

# Desktop PC world

***Participants:***

Oleg Sechovcov, Nijaz Salihovic, Emil W. Haenschke og Tobias Johansen

***Studienummer:***

4128451; 4127191; 464375; 201550117

***Supervisor:***

Maria S. Andersen, Gunver B. Majgaard, Michelle V. W. Larsen

***Educational institution:***

Syddansk Universitet: Campus Odense

***Project period:***

1-9-2024 – 19-12-2024

# 1. Abstract

This project aims to address the lack of effective learning tools for PCs. To identify specific pain points and limitations in existing state-of-the-art solutions, surveys, interviews, personas, and scenarios were employed. Based on the data collected, an iterative prototyping process, with users-centered, was conducted, with each iteration tested by users or evaluated through expert reviews, focusing on ease of use and understanding. Results showed that the mid-to-high-fidelity prototype successfully implemented key improvements, simplifying the interface for beginners while maintaining functionality for proficient users. The final design demonstrates enhanced usability, meeting both user and expert requirements. With further improvements, it could even apply to edge cases.

Video link: (<https://youtu.be/xvmlu3-HLYo>)

## 2. Contents

1. Abstract.....	2
3. Introduction.....	5
3.1. Approach to the problem domain and background. Why and how is this digital learning tool important .....	5
3.2. Problem statement .....	5
3.3. Project organization .....	5
4. State of the art (SOTA) .....	6
4.1. SOTA .....	6
4.2. Weaknesses .....	6
4.3. Strengths .....	7
4.4. Solution .....	8
5. User research (Target audience research) .....	8
5.1. Purpose.....	8
5.2. Is there a need for a product .....	9
5.3. Identifying the target audience.....	9
6. UX Research .....	9
6.1. Purpose.....	9
6.2. Methods .....	10
6.3. Persona .....	11
6.4. Evaluation .....	12
6.5. Scenarios .....	12
6.6. Evaluation .....	14
7. Learning theory .....	14
7.1. Bias for Target-group .....	14
7.2. Mindspace Framework .....	15
Foggs behavior-model .....	16
7.3. The Functional Triade .....	17
8. Method .....	23

9.	Prototype iteration .....	24
9.1.	Low Fidelity Prototype .....	24
9.1.1.	About (Goals: What is being developed, screenshots, sketches, etc.).....	24
9.1.2.	Evaluating (Test plan and results) .....	27
9.1.3.	Reflection and Decisions.....	27
9.2.	High Fidelity –Theme 1 (Vertical slice) .....	28
9.2.1.	About (goals – what is being developed, description of functionality, screenshot of interface) .....	28
9.2.2.	Evaluation (tests and results).....	29
9.2.3.	Reflections and Decisions .....	31
9.3.	Theme 2 (Extended Functionality and Improvement/Further Development of the User Interface) .....	32
9.3.1.	About (goals – what is being developed, description of functionality, screenshot of interface) .....	32
9.3.2.	Evaluation (test plan and results) .....	35
9.3.3.	Reflections and decisions .....	35
9.4.	Theme 3 (Polishing and Improving Usability).....	36
9.4.1.	About (goals – what is being developed, screenshot of interface) .....	36
9.4.2.	Evaluation (test plan and results) .....	38
9.4.3.	Reflections and decisions .....	39
10.	Technological development coding highlights, overview, and selected details .....	39
11.	Discussion .....	43
12.	Conclusion.....	44
13.	Perspective .....	44
14.	References.....	46
15.	Attachment .....	47

## 3. Introduction

### 3.1. Approach to the problem domain and background. Why and how is this digital learning tool important

Building your desktop PC can be very expensive, so it is important to know what you are doing before you start building. Small mistakes can result in the PC breaking and not turning on or certain components not working together. The user needs a broad knowledge of assembly and components to save money and get a better-performing PC by building it themselves. Therefore, a tool for learning such skills is in demand. This project aims to design such a tool through a user-focused, iterative approach to ensure it meets the needs of both beginners and experts.

### 3.2. Problem statement

Beginners have difficulties choosing the right components, and assembling the desktop PC, which creates financial problems, when some components do not fit, or break because of incompatibility. How do we create a website that will help new beginners in desktop PC building, to build their very first computer, without losing money?

### 3.3. Project organization

The project relates to interaction design, which means that understanding the target group and using it in the development of the product is a high priority. The project is built upon the target group, using the agile workflow. The product iterates using the feedback gained from the users, to better improve the final product.

The group worked with a fixed schedule, where every Wednesday the group has a meeting, discussing the progress of the project, and giving tasks to each member based on their working roles.

A backlog was also created and updated alongside the project. This insured that there was clarity on all tasks and their priorities while making sure that all tasks were aligned with our user feedback and evaluations.

For version control, the project was developed using GIT repository. This also in turn was used as a logbook for the group.

## 4. State of the art (SOTA)

Researching the state of the art (SOTA) is a crucial step in identifying current challenges that potential users may be facing (Erin S Barry, 2022). By examining the latest advancement, reveals strengths, weaknesses, and gaps, providing a solid foundation to address critical gaps (Erin S Barry, 2022).

### 4.1. SOTA

The research will focus on one of the most popular, websites for building custom PCs (pcpartpicker, pcpartpicker, n.d.). With an average monthly traffic rate of 1.9-2 million (See Figure 1) (Website Traffic Checker, n.d.), this platform provides valuable insights into the current industry leaders, highlighting their strengths and identifying potential areas for improvement.

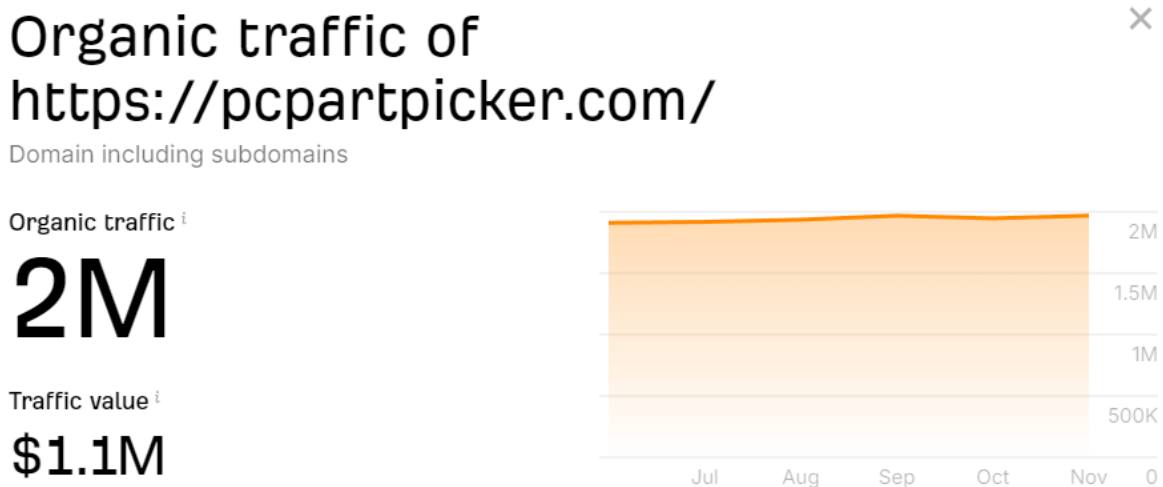


Figure 1 PCPartPicker Traffic

### 4.2. Weaknesses

The most glaring issue with the platform is its lack of focus on ease of learning. It offers little to no support in helping users understand the products. Technical details are presented in a way that is

overly complex for complete beginners (See Figure 2), creating a steep learning curve that hinders engagement for hobbyists and casual users (pcpartpicker, Benchmarks, n.d.).

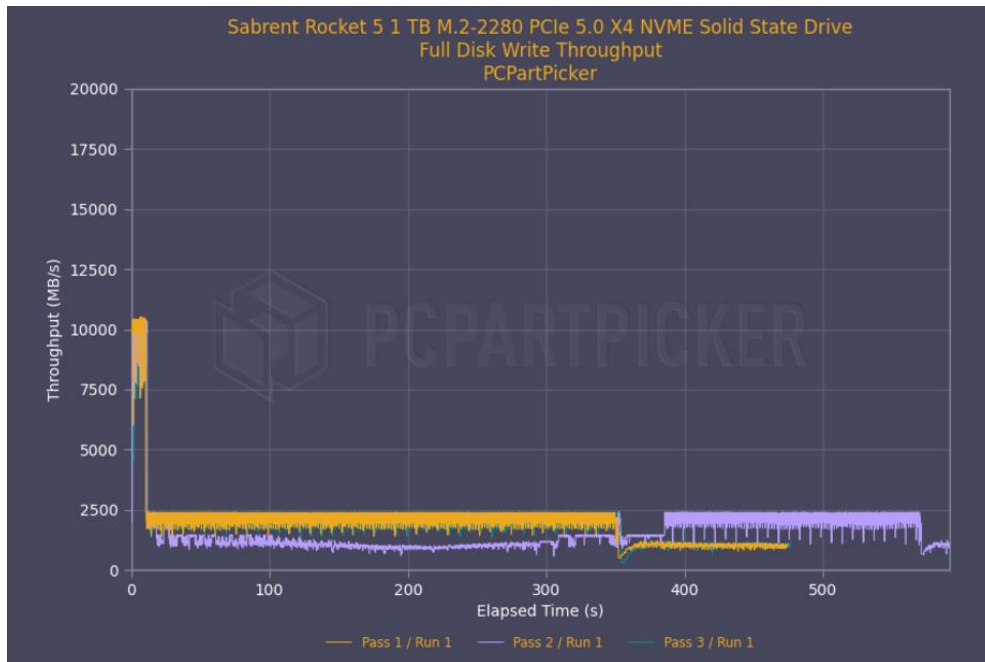


Figure 2 Critical information display PCPartPicker

Additionally, the platform lacks tutorials or resources for learning beyond user-driven forums. While it does provide guides, these are often too general and fail to address specific use cases (pcpartpicker, Guide, n.d.).

Such weaknesses can discourage beginners from using the website or seeking help, seeming too overwhelming.

### 4.3. Strengths

On the other hand, the platform has several standout features. The filtering system for components, allowing users to search based on crucial criteria such as price, performance, and compatibility (pcpartpicker, Products, n.d.). The forums and trends provide a collaborative space. Their guides are well-formulated, offering clear explanations of component choices and their benefits (pcpartpicker, Guide, n.d.).

These strengths enhance the user experience by making the website easier to navigate and reinforcing a positive perception. The inclusion of a public forum enriches the experience by tapping into the community, making assistance interactive and responsive. The guides provide beginners with a starting point, helping them focus on building their PCs without being overwhelmed.

#### **4.4. Solution**

This product is designed to enhance users' strengths and minimize weaknesses, especially beginners. A major focus will be on educating users about computers and their components, using structured tutorials to explain technical aspects in an intuitive way. These tutorials will be complemented by an active public forum. that functions as a comprehensive FAQ hub, where common questions are pre-answered. This forum allows users to find solutions quickly and avoid repetitive questions by browsing through pre-existing discussions and knowledge threads.

## **5. User research (Target audience research)**

To supplement the SOTA analysis, user research is crucial for accurately identifying and refining the target audience, while also determining whether there is a genuine need for the product (Pestana, 2017). The research will first explore potential users and assess their need for such a solution. Following this, the focus will shift to pinpointing the specific group that stands to benefit the most.

#### **5.1. Purpose**

Conducting thorough user research will either validate or challenge assumptions and insights identified in the SOTA. By gathering data directly from users, this research will establish a strong foundation for developing a product that genuinely meets their needs (Pestana, 2017).

Understanding users' specific pain points and positive experiences enables to address gaps and enhance strengths (Pestana, 2017).



## **5.2. Is there a need for a product**

Before conducting user research, it is essential to establish if there is a real need for the product. This preliminary assessment can be carried out cost-effectively through desktop research or by directly asking potential users (Moore, 2006).

To support a product centered on learning, it makes sense to highlight relevant educational programs that already address core aspects of PC building and hardware fundamentals.

The first program, Byg en PC at Ungdomsskolen in Esbjerg, teaches students the hands-on skills required to build a PC from scratch. Participants learn about essential hardware components, such as the CPU and RAM, and gain an understanding of component compatibility (UngEsbjerg, n.d.).

The second program, Computer-Teknologi at Aalborg University, offers a deeper dive into the integration of hardware and software systems. Here, students develop both a basic and advanced understanding of hardware, equipping them to design and innovate within tech spaces where collaboration between software and hardware is key (Universitet, n.d.).

## **5.3. Identifying the target audience**

With a clearer understanding of where and how the product is most likely to be used, it is now possible to identify a target audience. Given that the primary use cases involve educational programs and recreational activities, it makes sense to target individuals within an age range suited for attending such classes and programs—specifically, those with an interest in learning about PCs.

# **6. UX Research**

## **6.1. Purpose**

UX research is shaped by the product's underlying need, in this case, a reworked version of the SOTA. Conducting this research will help pinpoint key weaknesses, strengths, and areas requiring improvement (Jan Gulliksen, 2003).

## 6.2. Methods

Multiple methods have been employed to collect data and gauge users' interests, focal points, challenges, and strengths in relation to the product (Jan Gulliksen, 2003).

- **Persona**
  - **Purpose:** Creating a detailed hypothetical user based on demographics and target group. Allowing to understand users on a personal level.
  - **Description:** A persona is fictional but driven on data gathered for the target audience.
  - **Advantages:** Allows user-centered design, makes a lot of data simple and accessible.
  - **Limitations:** Easily oversimplified, can never truly encompass all users.
- **Scenarios**
  - **Purpose:** Visualize the process which a persona may go through using the product.
  - **Description:** The scenario provides one possible process of interacting with the product.
  - **Advantages:** Can spot pain points, faulty design and strengths,
  - **Limitations:** Is fictional and cannot represent truly what users may do or how they may react.
- **Survey**
  - **Purpose:** Collect quantitative data to understand general user trends, preferences and pain points.
  - **Description:** The survey is designed with a mix of open- and closed-ended questions.
  - **Advantages:** Cost-effective, scalable, and allows for statistical analysis.
  - **Limitations:** Limited in depth; may not capture nuanced insights or context behind answers.
- **Interviews**

- **Purpose:** Gather qualitative data to understand their individual experiences, motivations, and current challenges.
- **Description:** Using semi-structured interviews allows for flexibility and touching upon both our questions and other key areas which were not thought about.
- **Advantages:** Contextual and nuanced insight into users' needs and behaviors.
- **Limitations:** Time, limited sample, and bias in both parties.
- **Expert Test (Heuristics)**
  - **Purpose:** Evaluate product based on established usability principles, to identify design flaws and usability.
  - **Description:** Use of Jakob Nielsen's 10 heuristic, to ascertain the interface.
  - **Advantages:** Quick, cost-effective and requires no users to execute.
  - **Limitations:** Depends on expertise level, where issues normal users would experience can be overlooked.

