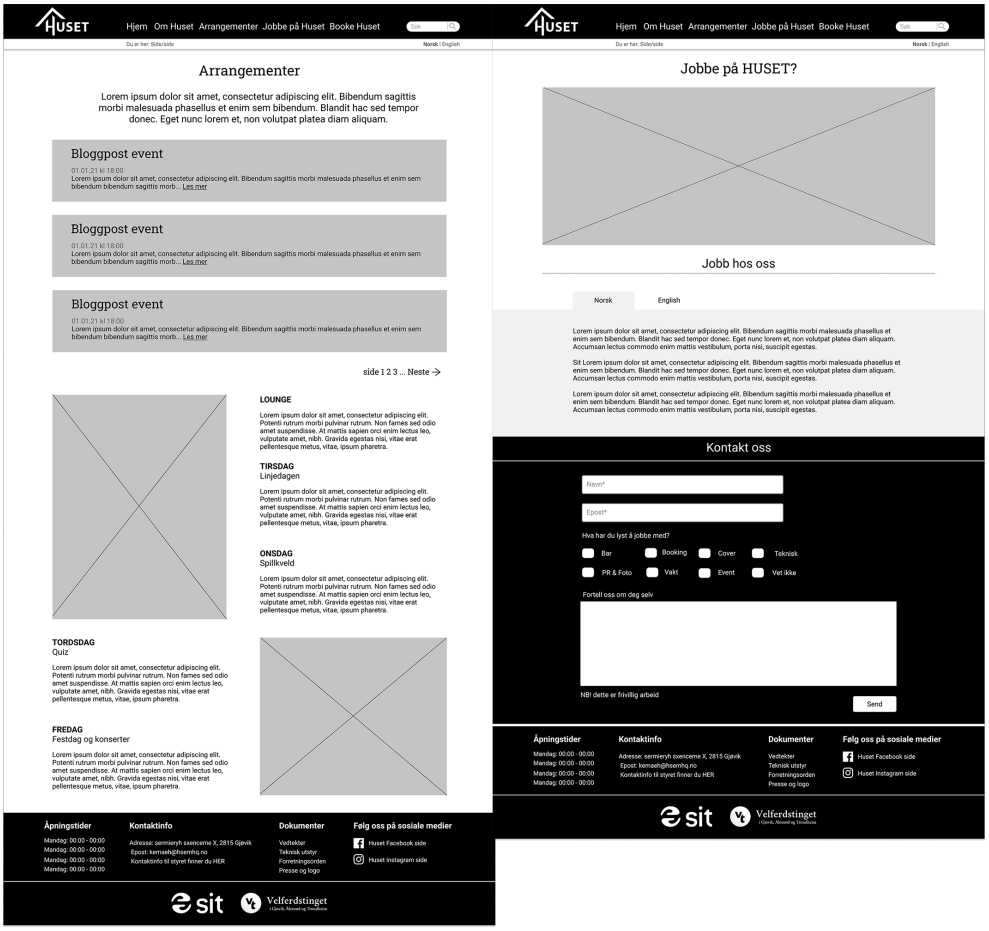
Appendix D

Lo-fi Prototype Iteration I

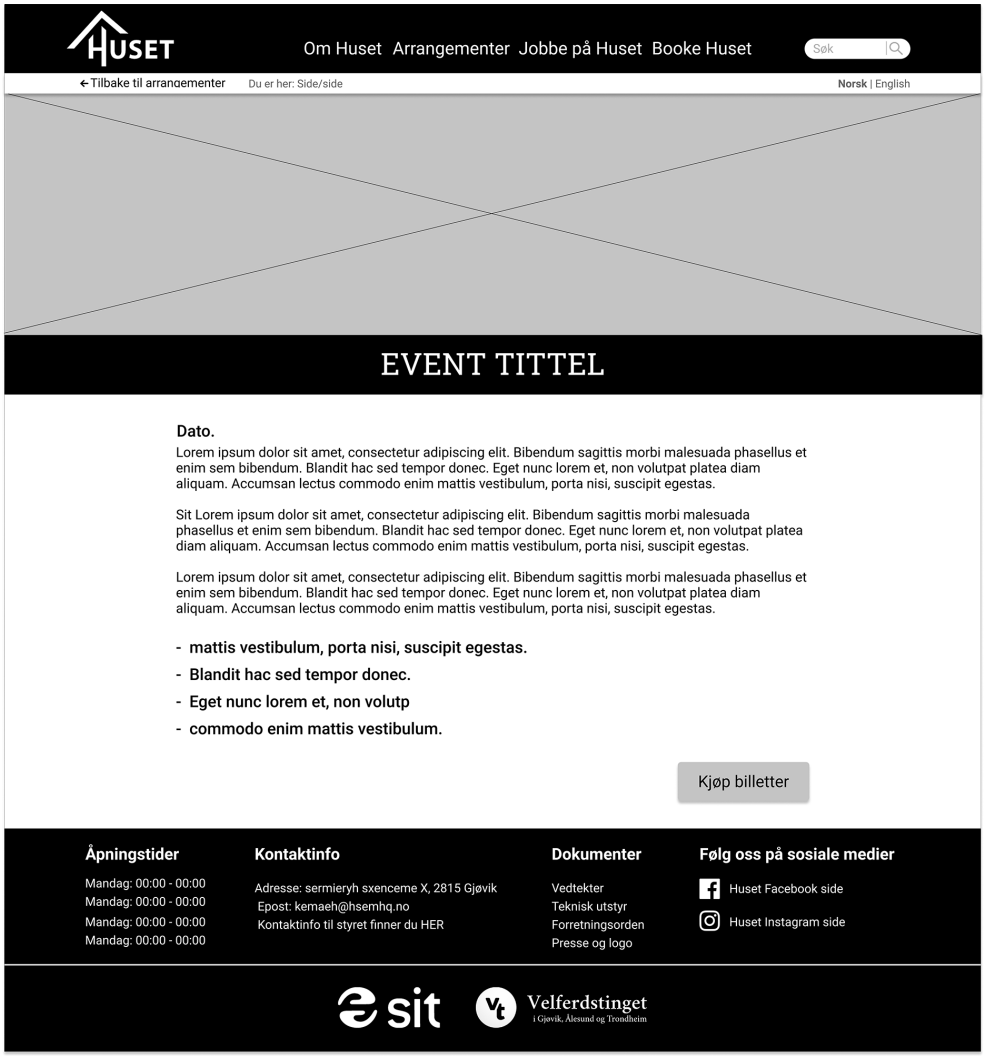
The homepage for iteration I of the lo-fi prototype.



The "booke Huset" and "om Huset" pages for iteration I of the lo-fi prototype.



