Bridging Theory, AI, and Practice: Measuring the Impact of UI Design Choices

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Abstract

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This thesis investigated how an existing user interface can be evaluated and improved by combining established usability theory, AI-generated insights, and empirical user testing. The study focused on the web hotel interface of SpeedZone, an Estonian-based web hosting provider, and examined how specific design changes influenced usability, user satisfaction, and user behavior. The work was motivated by the increasing importance of intuitive and efficient interfaces in modern digital services and by the growing role of artificial intelligence in design workflows. A further motivation was to explore how strongly overall user experience is shaped by the structure and clarity of the user interface itself, and to what extent small, targeted UI changes can meaningfully influence perceived usability.

The theoretical framework drew from user experience, user interface design, usability principles, human-computer interaction, and emerging research on AI-assisted evaluation. These perspectives provided the criteria for defining what a “good” user interface is, emphasizing clarity, consistency, cognitive simplicity, and alignment with user expectations. Based on these criteria, several potential improvements were identified, of which two were implemented for testing: one grounded in established usability theory and one derived from AI-generated suggestions. The empirical research consisted of interviews and task-based testing with twelve participants, divided evenly so that six interacted with the current interface and six with the improved version. Data was collected through observation and participant feedback, both qualitative and quantitative, and analyzed using a mixed-methods approach.

The findings showed that clarity, structure, and predictable design patterns remain central to effective user interfaces. Participants responded positively to improvements that enhanced information flow and reduced cognitive load, while more subtle visual additions, such as trust badges, had little observable impact. AI-generated suggestions supported the ideation process but required critical interpretation and validation through user testing. The results demonstrated that theory-based improvements aligned most strongly with actual user behavior, while AI recommendations were more variable. The study also revealed differences between beginner and advanced users, highlighting the potential value of adaptive interfaces that adjust to user expertise.

The thesis concludes that combining theory, AI, and empirical testing provides a robust and evidence-based approach to UI improvement. In doing so, it also demonstrates a practical method for conducting user interface evaluation that integrates expert principles, AI-assisted analysis, and structured user testing. The work offers practical recommendations for interface design and outlines opportunities for future research, including broader participant groups, real-world testing environments, longitudinal studies, and more extensive design interventions.

Key words
User Interface (UI), User Experience (UX), Artificial Intelligence (AI), Human-computer interaction (HCI), Usability, User testing, Mixed-methods research

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1 Introduction

Why do some applications feel natural and pleasant to use from the very first moment, while others frustrate users even before they get properly started? Many different factors influence the user experience, such as performance, content, and accessibility, but one of the most central elements is the user interface, the part of the software that users interact with directly and continuously.

In today's digital world, where nearly every service and product has a digital aspect tied to it, the importance of intuitive and efficient interfaces is greater than ever (Norman, 2013). A well-designed interface can make the difference between a successful product and one that users abandon immediately (Jacob, 2003). As technology evolves and competition increases, understanding what makes a good user interface has become a key factor in software development.

The user interface is the visible and sensible layer of a digital product. No matter how well designed or innovative the system beneath is, a poorly designed interface can render even the best functionality ineffective. People usually expect simplicity, clarity, and intuitiveness (Nielsen, 2024), but achieving these qualities is complex, as there is no single formula for good design (Norman, 2013).

This thesis explores how user interface design can be evaluated and improved through a combination of established theory, AI-generated insights, and empirical user testing. Instead of comparing two entirely separate design philosophies, the study focuses on a real-world case: the existing interface of SpeedZone's web hotel service and an improved version created based on recommendations from usability theory and artificial intelligence. SpeedZone is an Estonian-based web hosting provider and a collaboration partner in this thesis, introduced in more detail in Chapter 4. Through interviews and task-based testing conducted on two separate testing days, the research examines how specific design changes influence usability, satisfaction, and user behavior.

1.1 Background

Digitalization has transformed how people interact with software (Stone, Jerrett, Woodroffe & Minocha, 2005). From banking to shopping and entertainment, users now expect digital services to be seamless, fast, and pleasant to use (Finn & Downie n.d.). As user expectations have risen, user experience (UX) has become a major competitive factor for businesses and a key consideration for designers and developers (Norman, 2013).

While user experience depends on many aspects such as performance, reliability, and content, the user interface (UI) often plays the most visible and influential role. The UI shapes the first impression and determines how easily users can achieve their goals within the system (Jacob, 2003).

Over the years, researchers and designers have developed various frameworks for understanding and improving usability, such as Jakob Nielsen's usability heuristics (Nielsen, 2024), Don Norman's principles of design (Norman, 2013), and Theo Mandel's Golden Rules of User Interface Design (Mandel, 1997). At the same time, AI tools have become increasingly integrated into design workflows, offering new ways to analyze and optimize interfaces (Patel, Beeram, Ramamurthy, Garg & Kumar, 2024).

This thesis positions itself at the intersection of traditional usability theory, AI-assisted design, and practical UI evaluation. Rather than comparing fully separate design approaches, the study investigates how theory and AI can jointly inform improvements to an existing interface and how these improvements perform in real user testing.

1.2 Key Concepts & Definitions

This thesis uses several core concepts from user experience and interface design. To ensure clarity, the most central terms are briefly defined below.

User Experience (UX): The overall quality of interaction a user has with a product, including everything from emotions and perceptions to usability-related factors (Finn & Downie, n.d.).

User Interface (UI): The visual and interactive layer of a digital product, consisting of elements such as buttons, menus, icons, and layout structures (UserTesting, 2018).

Usability: The extent to which a system enables users to achieve their goals effectively, efficiently, and with satisfaction (Kaplan, 2024).

Human-Computer Interaction (HCI): A multidisciplinary field studying how people interact with digital systems and how these interactions can be improved (Stone, Jerrett, Woodroffe & Minocha, 2005).

Artificial Intelligence (AI): Computational methods that enable systems to perform tasks that typically require human intelligence, such as pattern recognition or language processing (Patel, Beeram, Ramamurthy, Garg & Kumar, 2024).

1.3 Objectives & research questions

The main objective of this thesis is to evaluate and improve a real user interface by combining theoretical knowledge, AI-generated insights, and empirical user testing. The study examines how specific design changes influence usability and user satisfaction, and how well theoretical and

AI-based recommendations align with actual user behavior. The thesis focuses on the following main research question:

Main Research Question (RQ1): How can an existing user interface be evaluated and improved using usability theory, AI-generated insights, and empirical user testing?

This question is supported by the following sub-questions:

1. What do established usability theories define as key principles of good UI design?
2. What kinds of improvement suggestions does AI (Microsoft Copilot) provide for the current SpeedZone interface?
3. How do users interact with the current interface, and what usability challenges emerge during testing?
4. How do theory- and AI-based improvements affect user performance and satisfaction in the improved interface?

Together, they support the main research question and enable a structured analysis of how user interfaces can be systematically evaluated and improved.

1.4 Scope and limitations

This thesis focuses primarily on the visual and structural aspects of user interface design, such as layout, hierarchy, clarity, and navigation. It does not examine technical performance, content quality, or accessibility in depth, although these factors are acknowledged as part of the broader user experience.

The empirical research was conducted in collaboration with SpeedZone, an Estonian-based web hosting service provider currently working to improve the user interface of its web hotel service. The study involved interviews and task-based evaluations using two interface versions: the existing SpeedZone page and an improved version incorporating recommendations from usability theory and AI-generated insights.

The goal is not to produce universal design rules but to illustrate how specific interface changes can influence user experience and how theory and AI can support practical UI development.

1.5 Thesis structure

This thesis is divided into several chapters, each building upon the previous one to form a coherent examination of how user interface design influences user experience. The introduction chapter introduces the topic, outlines the motivation behind the research, and defines its objectives, scope, and central research questions.

The second chapter forms the theoretical framework, drawing on established literature and key concepts in user experience (UX), user interface (UI), and usability design principles. It also introduces perspectives from human-computer interaction (HCI) and considers how artificial intelligence (AI) contributes to design evaluation and interpretation. This chapter seeks to lay a conceptual foundation for the later empirical work.

The third chapter focuses on research design and methodology. It describes the mixed-methods approach used in this study, combining theoretical analysis, AI-generated insights, and empirical evaluation through interviews and task-based user testing. It explains how data are collected and analyzed, both quantitatively and qualitatively, to ensure a well-rounded understanding of UI effectiveness.

The fourth chapter presents the empirical study, conducted in collaboration with SpeedZone. It describes the practical implementation of the interview-based testing, introduces the two interface versions, and presents the quantitative and qualitative findings derived from user performance data and participant feedback.

The fifth chapter offers an analysis and discussion of the results. Here, the findings from theory, AI-generated insights, and practical evaluation are compared and interpreted. This chapter examines where these perspectives align or diverge and discusses what the results imply for UI design practice and user experience research.

Lastly, the sixth chapter provides the conclusions and recommendations. It summarizes the main findings, reflects on the implications for software design and development, and suggests directions for future research. The chapter also acknowledges the limitations of the study and highlights opportunities for further exploration in the field of user interface and user experience design.

1.6 Significance

This thesis holds significance for both academic and professional communities interested in user experience and interface design. By combining theoretical insights, AI-driven perspectives, and empirical evaluation, the study demonstrates how UI improvements can be guided and validated through a structured, evidence-based process.

For professionals such as software developers, UX designers, and web developers, the findings highlight how even small design adjustments can meaningfully improve usability and user satisfaction. For organizations, the study emphasizes the strategic value of investing in user-centered design and iterative UI improvement.

End users ultimately benefit as well. By illustrating how theory, AI, and user testing can work together to refine digital interfaces, this research contributes to creating more intuitive, accessible, and enjoyable digital experiences. In addition, the study underscores the responsibility of designers and organizations to develop interfaces that are usable by as many people as possible. Responsible UI design supports inclusivity, reduces barriers, and ensures that digital services remain equitable and accessible across different user groups.

2 Theoretical framework

This chapter provides the theoretical foundation for evaluating and improving user interfaces. The principles discussed here form the basis for analyzing the existing SpeedZone interface and for guiding the design changes tested in the empirical study.

2.1 User Experience (UX)

User Experience (UX) refers to the overall quality of interaction a user has with a product, system, or service (Finn & Downie, n.d.). It includes the user's perceptions, emotions, and responses related to factors such as usability, accessibility, visual design, interface functionality, and the overall emotional impact of the interaction (Finn & Downie, n.d.). In practice, UX aims to ensure that products are not only functional but also meaningful, intuitive, and satisfying to use (Norman, 2013). Because of this, UX has become a central concept in designing products and services that align with user needs and expectations.

One of the key figures in shaping the field is Don Norman, who is widely regarded as one of the founders of UX design. Norman defines experience design as "the practice of designing products, processes, services, events, and environments with a focus placed on the quality and enjoyment of the total experience" (Norman 2013, 22). His perspective highlights that UX extends beyond usability alone and covers the user's holistic experience before, during, and after interaction.

2.1.1 User Experience vs Usability and User Interface

People often misinterpret user experience (UX) with usability or even with the user interface (UI), but these concepts are not interchangeable. UX is the overarching construct that includes all aspects of a user's interaction with a product or service, while usability and UI represent specific components within this broader experience (Kaplan, 2024).

Usability refers to the degree to which a system enables users to achieve their goals effectively, efficiently, and with satisfaction (Kaplan, 2024). It focuses on practical aspects such as task completion, error prevention, and ease of learning. While usability is critical, it represents only one dimension of UX. A product can be highly usable but still fail to deliver a meaningful or engaging experience if it overlooks emotional, aesthetic, or contextual factors.

User interface, by contrast, is the tangible layer of interaction, such as the buttons, menus, icons, and visual structures that allow users to communicate with the system (UserTesting, 2018). The UI shapes the immediate perception of the product, but it is only one of many touchpoints that

contribute to the overall experience. A well-designed interface may facilitate usability, but without considering broader UX principles, it risks being functional but still uninspiring.

Together, these distinctions highlight that UX is holistic: it integrates usability, interface design, emotional responses, accessibility, and the broader journey a user undertakes before, during, and after interaction. For example, a mobile app for public transportation may have a clean interface and high usability, but if users feel anxious about their data security or frustrated by customer support, their overall experience will still be negative. This illustrates why it's important to understand that UX is the totality of user perceptions shaped by both functional and emotional dimensions.

2.1.2 Frameworks for Human-Centered Design

Human-centered design is guided by several influential frameworks that provide principles and criteria for creating effective user experiences. Two widely recognized frameworks are Peter Morville's User Experience Honeycomb (Morville, 2004) and the ISO 9241-210 (ISO 9241-210:2010) international standard. Together, they offer both a conceptual and practical foundation for understanding and applying UX principles.

Peter Morville's UX Honeycomb (2004) is a visual model that identifies seven facets of user experience, as shown in Figure 1.

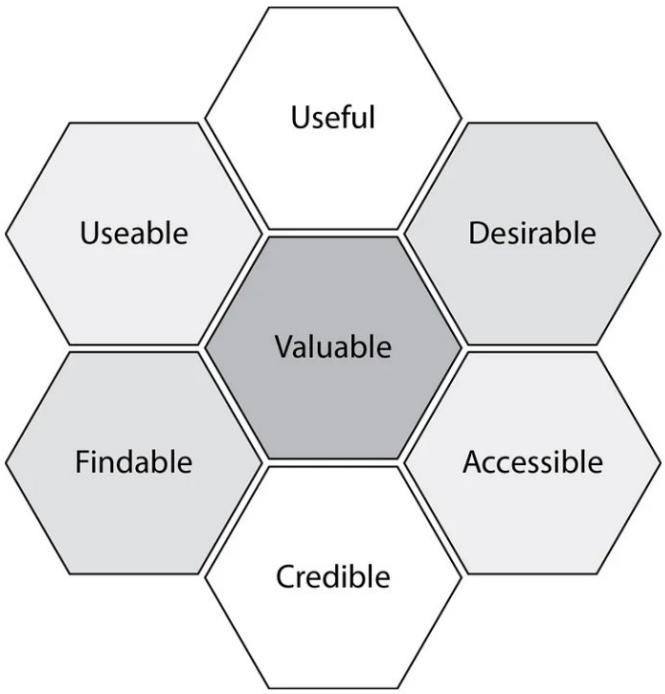

Figure 1. Peter Morville's User Experience Honeycomb (2004). Source: Morville, 2004.

This honeycomb is widely used because it simplifies complex UX considerations into a clear, memorable framework. It emphasizes that usability alone is insufficient; emotional, ethical, and business dimensions are equally important (Morville, 2004).

The ISO 9241-210 (ISO 9241-210:2010) standard provides a more formalized and comprehensive approach to human-centered design. It outlines principles such as:

1. Active involvement of users throughout the design process.
2. Iterative design that evolves based on feedback and testing.
3. Multidisciplinary design teams to address diverse perspectives.
4. Focus on the whole user experience, not just isolated interactions.

Unlike Morville's conceptual honeycomb, ISO 9241-210 functions as a practical guideline for organizations, ensuring that UX is systematically integrated into product development.

While Morville's Honeycomb offers a conceptual lens for evaluating the quality of user experiences, ISO 9241-210 provides actionable steps for achieving them. Together, they illustrate both the what (the facets of UX) and the how (the process of human-centered design). For this thesis, these frameworks establish a theoretical foundation for analyzing digital interfaces, ensuring that both experiential qualities and design processes are considered.