### 6.3. Persona

Personas are a useful tool for testing user experience (UX), representing the target audience to guide design without resource-heavy methods (Jenny Preece, Interaction Design: Beyond Human-Computer Interaction, 2023). By focusing on users' goals and frustrations, personas streamline design efforts for an optimal experience (Cooper, Reimann, Cronin, & Noessel, 2014) (Jenny Preece, Interaction Design: Beyond Human-Computer Interaction, 2023).

For example, Sabrina Kirkegaard, a 22-year-old Game Development student at SDU, illustrates the challenges faced by first-time PC builders. With limited technical knowledge, a tight budget, and a busy schedule, she embodies the struggles of balancing personal projects with academic and financial constraints.

Sabrina faces key challenges:

- No prior experience with PC assembly.
- Difficulty understanding component compatibility.
- Overwhelmed by excessive information.

- Limited time to learn due to her busy schedule.

Analyzing this persona highlights critical design priorities:

- Beginner-friendly resources like 3D visualizations, step-by-step lessons, and FAQs.
- Tools for selecting components by price range and compatibility, plus pre-designed builds.
- An intuitive interface to minimize time spent achieving her goal.

This persona captures the frustrations of first-time PC builders with limited time, budget, and technical knowledge. By addressing these challenges, the solution becomes more accessible to similar users, making PC building approachable for beginners.

The persona-driven approach ensures the design meets real-world needs, proactively resolves pain points, and enhances usability, improving the user experience before launch (Jenny Preece, *Interaction Design: Beyond Human-Computer Interaction*, 2023).

## **6.4. Evaluation**

The personas were developed using 45 survey responses capturing demographics, needs, and pain points, supplemented by six in-depth interviews. This ensured a well-rounded representation of the target audience, adhering to the Central Limit Theorem (CLT). However, some user needs and pain points may have been overlooked, particularly those not explicitly explored during the research.

The primary persona, Sabrina, was instrumental in shaping a student-focused interface, helping prioritize features for this key user group. Conversely, secondary personas, like professionals, received less attention, potentially limiting the design's adaptability for broader audiences.

## **6.5. Scenarios**

To gain better insight into how Sabrina and the users she represents may interact with the product, several scenarios have been created to illustrate key moments in her journey of building a PC. Here there will be a focus on merely one of those scenarios. These scenarios help visualize real-life contexts in which users will engage with the product, guiding design decisions to improve

user experience and usability (Jenny Preece, Interaction Design: Beyond Human-Computer Interaction, 2023).

### **Scenario 1: First-Time Build**

Sabrina embarks on building her first desktop PC to support her studies, despite her limited knowledge of PC components. Upon visiting the product's website, she encounters a simple interface offering step-by-step lessons on PC components and assembly. These lessons include visual aids and interactive questions, segmented to allow her to learn at her own pace without pressure from time constraints or scoring systems.

Exploring further, Sabrina browses a list of prebuilt PCs categorized by use, such as gaming or office setups. She filters the options based on her budget and academic needs. The site's compatibility check feature reassures her that the components will work seamlessly, even if she modifies the premade build.

To address lingering questions, Sabrina turns to the FAQ, which offers clear, beginner-friendly explanations. The community-driven aspect of the FAQ makes her feel supported, as if part of a network of fellow PC builders. The approachable tone and helpful answers boost her confidence in tackling her build.

Armed with her newfound knowledge and resources, Sabrina assembles her desktop PC with confidence and ease, turning what initially felt like a daunting task into an empowering and rewarding experience.

### **Key Takeaways:**

- Sabrina can navigate the interface easily, finding beginner-friendly tools and help.
- Prebuilt PCs and compatibility tool, allows for a simple and stress-free process.
- Clear, and accessible information through FAQ helps Sabrina feel more confident and less stressed.
- The FAQ fosters a sense of community and support, making Sabrina feel welcomed and less isolated in her learning journey.

- By building relationships through user-friendly content, the product enhances user engagement and satisfaction

## **6.6. Evaluation**

The scenarios effectively highlight key user tasks, such as building a first PC, by breaking them into manageable steps, from acquiring foundational knowledge to selecting components. This structured approach provides actionable insights into improving the user journey (Jenny Preece, Interaction Design: Beyond Human-Computer Interaction, 2023). However, external factors like stress and edge cases were not thoroughly considered.

During usability testing, the scenarios proved invaluable in pinpointing pain points, particularly in interface interactions. These findings led to significant functional improvements, including:

- Replacing prefixes with detailed explanations.
- Adding filters to streamline component searches.
- Implementing a looping mechanism between building and component selection to reduce unnecessary navigation.

These adjustments significantly enhanced the product's usability and user experience. However, further iterations that incorporate secondary personas and address edge cases and external influences would be necessary to create a more comprehensive and adaptable solution.

# **7. Learning theory**

## **7.1. Bias for Target-group**

IKEA-effect

The website is aimed at users who want to build a PC or learn the basic principles of PC building. As the product helps users build a PC, the IKEA effect is used. The effect gives a greater value to objects, by the handling and time invested in creating the object. This is distinct from the endowment, where an object has greater value just by the ownership of it. After a finished build

users have the option to share their creations and knowledge with family and friends (Norton, Mochon, & Ariely, 2012).

#### Testing-effect

To strengthen the storage of knowledge with long-term memory, the testing effect is used. The strengthening of information retrieval derives from the act of doing rather than only studying. Thereby doing things in practice will make future information retrieval easier and accessible. By constructing a PC, users will apply knowledge gathered from tasks and use them in a safe environment to test. This encourages users to get a deeper understanding of the material, which integrates better into long-term memory (Roediger & Butler, 2010).

## **7.2. Mindspace Framework**

The Mindspace Framework utilizes the user's cognitive skills and behavior to make learning and information storage easier and more appealing (Vlaev, King, Dolan, & Darzi, 2016). The project uses Salience and Ego, each of which has the user's intentions in focus.

Salience is based on the user's attention to relevant and useful information, which makes knowledge and information easier to store. Their interest keeps them focused on the program, which helps them learn and search for information.

The Ego focuses on what makes the user happy, which aligns with the choices made. With the project, there is real-time feedback after each task to reward the user's choices and strengthen their learning journey. In addition, the project can be shared and explored by other users, which can create competition for someone.

## Foggs behavior-model

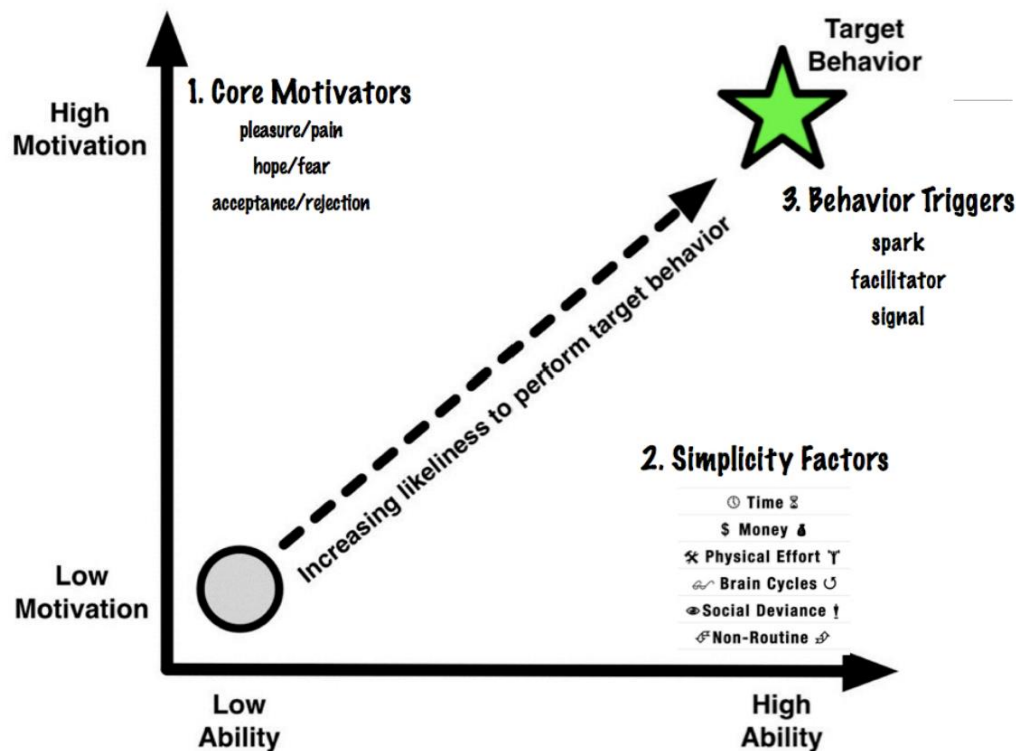


Figure 3 Fogg's behavior model with elements

The users' main motivator is the expectation motivator (Fogg, 2009). It deals with hope and fear, which applies to the users' desire to learn and gather knowledge when using the product. Thus, they hope for knowledge of which components are used and what provides the best benchmark. In addition, there is motivation in the form of fear. Components that do not fit, the PC does not turn on or overheat.

The users' simplicity factor will primarily be time, money, and physical effort. Since the product is a website, users will have it easily available, there is no physical effort to receive information and learn (Fogg, 2009). For the product to remain simple, a task shouldn't take a long time (Fogg, 2009). Users should easily find the knowledge they lack, either with lessons on different topics or with an index. In terms of money, a product that cost money isn't simple for users with limited financial resource (Fogg, 2009). With a free product, this will accommodate everyone. Another way of simplifying financially is to help users save their money in the process of building, by doing it virtually.



Since the product is designed for users who are interested in PCs, then their motivation for the subject is clear but lack the skills. The appropriate trigger for this scenario is the facilitator trigger (Fogg, 2009). To keep users' motivation, the subject must be made simple and understandable, by using real-time feedback and simple actions.

### 7.3. The Functional Triade

Tool:

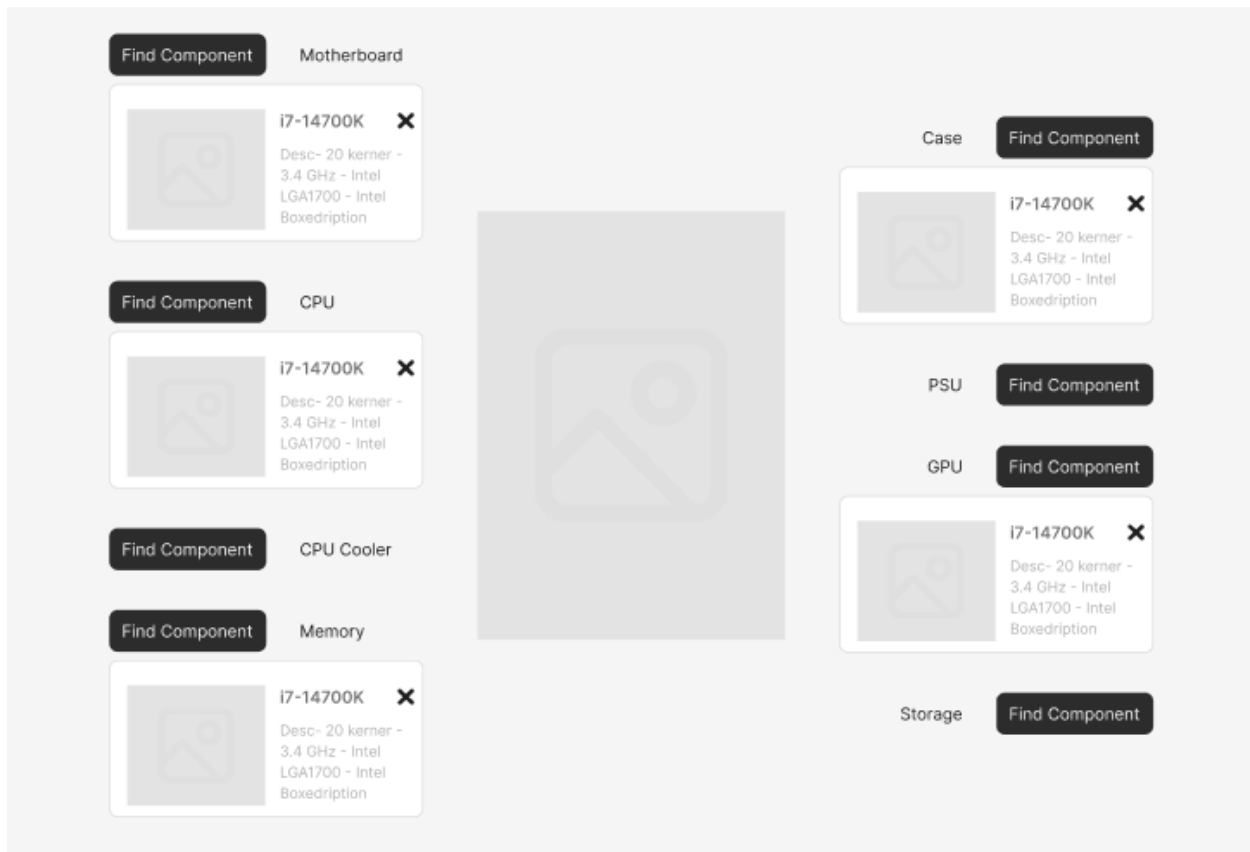


Figure 4 Build Section

Our technology is very easy to use which makes it very user-friendly for beginners. The technology provides many functionalities that make it easier for the user to achieve their goals. In Figure 4 Build Section you can see how the build section makes it easier to both remember which components must be in the desktop PC and which components you have already chosen. The build section itself calculates the final price of the desktop PC, how much power it uses, the benchmark score, and how many errors it has. The technology also makes it easier to learn, which can be seen in Figure 5. The technology makes it easy for the user to find what the user

needs to learn. There are 4 topics that the user can choose from: Components, Overclocking, Compatibility, and Assembly. Each subject has several lessons that you can choose from.