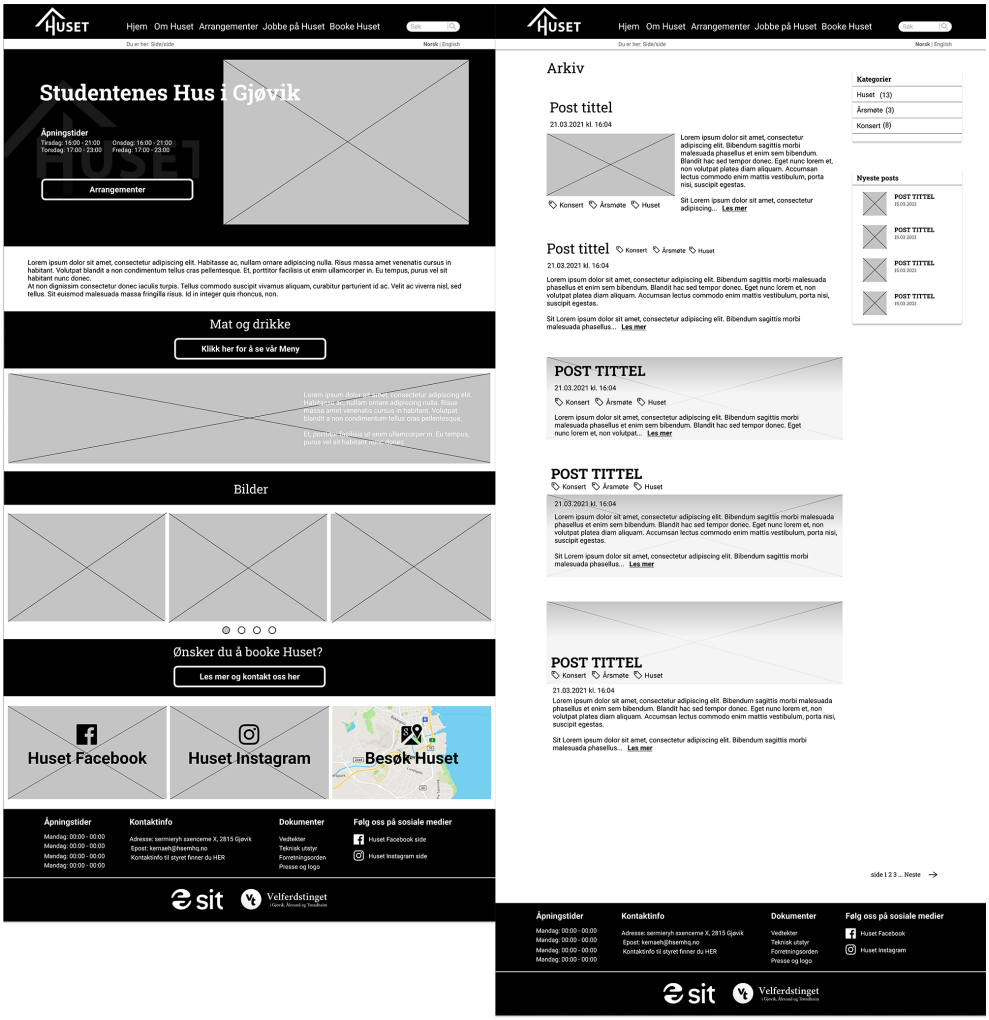
The "Arrangementer" and "Jobbe på Huset" pages for iteration I of the lo-fi prototype.



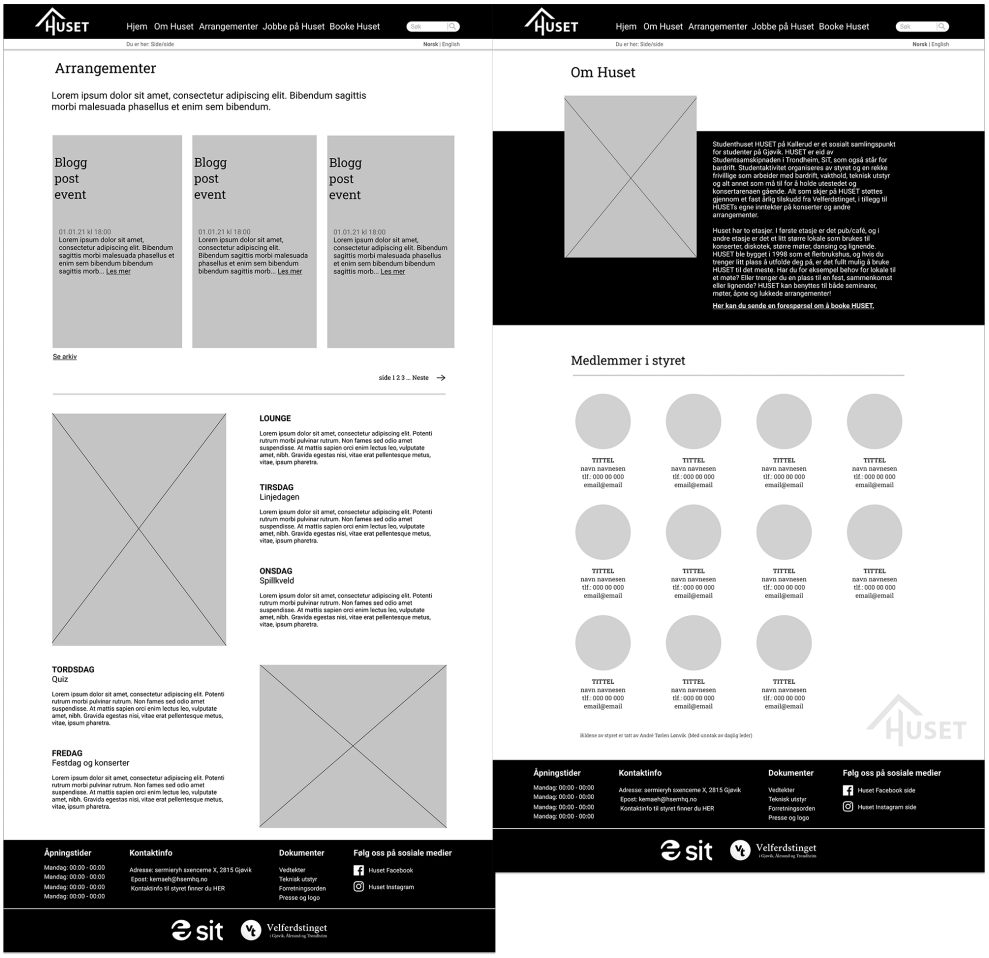
The single post page for iteration I of the lo-fi prototype.