2.1.3 Emotional & Psychological Aspects

Designing user experiences is closely intertwined with human psychology and emotions (Gajewska, 2025). When creating digital products, designers must engage with principles of user psychology to understand how individuals think, perceive, and interact with digital services (Gajewska, 2025). Users bring with them expectations about how systems should function, shaped both by prior experiences and by innate cognitive patterns (Gajewska, 2025). These expectations influence how easily they adapt to new technologies and how satisfied they feel during interactions (Gajewska, 2025).

Within the field of emotional design, user experience can be conceptualized across four key categories: functional, reliable, usable, and pleasurable (Gajewska, 2025). A product must first be functional, meeting the user's basic needs. It must then be reliable, consistently performing without errors or interruptions. Beyond this, it should also be usable, enabling users to achieve their goals efficiently and intuitively. Finally, the most advanced stage is pleasurable, where design evokes positive emotions, delight, and engagement. Together, these categories highlight that effective UX design is not only about efficiency but also about fostering meaningful emotional connections between users and digital products (Gajewska, 2025).

2.1.4 Accessibility & Inclusivity

The origins of accessibility in design can be traced to the concept of universal design, which aimed to create products and environments usable by the widest possible range of people (Cozlov & Zadorojnii, 2022). While this approach was groundbreaking at the time, it soon became clear that a single solution simply cannot meet the needs of every individual. As a result, inclusive design emerged as a complementary philosophy. Inclusive design emphasizes designing for diversity by considering differences in race, economic background, language, age, gender, and ability (Microsoft, 2016). Its goal is not to create one-size-fits-all solutions, but rather to ensure that products adapt to the full spectrum of human diversity (Microsoft, 2016).

In the context of user experience, accessibility and inclusivity range from relatively simple adjustments, such as providing multilingual options or clear, plain language to more complex challenges, such as ensuring that users with visual, auditory, or motor impairments can interact with digital products effectively (Microsoft, 2016). The difficulty lies in the sheer breadth of diversity among users, which requires designers to anticipate and accommodate a wide variety of needs (Microsoft, 2016).

Microsoft's Inclusive Design Guide (2016) highlights three key principles that support designing for diversity, as shown in Table 1.

Table 1. Microsoft's Inclusive Design principles (Microsoft, 2016).

Recognize exclusion	Designers must identify where and how people are excluded from using a product, whether due to physical, cognitive, or cultural barriers.
Learn from diversity	By studying the needs of people at the margins, designers can uncover insights that improve the experience for everyone.
Solve for one, extend to many	Solutions created for specific groups often benefit a broader audience. For example, captions designed for hearing-impaired users also help non-native speakers and people in noisy environments.

These principles illustrate that inclusive design is not simply about compliance with accessibility standards but about embracing diversity as a driver of innovation. For instance, voice-controlled interfaces originally designed for users with mobility impairments have become mainstream features that enhance convenience for all. By embedding inclusiveness into the design process, UX professionals can create products that are not only accessible but also equitable, meaningful, and empowering.

2.1.5 Measurement of UX

Because UX encompasses multiple dimensions of interaction, perception, and emotion, its evaluation requires a combination of different metrics rather than a single measure (Gulati, 2025). User experience can be evaluated through behavioral, attitudinal, and performance metrics, summarized in Table 2.

Table 2. Core categories of UX measurement metrics (Gulati, 2025).

Behavioral metrics	Capture the actual actions users take within a system. They reveal patterns of interaction, highlighting where users succeed, struggle, or abandon tasks. Examples include click paths, navigation errors, or time spent on specific features.
Attitudinal metrics	Provide insight into the emotional and cognitive responses behind those actions. They measure how users feel about the product, often through surveys, interviews, or satisfaction ratings, thereby adding context to behavioral data.
Performance metrics	Includes measures such as task completion rates, speed, error frequency, and perceived ease of use. Together, they indicate whether the system supports efficient and successful outcomes.

Breaking UX down into its constituent parts, such as user interface design, accessibility, or overall usability allows for more targeted evaluation. Specific tools exist for each area: for instance, user interfaces can be assessed against Nielsen's 10 usability heuristics (Nielsen, 2024), while accessibility can be evaluated using contrast checkers, screen reader compatibility tests, and standardized accessibility toolkits (w3.org, 2024).

Despite the value of these metrics and tools, user testing remains the most critical method of measuring UX effectiveness (Stone, Jerrett, Woodroffe & Minocha, 2005). Direct feedback from diverse users provides qualitative insights that quantitative metrics alone cannot capture. Observing real users interact with a product uncovers hidden pain points, validates design assumptions, and highlights areas for improvement (Stone, Jerrett, Woodroffe & Minocha, 2005). Ultimately, user testing ensures that UX evaluation reflects not only efficiency and usability but also the lived experiences and emotions of the people for whom the product is designed (Stone, Jerrett, Woodroffe & Minocha, 2005).

2.2 User Interface (UI)

A user interface (UI) is the part of an interactive system that communicates directly with the user, including all elements visible and manipulable within the product (Jacob, 2003). Because the UI is

the primary point of contact between humans and technology, its design cannot be treated as an afterthought. Instead, it must be integrated into the design process from the very beginning. A well-designed interface can significantly reduce training time, improve performance speed, lower error rates, and enhance overall user satisfaction (Jacob, 2003).

User interfaces exist in multiple forms, reflecting the diverse ways humans interact with technology. Early computing relied heavily on command-line interfaces (CLI), where users typed text-based commands to interact with systems (Stone, Jerrett, Woodroffe & Minocha, 2005). While CLIs remain powerful for technical users due to their precision and flexibility, they require specialized knowledge and are less intuitive for general audiences (Stone, Jerrett, Woodroffe & Minocha, 2005, 207). The rise of graphical user interfaces (GUI) introduced windows, icons, menus, and pointers, making digital systems more accessible to a wider population (Jacob, 2003). Other interface types have since emerged, such as voice user interfaces (VUI), gesture-based interfaces, and conversational interfaces (Stone, Jerrett, Woodroffe & Minocha, 2005).

Although each type has unique strengths, this thesis focuses specifically on graphical user interfaces, as they are the most prevalent in digital services and central to evaluating usability, accessibility, and user satisfaction.

2.2.1 Popular Frameworks for UI Design

When discussing rules for effective UI design, three influential figures stand out: Jakob Nielsen (2024), Theo Mandel (1997) and Don Norman (2013), all pioneers in the 1990s. Jakob Nielsen introduced the widely adopted 10 Usability Heuristics for User Interface Design (Nielsen, 2024), presented in Figure 2, which remains foundational in evaluating and improving interfaces.

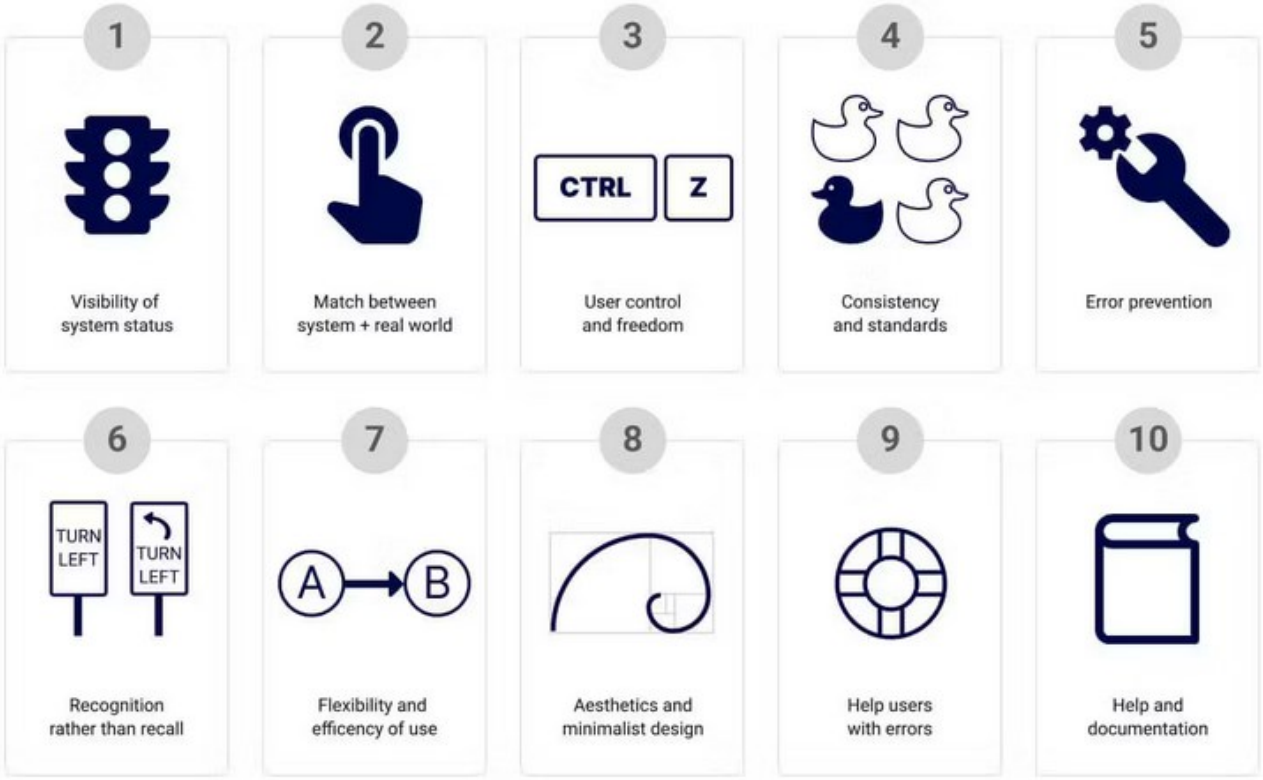

Figure 2. Jakob Nielsen's 10 Usability Heuristics. Source: Nielsen 2024.

Theo Mandel's Golden Rules of User Interface Design complement Nielsen's heuristics by focusing on three overarching principles: placing users in control of the interface, reducing memory load, and ensuring consistency (Mandel, 1997). Mandel's rules highlight the importance of predictability and user empowerment in interface design.

Norman's key concepts are presented in Table 3.

Table 3. Don Norman's core design concepts (Norman 2013).

Affordances	The perceived properties of an object that suggest how it can be used (e.g., a button invites pressing).
Signifiers	Cues that indicate where actions should take place (e.g., labels, icons, arrows).
Feedback	Immediate responses that inform users of the results of their actions (e.g., confirmation messages).
Constraints	Limitations that prevent errors and guide correct usage (e.g., grayed-out options).

Norman's framework highlights that effective UI design is not only about usability and consistency but also about aligning with human psychology and expectations (Norman, 2013). For example, a mobile app that uses clear signifiers (icons and labels), provides instant feedback (confirmation sounds or messages), and applies constraints (disabling unavailable options) reduces user confusion and builds trust.

Together, the frameworks of Nielsen, Mandel, and Norman emphasize that good UI design must balance usability, predictability, and psychological clarity. Modern design practices build on these foundations by incorporating responsive design, mobile-first approaches, and accessibility standards to ensure that interfaces remain effective across diverse devices and user groups.

2.2.2 Key elements of UI Design

User interface design is a broad concept, but several key elements consistently emerge as critical to creating effective interfaces. A foundational principle is to "know the user, know the tasks" (Sridevi, 2014). This highlights the importance of understanding who the product is intended for and what specific activities it must support. Since interfaces ultimately exist to serve people, users and their goals must remain central throughout the design process.

Beyond the principle of "know the user, know the tasks" (Sridevi, 2014), several other elements are central to effective user interface design. One of the most fundamental is layout and navigation, which determines how content and controls are arranged (Sridevi, 2014). A logical and intuitive structure supports efficient task completion, while clear navigation reduces cognitive load and prevents user frustration.

Equally important are typography and readability (Sridevi, 2014). Text must be legible, appropriately sized, and consistent across the interface, as good typography enhances comprehension and ensures accessibility for diverse users. Closely related to this is the use of color and visual hierarchy, which influence both aesthetics and usability (Norman, 2013). Thoughtful color choices can evoke emotional responses and guide attention, while contrast and hierarchy help users distinguish between primary and secondary elements (Norman, 2013).

Another key consideration is consistency. Uniformity in design patterns, terminology, and behavior ensures predictability, reduces the learning curve, and fosters user confidence (Mandel, 1997). Alongside consistency, feedback and responsiveness play a vital role. Interfaces should provide immediate and clear responses to user actions, reinforcing a sense of control and trust in the system (Norman, 2013).

Finally, accessibility must be integrated into UI design from the outset (Microsoft, 2016). Inclusive design ensures that users with diverse abilities can interact with the product effectively, aligning with WCAG standards and broader human-centered design principles (w3.org, 2024). Accessibility is not only a matter of compliance but also a commitment to equity, ensuring that digital products serve the widest possible audience.

2.2.3 Accessibility in UI

Designing an accessible user interface requires translating inclusive design principles into practical implementation (Microsoft, 2016). For users with visual impairments, this includes ensuring proper color contrast, scalable text, and compatibility with screen readers (W3.org, 2024). For users with auditory, motor, or cognitive limitations, accessibility may involve captions, keyboard navigation, voice input, clear language, and predictable interaction patterns (W3.org, 2024).

2.2.4 Evaluation and Measurement of UI

Evaluating and measuring the quality of a user interface is not a straightforward process. A radical approach is to just release the interface to end users and wait for direct feedback, but this is not necessarily a wise decision (Stone, Jerrett, Woodroffe & Minocha, 2005). First impressions matter a lot, and poor usability at launch can damage user trust and adoption. For this reason, it is important to evaluate and refine the interface before and after it is deployed (Strömberg, 2024).

There is no single universal design approach or life cycle for user interfaces. Instead, iterative design has become the dominant model, allowing for repeated cycles of evaluation, user testing, and refinement (Stone, Jerrett, Woodroffe & Minocha, 2005, 21). Within this process, evaluation can be divided into two broad categories: diagnostic evaluation, which seeks to uncover as many usability problems as possible, and measurement evaluation, which focuses on quantifying system performance and user outcomes (Stone, Jerrett, Woodroffe & Minocha, 2005, 23).

In the early stages of design, low-cost methods such as sketches, wireframes, or paper prototypes can be used to gather feedback quickly and efficiently (Stone, Jerrett, Woodroffe & Minocha, 2005). These early evaluations help identify fundamental issues before significant resources are invested. In later stages, user feedback becomes essential for refining the interface and ensuring that updates or new versions better align with user needs (Stone, Jerrett, Woodroffe & Minocha, 2005, 23).

A variety of methods can be employed to evaluate user interfaces. Observational studies allow designers to see how people interact with prototypes or live systems in real-world contexts. Interviews and discussions provide qualitative insights into user perceptions and frustrations (Stone,

Jerrett, Woodroffe & Minocha, 2005). Predictive models can be used to anticipate potential usability issues, while comparisons against established frameworks and principles, such as the above-mentioned Nielsen's heuristics or Norman's design concepts, offer structured benchmarks for evaluation (Nielsen, 2024 & Norman, 2013).

Ultimately, effective evaluation is not a one-time activity but a continuous process (Stone, Jerrett, Woodroffe & Minocha, 2005). By combining diagnostic and measurement approaches across different stages of the design life cycle, designers can ensure that interfaces are not only functional but also intuitive, efficient, and satisfying to use.