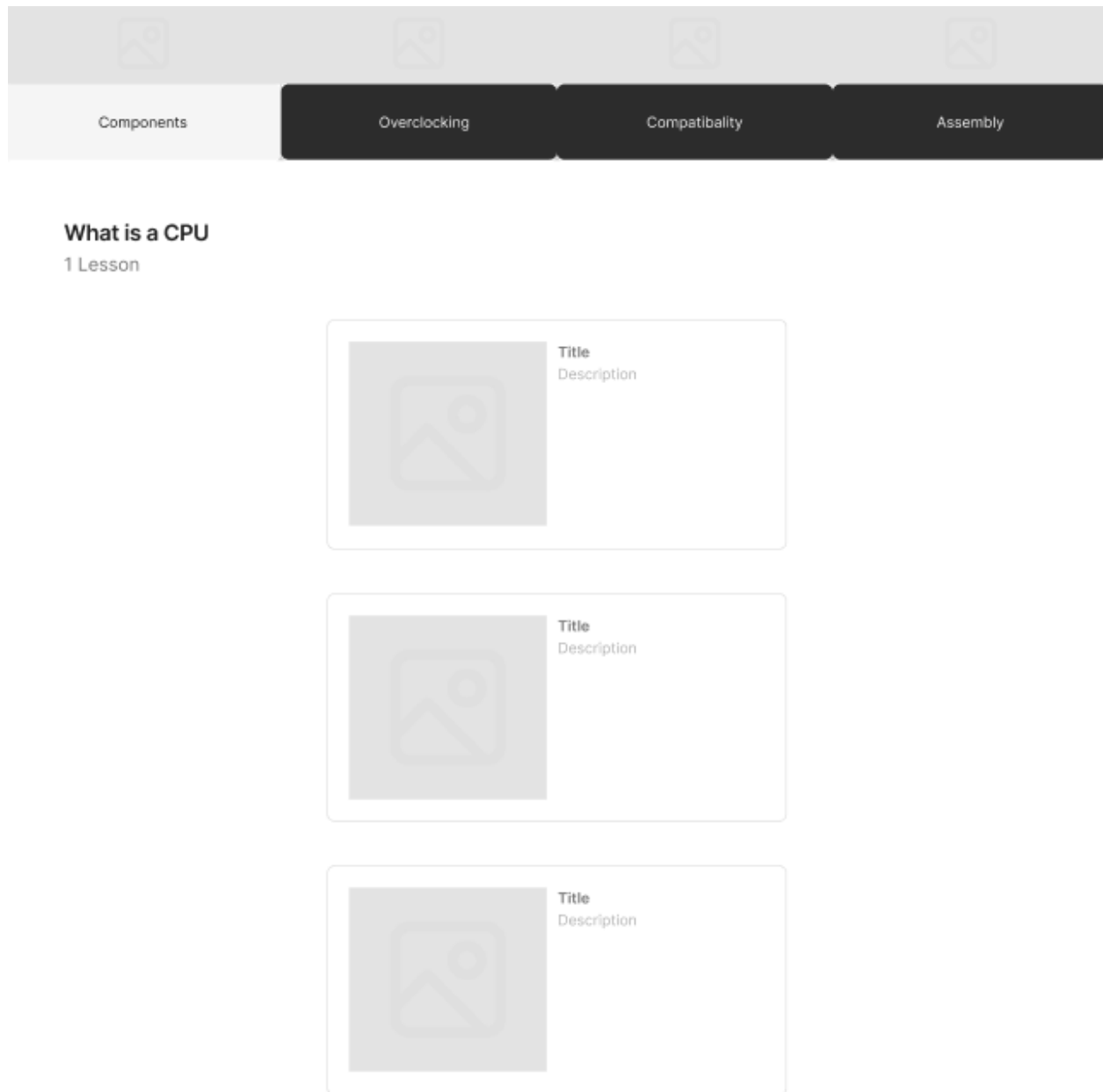


Figure 5 Lessons section

The last section which makes it easier for the user to achieve their goals is the component section. This section helps the user to find the right components, as can be seen in Figure 5 Lessons section. The user has the option to search for a specific component or they can explore components by using filters.

# Components

Simple component finder


Search for component

Search

Type

Select ▼


Search



Title

Description

Buy 999DDK



Title

Description

Buy 999DDK

Figure 6 Component Finder

## Medium

The product creates a persuasive and motivational experience, by giving the user the freedom of built, and experiencing the cause-and-effect relationship between components. Furthermore, motivation will be felt after the PC is completed and the creation of a sense of accomplishment. This experience facilitates rehearsal of this positive behavior.

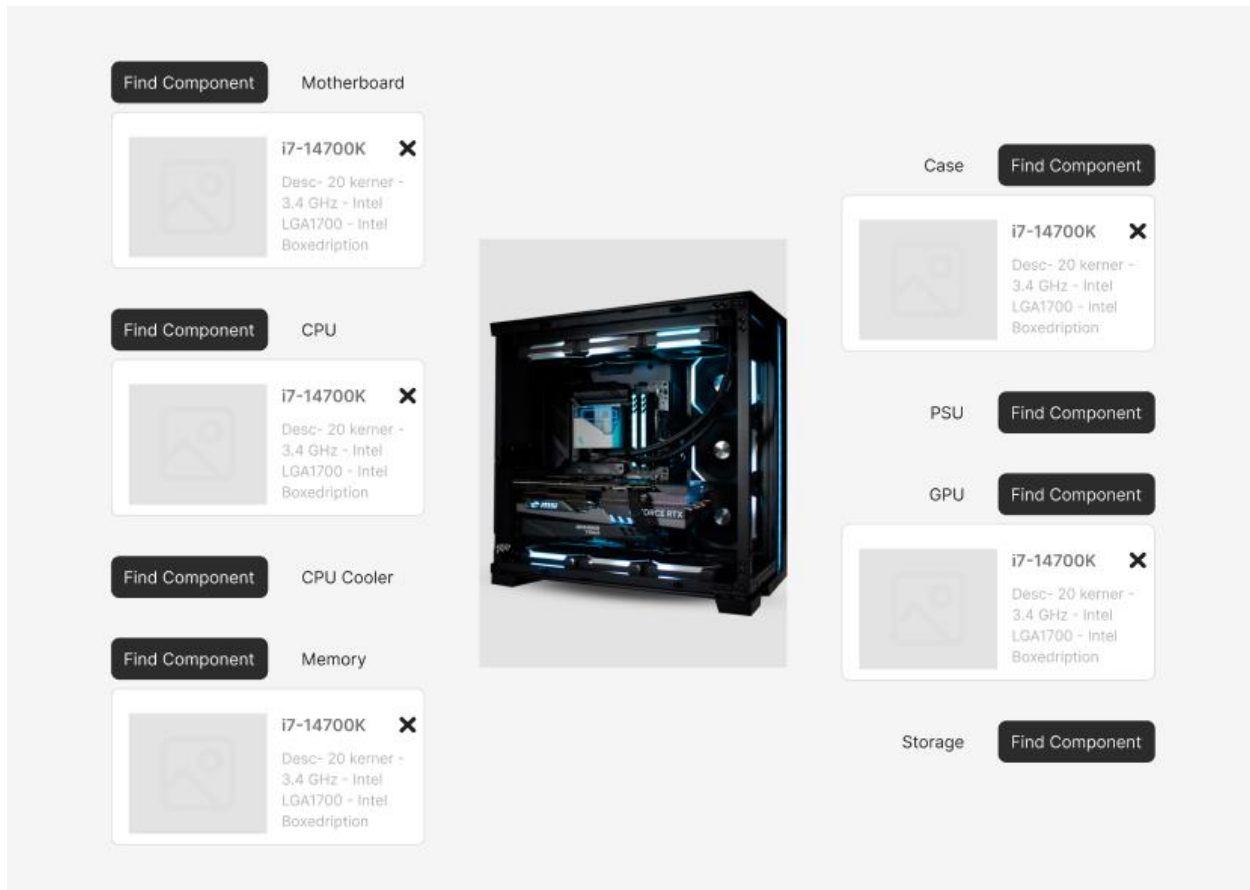


Figure 7 Build Section

In depth these experiences of building the PCs, finding faults and adjusting. Will give scenarios to the user which can and will change their perspective, behavior and take on these specific problems and understanding of them. Furthermore, the guiding hand will consolidate the behavior and experience this product is meant to facilitate and project.

## Social Actor

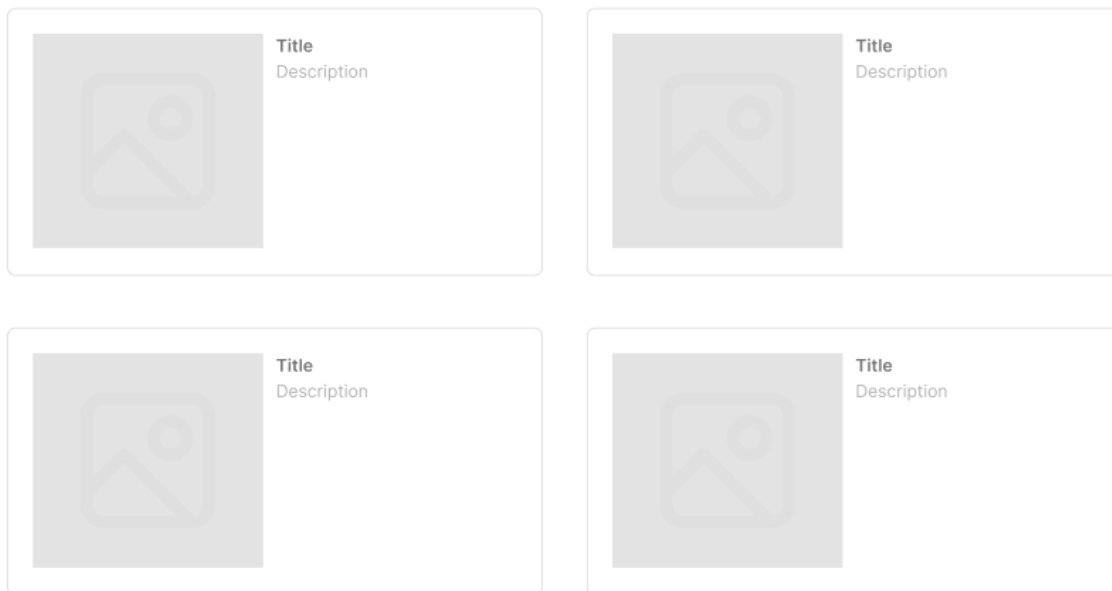
When the user finishes a lesson, The website uses humane responses as a reward system. **Error!**

**Reference source not found.:** shows how the text is displayed when the user finishes a lesson.

The text congratulates the user and tells them they did a great job. This will help the user develop a healthy relationship with the website, the same as if they were talking to another person.

## Popular builds

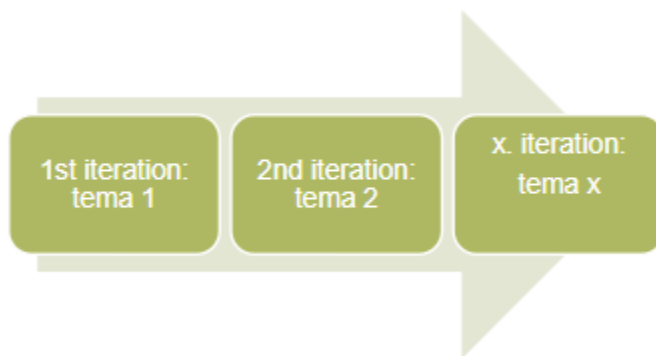
Made by community members



*Figure 8 Community section*

The website also includes a community section, where the users can communicate with each other by sharing their builds, and comments. Figure 8 Community section It shows a grid with multiple posts from different users. The user can select one of the posts to read more about the build or leave a comment on the build. This will help users to bond through the website but also work as a helping tool for users.

## 8. Method



*Figure 9 Iterations*

Agile is a design methodology used in development to help structure the development process.

The Agile model usually starts with a plan segment. The plan segment is where the requirements for the product will be revealed.

It is then followed by multiple segments that are considered flexible, meaning that segments can be swapped around, and new segments can be added or removed. These are in a wheel structure meaning that each segment is followed by another in a circular structure, so you end up at the first segment again. A usual segment structure for this section could be design, build, test, and evaluation.

- Design

The focus of the design segment is to find solutions to the requirements of the product. A common method to do so is to start brainstorming and mind-mapping ideas.

It is also we start doing some research, usually in the form of surveys, to get insight into potential consumers as people and their wants and needs. These can be used to create personas which are fictional consumers that fit the scope.

- Build

The build segment is used for creating low and high-fidelity prototypes of the designs we created in the design segment.

- Test

The primary focus of the test segment is to collect data usually by doing user tests. This data comes in many forms depending on the types test chosen. This makes it vital that the tests are planned out to ensure that the feedback returns usable data.

- Evaluation

The focus of the evaluation segment is to evaluate everything learned throughout the process. Some key points would usually be, what should be kept, what could be changed, what should be removed, and what is missing.

After going through all the segments, we have created the first iteration of our product. We can then either proceed by going through the segments another time, creating a new iteration or launching the product.

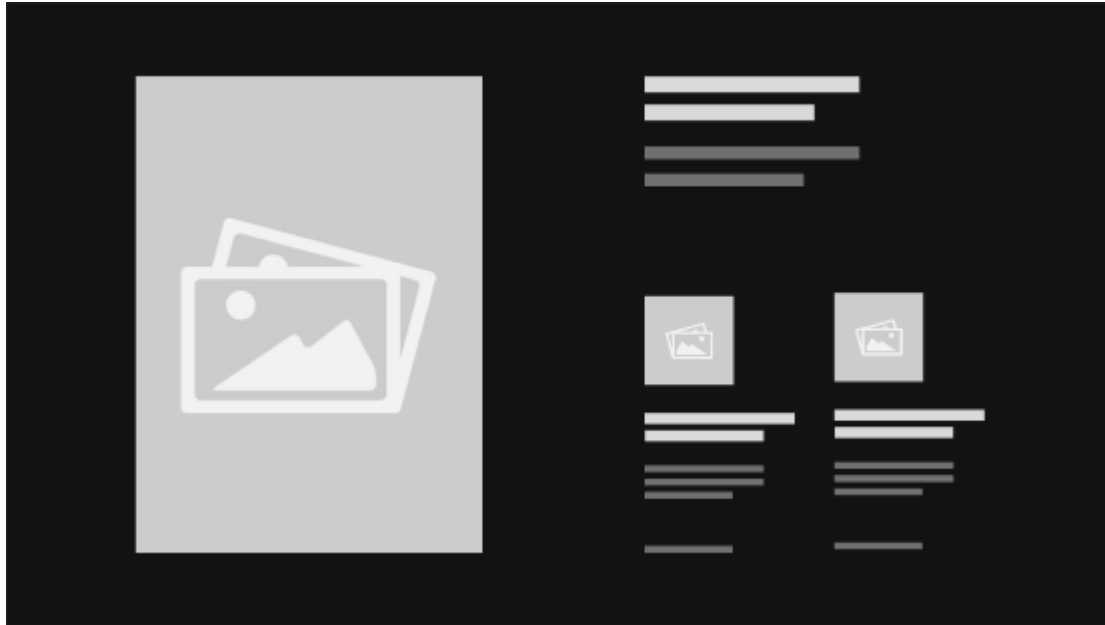
## 9. Prototype iteration

### 9.1. Low Fidelity Prototype

#### 9.1.1. About (Goals: What is being developed, screenshots, sketches, etc.)

The goal is to create a general overview of how the website's layout should appear before initiating the design production phase. The first iteration of the low-fidelity prototype is very simple, consisting of rectangles and other basic shapes. Figure 10, illustrates a simple layout for one of the sections, designed to introduce users to how they can find components and build their first desktop PC.