Appendix E

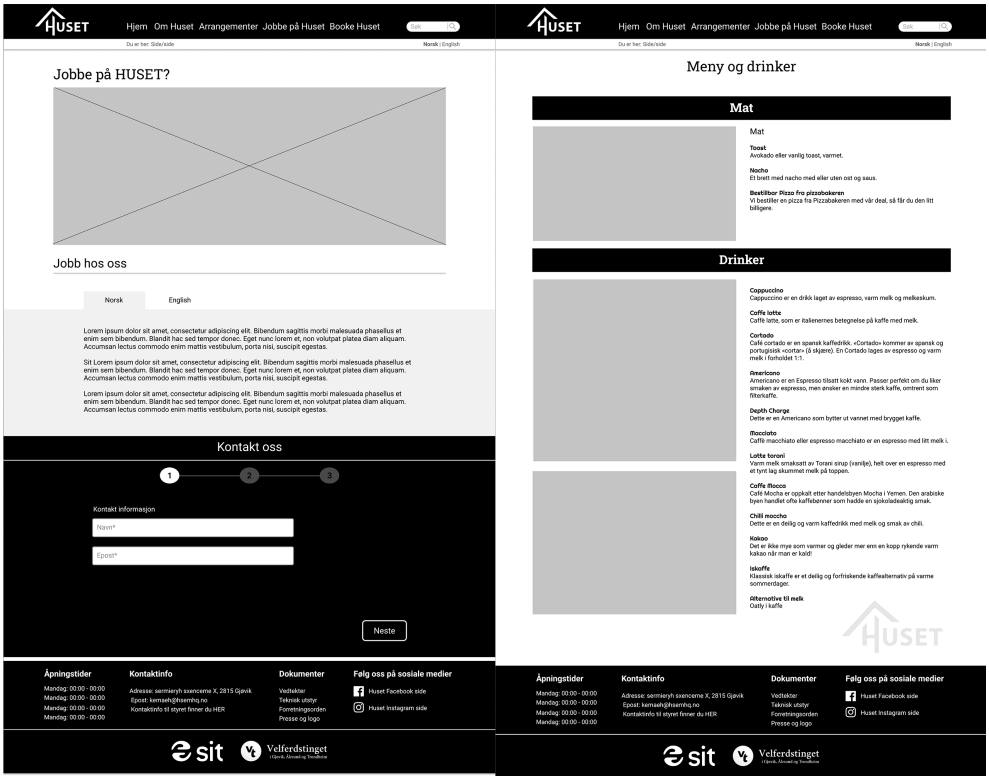
Lo-fi Prototype Iteration II



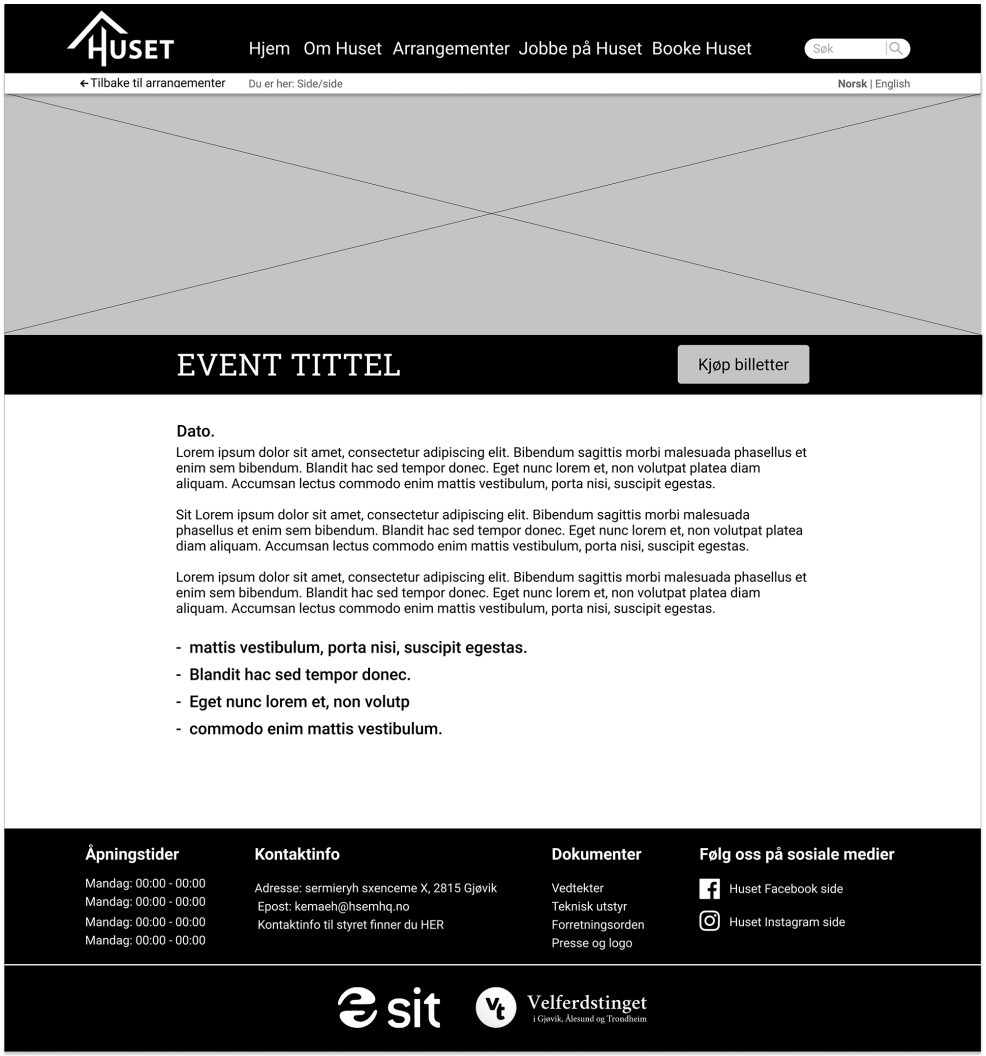
The homepage and archive page for iteration II of the lo-fi prototype.



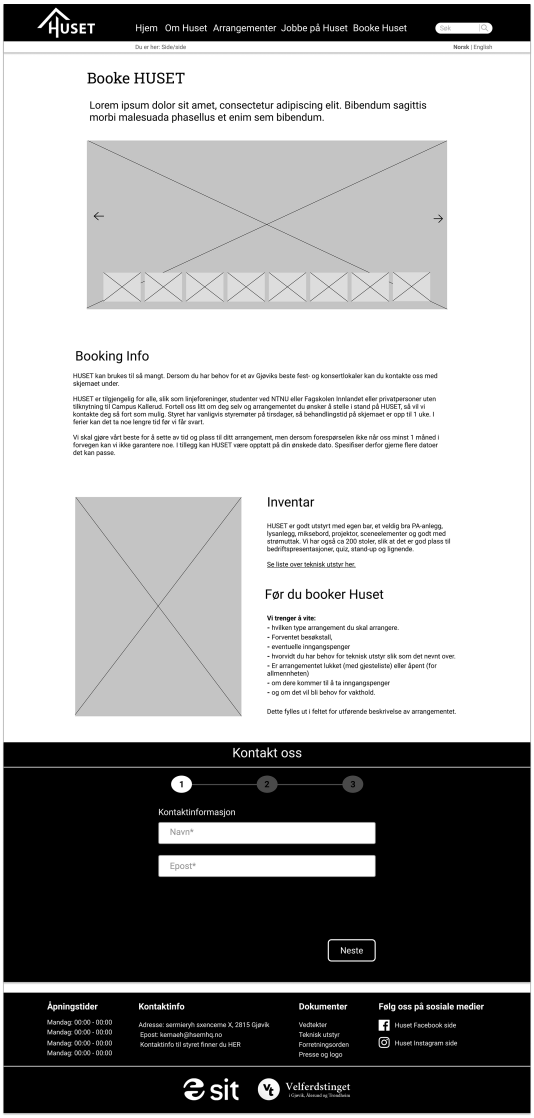
The "Arrangementer" and "om Huset" pages for iteration II of the lo-fi prototype.



The "Jobbe på Huset" and "Meny" pages for iteration II of the lo-fi prototype.