2.3 Usability and Design Principles

Usability is one of the core components of user experience and focuses specifically on how effectively and efficiently users can achieve their goals (ISO 9241-11:2018). According to the ISO 9241-11 standard, usability is defined as "the extent to which a system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (ISO 9241-11:2018).

Usability plays a critical role in shaping first impressions, influencing user trust, and determining whether users continue engaging with a product. Even visually appealing interfaces can fail if they are difficult to navigate or require unnecessary cognitive effort. As Stone, Jarrett, Woodroffe and Minocha (2005, 21-23) note, usability must be evaluated throughout the entire design lifecycle, as early detection of issues prevents costly redesigns and improves overall product quality.

2.3.1 Definition and Dimensions of Usability

Usability is commonly understood through three core dimensions: effectiveness, efficiency, and satisfaction (ISO, 2018). Effectiveness refers to how accurately and completely users can achieve their goals (ISO, 2018). Efficiency concerns the resources, such as time, clicks, or cognitive effort required to complete tasks (ISO, 2018). Satisfaction reflects the user's comfort, confidence, and overall attitude toward the system (ISO, 2018).

These dimensions are interdependent (Stone, Jerrett, Woodroffe & Minocha, 2005). A system may be effective but inefficient, or efficient but frustrating to use. For this reason, usability evaluation must consider all three aspects to form a comprehensive understanding of user performance and experience (Stone, Jerrett, Woodroffe & Minocha, 2005).

2.3.2 Popular Frameworks for Usability

Jakob Nielsen's Ten Usability Heuristics (Nielsen, 2024) are among the most widely used frameworks for identifying usability issues. They provide broad principles that can help designers evaluate whether an interface supports intuitive and predictable interaction. Key heuristics include visibility of system status, match between system and real-world conventions, user control and freedom, consistency, error prevention, recognition rather than recall, and minimalist design.

Theo Mandel's Golden Rules of User Interface Design (Mandel, 1997) complement Nielsen's heuristics by emphasizing three overarching principles: placing users in control, reducing cognitive load, and maintaining consistency (Mandel, 1997). Mandel's work highlights the importance of predictability and user empowerment, aligning closely with cognitive psychology, which suggests that users rely heavily on mental models and pattern recognition when navigating digital systems (Norman, 2013).

Don Norman's design principles deepen the understanding of how users interpret and act upon interface elements. Concepts such as affordances, signifiers, feedback, and constraints (Norman, 2013) explain how users form expectations about what actions are possible and what outcomes those actions will produce.

For example, a button that visually resembles a physical control invites clicking, while clear signifiers such as labels or icons guide users toward the correct interaction (Norman, 2013). Feedback ensures that users understand the results of their actions, reducing uncertainty and preventing errors (Norman, 2013). Constraints limit incorrect actions by guiding users toward valid choices (Norman, 2013). These principles highlight that usability is not only about efficiency but also about aligning design with human cognitive processes.

2.3.3 General Principles of Usable Design

Beyond formal frameworks, several general principles consistently emerge as essential for creating usable interfaces. Simplicity and clarity reduce cognitive load by minimizing unnecessary elements and focusing attention on key tasks (Nielsen, 2024). Consistency ensures that similar actions produce similar results, enabling users to transfer knowledge across different parts of the interface (Nielsen, 2024).

Learnability refers to how quickly new users can become proficient (Stone, Jerrett, Woodroffe & Minocha, 2005), while flexibility supports both novice and expert users by offering shortcuts or alternative paths (Nielsen, 2024). Error prevention and recovery are also central to usability, as systems should help users avoid mistakes and provide clear guidance when errors occur (Nielsen,

2024). These principles are widely recognized in usability literature and form the basis for many practical design guidelines used in industry.

2.4 Human-Computer Interaction (HCI) and the Role of AI

2.4.1 Human-Computer interaction

Emerging in the 1980s, Human-Computer Interaction (HCI) is a field of study concerned with the design, evaluation, and implementation of computer systems that are both effective and user-friendly (MacKenzie, 2013). HCI integrates insights from computer science, cognitive psychology, design, and ergonomics to understand how people interact with technology and how those interactions can be improved (MacKenzie, 2013).

The greatest challenge in HCI lies in the human factor (MacKenzie, 2013). Unlike computers, which operate according to strict rules and predictable logic, humans bring with them a wide range of variables that are difficult to anticipate (MacKenzie, 2013). Factors such as age, gender, level of experience, language, cultural background, and even emotional state influence how individuals perceive and use technology (MacKenzie, 2013). This diversity makes it nearly impossible to design systems that perfectly predict every user's behavior.

Instead, HCI emphasizes designing for flexibility, adaptability, and inclusivity (ISO 9241-210:2010). By studying patterns of human behavior and applying principles of usability and accessibility, designers aim to create systems that accommodate differences rather than eliminate them. In this way, HCI provides the theoretical foundation for modern user interface and user experience design, ensuring that technology serves not only functional needs but also aligns with the complexities of human diversity.

2.4.2 Artificial intelligence

Artificial intelligence (AI) is often associated today with services such as Microsoft Copilot or ChatGPT, but in reality, it is a broad field of computer science concerned with building systems that can perform tasks traditionally requiring human intelligence. These tasks include reasoning, learning, problem-solving, and language understanding (Mohammad, 2020).

The concept of AI began to take shape in the mid-20th century. Early theoretical work, such as Alan Turing's 1948 report Intelligent Machinery, laid the foundation, and by the 1950s researchers formally established AI as a discipline (Copeland, 2025). While AI has existed for decades, recent advances in computing power, data availability, and algorithms have made it mainstream, with applications accessible to everyday users through the internet (Mohammad, 2020).

Despite the term “intelligence,” current AI systems do not think in the same way humans do. Instead, they rely on machine learning, a subfield of AI that develops algorithms capable of recognizing patterns in data and improving performance over time (Zhou, 2021, 2). Machine learning works by training models on large datasets, allowing systems to make predictions or generate outputs based on prior “experience” (Zhou, 2021, 2). For example, a machine learning model trained on language data can generate text responses, while one trained on images can classify objects.

The main objective of machine learning is to build models that generalize from past data to new situations, enabling systems to react appropriately to novel inputs (Zhou, 2021, 2). This ability to learn and adapt is what makes AI powerful, even if it is not yet equivalent to human intelligence.

2.4.3 Artificial intelligence in User Interfaces

Artificial intelligence (AI) is becoming increasingly common in user interface (UI) design as it has become more readily available to designers and developers (Patel, Beeram, Ramamurthy, Garg & Kumar, 2024). One of the primary benefits of AI integration is that it can automate parts of the design process, reduce human workload and accelerate development (Patel, Beeram, Ramamurthy, Garg & Kumar, 2024). For example, AI systems trained on large datasets of effective UI patterns can generate layouts that follow established design principles, incorporate industry standards, and adapt insights from the web (Patel, Beeram, Ramamurthy, Garg & Kumar, 2024). In theory, this should result in interfaces that are both usable and efficient.

Still, some challenges remain. Human behavior is highly variable and not always predictable (Norman, 2013). While users often follow recognizable patterns, they also step out from these patterns in ways that are sometimes difficult to anticipate. Where humans can attempt to understand this unpredictability, since we share the same cognitive and cultural context, AI tends to struggle, as it is not inherently human and lacks the intuitive understanding of human variability. This unpredictability makes designing effective interfaces complex for both human designers and AI systems.

Another limitation lies in creativity. Current AI models rely on pre-existing data and examples, which means they reproduce established design solutions rather than generating truly novel ones. Unlike human designers, who may draw inspiration from diverse sources and create unique stylistic approaches, AI tends to replicate patterns directly.

Despite these limitations, AI holds significant promise for the future of UI design. One potential application is the development of adaptive user interfaces systems that automatically adjust and update themselves to match individual user needs and behavioral patterns (Paneru Biplov, Paneru Bishwash, Poudyal & Shah, 2024). Such interfaces would be extremely labor intensive for humans

to maintain, but AI could manage this dynamic adaptation efficiently. This would allow interfaces to evolve continuously, offering personalized experiences that respond to changing user contexts.

In this way, AI is not a replacement for human creativity in UI design but rather a complementary tool. By handling repetitive tasks and enabling adaptive systems, AI can free designers to focus on innovation, aesthetics, and the human-centered aspects of interface design.

2.5 Summary

This chapter has presented the theoretical foundation for evaluating and improving user interfaces, forming the basis for the empirical work that follows. It began by examining user experience (UX) as a holistic concept that includes usability, emotional responses, accessibility, and the broader context in which interactions occur. The distinctions between UX, usability, and user interface (UI) were clarified to show how each contributes to the overall quality of digital products. Frameworks such as Morville's UX Honeycomb and the ISO 9241-210 standard highlighted the importance of designing experiences that are useful, usable, desirable, and grounded in human-centered processes.

The chapter then explored the psychological and emotional dimensions of UX, emphasizing how user expectations, cognitive patterns, and emotional reactions shape interaction quality. Accessibility and inclusive design were discussed as essential components of modern UX practice, reinforcing the need to design for diverse user groups rather than assuming a single "typical" user.

The section on user interface design introduced the core elements that shape visual and structural interaction, including layout, navigation, typography, visual hierarchy, consistency, and feedback. Influential frameworks from Nielsen, Mandel, and Norman were included to provide structured principles for evaluating and improving interface quality, while accessibility considerations underscored the importance of equitable and inclusive design.

The section on usability and design principles fused these ideas into a focused examination of what makes interfaces effective, efficient, and satisfying to use. Usability was defined through established standards such as ISO 9241-11, and key frameworks, including Nielsen's heuristics, Mandel's Golden Rules, and Norman's design concepts were discussed as practical tools for identifying usability issues and guiding improvements. General principles such as simplicity, clarity, learnability, and error prevention further illustrated the foundations of usable design.

Finally, the chapter introduced perspectives from Human-Computer Interaction (HCI) and examined the emerging role of artificial intelligence in UI design. While AI offers new opportunities for

automation and adaptive interfaces, it also presents limitations related to creativity, unpredictability, and human variability.

Together, these theoretical perspectives provide a solid framework for analyzing the SpeedZone interface and for understanding how design decisions influence user behavior and satisfaction.

3 Research Design and Methods

This chapter describes the methodological choices and practical implementation of the empirical study conducted for this thesis. It explains how the research was designed, how participants were selected, and how data were collected and documented. The chapter also clarifies why these methods were chosen and how they support the overall research objectives.

3.1 Research design

The empirical part of this thesis is based on a qualitative research design supported by observational elements typical of usability evaluation. A qualitative approach is well suited for exploring how users perceive an interface, how they interpret visual structures, and how they articulate their reasoning while interacting with a system. Since the purpose of the study is not to measure performance statistically but to understand the underlying causes of usability challenges and improvements, qualitative methods provide the necessary depth and flexibility.

The research design combines semi-structured interviews with task-based usability testing. The interviews allow participants to express their expectations and experiences with user interfaces, while the task-based portion reveals how they behave in practice when navigating the SpeedZone interface. The think-aloud method is used throughout the tasks to capture participants' thought processes in real time. The study also incorporates a comparative element, as two different interface versions were tested on separate days. This structure makes it possible to examine how theory- and AI-based improvements influence user behavior and satisfaction.

3.1.1 Theoretical Basis for the Methods

Usability testing is a widely used method in human-computer interaction research for identifying how users interact with an interface and where difficulties occur (Stone, Jerrett, Woodroffe & Minocha, 2005). It is particularly effective for uncovering behavioral patterns, navigation problems, and mismatches between user expectations and system design. The think-aloud method, where participants verbalize their thoughts while performing tasks, provides insight into cognitive processes that are not visible through observation alone.

Semi-structured interviews complement this by capturing attitudinal data, such as expectations, preferences, and subjective satisfaction. Together, these methods form a well-established combination for evaluating user interfaces and are therefore appropriate for this thesis.

3.1.2 Justification of Method Choices

As discussed in the theoretical framework, usability evaluation relies heavily on observing real user behavior, capturing cognitive processes, and understanding subjective experiences. For this reason, a qualitative approach is the most suitable choice for answering the main research question, which examines how specific UI changes influence user behavior and satisfaction.

Semi-structured interviews and task-based usability testing directly reflect the principles of human-centered design described in ISO 9241-210 (ISO 9241-210:2010) and the usability evaluation methods presented by Stone, Jerrett, Woodroffe & Minocha (2005). These methods therefore align both with the theoretical foundations of the thesis and with the practical goal of identifying actual usability issues and improvements.

User behavior and user satisfaction were selected as the primary focus areas because they represent two complementary dimensions of usability. Behavioral data reveals how users actually navigate the interface, while satisfaction reflects their subjective experience and perceived ease of use. Together, these provide a comprehensive understanding of how the interface supports or fails to support the user's goals.

3.2 Selection of participants

Participants were recruited primarily from the Information and Communication Technology (ICT) degree program at Haaga-Helia University of Applied Sciences. One participant outside the institution was also included to diversify perspectives. The selection criteria were intentionally minimal to ensure a realistic representation of potential SpeedZone customers.

The only requirement for participation was that individuals had not previously used SpeedZone's web hotel ordering interface. Some students had interacted with SpeedZone during coursework, but this did not affect eligibility, as the educational ordering process differs significantly from the commercial customer workflow examined in this study.

A convenience sampling approach was used due to the exploratory nature of the research and the practical constraints of scheduling in-person sessions. Convenience sampling refers to selecting participants based on accessibility and availability rather than statistical representativeness (Simkus, 2023). While this method does not aim to produce generalizable results, it is commonly used in usability studies where the goal is to identify recurring patterns, usability issues, and user behaviors rather than to measure population-level trends (Banawa, 2025). In this study, the sample was sufficient for uncovering usability patterns and recurring themes relevant to the research objectives.

3.3 Data collection

Data were collected through individual testing sessions conducted at Haaga-Helia's Pasila campus. Each session lasted approximately 30-45 minutes and consisted of two phases: a semi-structured interview and a task-based usability test.

The interview phase focused on participants' general experiences with user interfaces, including examples of interfaces they considered intuitive or difficult to use. The semi-structured format allowed the interviewer to follow a predefined set of themes while still giving participants the freedom to elaborate on issues they found personally relevant. A predefined set of interview questions was used to ensure consistency across sessions and is included in Appendix 2.

After the interview, participants proceeded to the usability testing phase, where they were asked to complete a series of tasks using the SpeedZone interface. During this phase, participants were instructed to think aloud and continuously verbalize their thoughts, expectations, and decision-making processes. This method provides insight into cognitive processes that are not visible through observation alone. The interviewer documented the process by taking notes and recording audio to ensure accurate capture of user comments and reactions.

Data collection took place over two separate days. On the first day, participants interacted with the current SpeedZone interface. On the second day, a different group of participants tested the improved interface created using usability theory and AI-generated recommendations. This separation ensured that no participant was influenced by prior exposure to the interface and allowed for a clearer comparison between the two versions.

3.3.1 Data Handling and Ethics

All audio recordings and written notes were stored securely in Haaga-Helia's internal OneDrive environment and SpeedZone's internal environment, with access restricted to the researcher and the designated collaborator from SpeedZone. No personal data beyond participants' voices was collected, and all data was anonymized during analysis to ensure that individual participants could not be identified.

The study followed GDPR principles by ensuring voluntary participation, informed consent, and the right to withdraw at any time. Participants received an information sheet prior to the session (Appendix 1) and signed a consent form before the session began, confirming their understanding of the study and their permission to participate. All recordings will be permanently deleted after the completion of the thesis.