*Figure 10 Layout*

The use of basic shapes to represent both text and images aims to save time in the design process. There is no need to focus on fonts, image selection, or text sizes at this stage; the sole focus is on the layout itself.

Fifteen different layout templates were created to quickly build the various pages the website will consist of. These templates were made using **Figma.com**, a popular tool for wireframing. Figma enables the rapid creation of components (in this case, layout templates). When a single component is updated, all copies of that component reflect the changes automatically, saving significant time.

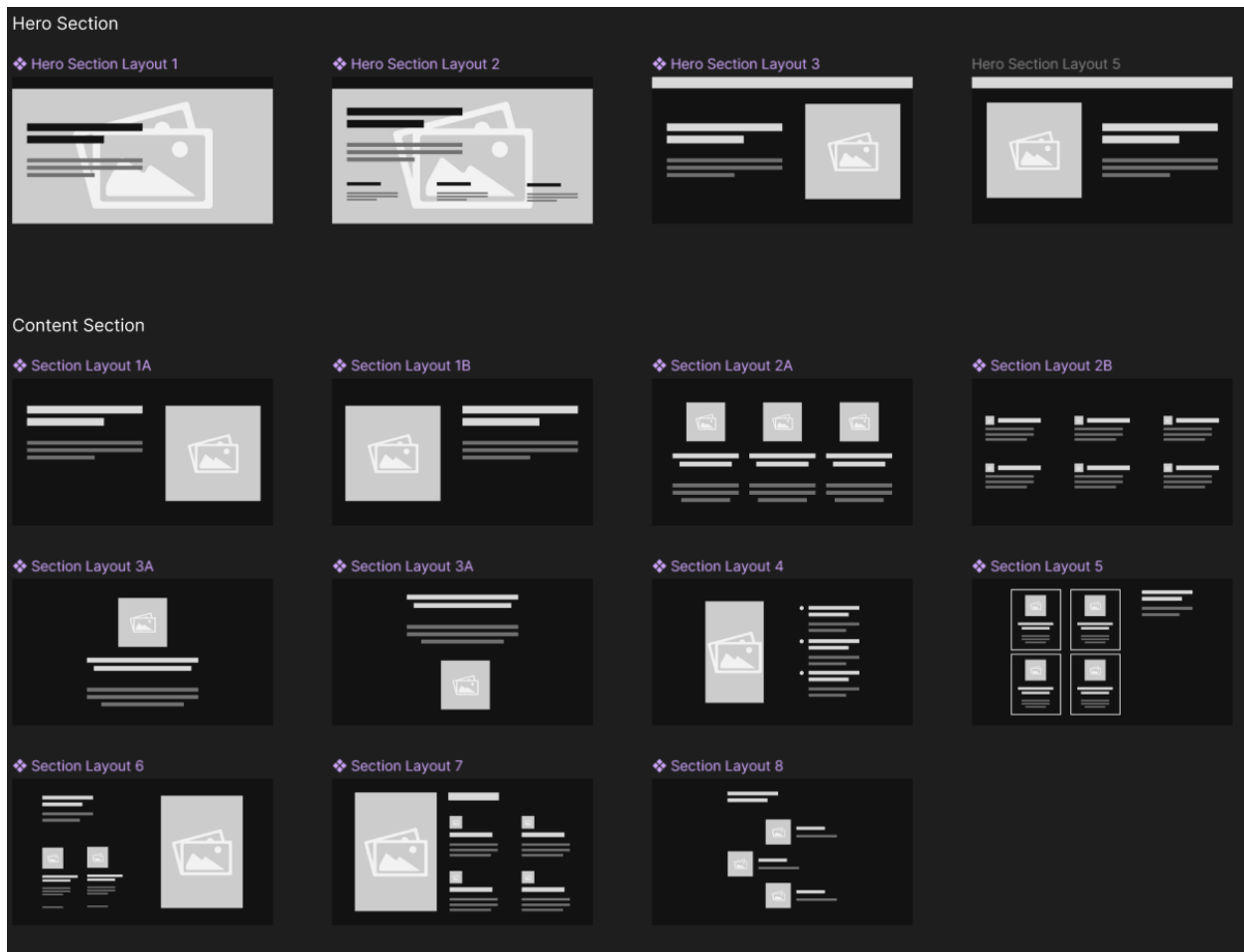


Figure 11 Components in Figma.com

Figure 11 shows the 15 different components. Two main types of components were created: **hero section components** and **content section components**. The four hero section components represent the front-page layouts that users see when they first visit the website. These layouts are designed to capture users' interest and encourage engagement with the site. Content section components are layouts used to convey the website's goals to the user.

The second iteration of the low-fidelity prototype is more complex. This iteration not only outlines how the website is structured functionally but also provides a more detailed layout concept. The prototype now includes layouts for all five pages of the website, as shown in Figure 12.

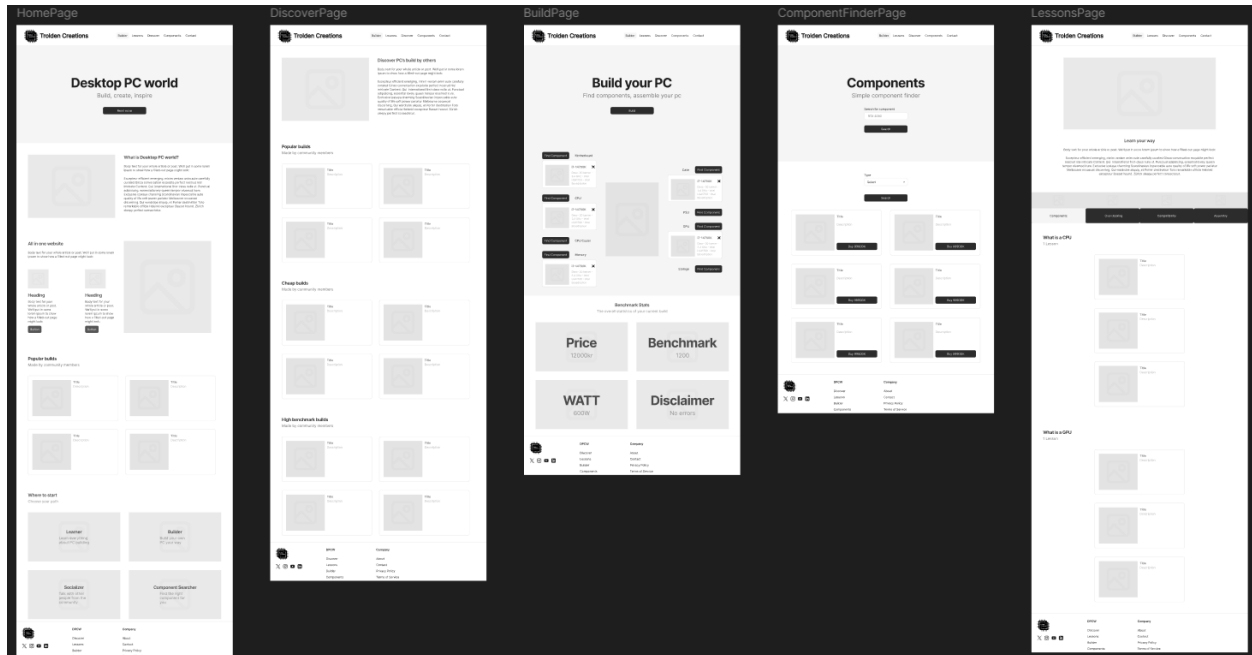


Figure 12 Wireframing

The first page is the “Home Page.” This page introduces everything the website offers to users. The Home Page assists users in selecting what they need. For example, if a user is unfamiliar with any of the components, they can choose to learn more at the bottom of the Home Page, which redirects them to the “Lessons Page”.

### 9.1.2. Evaluating (Test plan and results)

The test consists of multiple users, giving feedback on the website's layout. This is crucial to achieve a clean layout that is easy to navigate. The website has problems with navigation and is overcrowded in the current version. This makes the website hard to navigate, meaning that the user has a hard time finding the right content.

### 9.1.3. Reflection and Decisions

To enhance the website layout, it is important to focus more on the usability heuristics developed by Jakob Nielsen. To address the issue of overcrowded content, implementing more filters can

help to eliminate unnecessary information. Currently, users must scroll excessively to find the content they are interested in. Much of the content on the page could be effectively managed by hiding it behind these filters. Additionally, there should be clear indicators to show users which page they are currently on. This can be accomplished by highlighting the active button when selected.

## 9.2. High Fidelity –Theme 1 (Vertical slice)

### 9.2.1. About (goals – what is being developed, description of functionality, screenshot of interface)

Wireframing is another big step in developing the finished product. Wireframing helps to understand how the final product should function, without adding visual design elements. This saves a lot of time, meaning if something is not functioning as intended, there is no time wasted on the pretty design, and can easily be replaced with other functionality.

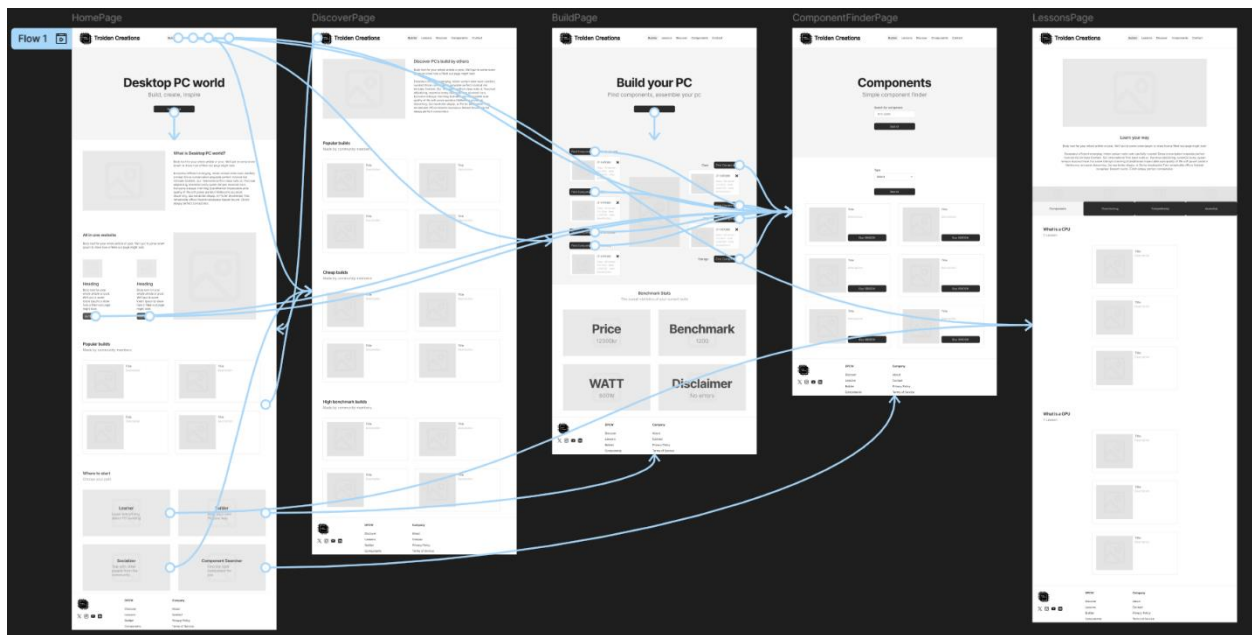


Figure 13 Prototype

To make functioning wireframing, it is important to focus on navigation. Wireframing helps to understand if the current layout of the website is easy to navigate. When done correctly, the wireframing can be tested by users, which can generate useful feedback that will be used to iterate the process. (Guilizzoni, 2024 )

After multiple iterations were conducted, and the navigation was considered improved, it was time to make a simple idea for the website theme. The chosen colors for the theme are: #1C1F26, #FFFFFF, #1c222b, #424c5a, #acacac, #FF6B35 and #007BFF. These colors are the shape of dark blue and light blue, orange, and white. The colors represent wisdom and technology, and a more minimalistic style.