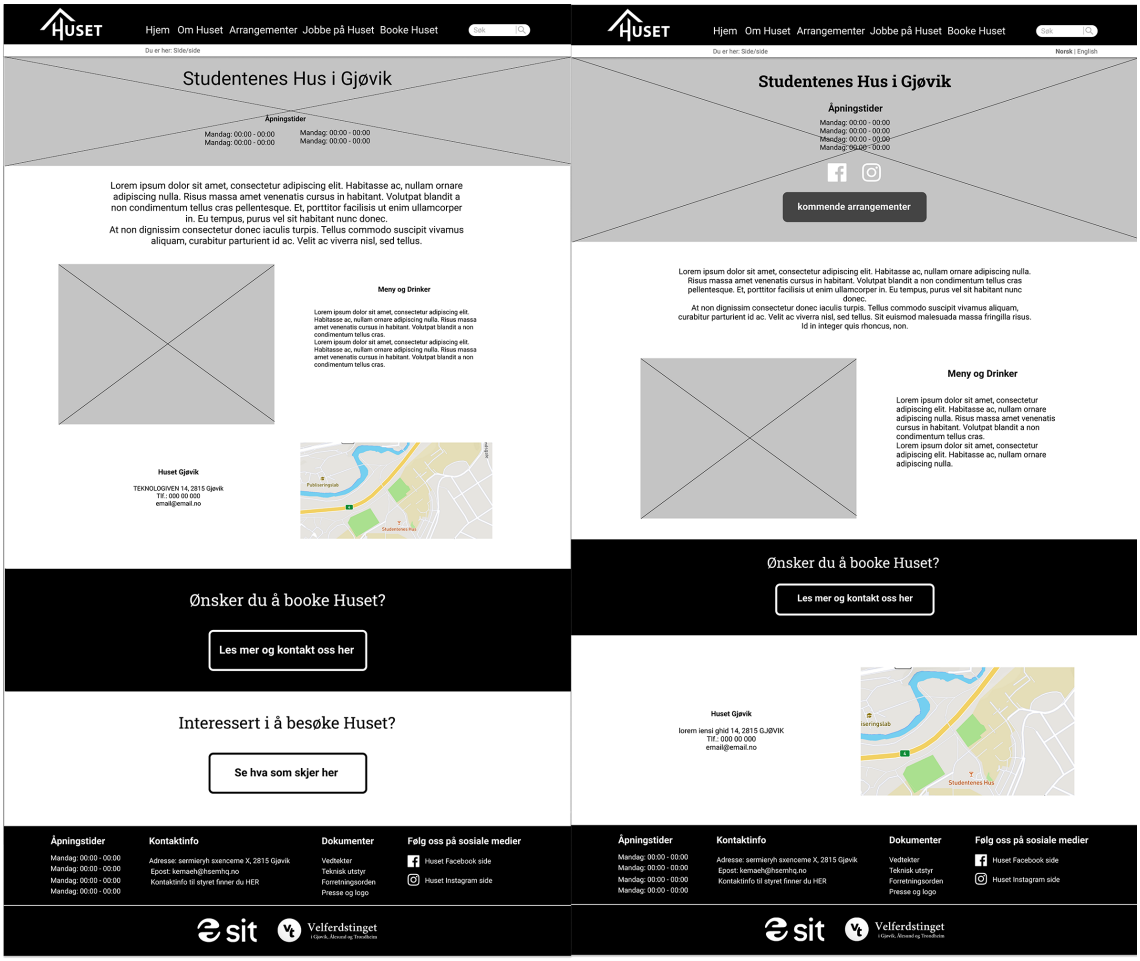
The single post page for iteration II of the lo-fi prototype.



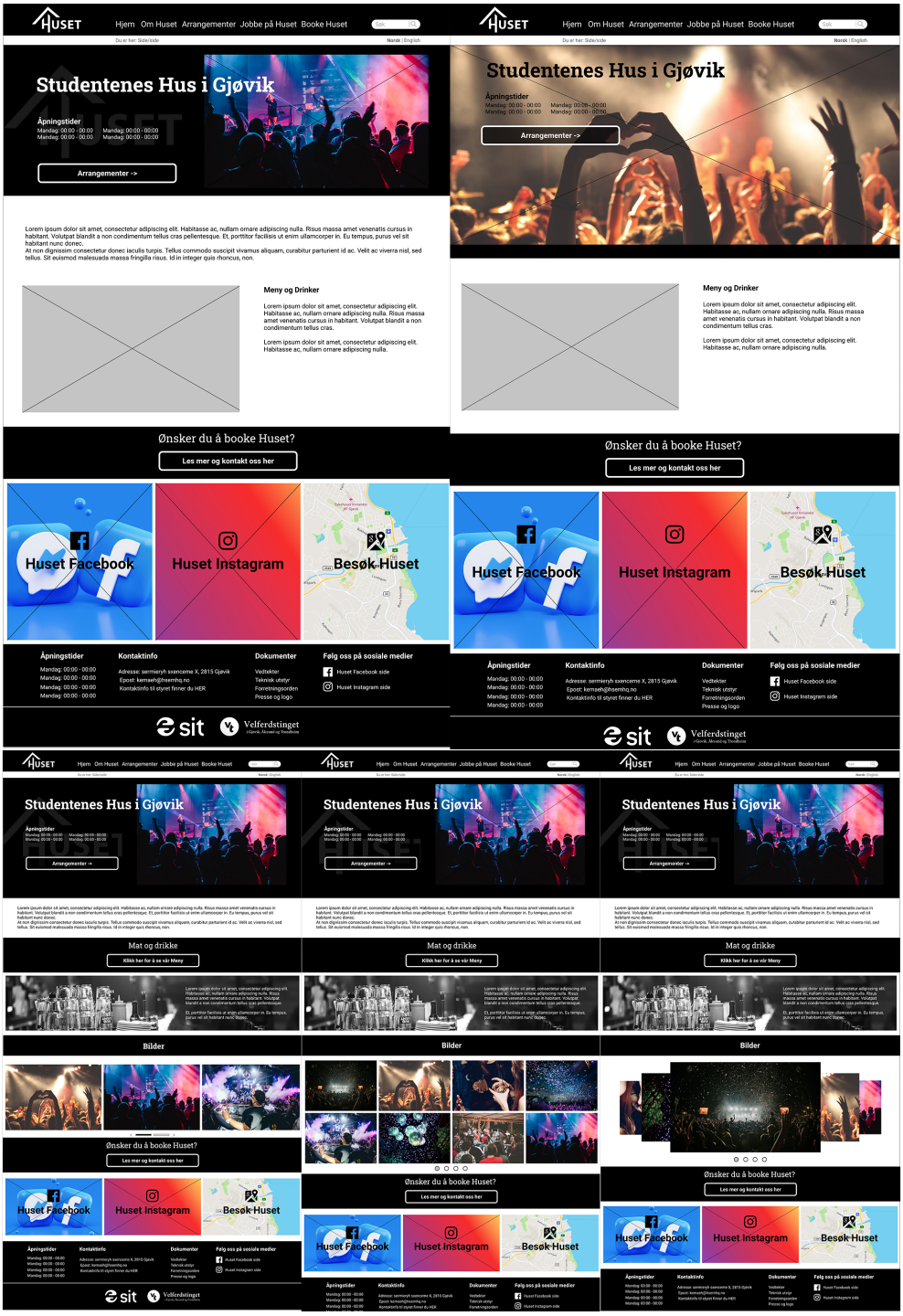
The "Booke Huset" page for iteration II of the lo-fi prototype.

