



# **Applying usability testing to improve customer experience with online shopping from Finnish grocery trade market: A case of K-market webshop**

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<p>Abstract:</p> <p>This Bachelor thesis is about the Kesko group's commercial website. Kesko Group is the largest publicly traded company in Finland. Their operations include the supermarket trade, the construction and technology trade, and the vehicle trade.</p> <p>This thesis' stated purpose is to assess the usability of Kesko's e-commerce website utilizing a few specific usability testing approaches. The evaluation is likely to expose the website's strengths and previously unknown shortcomings. Following that, discovered usability concerns provide recommendations for future website enhancement.</p> <p>The researcher's objective of assessing the usability of the Kesko commercial website and the research significance are covered in the introductory chapter's study aim. Two sub-questions proposed to support this goal: What is the current usability of K-market's web shop? How do users react with offered user interface and the website's design?</p> <p>The theoretical framework of the thesis covers usability theory, testing, and relevant attributes including user experience, which are elaborated by visualized models. These ideas explain the significance and goal of usability testing and offer the explanation of the usability methodologies used in the study.</p> <p>The methodology section of the thesis is rooted in qualitative research, and two usability testing methodologies, heuristic evaluation and thinking aloud testing, are used to obtain user insights, which are supplemented by post-test interviews. The first approach means a website evaluation done by the thesis author, and the second way implies testing conducted with by five volunteer respondents.</p> <p>The concept of website usability is explained to some degree based on obtained data and research results, as well as the author's evaluation. The website's descriptive suggestions for development were given and discussed. Findings might be considered for future website development and adjustments.</p>	

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# 1 INTRODUCTION

According to Yle News, in 2010, due to the inconvenience, shopping online groceries was not invested by the large Finnish stores and was supposed not to attract the purchasing demand of many Finns (Yle, 2010). These were reasoned by discouragement of added product prices and the higher costs of transportation and long distance. In the 2010s, Ilkka Alarotu, Director of the S-Group Grocery Chain Management, stated “The online grocery sales for the whole country were probably on the same scale as a small corner shop,” (Helsinki Times, 2012). Only three years later, the client base of the two largest supermarket chains, S-group and Kesko group, has grown significantly in relation to digital groceries in 2015. When S Group claimed a 50% increase in online grocery sales in the first quarter of the year, Kesko increased the number of stores offering the online service from 13 to 26 (Yle, 2015). The rising trend of the online grocery industry was maintained in the following years, as the Kesko company reported a 75% increase in online sales in 2018 (Kesko, 2018). According to the Finnish Commerce Federation, because of the COVID-19 pandemic, both habitual uses of various digital devices and social media have changed (Kauppa, 2020). “Digital buying has also changed, both in terms of the devices used and in terms of the products bought” (Kauppa, 2020).

The Corona virus was responsible for forcing customers to shift their purchase habits away from traditional shopping techniques and toward digital ones such as internet shopping. "While the use of online grocery stores will decline following the corona-virus crisis, there is no going back to the way things were. Online grocery shopping will grow increasingly prevalent in the major cities and towns in particular," claimed Jaana Kurjenoja, Chief Economist, Finnish Commerce Federation (Kauppa, 2020). According to the Finnish Commerce Federation, 60 percent of online orders placed in Finland in 2020 were transported from Finland (Kauppa, 2020). Regarding the grocery purchases per user, they were reported mainly from two sites including K-ruoka.fi and Foodie.fi. On the other hand, Oda, the Norwegian chain of food online stores, has quietly got their official operation running in Finland in the beginning of this year 2022. They focus on exclusively online service of delivery. Oda is predicted to be direct competitor of K-Group and S-Group in online grocery market due to its highly automated logistics and affordable price (Yle, 2022). Despite the small market size of online grocery delivery

compared to other countries like the UK and Sweden, Finland is still highly evaluated due to the potential growth and the estimation of grocery-trading value reaching more than 20 billion euros (Yle, 2022). Therefore, there are actions that should be taken by the big player, K-Group, to maintain this accelerated increase in their online grocery stores and compete against competitors. To achieve such increases in online business, it is necessary for corporations like K-market to focus on the development and success of their web shops. One of factors affecting those sites' success is their usability. A website is considered as a good one if it could communicate to users immediately the reason of its existence and the way it could satisfy users' given demand (Martinello, 2021). A study made by Marketing Sherpa showed the fact that the more frequent evaluation of website usability is conducted, the faster companies' businesses will grow (Burstein, 2015).

## **1.1 Problem statement**

Website usability is critical when designing a website for a certain business goal due to its correlation with company website's conversion rates (Blacknovadesigns, 2017). According to a Siegel+Gale study titled "Simplicity - The World's simplest Companies 2018-2019," companies with "simplicity" of use outperformed the competition. Simplicity thereby fosters greater trust and deepens commitment. People are also more inclined to promote a brand that provides simplified experiences. Consequently, businesses that embrace simplicity earn monetary benefits (Siegel+Gale, 2019). The study's conclusion underlined the importance of usability by reporting a consistent improvement in customer loyalty percentage from 64% in 2018 to 76% now, which indirectly increase the number of potential customers through customer's reference (Siegel+Gale, 2022). Additionally, it leaves a positive impression on users who could later become consumers of company in the future. The website easy to browse facilitate visitors locating what they are looking for easily. In contrast, visitors might redirect to another site that is designed with the ease of use and provides what they are in need (Dreamkatcha, 2021). Usability is more meaningful than ever with ecommerce websites. Users would rather access a website that is usable to them than a website with a slick design that offers them fascinating and sophisticated solutions. Eventually, elements that make people feel comfortable, easy, clear, and intriguing to use drive them to return and to become regular clients (Chorny, 2021). The customer's propensity of looking for



products quickly gets more problematic when he or she does online grocery shopping. Then, to fulfill user experience, simple and direct navigation, and usability elements such as favorite goods, suggested products, and stored shopping lists are heavily highlighted (Feld-Jakobsen, 2021).

Given the significance of usability, it is also vital to analyze how useful a website is so that relevant solutions for ensuring a degree of usability can be proposed and implemented appropriately. A variety of reasonings are offered to provide comprehensive opinions about whether the firm should perform testing. Usability testing helps firms better understand their consumers' thoughts and actions, interests, desires, and motives (YUJ Designs, 2020). It enables companies and researchers to discover how their consumers interact with their products or services, which is important if a firm wants to enhance customer acquisition and fulfillment (Davies, 2020). Such interaction of users is collected from feedbacks of users during the testing process (Fay, 2022). Furthermore, usability testing might minimize consumer unhappiness and website abandonment. Behaviorally, few users complain to the firm. According to expert data, 96% of dissatisfied users do not complain anything and 91% of this group quietly quit your website and never return (Müürsoo, 2022).

E-commerce has grown in popularity as a genuine option for Finns, whether for shopping, food, or other things. According to the Finnish Commerce Federation's 2021 report, online retail commerce increased at a rate of 22%. Although S-group and K-group continue to dominate the retail grocery trade in Finland, increased interest in e-commerce has pressured them to keep their share and brand awareness in their own e-commerce platforms in to keep consumer satisfaction in the online market compared to rivals (Lloydsbanktrade, 2022). Concerning Kesko Group's grocery trade strategy, the firm expects to continue its leading position in the online grocery market. One of the company's strategic targets, in particular, is to provide a seamless purchasing experience for their consumers using an omnichannel approach (Kesko, 2022).