3.4 Data analysis

All audio recordings gathered were first transcribed into text to enable systematic examination of participants' verbalized thoughts, reactions, and decision-making processes. The transcriptions were then analyzed using qualitative content analysis, focusing on identifying recurring themes, usability challenges, and behavioral patterns. The transcribed material was compared with the written notes documenting observable actions such as scrolling behavior, hesitation, misclicks, and navigation choices, ensuring that both spoken reasoning and visible interaction patterns were captured.

The analysis proceeded iteratively. Statements and observations were grouped into thematic categories that emerged from the data, including clarity, navigation, terminology, information density, and user confidence. These categories were refined as additional transcripts were reviewed and after analyzing each testing day separately, the findings were compared to identify differences between the two interface versions.

In the final stage, the empirical findings were interpreted in relation to the theoretical frameworks presented in Chapter 2 and the AI-generated recommendations described in Section 4.2.2. This comparison made it possible to evaluate how well theory-based and AI-based suggestions aligned with actual user behavior and where discrepancies emerged.

4 Empirical Study: Task-Based Testing and User Feedback

This chapter describes the practical implementation of the empirical study. It outlines how the testing was organized, how participants interacted with the two interface versions, and what tasks and interview questions were used. The purpose of this chapter is to be descriptive since analysis and interpretation are presented in Chapter 5.

4.1 Research setup

The user testing was organized in collaboration with SpeedZone and a supervising teacher at Haaga-Helia University of Applied Sciences. SpeedZone provided the laptop used during the sessions and granted access to their webpage. They also implemented the recommended design improvements, resulting in a second, modified version of the page for comparative testing. The teacher assisted in recruiting participants and arranging a suitable testing space.

Testing took place at Haaga-Helia's Pasila campus on 27 and 28 January 2026. The first day used the current SpeedZone website interface, and the second day used an improved version incorporating theory-based and AI-generated recommendations. Each day included six participants, resulting in a total of 12 testers evenly divided between the two interface versions.

Of the 12 participants that took part in the study, eleven were students from Haaga-Helia, and one participant worked outside the academic environment. Before the sessions, participants received an information sheet describing the purpose of the study, voluntary participation, and data handling practices. The original Finnish version of this document is included in Appendix 1.

Each participant completed an interview phase followed by a task-based usability test. Data collection relied on voice recordings and researcher notes documenting user actions, comments, and observable difficulties.

4.2 Interface versions

This section introduces the two versions of the SpeedZone interface used in the empirical study. It describes the original interface, the improved version, and the specific changes made based on theory and AI-generated recommendations.

Although participants could freely navigate the entire SpeedZone website during testing, the primary focus of this study was the Web Hotel page. This page is the most frequently visited section of the website and contains the core purchasing flow, which is why all design changes were implemented there. Other parts of the website remained unchanged between versions.

4.2.1 Current SpeedZone Interface

The SpeedZone Web hotel page is a long, scroll-based marketing and product information page that introduces the company's hosting services, pricing tiers, technical specifications, and support offerings. The layout is divided into several distinct sections that guide the user from general value propositions toward detailed technical information and purchasing options. In addition to these content sections, the page includes a small chatbot button fixed to the lower corner of the screen, which remains visible as users scroll and provides access to customer support without interrupting navigation.

The page begins with a large promotional banner featuring a background image and a short value proposition. Key selling points are presented as bullet points, highlighting reliability, ease of setup, WordPress optimization, and the fact that all servers are located in Finland. A call-to-action button directs users to the pricing section.

Immediately below the hero banner, the page displays four hosting plans: Entry, Basic, Business, and Pro in a horizontal comparison layout. Each plan is presented as a card containing the monthly price, first-year discount, regular price, a short list of included features, and a "Get started!" (Aloita tästä!) button. Users can toggle between annual and monthly billing and choose whether prices are shown with or without VAT. The Business plan is visually highlighted as the recommended option.

The beginning and look of the page, as described above, is shown in figure 3.

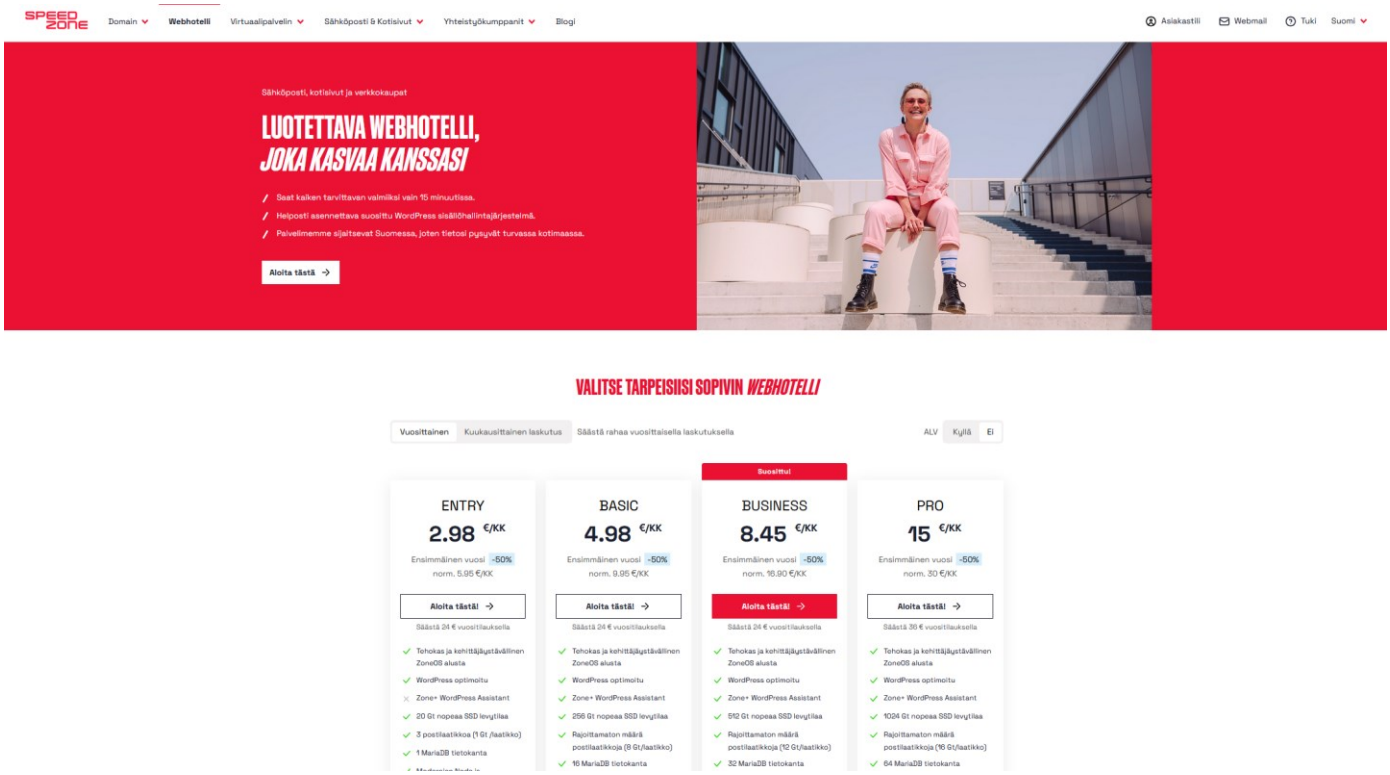

Figure 3. Current SpeedZone Web hotel interface Hero section and Price cards (screenshot from 2026).

Below the pricing cards, the page includes accordion dropdown menus containing detailed technical specifications for each hosting plan. These sections are aimed at more technically experienced users and include information such as storage capacity, supported technologies, email limits etc. These accordions allow users to access advanced details without cluttering the main layout.

Further down the page, a section highlights SpeedZone's long-term experience in hosting services, noting things like 26 years of hosting experience, nearly 50,000 web servers and more than 150,000 domains. This is followed by three short content blocks describing the company's strengths:

- All in one: domains, email, and hosting in one service
- Trustworthy and secure: routine server updates and reliability
- Rapid performance: emphasis on speed and SEO benefits

Below these is a section containing customer reviews. This section displays Google review excerpts or ratings, providing social proof and reinforcing trust.

The next section, shown in figure 4, presents six key features in a grid layout, including servers in Finland, one-click CMS installation, and easy webmail. Each feature is accompanied by a short explanatory text. Under this is also a "What is a web hosting?" (Mikä on webhotelli?) section that explains web hosting as a concept.

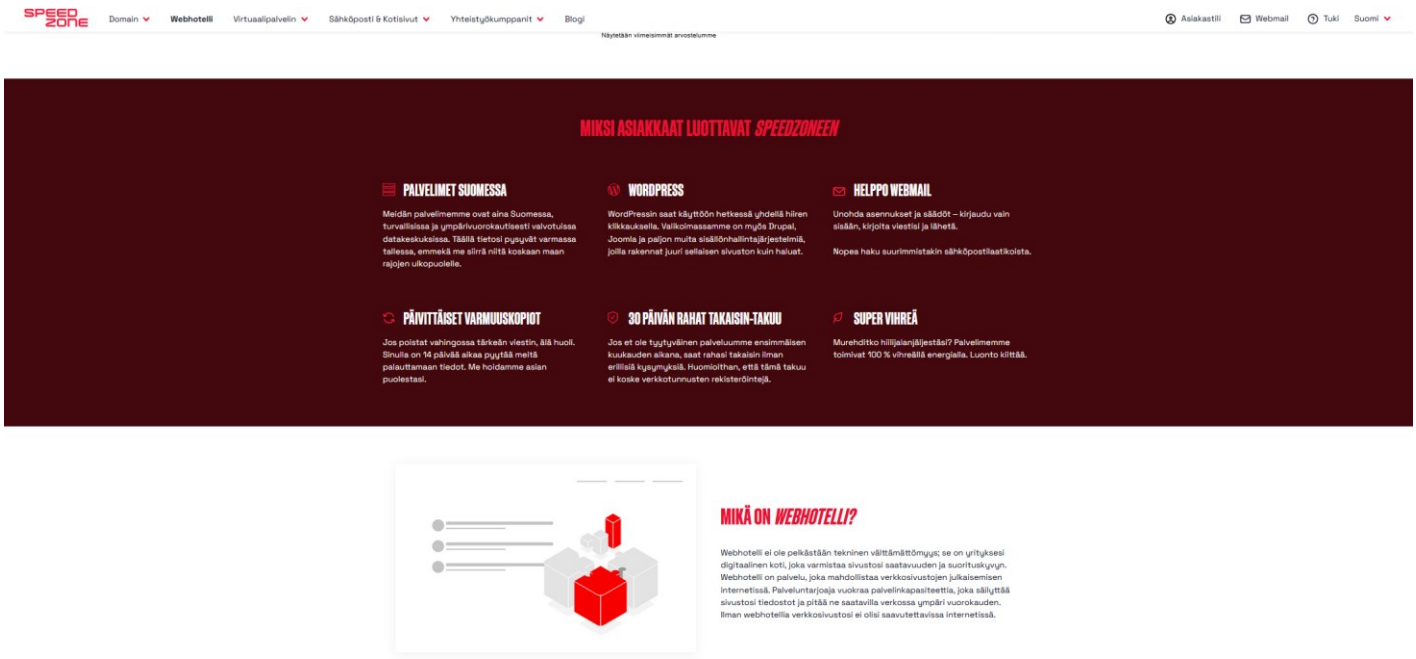

Figure 4. Current SpeedZone Web hotel interface Key features and Web Hotel explanation (screenshot from 2026).

A Frequently Asked Questions section follows, presented as accordion dropdowns. These provide explanations about web hosting, technical requirements, and common customer concerns.

Below the FAQ, the page includes information about SpeedZone's support team, web and email migration services, and assistance for new customers transitioning from other providers. These sections emphasize ease of onboarding and customer support availability.

Finally, the page concludes with logos of partner organizations and a standard footer containing contact information, documentation links, and legal notices.

4.2.2 Suggested Improvements

Before creating the improved version of the interface, a set of potential enhancements was generated using two sources: recommendations from Microsoft Copilot and established usability principles from Nielsen, Norman, Mandel, and ISO 9241-210, which are described in Chapter 2. The purpose of this was to identify concrete, testable modifications that could improve clarity, navigation, and decision-making on the SpeedZone Web hotel page. The suggestions ranged from small visual refinements to more structural adjustments. Not all proposed changes were implemented but documenting them provides transparency.

The AI-generated suggestions were produced using Microsoft Copilot by prompting the system with questions such as "How can this interface be improved?" and "What changes would increase clarity and smoothen the experience?" These prompts were intentionally broad to encourage the AI to generate its own perspective rather than replicate a specific theoretical framework. Copilot was provided with screenshots of the interface as well as a link to the live webpage.

Microsoft Copilot produced several suggestions aimed at improving visual clarity, increasing user confidence, and reducing decision making friction. These included enhancing the visibility of call-to-action (CTA) buttons through hover effects or subtle animations, adding customer testimonials or star ratings near the hosting plans, and introducing "Recommended for…" labels to help users quickly understand which plan fits their needs. Copilot also suggested repeating CTA buttons throughout the long page to reduce scrolling effort, adding a feature comparison modal or expandable table to clarify differences between plans, and placing trust badges near CTAs to highlight key selling points such as backups, SSL, or server location.

Additional AI suggestions focused on reducing uncertainty by adding a small FAQ directly under the pricing section and introducing an exit-intent reassurance banner, a UI element that appears when users show signs of leaving the page and provides last-minute clarification or support. These recommendations were primarily aimed at increasing conversion confidence users' sense of certainty that they are choosing the correct plan and supporting first-time buyers.

Theoretical frameworks highlighted several areas where the interface could be improved to better align with established usability principles. One issue was the lack of micro-feedback on interactive elements: buttons and links did not consistently provide hover or focus states, reducing perceived responsiveness. This relates to Nielsen's heuristic of visibility of system status (Nielsen, 2024) and Norman's principle of feedback (Norman, 2013). Another concern was the absence of page-specific navigation on a long, scroll-based page, which could make it difficult for users to maintain orientation. Although adding a local navigation menu would improve findability, SpeedZone considered this change too extensive for the scope of this iteration.

The specification accordion section was also identified as an area needing clarification. It lacked a clear title, and the plan names were not repeated inside the expanded content, requiring users to remember which plan they were comparing. This issue reflects Nielsen's heuristic of recognition rather than recall (Nielsen, 2024). A clearer heading and repeated plan labels were recommended to reduce cognitive load. Finally, the "What is a web hosting?" (Mikä on webhotelli?) explanatory section was not easily discoverable for new users. Theory suggested adding a link or prompt near the top of the page to guide beginners toward this information, supporting inclusivity and first-time user understanding. This aligns with the inclusivity principles described in ISO 9241-210 (ISO 9241-210:2010).

A complete list of all AI-generated and theory-based improvement suggestions provided to SpeedZone is included in Appendix 3. This appendix documents the full range of potential enhancements considered, including those that were not implemented in the improved interface version.

4.2.3 Implemented Changes

Based on the suggested improvements described in the previous subsection, SpeedZone implemented two targeted modifications to create the improved interface version used in the empirical testing. These changes were selected because they were feasible within the project scope and directly addressed issues identified through usability theory and AI-generated recommendations.