Appendix F

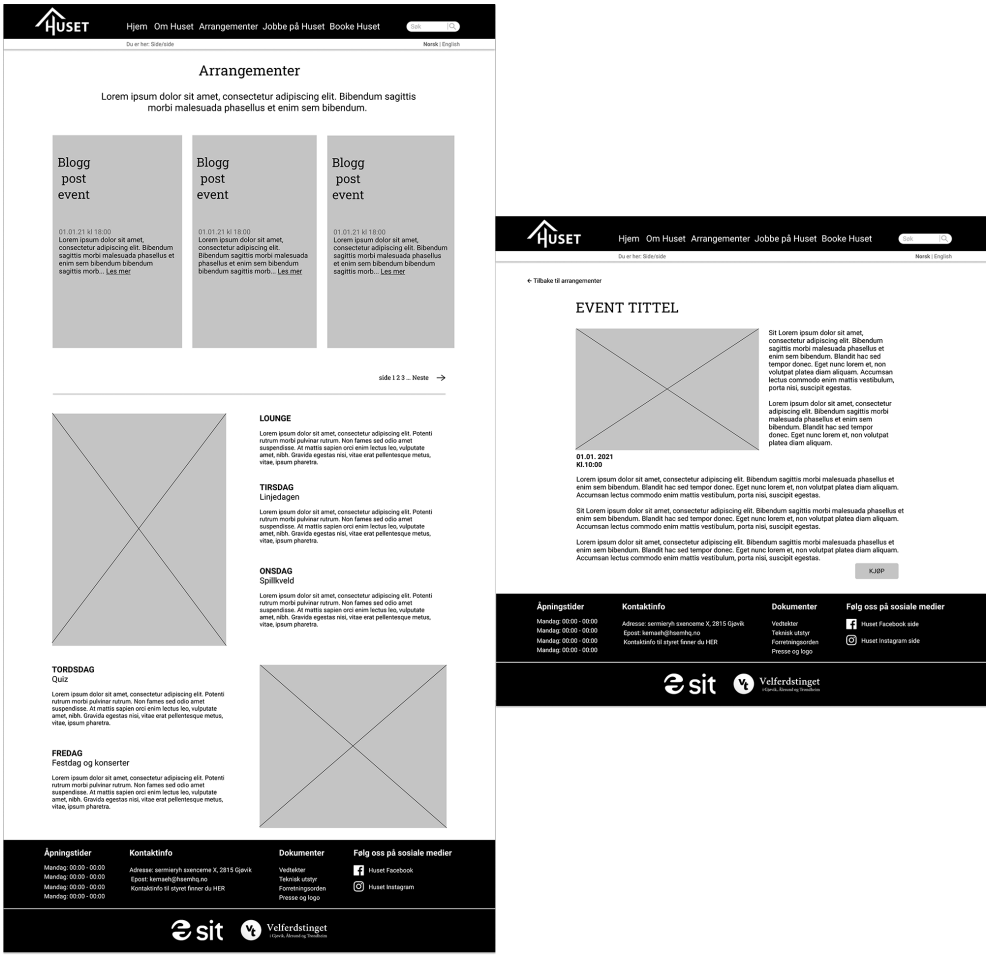
Lo-fi Prototype Design Suggestions



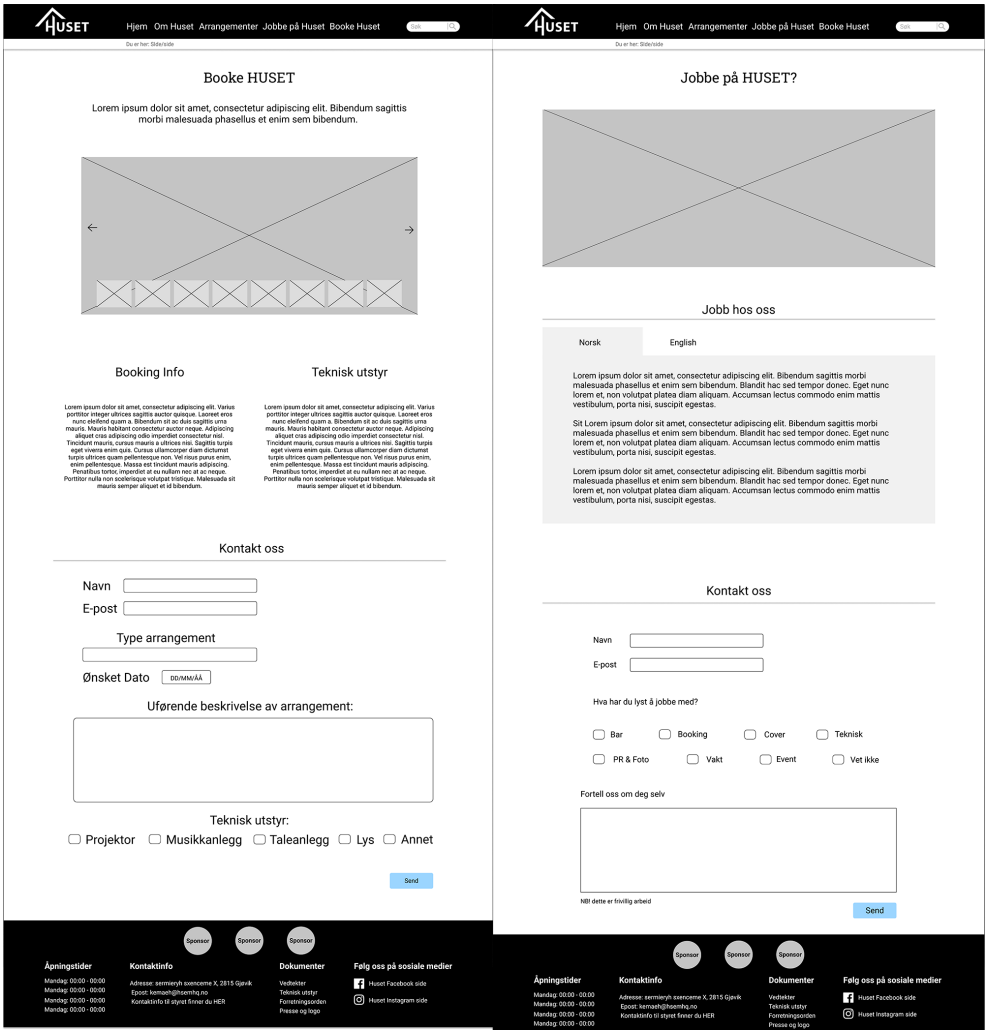
Alternative designs created for the homepage while working on the first and second iteration of the lo-fi prototype.



Alternative designs created for the homepage while working on the first and second iteration of the lo-fi prototype.