As previously stated, the importance of usability and usability testing may increase consumer happiness and experience with online buying. Meanwhile, the Kesko Group is committed to providing a positive purchasing experience for their customers through both

their retail and online channels. Thus, the researcher desires to incorporate all of them into this thesis to comprehend how accessible K' e-commerce website is using a couple determined usability testing methods.

## **1.2 Aim of study**

The thesis's purposes are to research and assess the current level of usability of the K-market web shop. The thesis' target consumers are foreign students who live, study, or work in Finland and are willing to buy online from a grocery trade market. The ideas for improving the usability of K web shop are then made.

There are unanswered questions that need to be addressed in the thesis:

- What is the current usability of K-market's web shop?
- How do users react with offered user interface and the website's design?

## **1.3 Demarcation**

The theoretical part of the thesis will encompass usability concepts such as usability definitions, usability-related models, and their components. Also, before to doing usability testing, the theory will be explained. The thesis will mention usability-testing analyses of a commercial website in Finland, although only on a broad level. The deeper investigation will thereafter be limited to the case study of the K-market. As a result, evaluation of existing website experience, user polling, and recommendation will be incorporated and analyzed using the provided theoretical framework. To some extent, the analysis and recommendations are based on a few subjective points of view, therefore there are concealed mistakes in the study that cannot be precisely determined.

## **2 THEORETICAL FRAMEWORK**

There are frameworks and terminologies in terms of the usability given, which allows thesis author to conduct the usability testing with K-market web shop based on theoretical premises stated earlier. This chapter is therefore divided into three parts. Theoretical overview of user experience is firstly introduced as usability is an element and have a relationship with it. Terminologies and models of usability and website usability are the second part of this chapter. The final part then presents theories of usability testing.

### **2.1 User experience**

Don Norman, the term's creator, believes that user experience integrates all phases of a solution or service from initial intents to final reflections, from first usage through help, support, and maintenance, and permits them to interact efficiently (The Interaction Design Foundation, n.d.).

Technically, user experience is referred the interaction between user's subjective experience and technological support. This interaction is to reach a goal or objective outcome through some performed function and task. User and technology are two elements directly affecting user experience. These elements' combination aims to increase experience to a higher level. User experience, hence, is applied to rationalize, quantify, and assess to operate business efficiently, get user related to company's culture, and appealed by aesthetics (Fishbeck, n.d.).

A good user experience, from the point of view of Don Norman and Jakob Nielsen, must address some concrete requirements of customers without making them bothered or fussed. Those experiences should be attached to elegance and simplicity which generate added fulfilment for customers once they purchase or use a product. To develop a quality-based user experience, seamless emerging between experience and services' disciplines like interface design, graphical, and marketing design should be established (Norman and Nielsen, n.d.).

The User Experience Honeycomb model (Figure 1) illustrates the theory of user experience proposed by Peter Morville, an information architect, and a designer, who has had extensive experiences in this field since 1994. Morville identifies seven facets of user experience design in this model. Each element is compared to a sweet spot that needs to connect firmly with others. The combination of different areas in user experience is alike. The User Experience Honeycomb facilitates designers' finding out the answers for questions such as "Is it more important for your web site to be desirable or accessible? How about usable or credible?". Additionally, every facet can be measured individually and more things beyond conventional boundaries are explored (Morville, 2004).



Figure 1. User Experience Honeycomb (Morville, 2004)

Seven facets represent seven factors required to create an accomplished user experience in the Honeycomb model. Namely, they are 'usable, findable, valuable, useful, credible, and accessible, and desirable'. The definitions of these factors have been offered by the author of this model, Morville and elaborated by well-known designers in the same industry.

Usability refers 'usable' in the model. This element has been known widely not only as a sole measure but also an irreplaceable one of user experience. It relates the ease of use and how users' journeys are guided when users visit a website and access its interface (Morville, 2004). The learning curve gone by them, hence, needs to be quick and less painful as it can (Wesolko, 2016).

‘Findable’ is a facet in which a website should be designed in a way that allows users navigate back and forth among their sites and find target object’ location easily (Morville, 2004). Controls and contents should be arranged logically so that there is no difficulty happening during searching process of user (Dillon, 2020). The loading time of a website is supposed to affect responsive feeling of customers (Dillon, 2020).

‘Useful’, according to Morville’s concept, is to create either a useful system or a product that should be highlighted by the creativity and courage of each designer (Morville, 2004). Every website exists due to its own purposes that should meet some concrete requirements of target customer (Wesolko, 2016).

Credibility, also known as ‘Credible’ in the model, reflects how trustworthy and reliable users find whenever they visit a website (Morville, 2004). Credible websites help companies reinforce their brand image and indirectly influence the user’s loyalty (Dillon, 2020).

‘Accessible’ implicates the accessibility of a website. Thereby, Morville stressed that accessible products or systems are the ones all user types, even the disabled, must be able to access to (Morville, 2004).

‘Desirable’ facet means that visual elements included in a product, or a system should satisfy users’ aesthetic desirability and fulfill criteria regarding the design of users’ emotions (Morville, 2004). In addition to attractiveness and the ease of translation, such visual elements are considered to form a good design if it ensures the minimalism but high centrality (Wesolko, 2016).

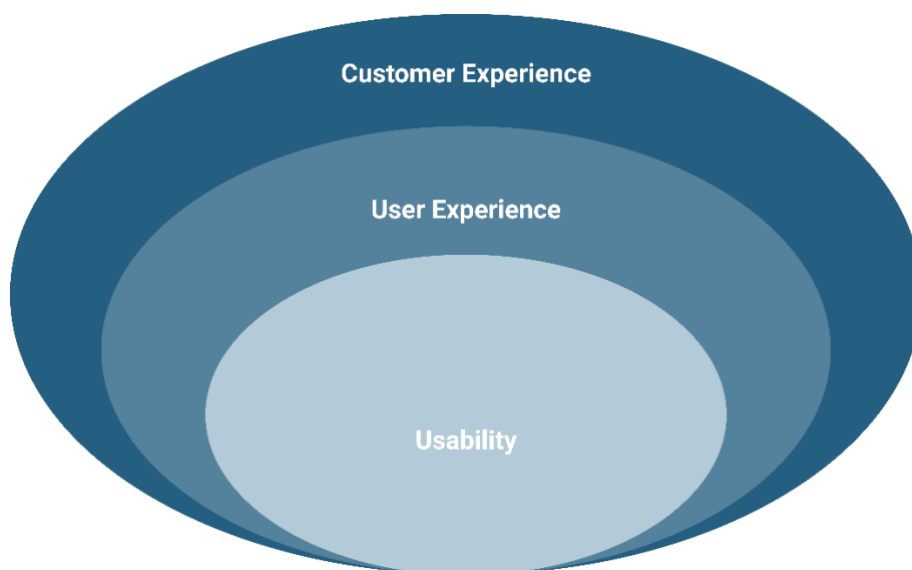
Finally, the ‘valuable’ quality which is put at the heart of the Honeycomb model partly conveys its meaning. Based on six previous facets, a website with valuable information is an ultimate goal especially concerned by users.