Trust badges were to increase user confidence. The badges highlight core service guarantees such as daily backups, servers located in Finland, and the inclusion of a free website created with the Zone+AI tool. In the original interface, these elements appeared deeper in the page and were easy to overlook. In the improved version, they were placed in a distinct section positioned directly above a CTA button, making the benefits more visible. This change is shown in figure 5.

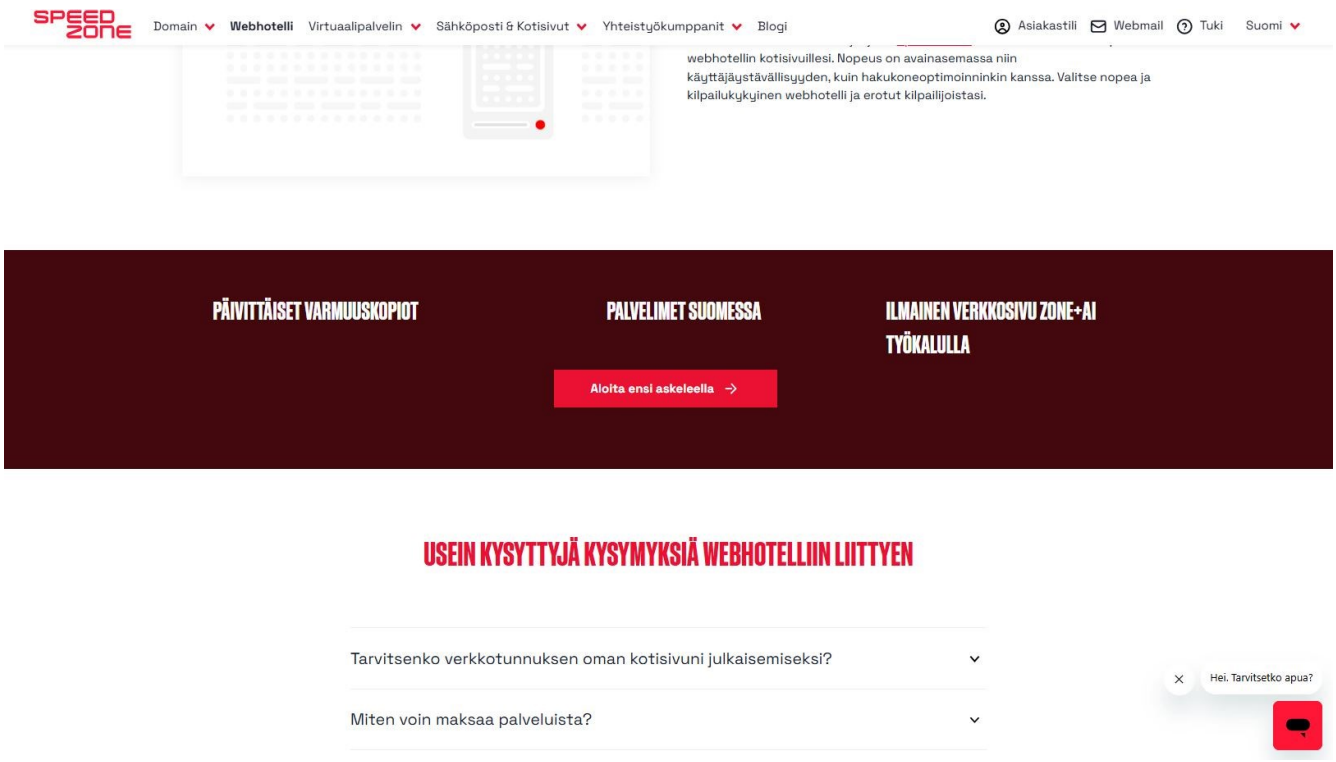

Figure 5. Changed SpeedZone Web hotel interface Trust Badges (screenshot from 2026).

A call-to-action button to the “What is a webhotel?” (Mikä on webhotelli?) explanatory section was also added in the hero section. In addition, the entire explanatory section was moved upward to appear directly below the hero section and before pricing information. This adjustment aimed to improve the discoverability of beginner-oriented content and ensure that users unfamiliar with hosting terminology could understand the basic concept before evaluating prices or technical specifications. In the original interface, the section was located much lower on the page, making it easy for new users to miss. Relocating it and adding a visible entry point earlier in the flow was expected to support inclusivity and reduce confusion, aligning with the human-centered design principles described in ISO 9241-210 (ISO 9241-210:2010). This change is shown in figure 6.

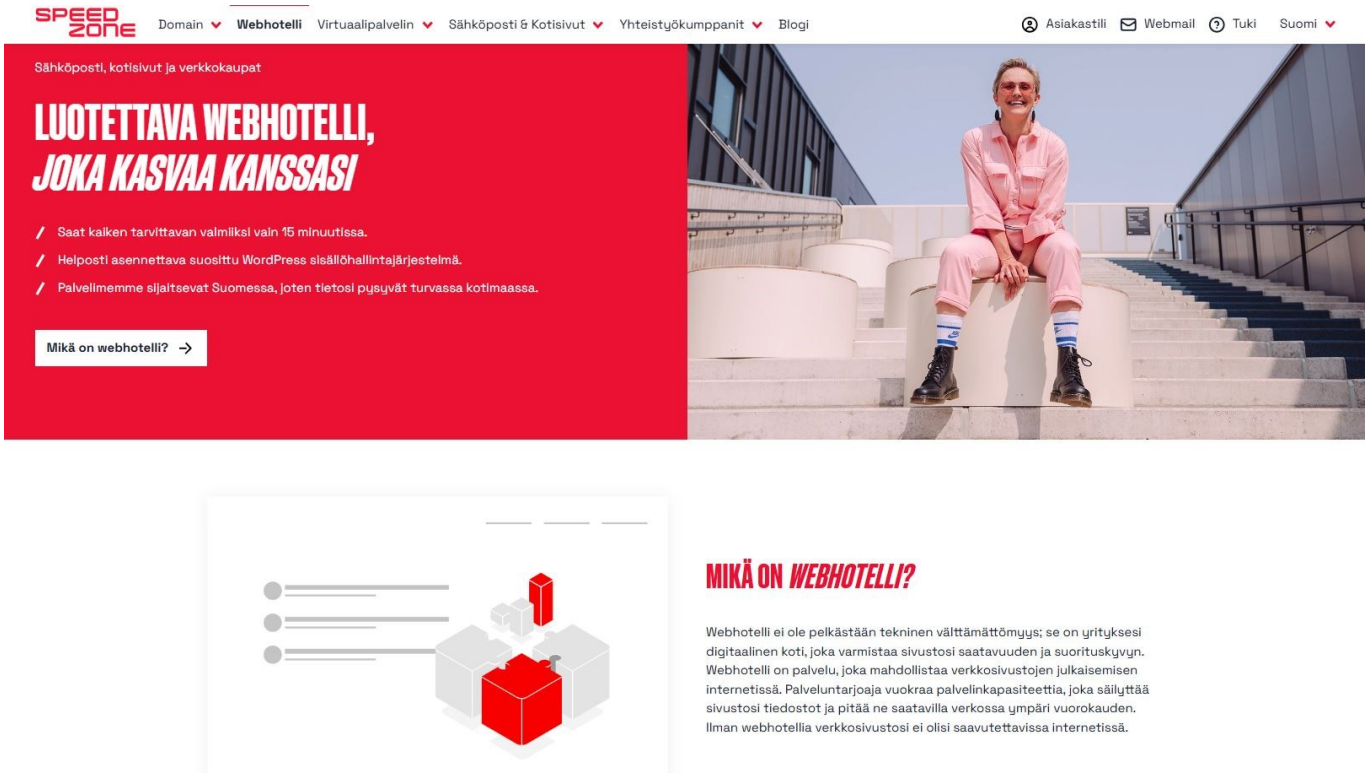

Figure 6. Changed SpeedZone Web hotel interface info call-to-action button and info section moved up (screenshot from 2026).

These two modifications formed the basis of the improved interface version used during the second day of testing.

4.3 Testing Procedure

4.3.1 Session Structure

The testing sessions were conducted at Haaga-Helia's Pasila campus on 27 and 28 January 2026. All sessions took place in a conference room reserved for the study. Each session involved the participant, the researcher (acting as interviewer), and one or two representatives from SpeedZone who observed the process. Session duration varied between approximately 30 and 45 minutes, with one session extending slightly over one hour.

At the beginning of each session, participants were welcomed and informed about the purpose of the study, the structure of the session, and the voluntary nature of their participation. They were also encouraged to think aloud during the task phase to make their reasoning and decision-making visible. After this introduction, the session followed a consistent structure: an initial interview, the task-based usability test, and a short set of concluding questions.

4.3.2 Interview Phase

The sessions began with a short semi-structured interview designed to capture participants' background, digital experience, and expectations before interacting with the interface. The interview covered topics such as participants' occupation or field of study, their familiarity with digital services, factors that influence their first impressions of a new digital service, and what they consider important in a clear and usable interface. Additional questions explored what typically causes frustration when using unfamiliar systems, what kind of feedback users expect from an interface, and examples of positive or negative digital service experiences. The interview phase typically lasted between five and ten minutes.

The full list of interview questions is provided in Appendix 2.

4.3.3 Task Phase

Before beginning the task phase, participants were briefly introduced to a simple scenario to help contextualize the tasks. They were asked whether they had ever considered creating and publishing a website of their own and were then instructed to imagine a situation in which they needed a website for a small business or project. This framing ensured that all participants approached the tasks with a comparable mindset and could more easily relate to the goals of a typical first-time customer.

Participants then proceeded to the task-based usability test. The tasks simulated realistic goals a new customer might have when visiting the SpeedZone website, such as identifying what is needed to create a new website, locating information about hosting plans, exploring available website and email solutions, and determining what aspects could be handled independently versus requiring professional assistance. Participants were also asked to find information related to ordering a new domain name, evaluate available options for business email addresses, and identify what information would be required to finalize an order.

Toward the end of the task phase, participants reflected on the overall experience, describing what felt clear or confusing and rating the interface on clarity and confidence using a 1-5 scale. Tasks were presented verbally, one at a time, and participants were encouraged to think aloud throughout the process. The researcher refrained from aiding unless the participant became completely stuck.

The complete task script is included in Appendix 2.

4.3.4 Data Collection

Data collection combined voice recordings with detailed researcher notes. Audio recordings captured participants' spoken thoughts, reactions, and comments during both the interview and task phases. Researcher notes documented observable behaviors such as scrolling patterns, hesitation, misclicks, navigation choices, and visible signs of confusion or confidence.

This approach provided a rich qualitative dataset, allowing the researcher to compare how participants interacted with the two interface versions and to identify recurring usability issues. No screen recordings were used and instead, observations were documented in real time to preserve the natural flow of the sessions.

4.4 Observations

4.4.1 General Observations

Across all sessions, participants approached the tasks with curiosity and generally positive attitudes toward the scenario. Most participants engaged actively in the think-aloud process, although the level of verbalization varied. Some narrated their reasoning continuously, while others required occasional reminders to articulate their thoughts. Participants' prior experience with digital services influenced their confidence, but even those with strong digital backgrounds occasionally hesitated when encountering unfamiliar terminology or navigation structures.

A recurring pattern across sessions was the reliance on visual cues, such as headings, icons, and section grouping to determine where to begin. Participants tended to scan pages quickly before committing to a specific action, often forming early assumptions about where information "should" be located. When these expectations aligned with the interface structure, navigation proceeded smoothly, but when they did not, participants showed signs of uncertainty, such as pausing, re-reading sections, or scrolling back and forth.

Participants also demonstrated a strong preference for clarity and predictability. They responded positively to elements that reduced cognitive load, such as concise labels, clear hierarchy, and consistent terminology. Conversely, ambiguous wording, dense text blocks, or visually similar sections sometimes caused momentary confusion. These general patterns were visible across both interface versions and throughout the interview and task phases.

4.4.2 Observations from Interview Phase

Participants' initial comments revealed a wide range of familiarity with digital services, though several consistent themes emerged. Since most participants were ICT students, a certain level of

digital fluency could be expected. However, when asked to describe their general level of digital experience, nearly all rated themselves as intermediate rather than advanced. This self-assessment suggests that even technically oriented users may not perceive themselves as experts when interacting with unfamiliar systems.

Across interviews, participants emphasized the importance of clarity, simplicity, and logical structure when encountering a new digital service. Many highlighted that they appreciate interfaces that follow common conventions, as this reduces cognitive effort and makes navigation more predictable. First impressions were strongly shaped by visual organization: clean layouts, clear headings, intuitive grouping, and a professional appearance were frequently mentioned as indicators of a trustworthy and usable interface.

Participants also described several common sources of frustration when using unfamiliar digital systems. These included unclear or overly technical terminology, information that felt hidden or nested too deeply within the interface, and navigation patterns that lacked consistency or predictability. Situations in which the interface required users to guess the next step, rather than guiding them through it were frequently mentioned as particularly discouraging.

When discussing service feedback, several participants emphasized that they expect modern digital services to provide immediate and visible responses to user actions. Examples included highlighting selected options, confirming completed steps, or otherwise signaling that the system had registered their input. This expectation was especially strong in contexts involving transactions or orders where participants noted that when placing an order, they anticipate receiving a clear confirmation to reassure them that the process was successful.

When discussing positive experiences, participants often referenced services that “just made sense,” where the path from intention to action felt natural. A frequently mentioned example was OP’s online banking service, which participants described as clear, predictable, and easy to use. In contrast, negative experiences typically involved feeling lost, overwhelmed, or unsure whether they were on the right track. The Peppi system used at Haaga-Helia was repeatedly cited as an example of a service that participants use only because they must, not because it supports intuitive or pleasant interaction.

These expectations and frustrations provided a valuable baseline for interpreting participants’ behavior during the task phase, offering insight into how they approached the interface and what aspects they found supportive or challenging.

4.4.3 Observations from Task Phase

Participants' behavior during the task phase revealed several consistent patterns in how they navigated and interpreted both interface versions. Overall, most users described the site as generally intuitive. The domain search feature found on the homepage was repeatedly characterized as easy to use, and the price comparison table was frequently praised for helping users understand differences between plans at a glance.

Despite these strengths, several usability challenges also emerged. A recurring issue involved technical terminology. Terms such as "Cron jobs," "Redis cache and "WP assistant" were unfamiliar to many participants, who openly stated that they did not know what these features meant or whether they were relevant to their needs. This uncertainty led to some hesitation when comparing plans or deciding what to select.

Participants also commented on information density. Several described the pages as containing "a lot of text" or requiring "a lot of scrolling," which contributed to a sense of overload. This was particularly noticeable on pages where multiple sections, feature lists, and pricing elements were stacked vertically. For some users, the volume of information made it difficult to identify what was essential for completing the task.

Another common theme was navigation uncertainty. Users occasionally lost track of where they were within the site, especially when moving between the homepage, the domain search, the web hotel selection page, and the shopping cart. Confusion was amplified by the repetition of certain elements such as the price cards, which appeared both on the homepage and on the web hotel page. Several participants commented that seeing the same cards in multiple locations made it harder to understand which page they were currently viewing.

Participants also expressed a desire for clearer explanations of core concepts. Many wanted to know what specific web hotel features actually do, what is required to build a simple website, and how cancellation works. These gaps in understanding slowed progress during some of the tasks, as users paused to interpret unfamiliar terms or search for missing information.