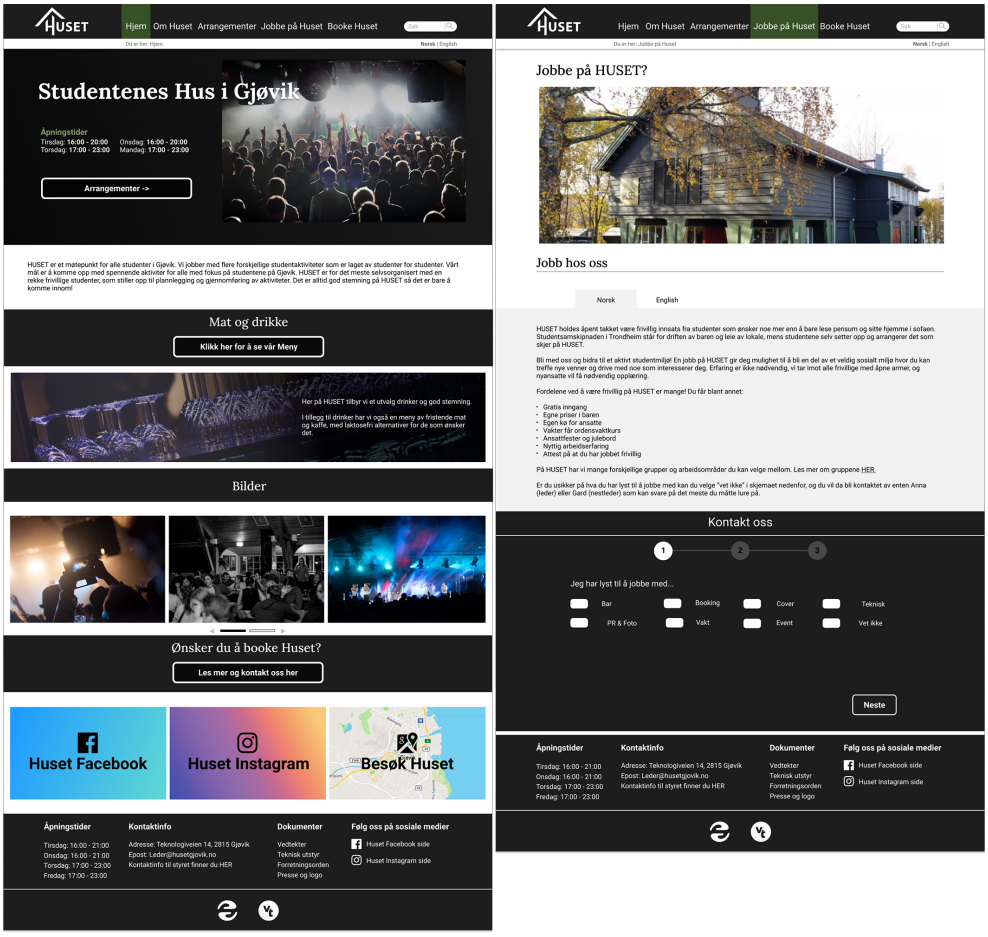
Alternative designs created for the "Arrangementer" and single post pages while working on the first and second iteration of the lo-fi prototype.



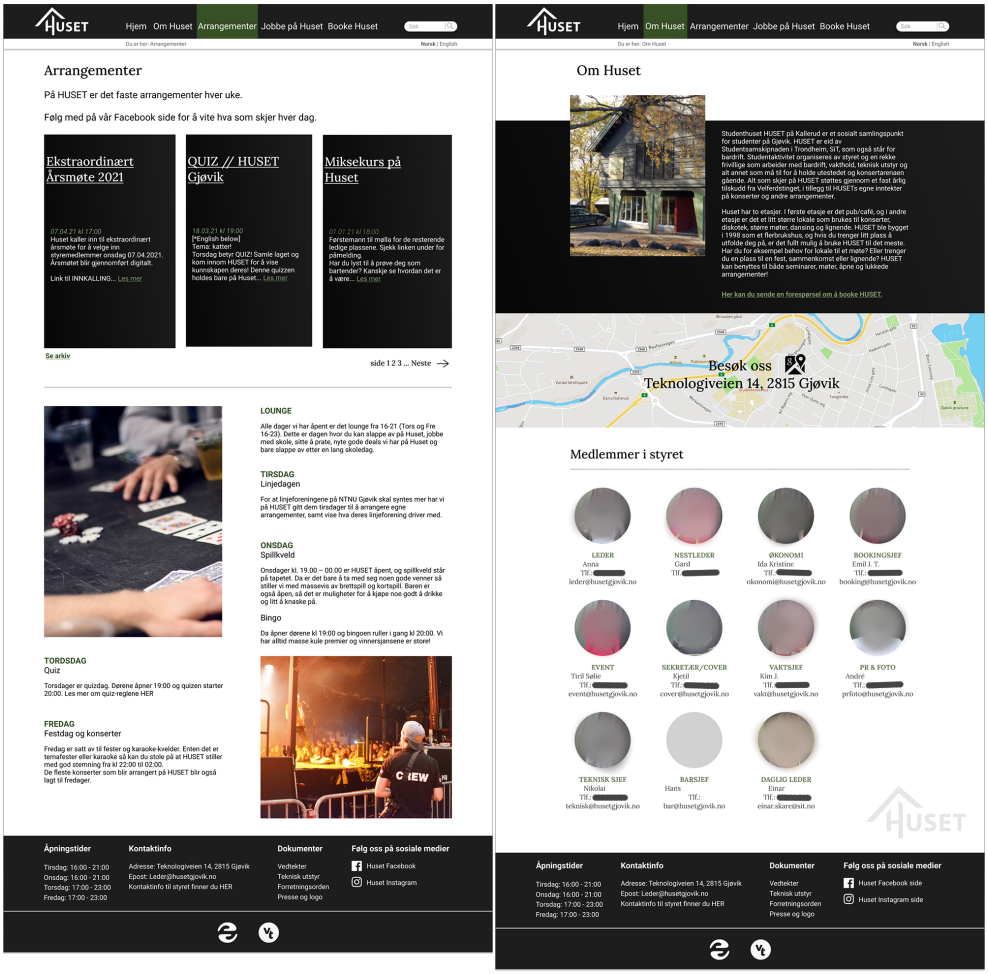
Alternative designs created for the "Booke Huset" and "Jobbe på Huset" pages while working on the first and second iteration of the lo-fi prototype.