## 2.2 Usability and website usability

Usability is a qualitative metric that assesses the ease of use of interfaces. The term "usability" can also refer to design ideas for improving usability (Nielsen, 2012).

Usability refers to the ease with which objects such as software and Web applications may be used to achieve desired goals effectively and efficiently. Usability measures the amount of effort required to use a user interface. n.d. (Techopedia)

There are misunderstandings between the concepts of user experience and usability. They are, nevertheless, distinct from one another. If usability is concerned with effectiveness, and fulfilment in accomplishing a task or a goal, user experience is involved in experience-related elements of website interaction. It is believed that the notion of user experience encompasses the concept of usability (Figure 2).



*Figure 2. The connection of user experience and usability concepts (Meduri Jun 8, 2021)*

Regardless of its distinction, the brand experience is not considered attractive in the absence of the interrelationship between user experience and usability. Customers are unlikely to be satisfied if their demands for simplicity of use or attractiveness are not addressed (Figure 3).



Figure 3. The association of user experience and usability elements (UX 4Sight, 2022)

When it comes to the widely acknowledged usability theories, theories are given by Nielsen and Krug are two of the most popular ones applied to analyze the usability of a website. In addition to these theories, Whitney Quesenbery, the former president of the Usability Professionals’s Association and Usability and UX expert, proposed the theory of more extensive usability criteria that are also being applied widely at the present. Therefore, they are described in detail in this theory chapter.

### 2.2.1 Nielsen theory

In 1993, a concept of usability was given by Jakob Nielsen, principal of the Nielsen Norman Group where there are leaders excelling in researching user experience. “Usability is not a single, one-dimensional property of a user interface. Usability has multiple components and traditionally is associated with five usability attributes: learnability, efficiency, memorability, errors, and satisfaction” (Nielsen, 1993, 26-37). These five attributes are illustrated in the Figure 4.

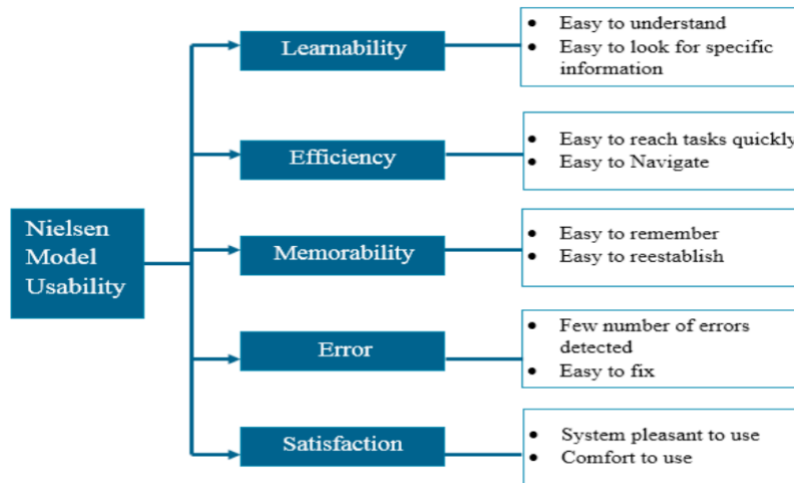


Figure 4. Nielsen's Usability model (Benmoussa et al., 2019)

Learnability refers to how simple it is for new users to begin learning and become acquainted with a user interface. Nielsen (1993, pp. 26-37). In other words, "How simple is it for users to complete fundamental activities the first time they meet the design?" (Nielsen, 2012)

The term "efficiency of use" refers to the amount of time it takes users to complete their activities, beginning with design learning and ending with practice with it. Nielsen (2012)

Memorability relates to a user's ability to remember information, particularly when they have not accessed an interface design in a long time. It refers to how proficiently they are acquainted with such design. Nielsen (2012).

The system's mistake rate is computed by measuring the number of such actions done by users while completing a certain job, which means error (Nielsen, 1993, 26-37).

Satisfaction is how users feel about the design of the website and want to connect with it. The more people appreciate it, the more likely they are to use it. Nielsen (1993, pp. 26-37).

### 2.2.2 Krug theory

Krug's usability ideas and standards, like Nielsen's, have been widely disseminated and



used as a previous usability consultant for organizations such as Bloom-berg.com and Apple. His best-known novel is "Don't Make Me Think," which was published in 2005. The purpose of the book is to empower readers to act as usability experts, discover potential solutions, and build usable websites. Three fundamental usability standards are addressed throughout the text.

The first rule is “Don’t make me think” in which he emphasized that a website’s structure should be designed with easy self-explanation, simplicity, and intuition. Such structure is aligned with easy navigation, which helps users access website’s information conveniently and comprehend the operation and structure of its better. This rule is supposed to reduce wasting time users spend thinking of the unnecessary actions with website (Krug 2014, 10-19).

Krug highlighted in the second rule that the click should be unthinking and clear. It is ideal to reduce the number of clicks necessary to access concretely desired information or actions. The goal of this guideline is to allow users to freely navigate the website without exerting too much effort or being lost in the website's traffic (Krug 2014, 42-47).

The third usability’s law Krug has proposed is “Omit needless words”. It has been recommended that half of the words on each web page should be removed. Though some of pages like NYTimes.com, according to Krug, were unnecessary to have their content shortened, it had better to eliminate needless words from pages but keep meaning value unchanged. Krug explained that the removal of meaningless words could bring several benefits. It would lead to the decrease in noise level of website accessibility, the highlight of notable information, and quick glance of web pages with shortened time (Krug 2014, 48-53).

### **2.2.3 Quesenbery theory**

Fundamentally, later usability theories were derived from the early usability concept mentioned in the standard of ISO 9241. Particularly, “The extent to which a product can be used by specified users to achieve specified goals, with effectiveness, efficiency and satisfaction in a specified context of use” (ISO, 2010).

From Quesenbery's standpoint, she supposed that usability's definition as 'easy-to-use' was not informative and extensive enough to signify the entire implication and function that usability should have contained. Alternatively, her proposition of five usability elements consisting of 'efficient, effective, easy to learn, error tolerant, and engaging' was to generalize users' demand, to set object aims, and to select evaluation methods regarding usability in a better way (Quesenbery, 2001). Figure 5 illustrates the 5Es mentioned in Quesenbery's model.

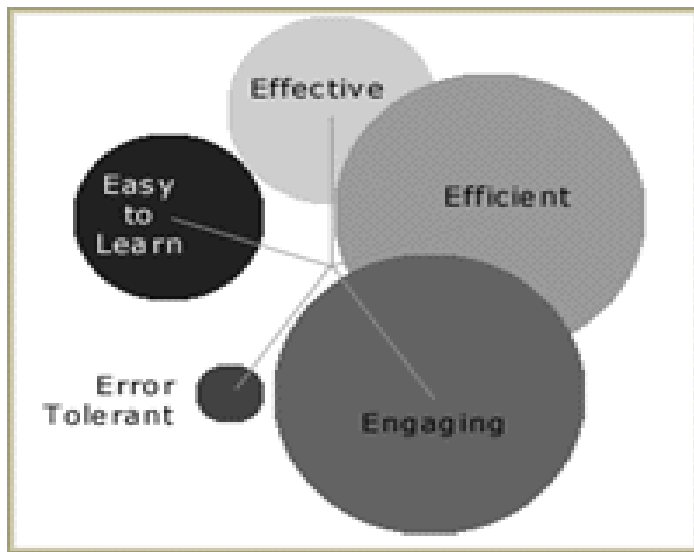


Figure 5. Quesenbery's usability model (Wqusability, n.d.)