Participants responded to the SpeedZone chatbot in a fairly consistent way. They appreciated that it remained small, unobtrusive, and did not interrupt their tasks, especially in contrast to the large, intrusive pop-up assistants they had encountered on other websites. Several participants did, however, express curiosity about the nature of the chat service. They wanted to know whether the feature connected them to a real person or an AI system, suggesting that transparency about the chatbot's function could further strengthen user trust.

In the first interface version, some users were unsure what “web hotel” meant, but this confusion was largely resolved in the second version, where the explanation had been moved to the top of the page.

User behavior varied widely in how participants explored the interface. Some immediately clicked through all available tabs, others read every text block carefully, and a few scrolled directly to the bottom of the page to inspect the footer. Some participants clicked call-to-action buttons quickly, while others hesitated until they felt they fully understood the content. Interestingly, in the second version, none of the participants noticed or read the newly added trust badges, suggesting that their placement or visual prominence may have been insufficient.

Together, these observations give some insight into the interplay between clarity, terminology, information structure, and navigation in shaping users’ task performance.

5 Analysis and Discussion

5.1 Overview of Analytical Approach

The analysis examines the empirical findings from both testing days to identify patterns, recurring usability issues, and differences between the two interface versions. The goal is to connect observable user behavior with the theoretical principles introduced in Chapter 2 and to evaluate whether the implemented design changes produced measurable improvements.

The analysis proceeds in three layers. First, it compares user behavior and comments across the interview and task phases to identify consistent themes such as clarity, navigation, terminology, and confidence. Second, it contrasts Version 1 and Version 2 to determine whether the modifications, such as the repositioned explanatory section and added trust badges actually had a noticeable impact on user understanding or task performance. Third, the findings are interpreted through the lens of established usability theory, highlighting where user behavior aligns with or diverges from expectations based on heuristics, design principles, and AI-generated recommendations.

5.2 Interpretation of Interview Findings

The interview phase provided insight into participants' digital backgrounds, expectations, and prior experiences with online services. Although most participants were ICT students at Haaga-Helia, one participant worked in the social sector. Nearly all reported using digital services daily, and the majority described their digital competence as intermediate or slightly above intermediate. Only two participants identified as advanced. Given the context that most ICT students are accustomed to digital tools, it is possible that some participants understated their abilities to avoid appearing overly confident. Nevertheless, the responses suggest that the group possessed sufficient digital fluency to evaluate the interface without being experts in web hosting. To illustrate the composition of the sample, Figure 7 presents the distribution of participant fields and self-assessed digital competence.

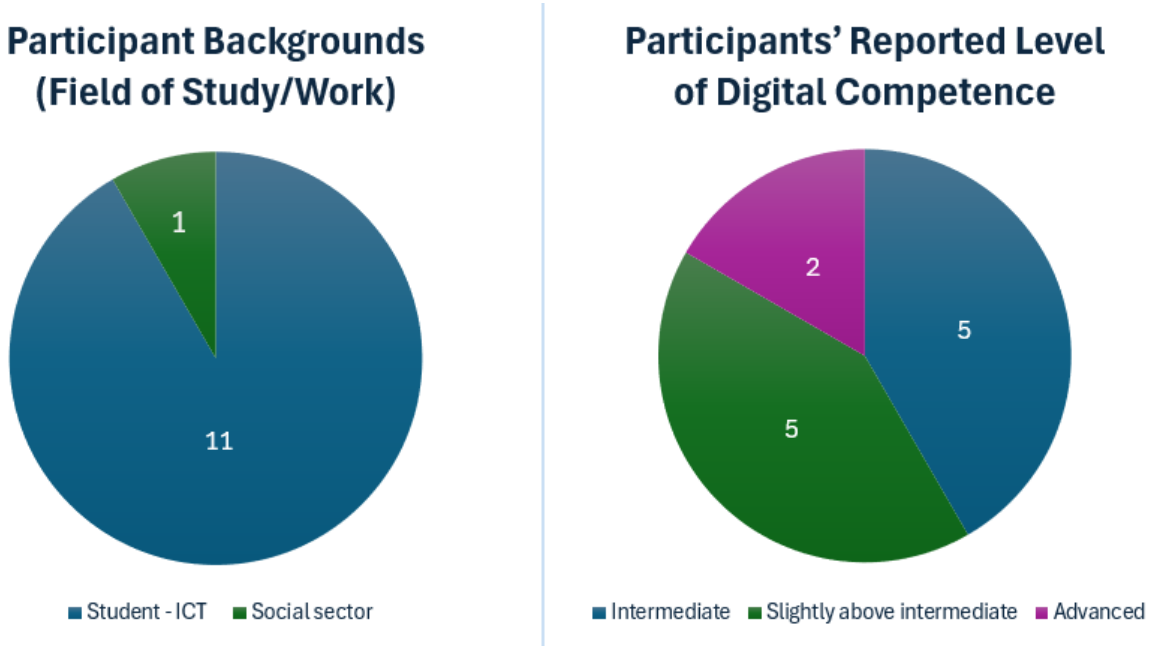

Figure 7. Distribution of participant fields and self-assessed digital competence.

When asked what they expect from a well-designed user interface, participants consistently emphasized clarity, simplicity, and logical structure. Easy navigation and predictable layouts were also frequently mentioned. These expectations align closely with established usability principles, such as Nielsen's heuristics on consistency and recognition (Nielsen, 2024), and Norman's emphasis on clear signifiers and intuitive structure (Norman, 2013). Participants described good interfaces as those that "follow the rules," indicating a preference for familiar patterns and conventions that reduce cognitive effort.

Table 4. User Expectations for Good UI

Theme	Description	Frequency (out of 12)
Clarity	Clear Structure, predictable layout	10
Easy navigation	Logical flow, visible menus	11
Familiar patterns	"Follows the rules"	7
Minimalism	No clutter, no unnecessary elements	9
Good visual hierarchy	Headings, spacing, contrast, color	10

Table 4 summarizes the most frequently mentioned expectations participants associated with well-designed user interfaces. The high frequency of themes such as clarity, predictable structure,

and easy navigation reinforces the strong alignment between participant expectations and established usability principles discussed earlier.

Participants also identified several characteristics that typically frustrate them in digital services. The most common complaints concerned poor hierarchy, slow or unresponsive interfaces, and confusing navigation. These frustrations reflect well-documented usability issues: unclear hierarchy disrupts visual scanning (Gordon, 2021), slow responsiveness breaks feedback loops (Nielsen, 2024), and inconsistent navigation increases cognitive load (Nielsen, 2024). Such comments provide a useful baseline for interpreting later task-based observations, where similar issues emerged in the SpeedZone interface.

When asked to name digital services they enjoy using, participants most frequently mentioned mobile banking applications, with OP Bank receiving several specific references. These services were praised for their clarity, reliability, and predictable structure, qualities that align with the participants stated expectations for good UI design which can been seen in Table 4. This is unsurprising given that banking apps are used daily and therefore receive significant investment in usability and user experience (Bhatnagar, 2025).

In contrast, the most cited negative example was Peppi, the academic management system used at Haaga-Helia. Participants described Peppi as confusing, inconsistent, and something they “use only because they must.” These comments reinforce the importance of clear structure, consistent interaction patterns, and intuitive navigation, qualities participants felt Peppi lacked.

Table 5. Common Frustrations in Digital Services

Frustration	Description	Example Mentioned
Confusing navigation	Hard to find actions	Peppi
Poor hierarchy	Unclear structure	Zara website
Slow responsiveness	Lag, delays	General complaint
Unexpected behavior	Buttons not doing what user expects	General complaint
Pop-ups / interruptions	Chatbots, cookie banners	General complaint

Table 5 highlights the recurring frustrations participants experience in everyday digital services. These issues, particularly confusing navigation and poor hierarchy mirror the usability challenges

later observed in the SpeedZone interface, providing a baseline for interpreting task-based behavior.

Finally, when asked whether functionality or visual design is more important, participants emphasized that both are essential. Responses were divided between those who prioritize functionality first and those who prioritize visuals first, but nearly all participants stressed that neither aspect can compensate for the complete absence of the other. This reinforces the theoretical view presented in Chapter 2: effective UI design requires a balance between aesthetic appeal and practical usability.

5.3 Interpretation of Task-Based Observations

The task-based observations provide insight into how participants interacted with the two interface versions and how well the design supported real user goals. Across both versions, participants relied heavily on visual hierarchy and familiar patterns when deciding where to begin. This behavior aligns with established usability principles, particularly Nielsen's heuristics on recognition rather than recall and consistency and standards (Nielsen, 2024). When the interface matched users' expectations, for example, through clear headings or predictable layout, navigation proceeded smoothly. When expectations were not met, users hesitated, re-scanned the page, or scrolled back and forth, indicating increased cognitive load.

Several strengths of the interface became evident during the tasks. The domain search feature found on the homepage was consistently described as easy and intuitive, suggesting that its placement, labeling, and interaction model aligned well with users' mental models. Similarly, the price comparison table supported quick decision-making by presenting differences between plans in a compact and scannable format. These elements demonstrate the value of clear structure and immediate comparability in reducing decision friction.

Table 6. Observed Strengths of the Interface

Strength	Evidence from Users	Related Usability Principle
Domain search	"Easy", "intuitive"	Recognition over recall
Price comparison tables	Quick scanning, easy comparison	Visual hierarchy
Clear CTA buttons	Users clicked them confidently	Signifiers & affordances

Table 6 presents the interface elements that consistently supported smooth task performance. These strengths demonstrate where the design successfully aligned with users' mental models and core usability heuristics, especially regarding recognition, visual hierarchy, and clear signifiers.

At the same time, the observations highlighted recurring usability challenges. Technical terminology caused confusion for many participants, slowing task progress and reducing confidence. This difficulty could reflect a mismatch between system language and user language, a violation of the heuristic match between system and the real world (Nielsen, 2024). Information density also contributed to overload, as several participants described the pages as text-heavy or requiring a lot of scrolling. This suggests that the interface did not fully support efficient information prioritization, making it harder for users to identify what was essential for completing the tasks at hand (Write, 2021; Nielsen, 1995).

Navigation issues further complicated the experience. Participants occasionally lost track of their location within the site, particularly when identical price cards appeared on multiple pages. This repetition created ambiguity about page identity and weakened the sense of orientation. Such confusion indicates that the interface lacked strong signifiers or contextual cues to help users maintain awareness of where they were in the overall flow, reflecting several of Nielsen's usability heuristics (Nielsen 2024).

Table 7. Observed Usability Problems

Issue	Description	Impact on Users	Related Heuristic
Technical terminology	"Cron job", "Redis cache"	Confusion, hesitation	Match with real world
Information overload	Long text blocks, scrolling	Increased cognitive load	Minimalist design
Repeated price cards	Users lost orientation	Navigation confusion	Visibility of system status
Weak page identity	Hard to know "where am I?"	Backtracking, rescanning	Consistency & standards

Table 7 outlines the key usability issues that hindered participants during task completion. The problems range from technical terminology to weak page identity, and these illustrate where the interface may have diverged from usability best practices and contributed to increased cognitive load.

The comparison between versions revealed mixed effects of the implemented changes. Moving the “What is a web hotel?” explanation to the top of the page successfully reduced confusion about the term, demonstrating the importance of placing beginner-oriented content early in the flow. In contrast, the newly added trust badges went largely unnoticed. This suggests that their visual prominence or placement was insufficient to attract attention, or that users were more focused on completing tasks than on scanning for reassurance elements.

Overall, the task-based observations illustrate the interplay between clarity, terminology, information structure, and navigation in shaping user performance. They also highlight where theoretical and AI-generated recommendations aligned with real user needs and where further refinement is required.

5.4 Comparison Between Interface Versions

Although the two interface versions differed only in a few targeted elements, the comparison still revealed meaningful differences in how participants interpreted and navigated the page. The most noticeable improvement concerned the repositioned “What is a Web Hotel?” explanatory section. In Version 1, this information appeared far down the page and was largely overlooked, most participants just scrolled past it. In Version 2, where the section was moved directly below the hero banner and supported by a visible call-to-action button, approximately half of the participants engaged with it. This suggests that placing beginner-oriented content earlier in the visual hierarchy can reduce initial confusion and better support first-time users, an outcome consistent with usability principles related to recognition, information placement, and reducing cognitive load.

In contrast, the newly added trust badges did not produce a noticeable effect. None of the participants in Version 2 commented on them or appeared to notice them during task completion. Several explanations are possible: the badges may have lacked sufficient visual prominence, users may have been more focused on completing the assigned tasks than scanning for reassurance cues, or the sample size of six participants may simply have been too small to detect subtle behavioral differences. Regardless of the cause, the finding highlights that perhaps trust-building elements must be both visually salient and contextually aligned with user goals to be effective.

Table 8. Version 1 vs Version 2 Comparison

Element	Version 1	Version 2	Observed Effect
“What is a web hotel?” placement	Low on page	Moved under hero banner	More users noticed it

Additional Trust Badges	Not present	Added	No noticeable impact
“What is a Web hotel?” CTA button	Not present	Added to the hero banner	Some users interacted with it

Table 8 compares the targeted design changes between the two interface versions and their observable effects on user behavior. The results show that structural adjustments, such as repositioning explanatory content, had a clearer impact than visual additions like trust badges.

Overall, the comparison indicates that structural changes affecting information flow, such as repositioning explanatory content, had a clearer impact on user behavior than smaller visual additions. Because the two versions were intentionally similar, the differences observed were fairly modest, yet they still illustrate how even small adjustments can influence comprehension and navigation. A broader redesign or a larger set of modifications would likely have produced more distinct behavioral patterns, but within the scope of this study and with the resources available, the results provide useful insight into which types of changes are most immediately noticeable to users.

5.4.1 Quantitative Comparison of User Ratings

In addition to the qualitative observations, at the end of the task section participants were asked to rate the clarity of the interface and their confidence in completing the tasks on a scale from 1 to 5. These ratings were collected separately for each interface version, allowing a quantitative comparison of perceived usability. Figures 8 and 9 present the distribution of clarity and confidence scores for Version 1 and Version 2. Not all participants provided numerical ratings, so the distributions reflect only the responses received.