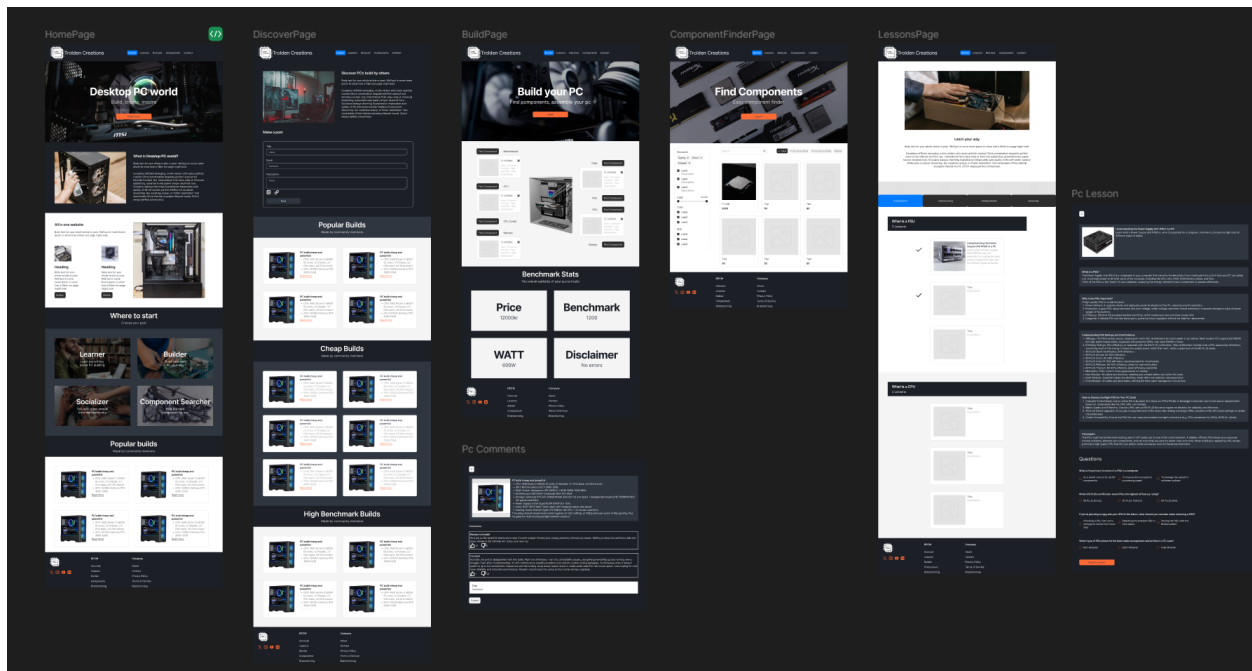


Figure 14 Wireframing with visual design

The wireframing iteration with the visual design was ready to be tested by the users. Figure 14 represents the final version of the wireframing. It has 5 pages and 2 pop-up pages.

### 9.2.2. Evaluation (tests and results)

The test consisted of four participants in the group. The name of the test is Heuristic Evaluation, which helps to understand the issues the current product has based on the 10 Jakob's usability Heuristics. Each user needs to write recommendations for how to fix the usability issues the product has (Moran, 2023). Each participant got the Heuristic Evaluation Workbook, from the [www.nngroup.com](http://www.nngroup.com) website. This handbook needs to be filled out by the participants, to later analyze with the whole team.

The test takes approximately one hour to complete, and participants could not communicate with each other during the duration of the test.

**Visibility of system status:** The website is not very responsive, the only feedback the user gets is from the header, where the buttons change colors when hovering over the button, some buttons do not even change the cursor to a pointer when hovering over it. Missing titles makes it much more unclear for the user what button they have clicked.

**Match between the system and the real world:** The website is lacking in real-world associated icons, that could help with communication and lessen the amount of text. Easier language for newcomers. The currently used language uses slang words like CPU and PSU etc. These words can be very hard to understand for a newcomer, and it will be harder for them to learn what they mean when they never see what that slang stands for.

**Users' control and freedom:** Lack of exit, there is no way to get back to the homepage. Some pages are difficult to access, and only accessible through different pages. This can confuse the user on how to access those pages. The lessons section also lacks the previous page and next page buttons, to make it faster to navigate through the lesson's pages.

**Consistency and standards:** It is intuitive to press the logo button to be sent back to the homepage, but the website does not have that option.

**Error prevention:** There are no error messages. This means that the website does not warn the user if they have not saved before exiting, or when they press on an external link. There should be a warning when pressing on an external link.

**Recognition rather than recall:** It is hard to navigate inside the build section. If the user selects to fill the CPU, the button will send the user to the component finder, where the user needs to remember what component, they need to fill.

**Flexibility and efficiency of use:** There are no shortcuts on the website or customization options. The languages cannot be changed, which can be a problem if the user lacks the knowledge of the English language.

**Aesthetic and minimalist design:** Not everything is important inside the website. Some things should be able to be filtered out. It is annoying to go through all the lessons inside one topic, to be able to find the right lesson for the user.

**Help users recognize diagnose and recover from errors:** There are no ERROR messages on the current website

**Help and documentation:** The only way for the user to get help is from the contact section. This can be a problem if the user has social anxiety and is not willing to message or call for support.

### 9.2.3. Reflections and Decisions

Selected tabs must be distinctly colored to differentiate them from unselected tabs. The website's usability will be greatly improved by incorporating more real-world icons, such as a floppy disk for the save function or a folder to represent collections. Furthermore, the scrolling system must feature animations to create a more enjoyable user experience. A button must be added to the logo, directing users back to the start page so they can easily begin anew. To increase clarity for all users, replace technical jargon like PSU, GPU, and CPU with straightforward language. A PSU should be clearly labeled as a power supply unit to ensure new users understand its importance from the start. Immediate warnings are necessary to alert users when they are about to leave an unsaved element. Additionally, users must be informed when they are being directed to an external link after clicking a button. They should also have the option to select "Don't show again" if they wish to dismiss such warnings in the future. The component selection process requires automatic filtering to display only relevant results. For example, if a user wants to change their CPU, only CPU options should be shown. Overall visibility can be drastically improved by adding more filters and reducing the number of mandatory lessons displayed on the screen. When presenting error messages, they should align with the PC building theme; for instance, a broken PC graphic should clearly indicate the issue

### 9.3. Theme 2 (Extended Functionality and Improvement/Further Development of the User Interface)

#### 9.3.1. About (goals – what is being developed, description of functionality, screenshot of interface)

To make the website more functional, it requires more advanced software than Figma.com; therefore, Visual Studio Code is being used. Visual Studio Code can write JavaScript, HTML, and CSS, which are crucial languages for creating a website. In this state, the structure of the website is being developed. Important classes and IDs are being initialized. All functionalities are being made for the Home page Figure 15. This page needs to be appealing to catch the user's interest.

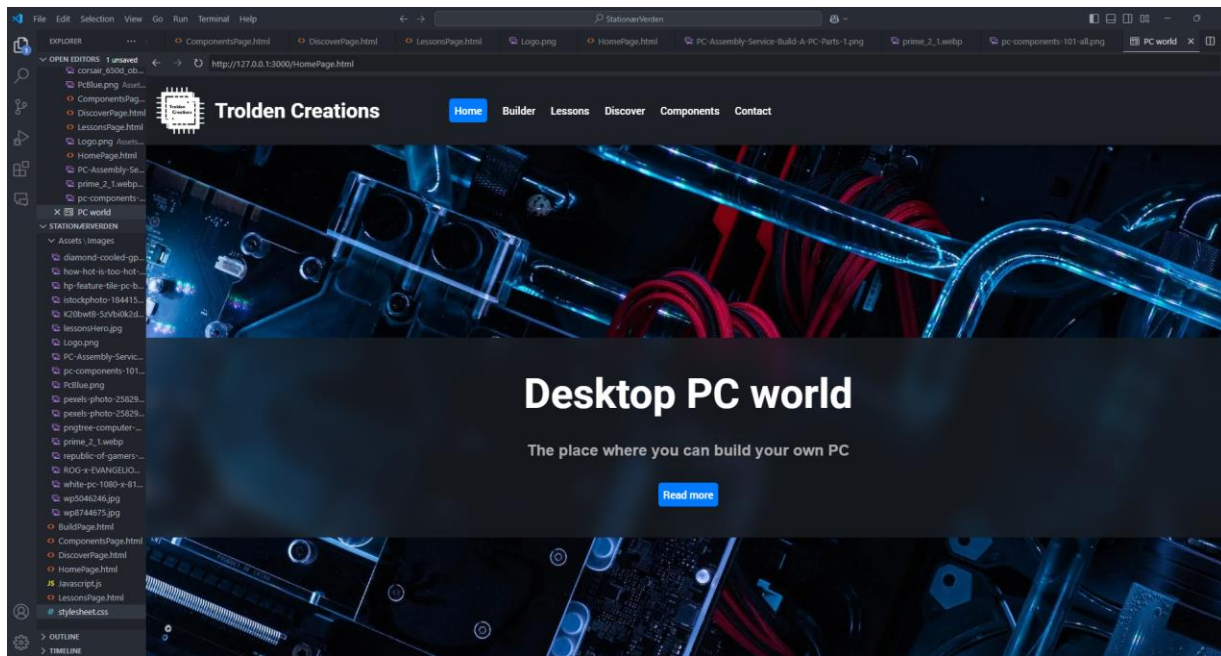


Figure 15 Home Page

The content inside the website is currently AI-generated to, to spare time and cost to create the filler text. This text will be changed later in the process with expert knowledge. shows the content inside the website. The layout is minimalist but also unique to keep the user engaged. The text is subdivided into 3 sections, to prevent a crowded text wall. The user can choose what they find the most interesting and important, by reading the title and subtitles. This also helps with navigation by filtering information that the user does not want to read about. Three images are



used to further engage the user, by also presenting some visual elements. “Pictures help build on what the reader may already know or helps build new bridges of information” (Zimmerman, 2009) images serve as clues for readers so that they know what the text is telling them. The images should have a connection to the text that it represents.

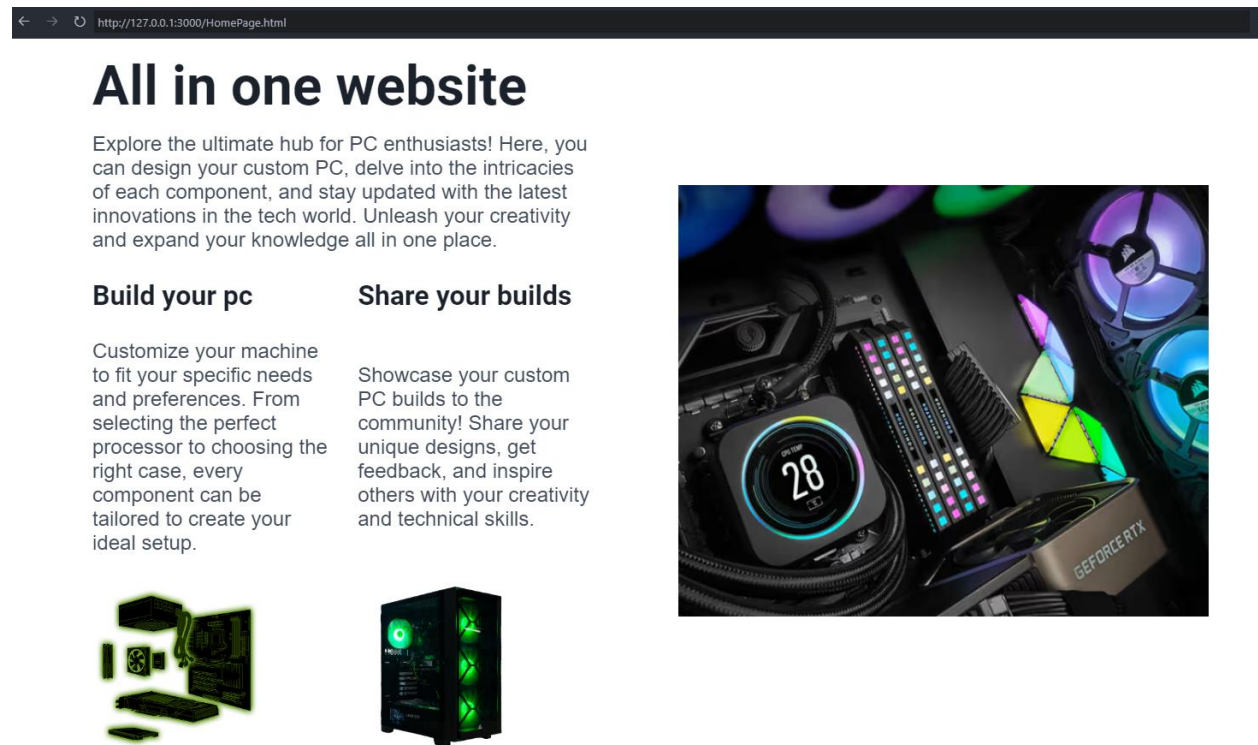


Figure 16 Home Page Content

An important learning functionality the website offers is the build functionality. The build page is also shown in Figure 17, the user can create their own desktop PC, by selecting each part category, and filling them up with any component they find suiting. For example, if the user presses add component inside the CPU container, the user will be referred to the component finder, where they can find the perfect CPU for their desktop PC. When the user has selected all the components for the desktop PC, the website will then calculate the performance of the current desktop PC build.

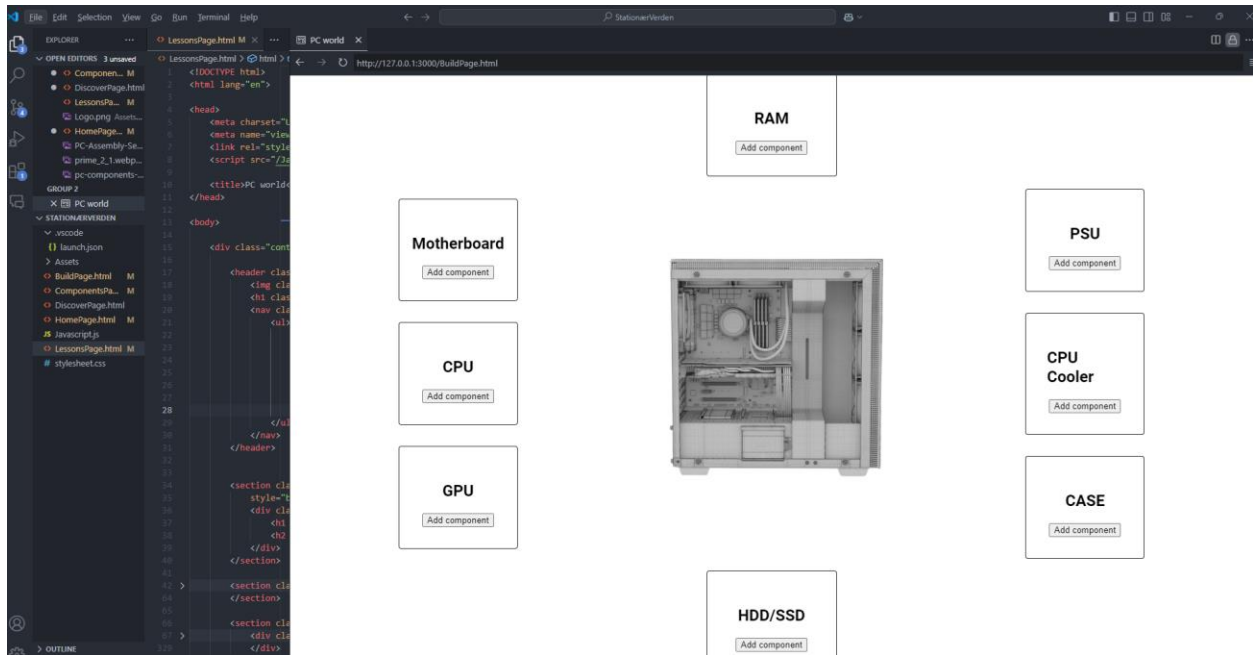


Figure 17 Build Page

The website shows the performance of the current desktop PC build based on benchmark score, price, compatibility, and watt usage Figure 18. If the current desktop PC build has some compatibility issues, it will be displayed inside the compatibility container, where it will explain what is wrong and show a possible fix. The visualization in the middle is a PC that changes components based on what the user has picked. This feature is yet not implemented

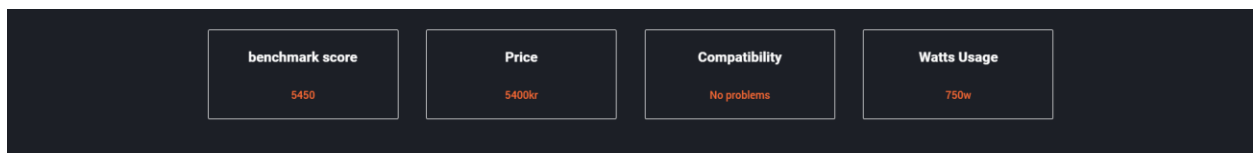


Figure 18 Performance Calculation

The idea behind the discover page is to give the user the possibility to explore other extraordinary desktop PC builds by other users inside the community. This feature is still in development but will feature the possibility for the user to post their builds and communicate with other PC enthusiasts. The feature will users to learn from each other, by helping each other build new desktop PCs, inspiring others, and discussing components together.