'Efficient' from Quesenbery's perspective refers the speed of users' task completion when they use either a product or service. These characteristic measures the anticipated number of keystrokes and clicks that are necessary for users to reach their goals and considers the reduction of these steps if they are needless. Components in response to the design of navigation including links, useful keyboard shortcuts, menus, and other navigation buttons can cause an influence on efficient usability. Along with navigation's impact, the awareness of users' working preference can augment the usability's efficiency (Quesenbery, 2001).

'Effective' and 'efficient' are mistakenly comprehended that they could be defined with analogous meanings. Each of them actually evokes their own one but has a close correlation to each other. While efficiency relies more on the speed of task completion,

effectiveness relies on the accuracy of task completion to get user's objective achieved. Effectiveness is determined as the first aim of task requirement as opposed to efficiency. User support with interface which relates the comprehensive arrangement of options provided to users is supposed to affect usability's effectiveness. Users' better task performances with limited problems are results of informative interfaces that are well-designed (Quesenbery, 2001).

The concept of learnability is primarily given with similarity of other theories in which the element is mainly aligned with the ease of user's learning. As functionality, work scopes, and workflow can be varied consecutively with adaptability-related requirements of users, the interface's ease of learning, hence, needs to be updated continuously along with those changes, which encompasses just-in-time and knowledge domain-based trainings. Moreover, learnability of interaction patterns should be associated with the effortless predictability. This complementary factor enables users to identify information's location and to learn new functions quickly (Quesenbery, 2001).

The following element in five Es of usability is error tolerance. According to Quesenbery, it is unlikely to have errors removed completely from products or systems. The occurrence of errors is also caused by the fact that designer's prediction cannot cover every single problem happening during users' interaction process. That is the reason why error messages should be entailed readily in interface design. These error messages are to report apparent problem description and provide precautionary links for correcting unexpected issues. To prevent taken actions against inaccuracy, invalidity, and irreversibility, there are various remedies recommended for distinct cases. Solutions for incorrect actions can be taken as an example. Specifically, used language should be self-explanatory and technical jargon should be avoided as much as possible (Quesenbery, 2001).

The last component revealed is 'engaging'. Engagement refers how interface is capable of resonating user's delightfulness and satisfaction in use. Interface's engagement relies heavily on aspects of visual design such as function style, number style, color pallet, and other visual elements. However, the formation of engaging interface is decided by more than a sole contribution of visual elements. It is also affected by the appropriation of

website's layout, typography, and more interface-related factors. Interface's design is ultimate to satisfy target users' demand and encourage them to engage in designed interface (Quesenbery, 2001).

## **2.3 Usability testing**

Usability testing is defined as a process in which several people will be chosen to participate the test. Those people are responsible for representing a group of target audience aimed by the test and the process is to determine how usable a product is according to some of concretely required standards (Rubin and Chisnell, 2008).

Usability testing is meant to examine the ease of use of design with typical users arranged into a specific group. This kind of testing is conducted to observe users' effort concerning task completion and can be applied to evaluate various designs (The Interaction Design Foundation, n.d.).

According to Nielsen Norman Group, no matter what the goal of study is, usability testing always ensures the problem of product or service's design identified. Then, the design's improvement will be done based on discovered opportunities. Additionally, information of users' preference as well as behaviour can be collected during the testing process. Facilitators and participants are the ones who will present themselves in the session of usability testing. Facilitators are in charge of giving tasks to their participants. The given tasks must be close to activities which participants probably do in daily life. Once those tasks start being run, it is necessary for facilitators to keep an eye on behaviour of participants throughout the testing process and receive responded feedbacks from them after the tasks are finished. Follow-up questions can be asked in ongoing process to get more details acquired from participant (Moran, 2019).

### **2.3.1 Heuristic Evaluation**

Heuristic assessment refers to a method in which specialists apply a set of rules to evaluate and report on the usability of user interfaces in various ways (The Interaction Design Foundation, n.d.). This thesis focuses on the theoretical explanation of 10 usability criteria

developed in 1990 with the help of Jakob Nielsen and Rolf Molich. Since 1994, a new version 10 heuristics later has been issued.

Nielsen's first heuristic on his list of ten is the transparency of system status. Nielsen underlined the importance of system status, which pertains to the way it is properly presented and updated by users so that constructive comments is obtained in a specified duration (Harley, 2018). Once the system status update functions properly and users find the website more predictable, they define further actions more easily, reaffirm their trust and confidence with the website (Aela, 2022).

The second heuristic suggests that a connection be formed between the real world and the system. Designers should consider design components like graphics, fonts, and icons being recognizable to individuals in daily life and not causing a mislead of those elements' function (Devazya, 2019).

The third heuristic of user control and freedom is that "redo" and "undo" tools be accessible throughout user action or task execution in case users make mistakes and wish to modify something about them. An obvious 'exit' gives consumers control over the system and provide them the right to abandon an undesirable activity without having to undergo a lengthy procedure, or to continue unpleasant task with unavailable return option (@CSW, 2021).

The fourth one Nielsen suggests is consistent maintenance and standard compliance. Users, in particular, are hesitant to deal with words, situations, or acts abnormal from their usual perspectives. As a result, it is advised that websites be developed in accordance with familiar norms that easily resonate with user behaviour when using the website. Furthermore, website design that follows to some common principles and uniformity diminishes distraction notably. The website's consistency should be guaranteed internally and externally (Krause, 2021).

The fifth heuristic stated in the list is error avoidance. In this situation, errors are classified into either mistakes or slips. While slips are faults triggered by the user's lack of attention, mistakes are those produced by a conflict between the design and the user's perception.

As a result of this heuristic, it follows that websites should be created with the probability of error in consideration. Users can commit fewer errors or acquire error warnings from the site (Naveed, 2022).

The sixth heuristic emphasizes recognition preference to ease users' memory load. It is necessary to make alternatives and actions components obvious since users prefer noticing something to memorizing it. Informative prompts should be given to facilitate users visiting the site without learning the system's operations or functionalities (Aela, 2022).

The seventh criterion is about changeability and accessibility. Concretely, interface should be designed to satisfy both novice and advanced users' demand. The interface should be compatible with many techniques applied for the same activity, which is dynamic according to the user's preferences. Likewise, accelerators are extra services that help experts but do not disturb novice users (Laubheimer, 2020).

The eighth heuristic suggests that website design should be examined with aestheticism and minimalism simultaneously. In general, minimalism in interface design is intended to optimize usefulness for the site by making it simpler for visitors to focus on relevant and vital information due to its ease of visibility. However, components with attractive graphics are also required because they are more likely to impress and attract people. This also improves the brand's identity (Fessenden, 2021).