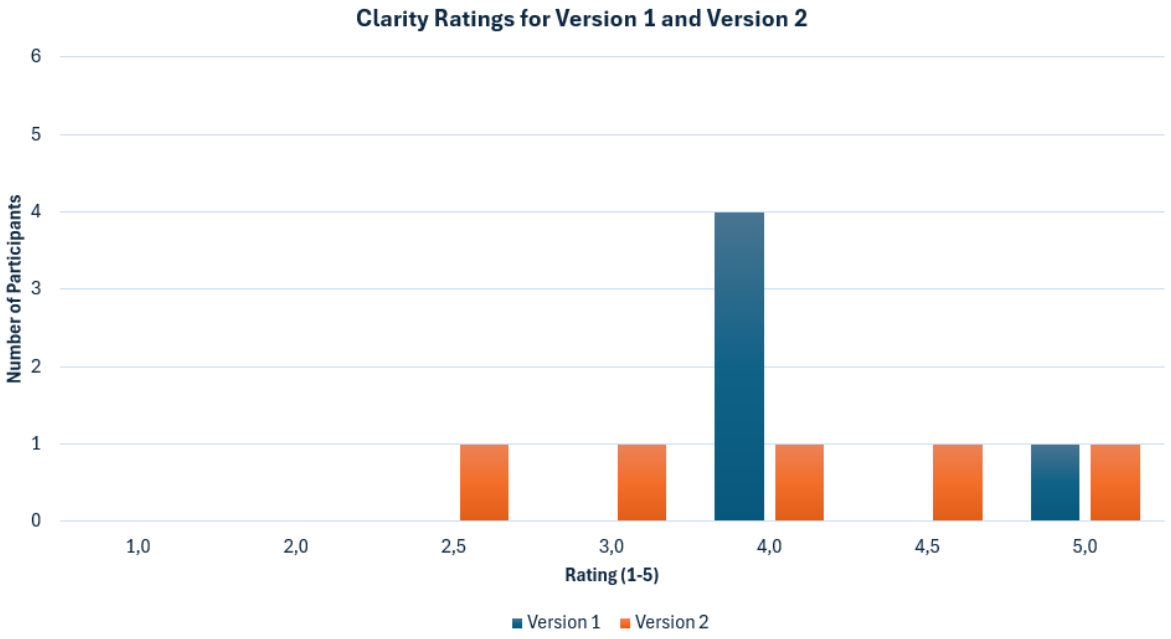

Figure 8. Distribution of clarity ratings (1-5) for Version 1 and Version 2.

As shown in Figure 8, participants rated the clarity of the two interface versions differently. Version 1 received a more concentrated set of ratings, with most participants giving it a score of 4. In contrast, Version 2 produced a more dispersed distribution, with individual participants assigning ratings between 2.5 and 5. Although Version 2 did receive one rating of 5, the overall pattern suggests that Version 1 was perceived as slightly clearer by the participants.

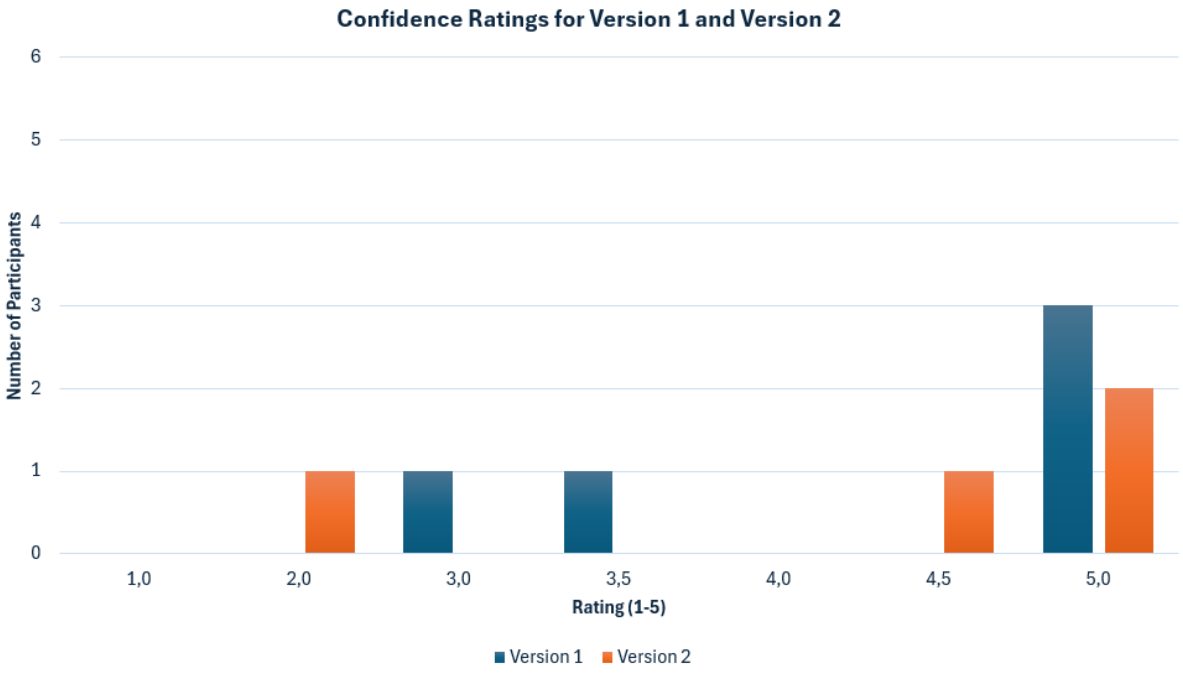

Figure 9. Distribution of confidence ratings (1-5) for Version 1 and Version 2.

Figure 9 shows the distribution of confidence ratings for both versions. Version 1 again displays a more consistent pattern, with most participants rating their confidence at 5. Version 2 produced a wider spread of ratings, including lower scores at 2 and 4.5. While Version 2 did receive one high rating of 5, the overall distribution indicates that participants generally felt a bit more confident completing the tasks with Version 1.

5.5 Alignment Between Theory, AI Recommendations, and User Behavior

The empirical findings reveal several points of alignment, but also notable gaps between theoretical usability principles, AI-generated recommendations, and the actual behavior of participants during testing. Overall, the results suggest that both theory and AI provided some valuable guidance, but neither fully anticipated the nuances of real user interaction.

A strong area of alignment emerged around clarity, simplicity, and predictable structure, which participants consistently emphasized during interviews and demonstrated through their navigation patterns. These expectations closely mirror established usability principles such as Nielsen's heuristics (2024) on consistency, recognition rather than recall, and minimalist design, as well as Norman's (2013) emphasis on clear signifiers and intuitive affordances. Participants' reliance on headings, grouping, and visual hierarchy further supports the theoretical view that users form mental models quickly and depend on familiar patterns when navigating digital interfaces (Nielsen, 2024; Norman, 2013).

The theoretical recommendations, particularly those derived from ISO 9241-210's (2010) emphasis on inclusivity and supporting novice users, aligned well with observed user behavior. The decision to move the "What is a web hotel?" explanatory section upward was based on these theoretical principles. This change proved effective: participants using Version 2 showed noticeably less confusion about the term, indicating that placing beginner-oriented information earlier in the flow supports first-time users and reduces cognitive load.

In contrast, the AI-generated recommendation to add trust badges did not appear to influence user behavior. None of the participants in Version 2 commented on or interacted with the badges, suggesting that the element did not attract attention in the context of task-oriented navigation. While trust badges are a common pattern in commercial UI design, their placement or visual prominence may not have been sufficient for users focused on completing specific tasks.

Finally, the navigation difficulties observed, particularly confusion caused by repeated price cards across multiple pages, highlight a mismatch between theoretical principles of orientation and the actual structure of the site. While theory stresses the importance of clear signifiers and contextual cues, the interface did not fully support users in maintaining awareness of their location. Neither AI

recommendations nor the implemented changes addressed this issue, suggesting that some usability challenges may require deeper structural reconsideration beyond surface-level adjustments.

Taken together, the findings show that theory and AI provide valuable but incomplete guidance. The strongest improvements occurred where theoretical principles, AI suggestions, and user needs converged, such as improving the visibility of beginner-oriented information. In contrast, areas where AI or theory alone guided changes without strong grounding in observed user behavior, such as trust badges, had limited impact. This reinforces the importance of iterative, user-centered evaluation: theory and AI can propose directions, but real user testing remains essential for validating which changes genuinely enhance usability (Nielsen, 1993).

5.6 Implications for UI Design

The findings from the testing sessions highlight several practical implications for designing clear, user-friendly interfaces, particularly for services that target both novice and intermediate users. First, the results reinforce the importance of strategic information placement. Moving the “What is a web hotel?” explanation higher on the page did improve user understanding, demonstrating that beginner-oriented content should appear early in the visual hierarchy to reduce cognitive load and support first-time visitors, as theory suggested (ISO 9241-210:2010).

Second, the observations highlight the importance of clear terminology and user-centered language. Confusion around technical terms such as “Cron job” or “Redis cache” shows how system-oriented vocabulary can hinder task performance, particularly for less experienced users. Designers should therefore prioritize plain language, provide contextual explanations, and use progressive disclosure so that essential information remains accessible without overwhelming the user (Nielsen, 2024; Norman, 2013). This, however, creates a new design challenge. More advanced users often expect these technical terms to be visible and may even rely on them for making decisions (Nielsen, 2000). Balancing the needs of both groups, beginners who benefit from simplification and experts who prefer precision require thoughtful interface design that adapts to varying levels of expertise.

Third, the recurring navigation issues, particularly confusion caused by repeated price cards and weak page identity highlight the need for strong orientation cues. Interfaces should provide clear indicators of location, unique page identifiers, and consistent structural patterns to help users maintain a sense of where they are within the site (Nielsen, 2024).

Finally, the limited impact of the trust badges suggests that visual additions alone are insufficient unless they are both noticeable and aligned with user goals. Trust-building elements must be

integrated into moments where users naturally seek reassurance, rather than placed passively on the page (Fogg, Soohoo, Danielson, Marable, Stanford & Tauber, 2002).

Together, these implications underscore the importance of designing interfaces that balance clarity, structure, and contextual support, especially in areas where users may have varying levels of prior knowledge.

5.7 Limitations of Key Insights

While the findings provide valuable insight into user behavior and interface performance, several limitations must also be acknowledged. First, the sample size was quite small with only twelve participants across two testing days, resulting in only six participants per interface version. Although this is quite typical for qualitative usability studies, it limits the generalizability of the results and increases the likelihood that more subtle behavioral differences, such as reactions to trust badges, may have gone completely undetected.

Second, most participants were ICT students, meaning the group had relatively strong digital competence. This may have reduced the visibility of issues that would affect less experienced users, particularly regarding terminology or navigation. The results therefore reflect the experiences of moderately skilled users rather than a fully representative audience.

Third, the presence of company representatives during the testing sessions may have influenced how openly participants expressed criticism. This could have led some individuals to provide slightly more positive clarity or confidence ratings than they otherwise would have in a fully neutral environment. As a result, the quantitative scores may contain a mild social desirability bias.

Fourth, the two interface versions differed only in a few targeted elements. While this allowed for focused comparison, it also meant that the observed differences were modest. A broader redesign might have revealed more pronounced behavioral changes.

Finally, the study relied on task-based observation in a controlled environment. Participants may behave differently in real-world contexts where their goals, time pressure, and motivations vary. As a result, the insights should be interpreted as indicators of usability trends rather than definitive measurements of long-term user behavior.

6 Conclusions and Recommendations

6.1 Summary of the Study

This thesis examined how an existing user interface can be evaluated and improved by combining usability theory, AI-generated insights, and empirical user testing. The study focused on the SpeedZone website's web hotel interface and compared the current version with an improved version created using recommendations from established usability frameworks and Microsoft Copilot. Through interviews and task-based testing, the research explored how specific design changes influenced user performance, satisfaction, and behavior.

The theoretical framework highlighted the importance of clarity, hierarchy, consistency, and user-centered design. AI-generated suggestions provided additional perspectives, particularly regarding visual clarity, navigation structure, and trust-building elements. The empirical study demonstrated that even small adjustments, such as beginner-friendly content being more available, had a measurable effect on user efficiency and confidence.

Overall, the study showed that theory, AI, and user testing each contribute unique value to UI improvement, and their combination provides a structured and evidence-based approach to interface design.

6.2 Key Conclusions

The findings highlight the inherent complexity of user interface, usability, and human-computer interaction. There is no single correct way to design a "good" interface but instead UI design is an iterative process shaped by user needs, context, and continuous refinement. This study reinforces that clarity and simplicity remain the most valued qualities of an interface. Users consistently gravitated toward elements that were predictable, well-structured, and easy to understand, confirming long-standing principles in usability and cognitive psychology.

The empirical testing, despite its small sample size, produced several meaningful insights. Participants did respond positively to structural improvements, such as repositioning the explanatory section, while more subtle visual additions, such as trust badges, went largely unnoticed. This suggests that changes affecting information flow and cognitive load have a more immediate impact on usability than more aesthetic oriented enhancements.

Participants relied heavily on prior mental models when interacting with the interface. When elements aligned with familiar patterns, tasks felt easier and when they did not, confusion increased. This confirms the importance of consistency and predictable design.

AI provided several helpful suggestions, such as reorganizing content and improving clarity, but the implemented recommendation (trust badges) had little observable impact on user behavior. This highlights that at least if you are seeking immediate results, AI can support ideation but cannot directly replace empirical testing.

The study also revealed a tension between beginner-friendly language and terminology expected by more advanced users. While technical vocabulary confused less experienced participants, prior usability research shows that expert users often consider such terminology normal or even necessary (Nielsen, 2000). Designing separate interfaces for different skill levels could address this, but that would be costly and potentially problematic, given the unpredictability of user behavior. However, the findings point toward the future potential of adaptive interfaces that adjust dynamically to user expertise, an area where AI may play a very significant role.

6.2.1 Integration of Theory, AI and Empirical Findings

A central contribution of this thesis is the demonstration of how theory, AI, and user testing complement one another.

- Theory provided a stable foundation and clear criteria for evaluating the interface.
- AI offered rapid idea generation and alternative perspectives, though sometimes lacking contextual nuance.
- User testing validated what users expect and which changes actually improved usability and which had limited effect.

The strongest improvements emerged when all three perspectives aligned. Conversely, when AI suggestions diverged from theory or user expectations, their impact was minimal. This triangulation shows that AI is most effective when used as a supplementary tool within a human-centered design process.

6.3 Practical Recommendations

Based on the findings, several practical recommendations can be made for improving user interfaces:

1. Prioritize clarity and simplicity. Clear hierarchy, predictable structure, and concise language consistently support smoother navigation and higher confidence.
2. Use familiar patterns and predictable structures. Users rely on mental models formed from other digital services. Aligning with these expectations reduces confusion and increases confidence.

3. Validate design decisions through user testing. Even well-justified design choices may not behave as expected in practice. Testing with real users ensures that improvements are grounded in actual behavior.
4. Apply AI as a supportive tool, not a decision maker. AI can accelerate ideation and highlight potential improvements, but its suggestions must be interpreted critically and validated empirically.

6.4 Limitations

Although the study produced meaningful insights, several limitations must be acknowledged. The participant group was small and relatively homogeneous, which limits the generalizability of the findings and means that the results should be interpreted as indicative rather than representative. The testing was also conducted in a controlled environment rather than in real usage contexts, which may have influenced participant behavior by reducing distractions or creating a more focused mindset than would occur naturally.

In addition, the study examined only first-time interactions and therefore did not capture long-term learning, adaptation, or sustained satisfaction. These are factors that often play a significant role in how users ultimately perceive an interface. The scope of the implemented design changes was also relatively modest, focusing primarily on structural adjustments rather than a full redesign. As a result, the magnitude of observable improvements was naturally limited, and some deeper usability issues may not have surfaced within the constraints of the modified interface.

Together, these limitations highlight the need for further research with more diverse participants, real-world testing conditions, longitudinal data, and broader design interventions.

6.5 Suggestions for Future Research

This study was limited by its small sample size and the modest scope of the implemented design changes. Future research could expand on these findings by:

- Conducting larger-scale usability tests with more diverse user groups
- Testing more substantial redesigns to better understand how structural changes influence user behavior
- Investigating long-term user interaction patterns rather than single-session observations

Together, these directions would deepen understanding of how theory, AI, and real-world behavior can be integrated to create more intuitive and effective user interfaces.