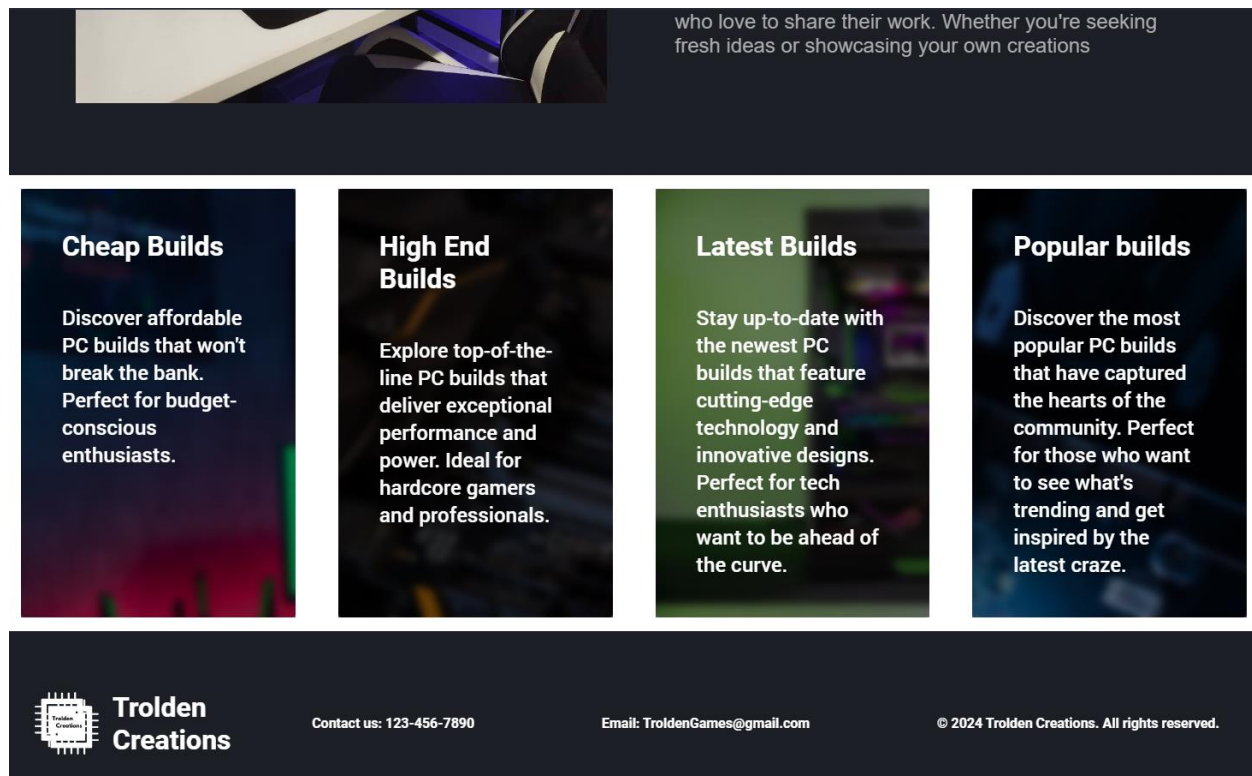


Figure 19 Discover Page

### 9.3.2. Evaluation (test plan and results)

The test consisted of the group members, testing the navigation inside the website, and each functionality. Each group member got the test to navigate to a certain tab and complete a task. One group member had a task to build their desktop PC while telling everything that was on their mind. The test showed that the website has improved since the first iteration. The website is easier to navigate because the added color highlights on the buttons make it easier to understand what page the user is currently on. Problems arise when the user presses the add component inside the build page, the component page does not automatically filter based on the selected component. The user still needs to filter the components by themselves, which is not optimal. The group concluded that the website is heading in the right direction, but there is still functionality missing, like the lessons, and adding components.

### 9.3.3. Reflections and decisions

The next iteration will focus on changing all the AI text with the expert text and make it more "human-like". Words like CPU, GPU, and PSU need to be changed from slang to actual words, to

make it easier for newcomers to learn. Functionality like adding the components and calculating the performance of the desktop PC build and the learning page should also be implemented in the next iteration. It is most important to showcase the idea and not the entire functionality.

## 9.4. Theme 3 (Polishing and Improving Usability)

### 9.4.1. About (goals – what is being developed, screenshot of interface)

The goal is to replace all the filler AI text with expert text. Desktop research was performed and information about different components was collected and ready to be implemented into the website. The lessons page is being created, where the user can learn all about PSU, GPU, CPU, and other important components. On the left is a menu bar for the lessons, shown on **Error! Reference source not found.** This bar is used as a lessons filter, where the user can select specific lessons and read about them. Each lesson has a quiz the user could complete to see if they understood the theory correctly.

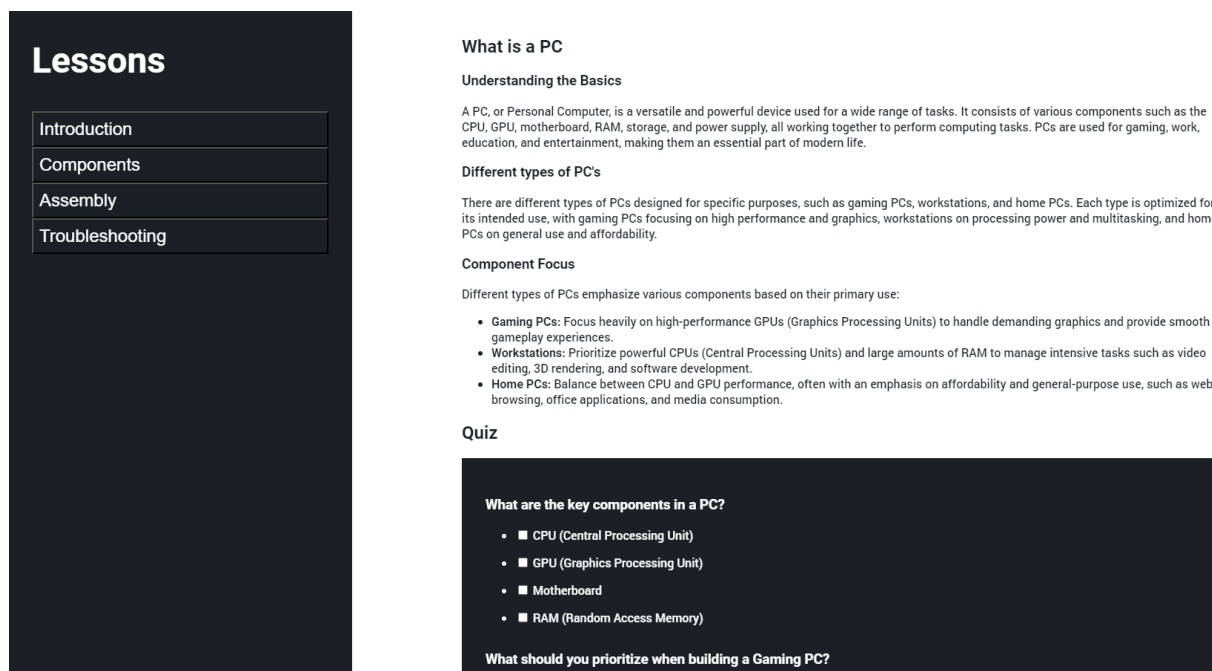


Figure 20 Lessons Page

To better improve the learning, the website will be able to give the user the possibility to use the theory and build their own desktop PC by using the building functionality shown on Figure 21. In this section the user can select components for each container, to plan their final desktop PC

build. This helps the user to use the theory they learned from the lessons page and use it in practice. For example, when a person learns all the theory about drawing, but they never used a pen in their life, they would not be able to draw anything pretty, because they also need to learn how to do it in practice.

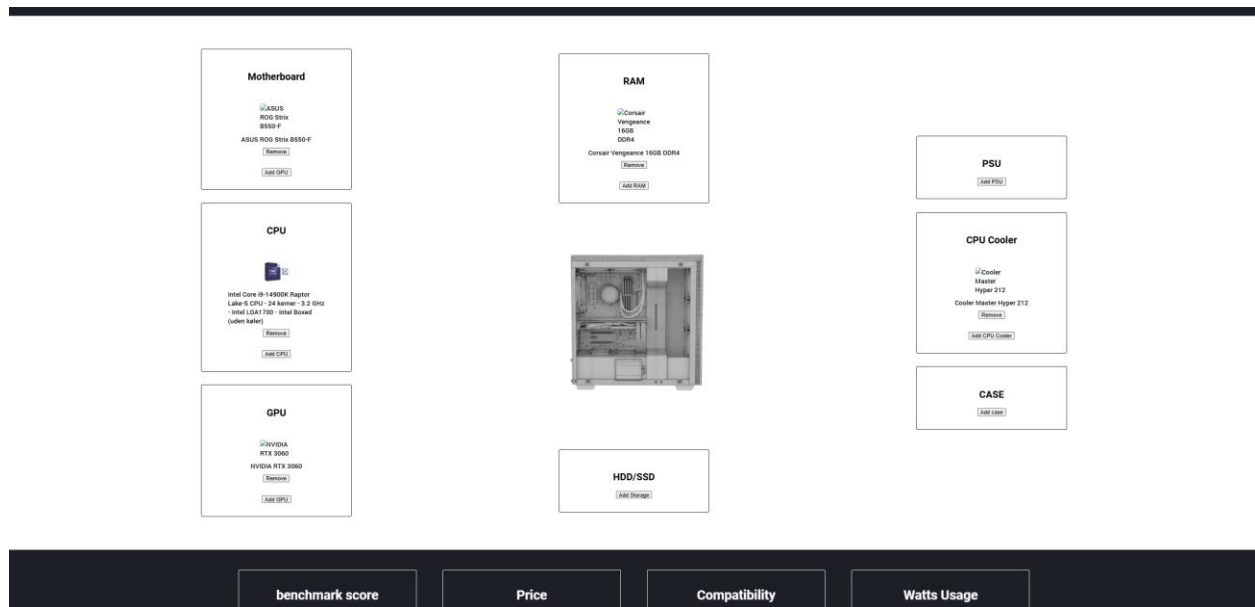


Figure 21 Building Functionality


The build functionality works with the component finder functionality, and therefore it has also been implemented in this current iteration. Inside the component finder, there are filter boxes, where the user can select component type, manufacturer, and price range. When the user fills out the filters, they can then find the components inside the results container. The user can press the add component button, to add the corresponding component inside the build page container.

# Search for Components

Component Type:

Manufacturer:


Price Range:



Intel Core i9-14900K Raptor Lake-S CPU - 24 kerner - 3.2 GHz - Intel LGA1700 - Intel Boxed (uden køler)  
(CPU) - 3444kr.  
Manufacturer: Intel

[View Product](#)

---



AMD Ryzen 7 9800X3D CPU - 8 kerner - 4.7 GHz - AMD AM5 - AMD Boxed (uden køler)  
(CPU) - 4190kr.  
Manufacturer: AMD

[View Product](#)

Figure 22 Component Finder

## 9.4.2. Evaluation (test plan and results)

The website is now being compared to the interviews conducted on October 24, where the target group explained what features should be implemented for the website to be useful. 6 interviews were taken, and nearly all of them wanted the same features to be implemented into the website. The features are: Benchmark, which shows all the important information about the current desktop PC build, lessons that help the user to learn about different components and the process of building their own desktop PC, component finder that helps the user to find the right components for their desktop PC build, and a 3D visualization of the current desktop PC build that shows all the selected components. These features are added in the current build, but they are still not 100% functional, they serve as a vertical slice for the intended purpose. The formula with 45 answers from the target group also ranked navigation as the most important element to focus on and therefore the website has a clear navigation guide for new users.

### 9.4.3. Reflections and decisions

The website has all the features the target audience wanted, meaning that it fulfills their needs for a website that can teach them how to build their very own desktop PC build. The website still has issues to solve, like the lessons submit button now working, and making the benchmark tool functional. The CSS for the component's container inside the build page should also be made prettier and more stylized.