The ninth heuristic requires user assistance in identifying, evaluating, and restoring from problems. Though mistakes should be avoided as much as possible, some are unpreventable. There should be a plan in case an issue occurs. In that case, the error message should be tailored with relevant terminology to help consumers to understand their problems and discover a solution to manage with the error (Devazya, 2018).

The final heuristic on the list is the website's help and documentation pages. Users are not interested in reading instructions; however, they are reluctant do it on occasion. Designers, then, must anticipate if users require assistance and present appropriate

information to assist them in achieving their goal. Support documentation should be succinct, manifest, and possible to skim (Joyce, 2020).

### **2.3.2 Thinking Aloud Protocol**

Thinking aloud is a frequently used approach for usability testing. Specifically, in this testing approach, users are asked to complete a set number of tasks without interruption. At the same time, they must speak out their ideas, what they perceive, why they do actions, and how they feel in relation to the task requirement during the testing process (Panagiotidi, 2021).

The thinking aloud method is claimed to be applicable to any digital product, such as a mobile application or a commercial website, because these kinds of product all need to be updated and enhanced on a regular basis to maintain usability and provide a pleasing user experience (Fanetti, 2021).

The method of thinking aloud is split into two minor subcategories, which are retrospective think aloud and concurrent think aloud. Essentially, both are to examine participant insight through verbalization (Tobii Pro, 2015). The difference between the two is the interruption that occurs throughout the testing procedure. In fact, the concurrent approach connects the prompts supplied by observers to encourage evaluators to generate further ideas for the evaluated product (Usability, 2014). In contrast, the observer in the retrospective technique seeks to the clarification of guidelines and task requirements prior to the exam. Then, there is a convenience left for the evaluator so that they are not influenced by external influences and may give their opinions smoothly. When the testing session is finished, the observer could request the evaluator's recall (Sauro & Lewis, 2022).

Because of its low cost, persuasiveness, and adaptability, the think aloud approach is commonly included in usability research. It can be accessed on a variety of digital platforms and is not subject to any rigid restrictions. It can also provide an acknowledged degree of trustworthiness for academic and professional adoption (Netto, 2019). Nonetheless, it is followed by several significant flaws. The evaluator's verbalization is

greatly overstated rather than identifying objective measures. Furthermore, assessors might provide replies based on their assumptions instead of instant cognition or emotion. They can induce behavioural bias, which leads to outcome bias (Gov, 2021).



### **3 METHODOLOGY**

In the continuation of the theoretical framework chapter, it is vital to identify methods that are best suited for accomplishing the principal goal and allowing for the collection of pertinent, significant data. This thesis chapter will describe the research methodologies employed to acquire data, seek answers to the proposed research questions, and attain the thesis's objectives.

#### **3.1 Choice of method**

To conduct usability testing, either qualitative or quantitative methods can be used to achieve objective research goals. While question types of quantity are to gather interpretive, exploratory, or predictive information, those of quality are more relevant to collecting data which are correlative, descriptive, or comparative (Rudat, 2017). Qualitative methods are intentionally chosen for researching this thesis due to some reasons. Firstly, the outcomes of research must facilitate author addressing research questions and research aims presented in the introduction chapter. Then, usability, events, or things could be comprehended fully when they are viewed in context, which is reflected clearly in qualitative study. Correspondents in qualitative studies, hence, are encouraged to stand out for themselves and to share their opinions through words and other acts (McLeod, 2019). Another reason added to these qualitative methods is the problem of user recruitment for testing. Compared to quantitative methods, qualitative ones require less the number of participants (IDA Northern Ohio, 2019). Concretely, those questions begin with question words like “What” and “How” being more compatible with the use of qualitative methods.

Based on the analysis of Nielsen’s UX specialist, Christian Rohrer in terms of research methods, a holistic picture of user research methods is provided (Figure 6). The figure 6 illustrates variety of methods applied into qualitative studies. According to the figure 6, usability testing and interviews are classified into methods of qualitative measurement. They allow tester to discover and evaluate data regarding dimensions of users’ behaviors and attitudes by direct observation. It is supposed that to conduct usability testing method, testers should create product’s scripted use if they want to collect necessary data.

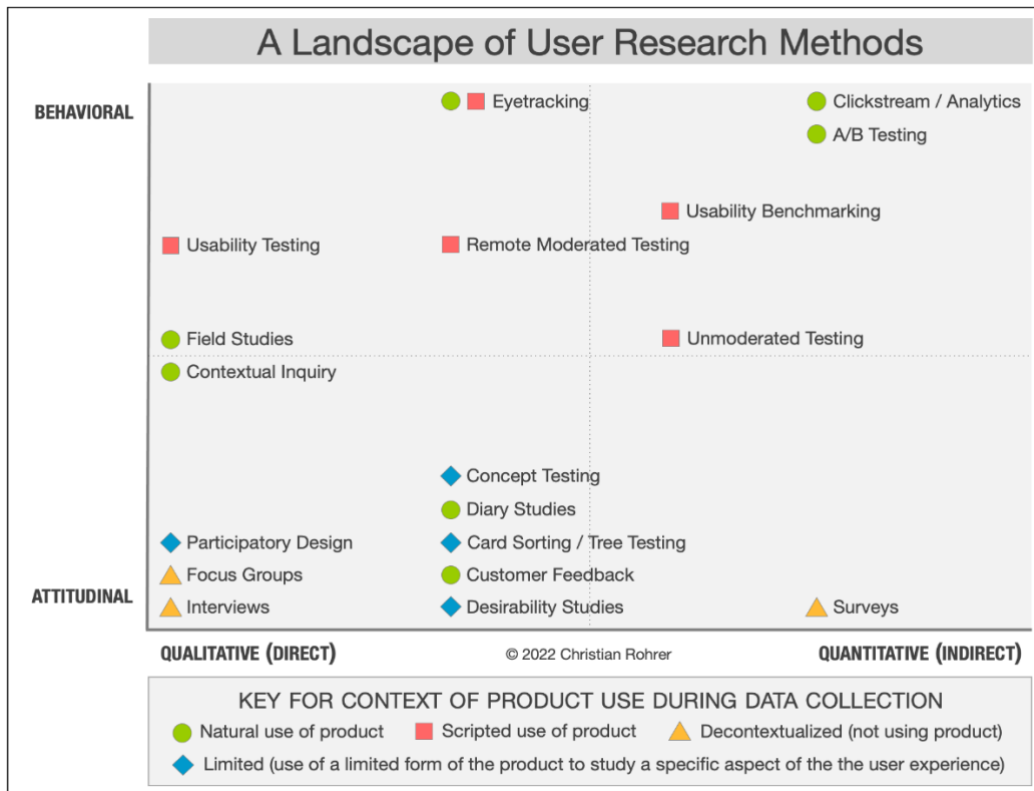


Figure 6. A Landscape of User Research Methods (Rohrer, 2022)

In accordance with research questions and thesis aims given in the previous chapter, the qualitative is considered the primary approach for this study. In particular, there are two methodologies that are known as qualitative methods and could be used for usability testing. They are heuristic evaluation and thinking aloud test combined with interview.