6.6 Final Reflection

This thesis shows that meaningful UI improvement emerges at the intersection of theory, AI, and real user behavior. While AI can accelerate the design process and generate useful improvement ideas, it cannot replace the nuanced understanding gained through user testing or the foundational principles established by decades of usability research. And although there is extensive, well-established theory about what constitutes a “good” user interface, practical testing continues to offer insights that theory alone cannot provide. The findings underscore the value of iterative, evidence-based design and demonstrate that even modest interface adjustments can influence the user experience. As digital services continue to evolve, the combination of human insight and AI-driven tools will become an increasingly important part of creating intuitive, accessible, and user-centered interfaces.

The process of completing this thesis also highlighted the realities of project work. The original plan was more ambitious: implementing interface changes directly on SpeedZone’s website and conducting A/B testing with real customers. However, the A/B testing phase could not be carried out due to internal reasons within SpeedZone, which required the project to be adjusted. As a result, the research design shifted toward interview-based testing supported by a structured task list. This change demanded some flexibility, quick adaptation, and a willingness to rethink the methodology while still maintaining the integrity of the research questions.

Recruiting participants proved more challenging than expected, especially with the holiday season approaching, which pushed the testing days into January. Even then, the new interface version had a very limited number of implemented changes due to scheduling and communication constraints. These challenges were further amplified by the fact that the collaboration took place almost entirely remotely, as the company is located outside Finland, which occasionally slowed down communication and decision-making. While these limitations were at times a bit frustrating and hectic, they also reinforced the importance of realistic planning, clear communication, and building time buffers into the project timeline.

Despite these challenges, the process was highly instructive. I learned how to manage a multi-party project, adjust expectations when external factors change, and maintain research quality even when the original plan cannot be followed exactly. These experiences further strengthened my understanding of project management and taught me to approach unexpected obstacles constructively rather than as pure setbacks. In the end, although the thesis evolved into a different form than initially envisioned, it still produced meaningful insights and provided valuable learning about both UI/UX research and the practical realities of conducting applied research in collaboration with a company.

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Appendices

Appendix 1. Participant Information Sheet (Finnish Original)

Tutkimustiedote

Opinnäytetyön nimi: Bridging Theory, AI, and Practice: Measuring the Impact of UI Design Choices

Opiskelijan nimi ja yhteystiedot: Kasperi Kuusisto, kasperi.kuusisto@myy.haaga-helia.fi, puhelinnumero.

Toimeksiantaja: Zone Media Oy (SpeedZone)

Aineiston keruun tavoite: Tiedonkeruun tarkoituksena on tutkia, miten erilaiset käyttöliittymäsuunnitteluratkaisut vaikuttavat käyttäjäkokemukseen. Tutkimuksessa kerätään tietoa osallistujien vuorovaikutuksesta kahden eri ohjelmistokäyttöliittymäversion kanssa, mukaan lukien käytön helppous, tyytyväisyys, koettu selkeys ja yleiset vaikutelmat. Kerättyä aineistoa hyödynnetään arvioitaessa, kuinka hyvin tekoälyn tuottamat suunnittelusuositukset ja vakiintuneet käytettävyysperiaatteet toimivat käytännössä sekä miten nämä näkökulmat vastaavat toisiaan.

Aineiston keruun toteuttamistapa ja vaiheet: Tiedot kerätään yksilöllisissä haastattelutilanteissa, jotka toteutetaan kasvotusten Haaga-Helian Pasilan kampuksella. Jokainen istunto koostuu kahdesta vaiheesta: haastatteluvaiheesta, jossa osallistujat vastaavat yleisiin kysymyksiin kokemuksistaan ja odotuksistaan käyttöliittymiä kohtaan, sekä tehtäväpohjaisesta testausvaiheesta, jossa osallistujat suorittavat sarjan tehtäviä kahdella eri ohjelmistokäyttöliittymäversiolla. Toinen versio on suunniteltu tekoälyn tuottamien suositusten pohjalta ja toinen perustuu vakiintuneisiin käytettävyysperiaatteisiin. Tehtäväpohjaisen testauksen aikana kirjataan havainnot, tehtävien suoriutuminen ja osallistujien palaute. Haastattelut äänitetään litterointia ja käännöstä varten, ja videoita käytetään ainoastaan näytön tallentamiseen tehtäväpohjaisen vaiheen aikana.

Osallistuminen kesto: Osallistuminen kestää noin 30–45 minuuttia.

Etukäteisvalmistautuminen: Tutkimukseen osallistuminen ei vaadi ennakkovalmistautumista.

Osallistumisen hyöty tutkittavalle tai hänen edustamalleen organisaatiolle: Osallistujat saavat tietoa käyttöliittymien arviointiprosessista ja mahdollisuuden vaikuttaa todellisen digitaalisen palvelun kehittämiseen. Heidän panoksensa auttaa tunnistamaan käytettävyyden parannuskohteita, joista tulevat käyttäjät voivat hyötyä. Kevyttä tarjoilua (esim. välipaloja ja juomia) voidaan tarjota istunnon aikana, mutta niitä ei pidetä palkkiona ja ne ovat vapaaehtoisia.

Aineiston käsittely, säilytys, luovutustahot ja hävittäminen: Kerätty aineisto käsitellään ja analysoidaan Haaga-Helian ammattikorkeakoulun ja Zone Media Oy:n tarjoamien turvallisten tallennuspalvelujen ja analyysityökalujen avulla. Tiedot säilytetään Haaga-Helian ja Zone Media Oy:n järjestelmissä, jotka täyttävät organisaatioiden tietosuoja- ja tietoturvavaatimukset.

Äänitallenteita käyttää ainoastaan tutkija litterointia ja käännöstä varten. Videotallenteet sisältävät vain osallistujan näytön tehtäväpohjaisen vaiheen aikana, eivätkä ne sisällä osallistujan kasvoja tai muita tunnistetietoja. Kaikki Zone Media Oy:lle (SpeedZone) jaettava aineisto anonymisoidaan täysin, eikä heille luovuteta henkilötietoja (kuten nimiä tai tunnistettavia kommentteja). Zone Media Oy saa ainoastaan anonymisoidut käytettävyystulokset, jotka ovat tarpeen heidän palvelunsa arvioimiseksi.

Aineistoa käsittelevät ja analysoivat tutkija Kasperi Kuusisto sekä tarvittaessa Zone Media Oy:n edustajat heidän palvelunsa käytettävyyden arviointia varten. Kaikkia aineistoa käsitteleviä osapuolia sitovat salassapito- ja tietosuojavelvoitteet. OpenAI:ta käytetään myös käännös- ja analyysitarkoituksiin.

Tutkimus ei edellytä arkaluonteisten henkilötietojen keräämistä. Mikäli henkilötietoja kerätään (esim. nimi, ääni tai tunnistettavat kommentit), käsittelyn oikeusperusteena on osallistujan tietoon perustuva suostumus. Kaikki henkilötietojen käsittely noudattaa EU:n yleistä tietosuoja-asetusta (asetus (EU) 2016/679) sekä soveltuvaa Suomen lainsäädäntöä. Osallistujilla on oikeus tarkastaa, oikaista tai pyytää henkilötietojensa poistamista milloin tahansa ennen aineiston anonymisointia.

Ennen analyysia ja raportointia kaikki aineisto anonymisoidaan siten, ettei yksittäisiä osallistujia voida tunnistaa. Alkuperäinen, anonymisoimaton aineisto poistetaan turvallisesti viimeistään 28.08.2026.

Rekisterinpitäjä: Kasperi Kuusisto, Haaga-Helian ammattikorkeakoulu

Tuloksista tiedottaminen: Opinnäytetyöraportti julkaistaan Theseus-verkkopalvelussa.

Rahoitus ja mahdolliset intressiristiriidat: Tutkimusta ei rahoiteta ulkopuolisesti. Tutkimus toteutetaan osana Haaga-Helian ammattikorkeakoulun opinnäytetyöprojektia. Tutkimukseen ei liity tiedossa olevia eturistiriitoja. Yhteistyö Zone Media Oy:n (SpeedZone) kanssa on rajattua eikä vaikuta tulosten analyysiin tai raportointiin.

Vapaaehtoisuus ja suostumuksen peruuttaminen: Tutkimukseen osallistuminen on täysin vapaaehtoista. Osallistuja voi peruuttaa suostumuksensa milloin tahansa haastattelun tai tehtäväpohjaisen

testauksen aikana ilman perusteluja, esimerkiksi keskeyttämällä istunnon. Mikäli osallistuja peruuttaa suostumuksensa ennen aineiston anonymisointia, hänen tietonsa poistetaan.

Huomioithan, että sen jälkeen kun aineisto on anonymisoitu ja sisällytetty analyysiin, yksittäisen osallistujan panosta ei ole enää mahdollista tunnistaa tai poistaa.

Appendix 2. Interview Questions and Task Script

INTERVIEW PHASE

1. What is your current occupation or main activity? (If you are a student, please specify your field of study and year.)
2. How often do you use web-based services such as online booking systems, banking, or e-commerce platforms?
3. How would you describe your general level of digital experience?
   (e.g., beginner, intermediate, advanced)
4. Have you previously signed up for a digital service or online platform?
5. What usually matters most to you when using a new digital service for the first time?
6. In your opinion, what makes a user interface easy or pleasant to use?
7. Can you describe a digital service you have enjoyed using? What made it positive?
8. Have you ever stopped using a service because the interface felt confusing or frustrating? Why?
9. How important is visual design (colors, layout, spacing) compared to functionality for you?
10. What usually causes frustration when using unfamiliar interface?
11. When using a new service, what helps you understand what to do first?
12. What kind of feedback do you expect from a system when you complete an action?

TEST PHASE

1. a) You need a new website for your business with a new web address.
   What do you think you would need in order to get it?
   b) What would you Google for to start this process?
2. Let’s say you found a potential service provider through Google (open SpeedZone website). Please try to find all the information on the page related to getting a website for yourself.
3. What options and solutions would you need regarding the website? Try to find this information on the Zone website.

4. What would you need in order to do it on your own, and what would you need a professional's help with regarding the website? Try to find this information on the Zone website.
5. How would you order a new web address for yourself, and what questions would you have about it? Try to find this information on the Zone website.
6. What information would you need to finalize the order to get a website for your business?
7. a) You need an email address using your new business name. What do you think you would need to get it, and what steps would you expect to take?
   b) How would you look for this solution? (You can Google it or go to the Zone website.)
8. What options and solutions would you need to get an email address using your new business name? Try to find this information on the Zone website.
9. What did you like about the experience of getting yourself a new website with a new web address?
   What did you find clear or easy?
   What felt unclear, confusing, or unnecessarily complicated?
10. What could have been better in that experience?
11. Have you seen a better solution somewhere, and what was different there?
12. On a scale of 1–5, how clear did you find this interface overall?
13. On a scale of 1–5, how confident did you feel using this website to complete the tasks?

Appendix 3. Full List of Improvement Ideas Sent to SpeedZone

Changes for the website

AI recommendations (Microsoft Copilot)

1. Make CTA buttons more visually engaging

Change: Enhance the "Start here" and "Start now" buttons with hover effects, subtle animations, or shadows to make them pop.

Hypothesis: This draws user attention to key actions, increasing click-through rates and reducing hesitation during decision-making.

2. Add customer testimonials or ratings

Change: Include short user reviews or star ratings next to hosting plans (e.g., "★★★★★ – Easy setup and fast support").

Hypothesis: Social proof increases credibility and can influence undecided visitors, especially first-time buyers comparing providers.

3. Add a “Recommended for…” label to each plan

Change: For example:

- ENTRY → “For personal sites and small projects”
- BASIC → “For small businesses”
- BUSINESS → “Most popular — for growing companies”
- PRO → “For high traffic or resource heavy sites”

Hypothesis: People often choose based on identity (“this is for someone like me”), not specs. This reduces decision paralysis.

4. Secondary CTA buttons in long sections

What to add: A floating or repeated CTA such as:

- “Choose your plan”
- “Start with WordPress”
- “Compare plans”

Where:

- After the domain search section
- Midway through the pricing grid
- At the bottom of the page

Why: Users scroll. CTAs shouldn’t live only at the top. Repeated CTAs increase the chance of action without forcing the user to scroll back up.

5. Feature comparison modal or expandable table

What to add: A “Compare plans” button that opens:

- A modal
- Or an accordion table

with detailed features (storage, email accounts, backups, databases, etc.)

Why: Right now, the plans look almost identical. Users need differentiation to feel confident choosing anything other than the cheapest option.

6. Trust badges near CTAs

What to add: Small icons or badges:

- “Daily backups included”
- “Servers in Finland”
- “Free SSL”
- “DDoS protection”

Why: These are strong selling points, but they’re hidden in text deeper in the site. Surfacing them near CTAs boosts trust at the moment of decision.

7. Micro FAQ under the pricing section

What to add: 4–6 collapsible questions:

- “Can I upgrade later?”
- “Is there a money back guarantee?”
- “How do I transfer my domain?”
- “Is WordPress included?”

Why: FAQs reduce uncertainty and prevent users from leaving the page to search for answers.

8. Exit intent CTA or reassurance

What to add: A subtle banner when the user scrolls up or moves toward closing the tab:

- “Not sure which plan to choose? Try ENTRY — upgrade anytime.”

Why: Reduces abandonment by offering a low risk next step.

Theory based changes

Overall, the pages already follow common theoretical rules and frameworks well. There are a few improvements that can be made:

1. **Missing micro-feedback on interactive elements**

   Buttons and interactive components lack hover states or micro-interactions. This reduces perceived responsiveness and makes it harder for users to understand what is clickable. (Nielsen’s Heuristic 1: Visibility of system status, Norman’s Principles: Feedback)

   Adding hover states, focus states, and subtle animations to buttons, links, and cards could make users feel more confident interacting with the interface, leading to faster task completion, fewer mis-clicks and increased perception of quality.

2. **No page-specific navigation on long pages**

Long pages require scrolling without a local navigation menu or sticky anchor links. Users may lose their sense of position on the page. (Nielsen's Heuristic 1: Visibility of system status)

Adding a page-level navigation component could help users jump between sections more easily, which should in theory reduce scrolling fatigue, improve findability of information and increase engagement with deeper content. (This is probably too big of an element to implement now as we spoke)

3. **Accordion specification section lacks clarity and context**

   On the webhotel page, the specification accordion section has no title, so users may not immediately understand its purpose. The spec sheets do not display the plan names inside the accordion content, and one column is gray without explanation, which may confuse users. (Nielsen's Heuristic 6: Recognition rather than recall)

   Adding a clear title above the accordion (something like "Detailed Plan Specifications", "Yksityiskohtaiset suunnitelmien ominaisuudet"), include the plan names inside each accordion panel and add an explanation for the gray column (or remove it if is unintentional).

   If the accordion section is labeled clearly and plan names are repeated inside the content, users will not need to remember which plan they are comparing and this should reduce cognitive load, improve comparison accuracy and increase confidence when selecting a plan.

4. **"What is a webhotel?" section is not easily discoverable for new users**

   The educational section explaining "What is a web hosting?" is useful but not directly linked from the top of the page. New users may not understand hosting terminology and may feel uncertain. (ISO 9241-210: Human-centered design, Inclusivity and beginner friendly UX)

   Adding a button or link near the top of the page or near the plan cards (something like "New to hosting? Learn what a webhotel is") could help new users. In theory, when new users are guided to the explanatory section, they will better understand the product offering, which should in return reduce confusion, increase trust and improve conversion rates for first-time buyers