Appendix G

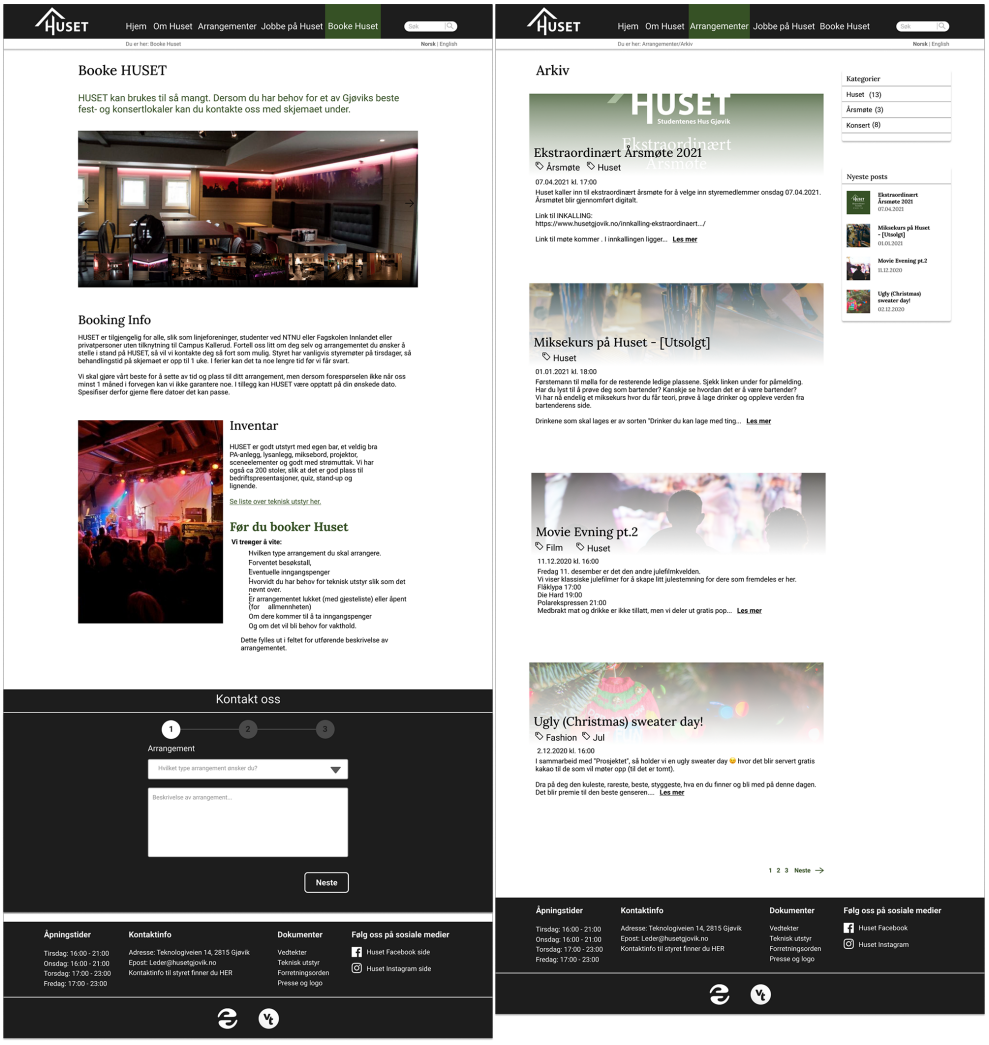
Hi-fi Prototype Iteration I



The home and "Jobbe på huset" pages for the hi-fi prototype.

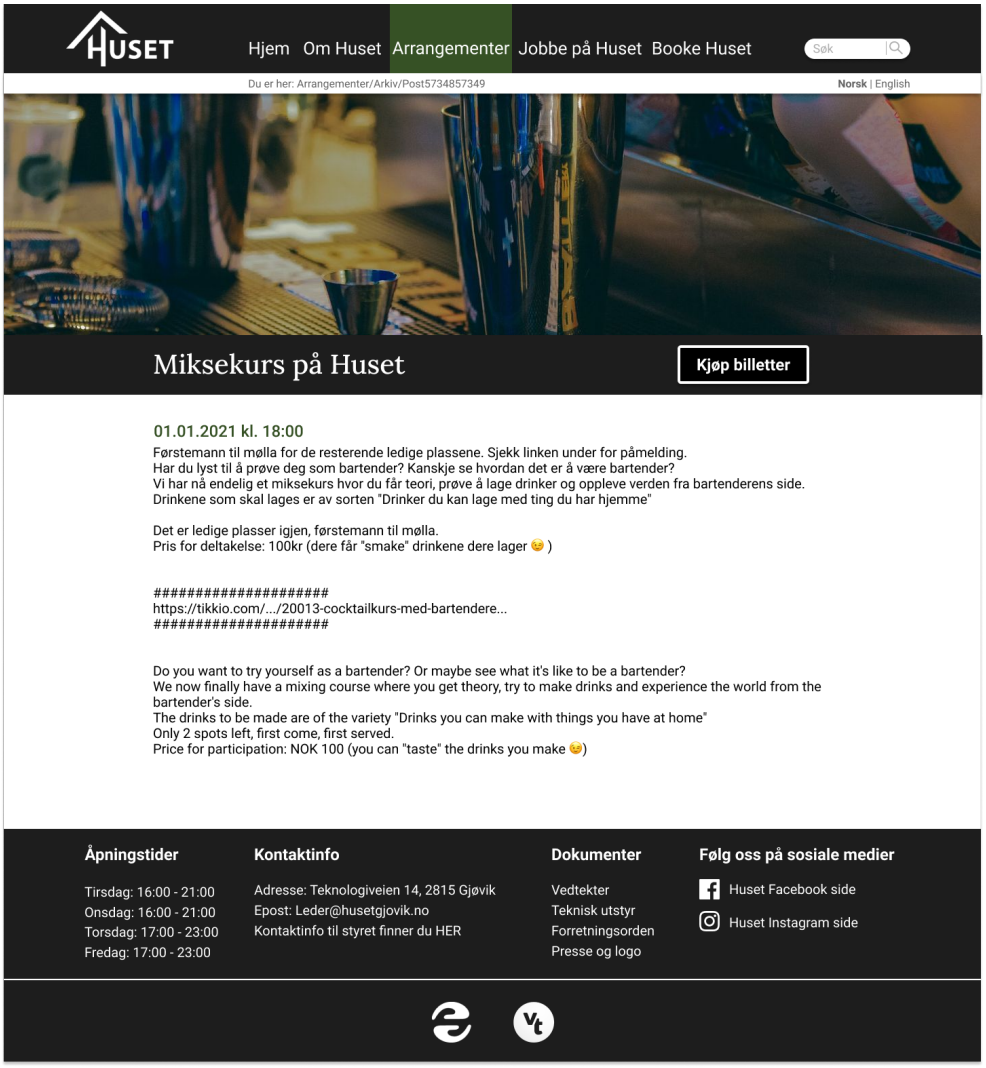


The "Arrangementer" and "Om Huset" pages for the hi-fi prototype. Board members information is censored due to privacy considerations.

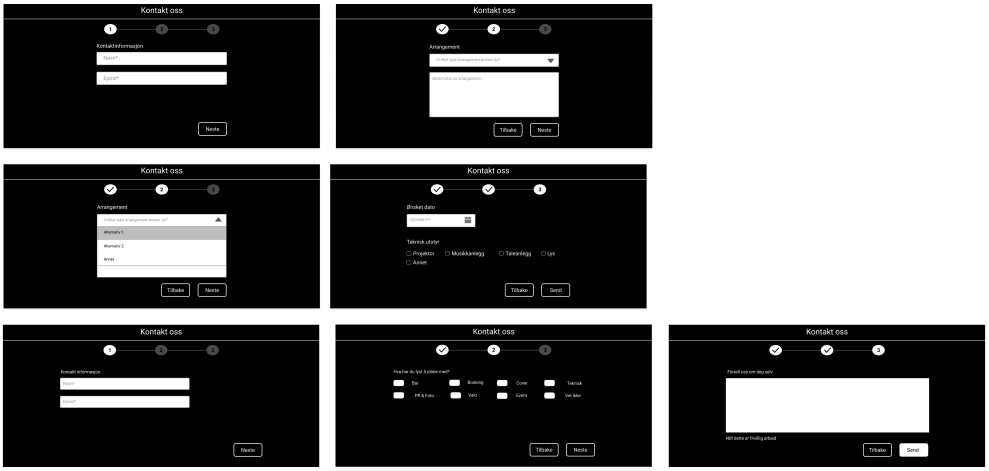


The "Booke Huset" and "Arkiv" pages for the hi-fi prototype.

The "Meny" page for the hi-fi prototype.