This method, hence, is applied to investigate the responses of target user segment toward K-market web shop, collect feedback from them, and discover usability problems from received feedbacks. Concerning the engagement of research ethics, the thesis is guaranteed with ethical aspects including the respondent consent based on informed voluntary, the respect of confidentiality, privacy, and anonymity (Roberts and Allen, 2015). Respondents in study must be guaranteed that their information and replies will not be shared with any organization unrelated to the research. This should be asserted while recruiting and moderating process (Mincey, 2020). Following ethical aspects are aligned strictly with the EU GDPR (General Data Protection Regulation) in which informed consent refers the recognition of data subject about thesis’s author identity,

intentionally conducted activities, data processing's aim and respondent's right of getting their consent drawn (GDPR, n.d.).

### 3.2 Choice of respondents

Generally, regarding the usability testing, Jakob Nielsen agreed with the fact that the percentage of discovered usability problem from usability research has shown that as long as the number of evaluators are not exceeded an insignificant threshold, more evaluators participate, the higher probability of usability problems is found (Figure 7).

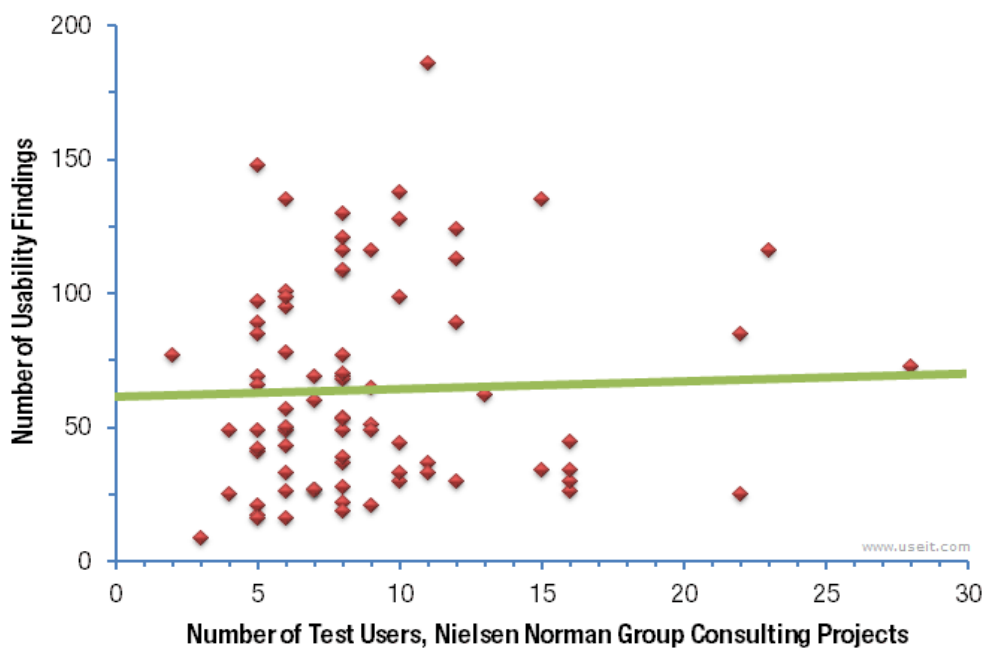


Figure 7. The correlation between number of usability findings and numbers of Test user (Nielsen, 2012)

In addition to that, other illustrations proposed by Faulkner and Miklos Philip, a UX designer with 18 years of experience, supported for the argument (Figure 8 and Figure 9).

Number of Participants	Minimum % Found	Mean % Found
5	55	85.55
10	82	94.686
15	90	97.050
20	95	98.4
30	97	99.0
40	98	99.6
50	98	100

Figure 8. Numbers of problems found relative to number of participants (Faulkner, 2003)

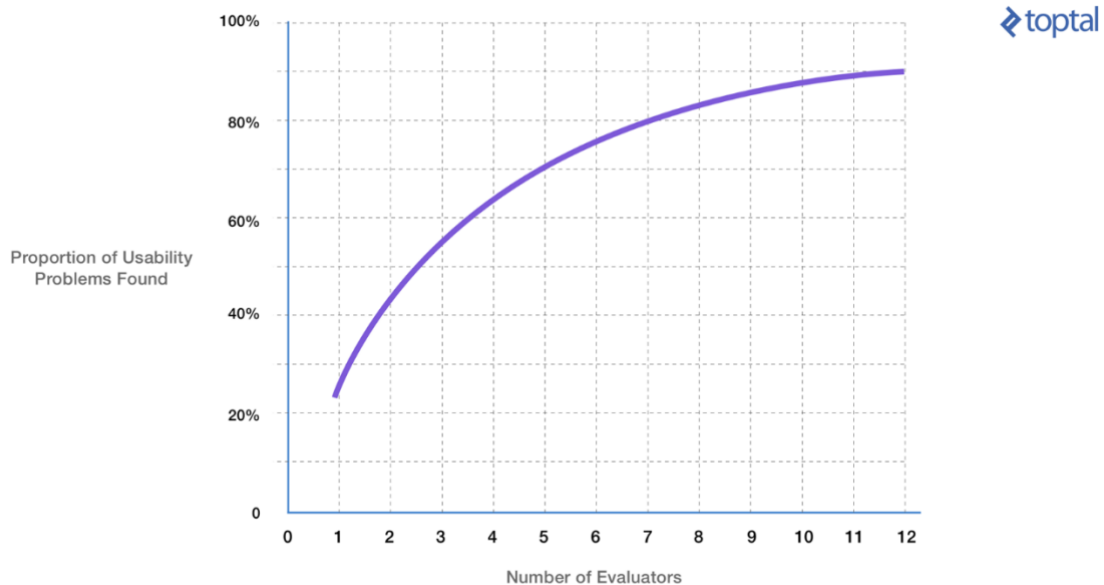


Figure 9. The correlation between Proportion of Usability Problems Found and Number of Evaluators (Philips, 2017)

Nevertheless, it is supposed that there is no totally ideal selection or common standard of number of research participant which can be applicable for all usability testing methods (M. Six and Macefield, 2016). Alternatively, the recommendation given by Macefield could be minded. Thereby, the purposes of study could be divided into two categories which are problem discovery study and comparative one (Macefield, 2009). This division varied the recruitment of participant groups (Figure 10).