## 10. Technological development coding highlights, overview, and selected details

The website is made by using Visual Studio Code and GitHub Copilot. Visual Studio is the programming and visual representation of the website software, while GitHub Copilot was used as an AI assistant to generate filler text, also shown on Figure 23. The website is separated into 5 HTML pages. Each page has its layout, but they have the same goal of teaching the user how to assemble and find the correct components for their desktop PC build. The project includes stylesheet.css and Javascript.js, those two files help to create a visual design for the website using CSS and functionality using JavaScript. The project is shown on Figure 23. The project has an Assets folder, where all images are stored



Figure 23 Pages HMTL

The Ai can be accessed by pressing Ctrl + I. This is called inline chat AI assist, where the AI collects information based on the content selected. The AI can then generate either code or text,

based on context. The Ai text is not used in the current iteration, it was replaced with actual expert knowledge collected from desktop research.



obtain the components. The if statement `components.length === 0`, checks if there is any components found using the filter, if not the HTML will show “No components found”. For each component inside the argument array, it will loop and create the component HTML inside the `listItem`. To create a new component inside the `listItem`, the JavaScript function takes the innerHTML of the `listItem`, to assign the new component and then append the child.

```
function displayResults(components) {
  const resultsList = document.getElementById("resultsList");
  resultsList.innerHTML = "";

  if (components.length === 0) {
    resultsList.innerHTML = "<li>No components found</li>";
    return;
  }

  components.forEach(component => {
    const listItem = document.createElement("li");
    listItem.style.display = "flex";
    listItem.style.alignItems = "center";
    listItem.style.gap = "10px";

    listItem.innerHTML = `
      
      <div id="component-item">
        <strong>${component.name}</strong>
        (${component.type}) - ${component.price}kr.<br>
        Manufacturer: ${component.manufacturer}<br>
        <a href="${component.link}" target="_blank" style="">View Product</a>
        <button onclick="addToBuild('${component.type}', '${component.name}', '${component.image}')">Add to build</button>
      </div>
    `;
    resultsList.appendChild(listItem);
  });
}
```

Figure 26 Component creator

For a more dynamic CSS approach, the stylesheet uses variables inside the root. Color variables and spacing variables for both margin and padding are used to create a clean and repeating consistency in the website. Figure 27 shows the basic structure of the root, which is used for the whole website.

```
/* Variables */
:root {

  /* Colors */
  --background-color-primary: #1C1F26;
  --background-color-secondary: #FFFFFF;

  --text-color-primary-on-white: #1c222b;
  --text-color-secondary-on-white: #424c5a;

  --text-color-primary-on-black: #FFFFFF;
  --text-color-secondary-on-black: #acacac;

  --highlight-color-primary: #FF6B35;
  --highlight-color-secondary: #007BFF;

  /* Fonts */
  --font-primary: 'Roboto', sans-serif;
  --font-secondary: 'Open Sans', sans-serif;
  --font-tertiary: 'Montserrat', sans-serif;

  /* Spacing */

  --Spacing-tiny: 0.5rem;
  --spacing-small: 1rem;
  --spacing-medium: 2rem;
  --spacing-large: 3rem;

  /* Font Sizes */

  --font-size-small: 1rem;
  --font-size-medium: 1.5rem;
  --font-size-large: 2rem;
  --font-size-xlarge: 3rem;
  --font-size-xxlarge: 4rem;

}
```

Figure 27 CSS

When writing CSS, it is important to prevent writing the same code over and over, and therefore important to create basic classes that work as a template. Figure 28 shows a basic structure for CSS class template, for two-column containers. When writing HTML, it is now possible to make a parent class two-column containers, and then add two children classes left and right containers, to see the effect of the CSS.

```
.two-column-container{
  display: flex;
  justify-content: space-around;
  align-items: center;
  margin: var(--spacing-medium);
}

.left-column{
  width: 50%;
  padding: var(--spacing-medium);
}

.right-column{
  width: 50%;
  padding: var(--spacing-medium);
}
```

Figure 28 CSS Templates

## 11. Discussion

The purpose of learning and cost efficiency, as well as the choice of learning methods, such as the testing and IKEA effects, reflect long-term retention and the value of do-it-yourself. This is mirrored in the website's structure, with elements organized under separate tabs. A Lessons tab provides relevant knowledge about building a PC and the function of its individual components. With the lessons, users can study the different elements, built around short understandable information paragraphs, with a multiple-choice questionnaire that gives feedback. This way the users will read and understand the topic, before moving to the next topic. Additionally, a builder tab allows users to practically test their newfound knowledge, helping it stick better. This way users' skills are visualized and can help better understand the required knowledge. These divisions focus on beginners in the topic by saving users time and effort searching the internet, as everything is gathered on one website.

## 12. Conclusion

This project successfully addressed challenges faced by beginners in building their first PCs, by providing a user-friendly and intuitive website, with a focus on teaching about the basics. With the use of a user-centered iterative prototyping process, involving user feedback and expert reviews, the design meets varying levels of expertise of users, accommodating most potential customers. The mid-high-fidelity prototype refined to simplify the assembly process for beginners, while still maintaining the requirements of advanced users, makes it possible to build a community of varying groups of people. Therefore, the final design not only enhanced usability but also demonstrated the potential to reduce monetary loss and risk associated with building your first PC on your own.

The current prototype provides a solid foundation, but there are still opportunities for further improvements, especially concerning edge cases and expanding the capabilities of the tool, to accommodate even more build types. Later iterations could therefore focus on incorporating more advanced custom options for experienced users, this could be in the form of component searching or specific builds with specific focuses or specs.

In conclusion, the project contributes to bridging the gap between novice and expert users in the realm of desktop PC building, granting power to beginners and individuals to undertake the road of building their own PCs for the first time without fearing monetary loss.

## 13. Perspective

Further development of the project will include auto-calculation of the current desktop PC build measuring the wats usage, compatibility issues, price, and benchmark score. The website database will also be further developed, using ProShop.dk component database, to include all the components, to give the users a broad variety of different components. To sustain the website, the database will also include the affiliated links, to produce revenue for sustainability of the website.

The social section will also be completed, where users will be able to share their builds with each other, and comments on the posts. Each section that is shown in Figure 19, serve as a selectable category that the user will be able to use to find the right content for them. If the user wants to find the cheapest desktop PC build, then they will be able to press the Cheap Builds banner and see a list of posts, that show some economic desktop PC builds. When creating a post, the user will be able to feature an image, title, description, and their desktop PC build from the build section. This will help others to copy each other's builds and leave comments. This will help to build a strong community where the users will be able to help each other and learn from each other.

Lastly, the design of the websites needs further improvements, changing the images to better represent the context, and improving the navigation by adding more taps that hide the unnecessary content and show the important content for the user. More animation to create a fun experience, when exploring the website.

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## 15. Attachment

Consent  
 45 svar

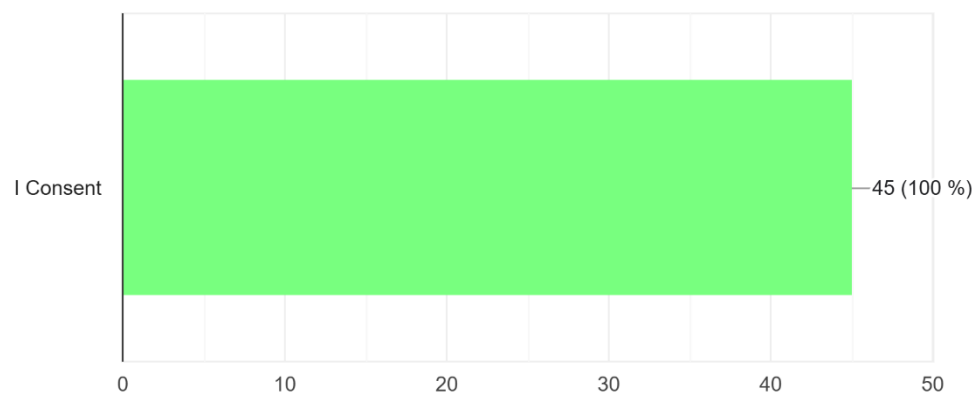


Figure 29 Consent table

## Gender

45 svar

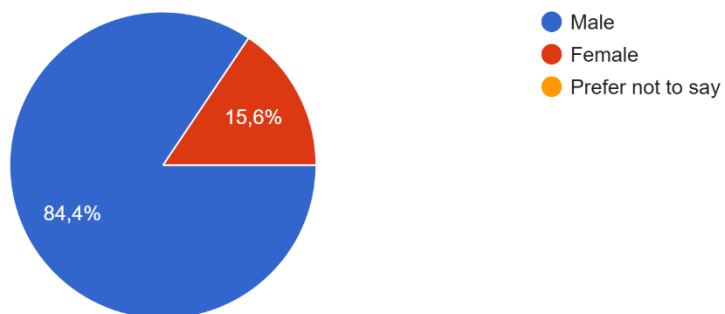


Figure 30 Gender table

## How old are you?

45 svar

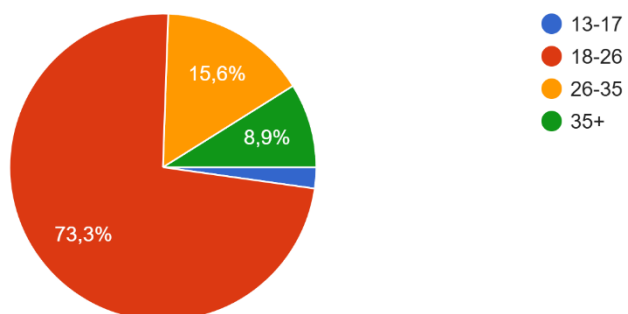


Figure 31 How old are you table



Are you a Professional or Personal desktop PC builder (Both can be chosen)

45 svar

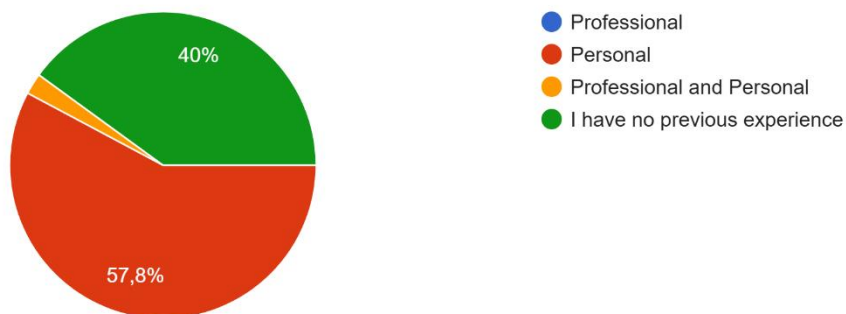


Figure 32 Are you a professional table

How would you rate your experience with building desktop PCs?

45 svar

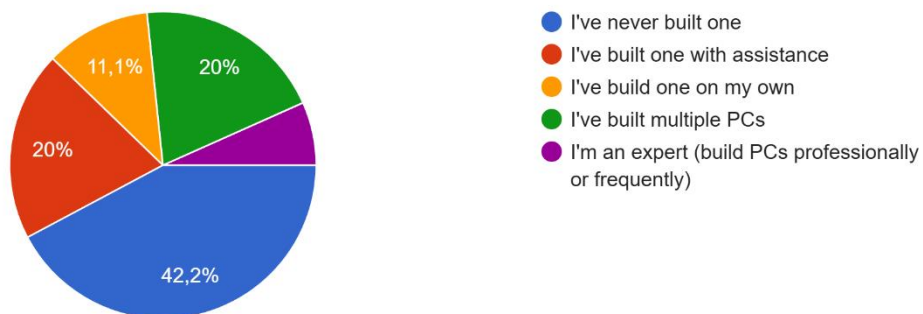


Figure 33 How would you rate table

### How many desktop PCs have you built?

26 svar

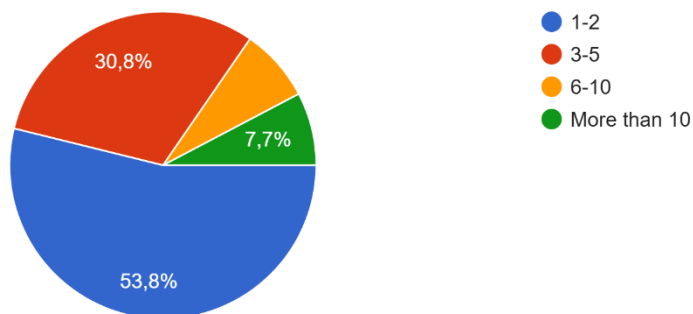


Figure 34 How many desktop PCs have you built table

### What type of desktop PC builds have you completed? (Select all that apply)

26 svar

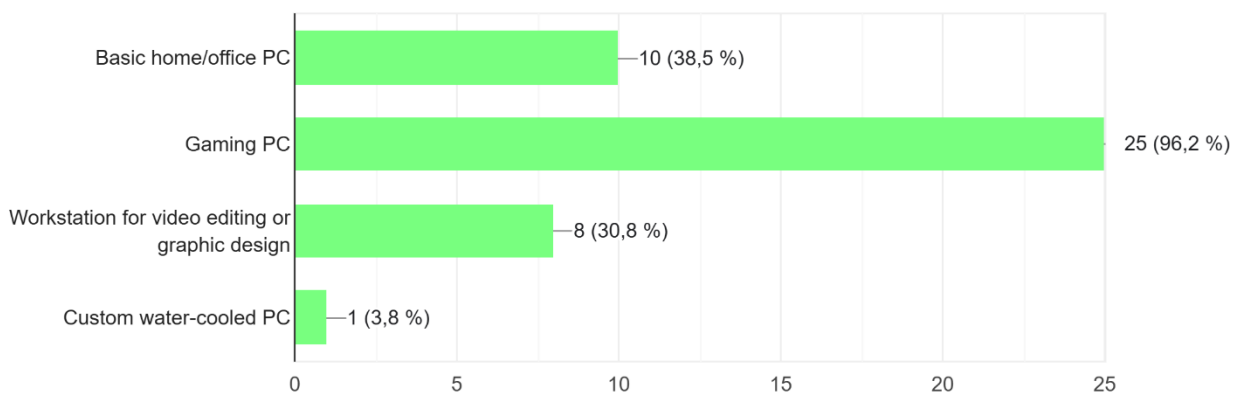


Figure 35 What type of desktop PC build completed table

How confident are you in your ability to build a desktop PC from scratch?