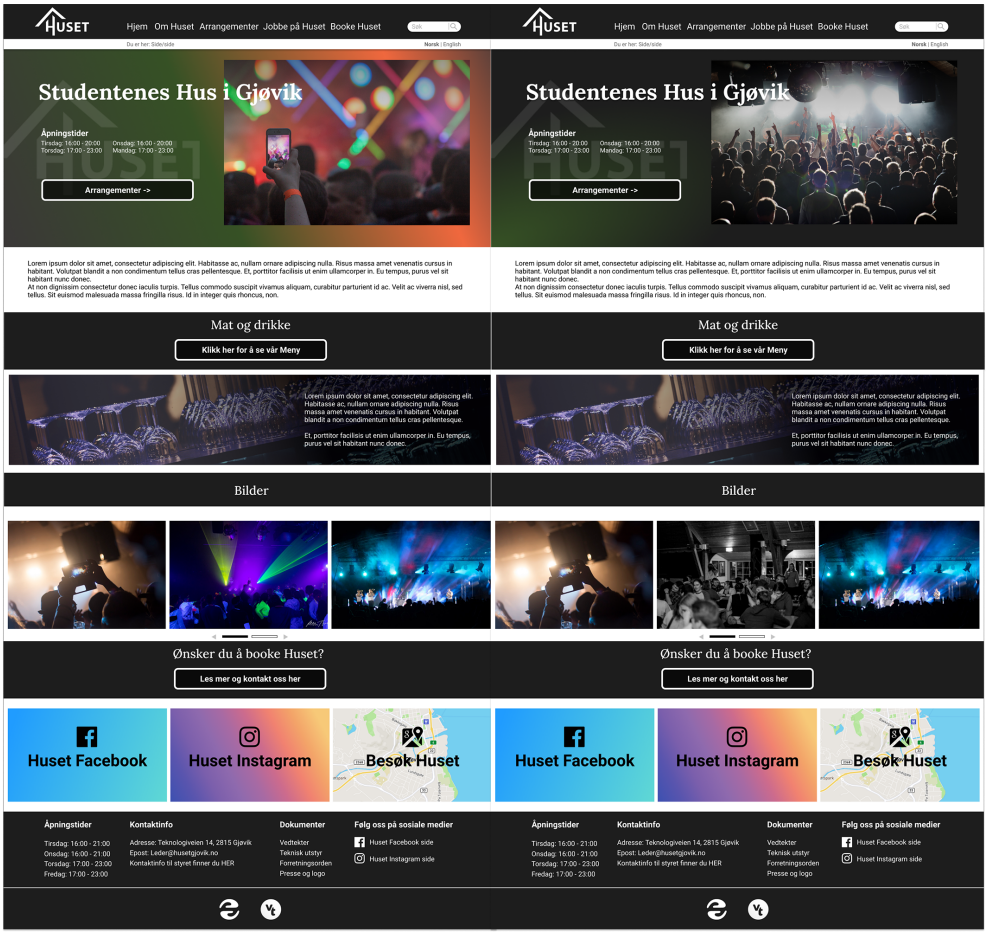
The single post page for the hi-fi prototype.



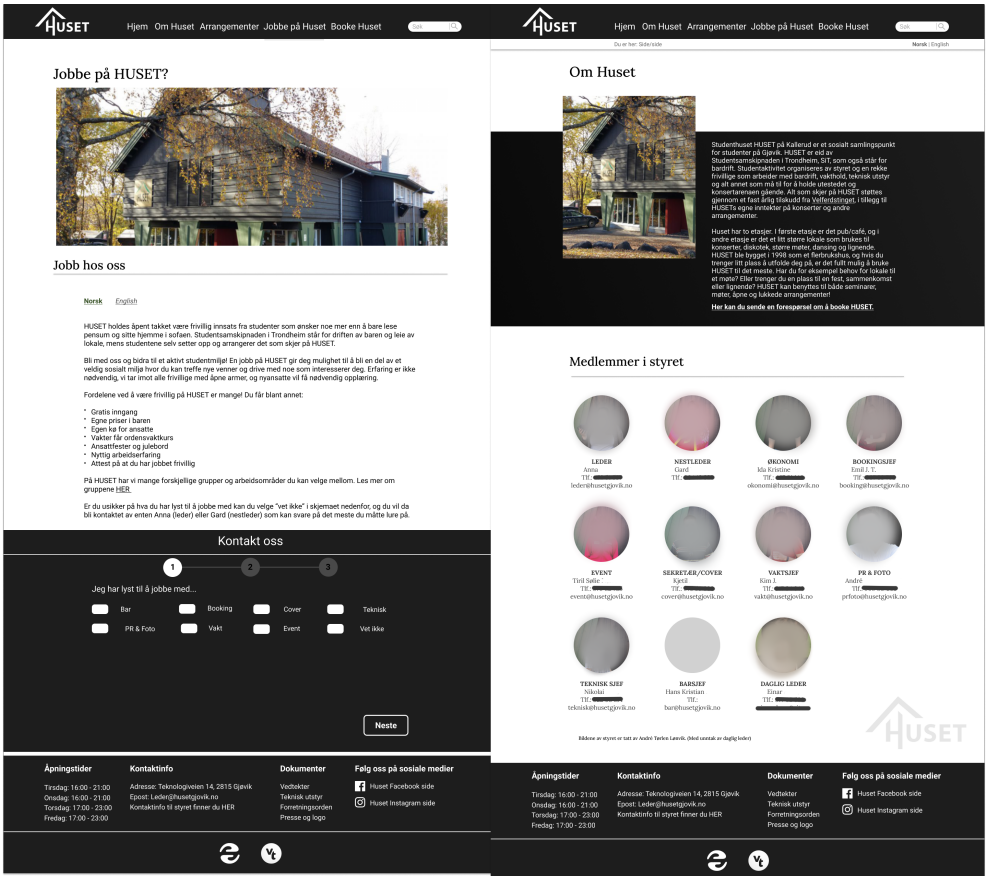
The form designed for the hi-fi prototype.

Appendix H

Hi-fi Prototype Design suggestions



The alternative homepages designed for the hi-fi prototype.



The alternative designs for the "Jobbe på Huset" and "Om Huset" pages for the hi-fi prototype. Board members information is censored due to privacy considerations.

Appendix I

Full list of feedback

This contains the full list of feedback from the project owner. It includes things that need to be fixed in the developed theme, but that we were not able to do.

- Margins are not consistent across pages.
- The design is too wide on larger screens. Should add a max-width to content to combat this.
- Client logo should be clickable.
- Should be more padding around the logo.
- Should add more padding between words inside the "opening hours" on the front page.
- Text on top of google maps is not clickable
- The design for the Facebook and Instagram link on the bottom of the page is boring.
- Headers do not align with the text underneath it on these pages: homepage, om huset
- the google map on the "Om Huset" page is not interactable because there is an element above it.
- The text above the google map on the "Om Huset" page covers the destination.
- the header on the "arrangementer" page should be centered.
- On the list of upcoming events: the date looks clickable because it has a :hover effect, but it is not.
- On the list of upcoming events: the paragraph should be clickable.
- On the list of upcoming events: the h2 is almost as big as the h1 and should be smaller.
- The "se arkiv" link on "arrangementer" page is too small. Should also consider moving it to the right side of the page instead of left.
- The horizontal line between the list of upcoming events and weekly events is missing in the developed solution. This should be added.
- The forms have some input fields that drag out very unnaturally. Could potentially make it possible for the user to make this field larger or smaller as they want.
- Can remove the text and only leave social media icons in the footer.
- There is no clear difference between the items in the "contact us" part. Make the e-mail and adress more visible than the preceeding "email:" and "Adresse:".
- There is inconsistent spacing between paragraphs inside the footer. This should be consistent.
- Links inside the footer should have the same green used on other links on the page.
- The footer is not responsive.