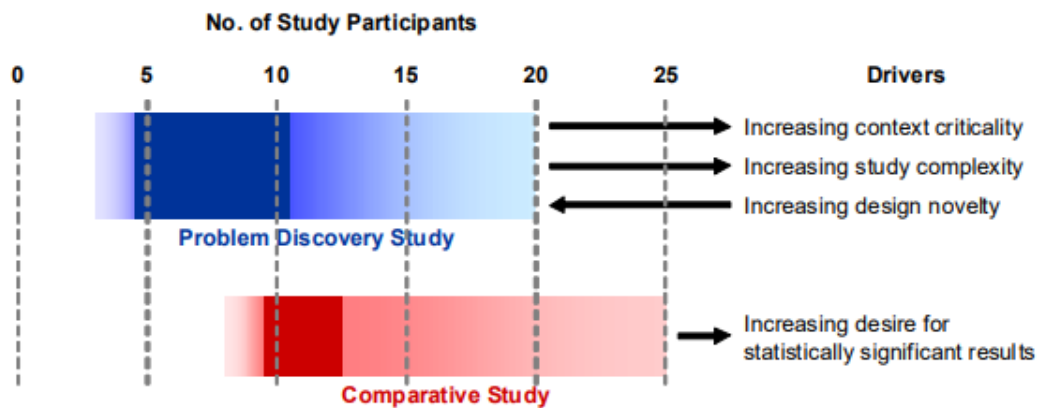


Figure 10. The number of participants for problem-discovery and comparative studies (Macefield, 2009)

The aim of problem discovery is close to the aim of qualitative method applied in the thesis, which requires a smaller number of test users compared to quantitative method used for statistical purpose. Also, the objective of usability testing is primarily to gather necessary information of users' insights for design improvement (Nielsen, 2012). As a result, only a few test users are competent enough to deliver significant insights.

K-market is a leading brand with thousands of customers. Because K-ruoka.fi is a public website that is accessible to anybody interested in online grocery shopping, it is understandable that the website receives a large number of visits. Nonetheless, it is also an impossible chore for the observer incentive to test and poll all of these people. On In this thesis, there is one participant associating with the heuristic evaluation. The author is also the participant attending the evaluation process. The researcher is enrolling bachelor programs of international business of a Finnish University of Applied Science. Concerning Nielsen's suggestion, the range of recruited user number is from three to five and the optimal number of participants for testing is five (Nielsen, 2000). However, due to the combination of two methods comprising heuristic evaluation and thinking aloud method, the target of heuristic evaluation in this research is to present an overview of usability analysis biased to the website interface and its design. Therefore, one test user is theoretically acceptable for research considered being low-budget one (Nielsen, 2012). That number of evaluators allow researcher to discover approximately 35% of usability problems of studied website (Figure 11).

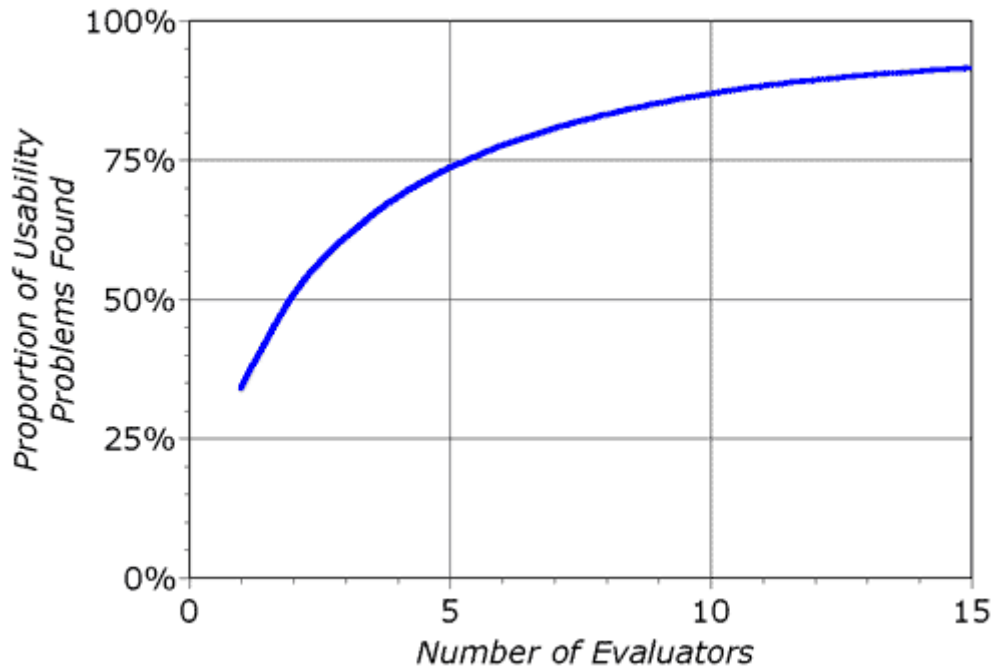


Figure 11. The correlation between the number of evaluators and the percentage of found usability problem in heuristic evaluation (Nielsen, 1994)

Corresponding to the prerequisite for previous knowledge or experience of usability, participants are learners of usability guided for testing process first while it is suggested that evaluators get prior knowledge or experience of usability or they are even experts of this area (Affairs, n.d.). Nevertheless, non-experts' evaluation, is significant according to the Jeff Sauro's study (Sauro, 2012).

As a result, the thinking aloud approach has five participants. For starters, they are volunteers who have agreed to become evaluators for this usability testing approach. The quantity of evaluators is then assessed in conjunction with the recommendations of testing usability specialists. It can be observed, for example, that the proportion of discovered usability problems might reach a minimum of 70% (Figures 9 and 12), which is sufficient for insight assessment. These five people who are taking part in the thinking aloud testing method are divided into two groups. The first group consists of two individuals with an IT study background, whereas the second group consists of three participants with a business study background.

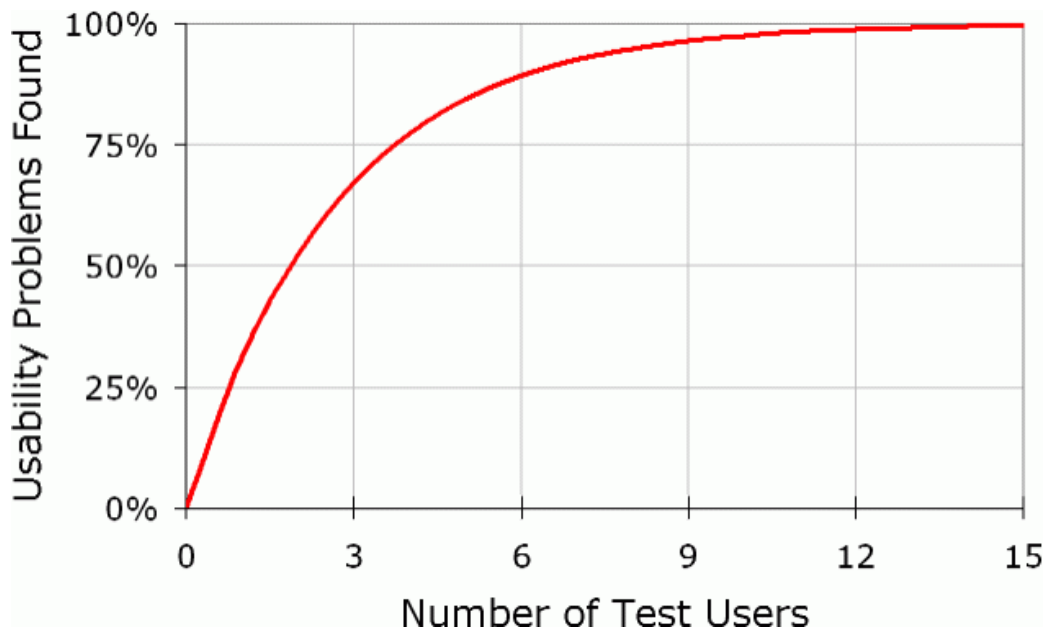


Figure 12. The correlation between the number of evaluators and the percentage of found usability problem in Usability testing (Nielsen,2000)