26 svar

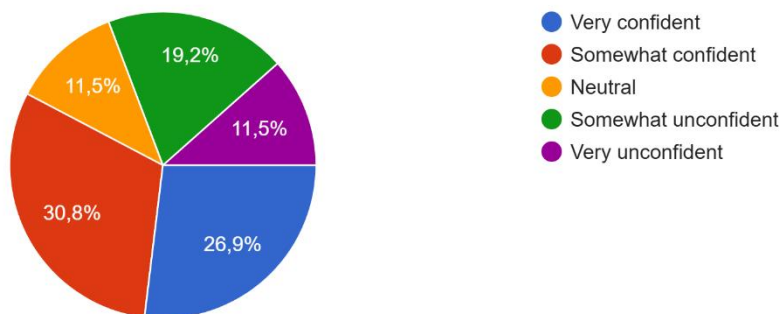


Figure 36 How confident are you table

How did you learn to build desktop PCs? (Select all that apply)

26 svar

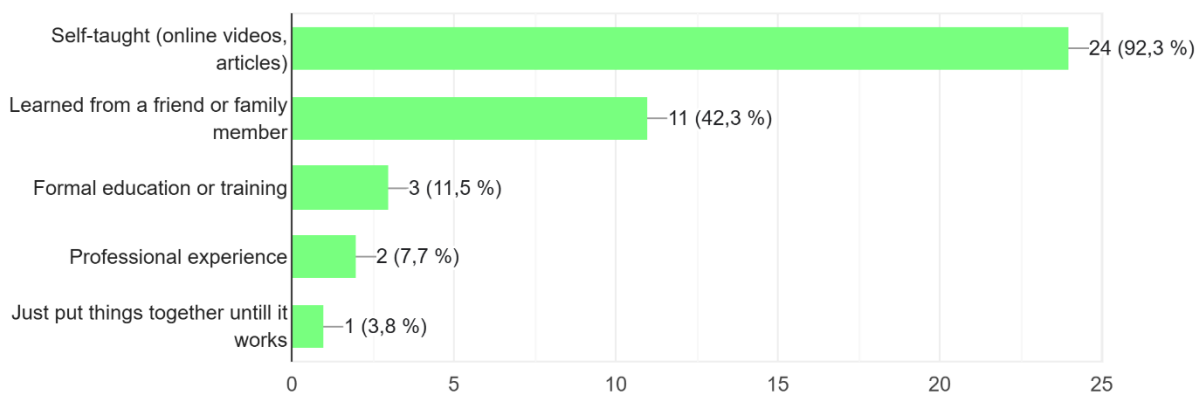


Figure 37 How id you learn to build desktop PC table

Please rate your knowledge of the following components on a scale from 1 (Not Familiar) to 5 (Very Familiar):

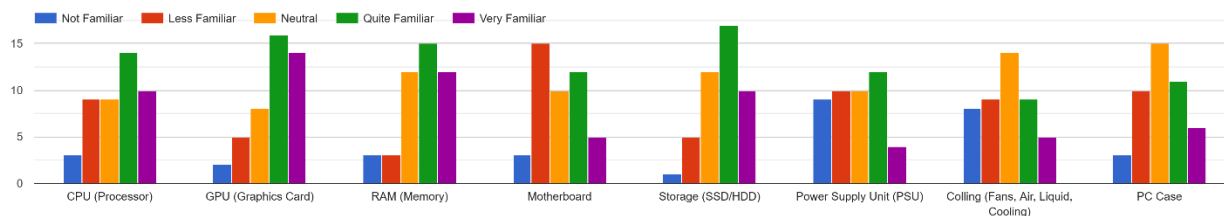


Figure 38 rate your knowledge table

Which challenges would you love to be made easier when building your desktop PC

45 svar

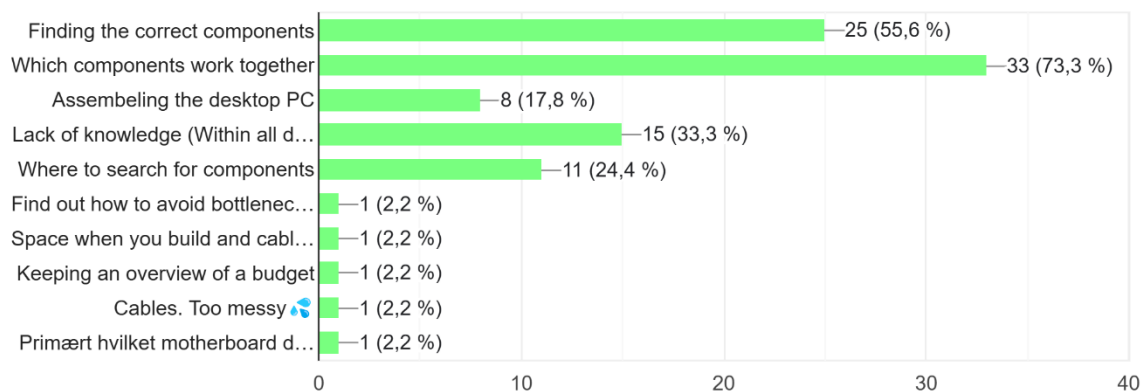


Figure 39 Which challenges would you love to be made easier table

### What functionalities should the website have (Optional)

43 svar

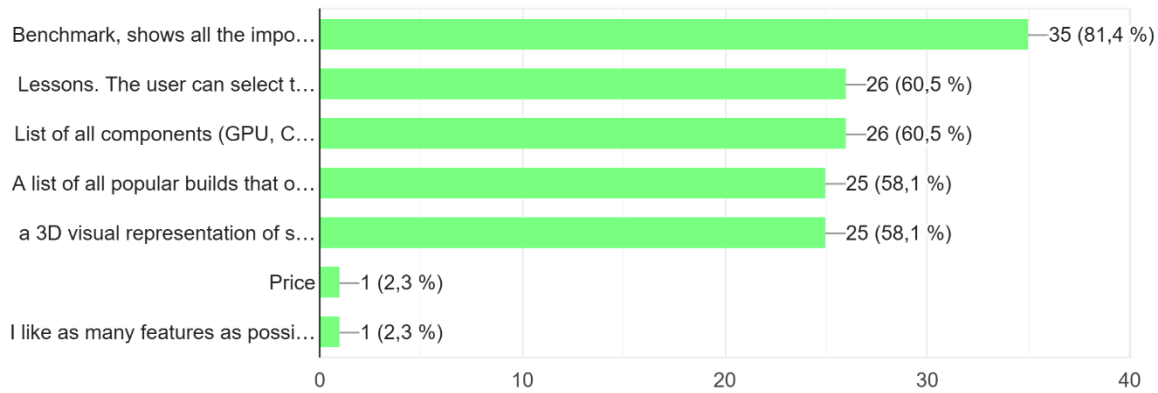


Figure 40 What functionalities table

### Please rank what you find most important (Optional)

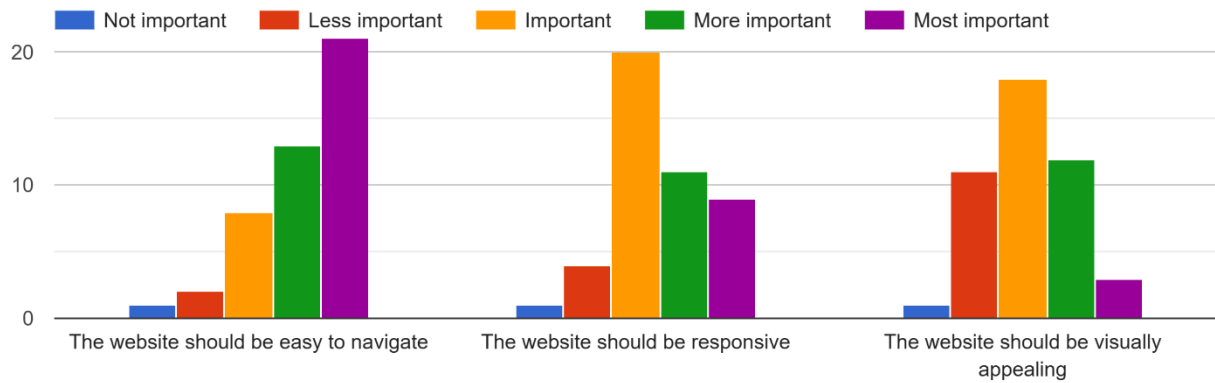


Figure 41 Please rank what you find most important table

Is there a need for a FAQ section in the website? (Optional)

45 svar

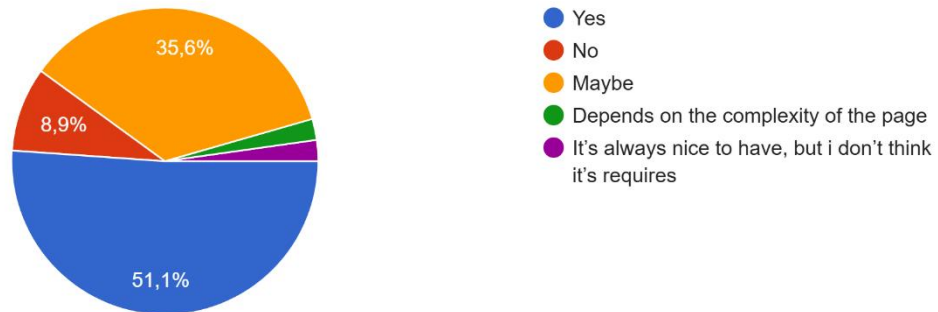


Figure 42 Is there a need for a FAQ table

Are you currently facing any challenges with building a desktop PC that you would like assistance with? (Optional)

15 svar

No
How to upgrade your current PC or replace damaged parts
How to optimize/upgrade current build
Nope
Finding the cheapest viable gaming components on 2nd hand market
Financing :)
Proper tutorial

Figure 43 Challenges table

Are you currently facing any challenges with building a desktop PC that you would like assistance with? (Optional)

15 svar

Im not building a pc atm. But would probably need help constantly while coping with the fear of breaking/misplacing something any second.
nope
Money shit expensive
Picking the parts for good prices
This is more of an issue I encountered before: I bought a PSU that didn't really fit in the case, it would be cool to know whether physically the components can also fit together (also considering some GPUs are huge)
Clearances, the only problem I've ever had is a cpu cooler too thick for the case. It also covered 1 of the m.2 slots and ram slots on my motherboard. I had to bend the cooler to fit the side panel. So clearances.
Finding components

Figure 44 Are you facing any challenges? table

## Samtykke

Dataansvarlige Studerende: Tobias K. Johansen, Nijaz Salihovic, Oleg Sechovcov og Emil W. Haenschke

Projekt: Stationær Verden (Læring af PC)

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### Projektbeskrivelse

Projektet er udarbejdet med fokus på STEM, i forhold til opbygning af stationær pc. Det er en læringsportal for interesserede pc builder'er, hvor de kan finde viden og afprøve/teste sammensætningen af komponenter på en virtuel model. Således vil der gives feedback og information om pris, varme, strøm osv.

### Dataindsamlingens formål

Interviewet formål er at forbedre projektets brugeroplevelse i forhold til funktionaliteten, designet og formidling af information.

### Beskrivelse af brugertest

Inden interviewet får du en kort beskrivelse af projektet og den overordnede ide. Efterfølgende vil der blive stillet spørgsmål til PC og erfaring indenfor PC-build. Den indsamlede information, bruges til formidlingen af viden på hjemmesiden.

### Behandling af personoplysninger

Testdeltagere bliver omtalt som testdeltagere/testpersoner i rapporten og er anonyme.

*Med min underskrift giver jeg samtykke til følgende:*

- At jeg har læst og forstået ovenstående
- At data, noter og observationer indsamlet ved brugertesten må anvendes i opgaven.
- At jeg ikke bliver kompenseret for deltagelse i testen.
- At jeg deltager i testen af egen fri vilje.

---

Dato:

Navn:

Underskrift:

Figure 45 Consent form



### Consent form

Name:

Age:

Gender:

Education:

Responsible students: Oleg Sechovcov, Tobias K Johansen, Nijaz Salihovic and Emil Haenschke

Title of project: Stationær Verden

#### **The project:**

The project involves creating a website aimed at helping desktop PC enthusiasts streamline the process of building a computer. It will educate users about each component and guide them through the assembly process. This initiative combines elements of interactive design, web development, educational technology, and statistics.

#### **Data processing:**

The information gathered from this form will help identify the target group and their needs for the website. The data is anonymous and will solely be used for exam purposes.

#### **The Interview**

Before the interview, you will receive a brief description of the project and the overall idea. Subsequently, the questions asked will focus on PC and experience within PC building. The collected information is used for the dissemination of knowledge on the website.

#### **Processing of personal data**

*With my signature, I consent to the following:*

- My information must be processed in the project

- My information must be passed on to one or more students who write the project together. The students have joint data responsibility
- My information must be passed on to the University of Southern Denmark and to any external censor in connection with guidance and assessment
- My information must be published in anonymized form in connection with the publication of the project.

Date:

*Signature:*

## **2. Experience and Background**

- Can you tell me a bit about your experience with desktop PCs? Have you ever built a PC before?
- Do you consider yourself more of a beginner, or do you have professional experience in building PCs?

## **3. Current Challenges**

- When you think about building a desktop PC, what do you find most challenging?

Are there any areas (e.g., choosing components, assembling the PC, overclocking, etc.) where you feel you need more guidance or help?

Can you share a recent experience where you struggled with any aspect of PC building?

What did you do to overcome it?

## **4. Knowledge and Confidence**

- How confident are you in your ability to select the right components for a desktop PC? What kind of information would help you feel more certain about your choices?

Are there any technical terms or processes that you find confusing or difficult to understand when it comes to building a PC?

If you've worked with desktop PCs before, how comfortable are you with more advanced tasks, like overclocking or troubleshooting compatibility issues?

## **5. Online Tools and Resources**

- When you need help building a PC, where do you usually go for information or guidance (e.g., websites, YouTube, forums)?

What kind of tools or features would you find most useful on a website designed to help with PC building (e.g., step-by-step guides, compatibility checkers, visual tools)?

- Do you think a benchmarking tool or a 3D visualizer would be helpful? Why or why not?

## **6. Website Design Preferences**

- If a website were designed to help you build a desktop PC, what would you expect it to look like? What features would be most important for you (e.g., ease of navigation, visual appeal)?

Do you prefer text-based tutorials, video guides, or interactive tools when learning about building a PC?

Is there anything you feel is missing from current PC-building websites that you would like to see added?

## **7. Overall Needs and Recommendations**

- If you were to start building a PC today, what's the first thing you would want help with?

How do you think a website could best support someone building a PC for the first time?

What should it focus on?

Do you have any recommendations or ideas for features that would make the process of building a PC easier for you?

To what degree would you describe your knowledge of circuits

- Is there any expected knowledge within your current educational level that you struggle with?"
- To what degree would you describe your knowledge of components
- Do you think it is important to know component work? (or do just use them as intended)
- How do you prefer to acquire knowledge (Lectures, reading, tutorial/guides etc.)
- Do you use any online learning tools (If yes, which tools and for what purpose)

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*Figure 46 Interview table*