## Interview guide

There are several remedies of heuristic evaluation offered and suggested by credible and legitimate usability experts. They can be referenced to, for example, Ben Shneiderman's "Eight Golden Rules of Interface Design," Jakob Nielsen's "10 Usability Heuristics for User Interface Design," or Bruce Tognazzini's "First Principles of Interaction Design.". This thesis focuses on Jakob Nielsen's ten heuristics, which have been verified and extensively used in both professional and non-expert usability testing (Goldberg, 2019). Nielsen's ten heuristics are considered gold standards in user experience since they provide researchers with a comprehensive understanding of a targeted website's interaction design. In addition to these ten heuristics, one extra heuristic is tested on purpose in the research. It is about inclusiveness and accessibility. This extra heuristic is to assess accessibility in which users are not excluded based on their abilities linked to physical, emotional, or cognitive characteristics, and inclusivity in which the aims of accessibility are applied to persons of varied cultural origins, ethnicities, body kinds, and gender identities. This additional heuristic is used to assess how accessible and inclusive users find the site when it comes to their abilities related to physical, emotional, or cognitive traits, or their cultural diversity, ethnic, appearances, and sexualities

(SCHROETER, 2021). As a result, the evaluator will run through the eleven heuristics that have been specified (Table 1).

Table 1. Eleven heuristic Evaluation Principles (Nielsen, 2020), (SCHROETER, 2021)

Number	Principles of Heuristic Evaluation
1	System Status's Visibility
2	Connectivity between the System and the Real World
3	Freedom and Control of User
4	Rules and Uniformity
5	Error Avoidance
6	Recognition rather than Recall
7	Usefulness and Adaptability
8	Design Aesthetics and Minimalism
9	Assist Users in Identifying, Diagnosing, and Learning from Errors.
10	Documentation and Support
11	Accessibility and Inclusiveness

Once usability issues have been identified, it is necessary to determine their level of severity, which is then followed by a trustworthy rating system. Jeff Sauro has generated a table that summarizes and compares several severity ranking methods (Table 2).

Table 2. Summary of severity rating methods

Level	Rubin	Dumas	Nielsen	Wilson
0			Not an issue	
1	Irritant issue	Potential improvements/recommendations	Cosmetic issue	Little cosmetic/coherence problem
2	Moderate problem	Usability is affected slightly by found issues	Minor problem	
3	Major issue	Major disruption/disappointment can happen	Severe issue	Issue is moderate
4	Usability can be useless	Be unable to finish tasks		Major issue
5			Catastrophe problem	Problem can cause catastrophic fault

In compliance with the summary of Sauro and the use of Nielsen's heuristic evaluation, Nielsen's severity rating is also employed in the thesis to simplify analysis and maintain close synchronization. Table 3 illustrates in detail rating levels and their descriptions.

Table 3. Severity Rating by Nielsen (Nielsen, 1994)



Level	Description
0	Almost no usability issues exist.
1	This level relates cosmetic issue hardly occurring and quickly resolved by user. It could be repaired without urgency.
2	The level refers minor problem in which the low priority of repairing is needed as such problem seem to appear more often and to be more challenging to deal with.
3	The level refers severe issue being too critical to ignore and it should be given top priority for fixing. The user, hence, is unclear of how to resolve the issue.
4	At this level, it is considered as catastrophe problem that is mandatory to be fixed before the release of product.

Concerning thinking aloud testing method, a certain strategy needs to be developed before testing sessions are run. The offered strategy does not adhere to strict rules; rather, it is determined by the thesis author's knowledge of test's concept and guidelines provided by Jakob Nielsen. Test materials for thinking aloud method comprise a task introduction paper with descriptions of 20 concrete tasks, and a list of interview questions asked after the process of thinking aloud is done. The detail of these materials is well explained in Appendix 1. The evaluation is divided into the main test section and post-test interview.

Pre-test introduction clarifies that participants must accomplish all activities without assistance or intervention from observers throughout the procedure. Participants must speak loudly persistently and without interruption. If they go quiet, the observer will prompt them to continue speaking. Furthermore, participants should be notified on how their ideas on assigned tasks, their awareness of design problems, or their suggestions for the website should be communicated adequately in the test section. On the test phase, participants are required to complete tasks outlined in the task list paper presented in Appendix 1. Following the completion of the main testing phase, a post-test interview is organized. Probing questions are asked by observers to acquire relevant qualitative information before the evaluation is officially finished.

### 3.3 Research Approach

In terms of heuristic evaluation, Nielsen recommends that the evaluator should inspect the interface at least twice as he explained that the first time is for the evaluator to understand the overall flow of the system and its interactions, and the second time is to concentrate on objective elements of website's interface (Nielsen, 1994). The evaluator inspects each page of k-ruoka.fi, including the log-in and ordering processes, using the prescribed Heuristic principles. When usability concerns are discovered by chance, they must be documented together with the task description and the page on which they are encountered and not fitted with heuristic criteria (GHAZARYAN, 2014). Defects are continuously compared and assessed with the combination of those heuristics and Nielsen's severity ranking system mentioned earlier. The entire evaluation session should run between 1 and 2 hours (Nielsen, 1994).

From September 24 to September 28, the Simplified Thinking Aloud test was conducted. Testing takes 40 to 60 minutes to complete for every respondent. Participants get roughly 15 minutes before the exam, which allows them to become acquainted with the test introduction, to complete the background information form, to learn how they handle with the tasks in generally, and to maintain a calm attitude for best testing performance. Then, the main task requires approximately 30 minutes to complete. As stated in the preceding section, he or she must continue speaking loudly throughout the test. Tasks must be completed sequentially and cannot be bypassed. To alert the observer when a task transition occurs, the participant should state out the task number, the beginning and ending times. Afterward, it is the phase of post-test interview which lasts around 15 minutes. Thinking aloud testing is conducted online under the supervision of evaluator due to the agreement between the evaluator and the participant. Following the introduction, the completion of background information form, and the readiness of participant for the exam, the testing procedure begins with recording permission. When a participant exhibits an indication of completion, the record is stopped. The individual then answers questions from the post-test interview to complete the evaluation. Participant can use auto translation when they perform the tasks on the website.

Evaluator thoroughly prepare for testing equipment and testing environments. There is a detailed review of the internet quality, technological gadgets such as laptops, the availability of pens and notebooks for note taking, and even a watch for time control. Furthermore, setup for a quiet testing environment is required throughout the testing process.

### **3.4 Analysis of the data**

The data of thesis was analyzed using heuristic assessment and thinking aloud testing. The data obtained from these two procedures is intended to characterize and analyze the logic of evaluators' thoughts and behaviors for both testing processes.

Two different approaches are used in this thesis to augment one another. Their findings can then be compared to establish a conclusion of correlation or contrast connection. As a result, the first approach of heuristic evaluation is regarded as the analytic basis supporting the second method of online usability testing. Furthermore, the outcomes of the methodologies allow the researcher to uncover user evaluations on the usability of the K-ruoka website and tackle the research questions presented in the introduction chapter: What is the current usability of K-market's web shop? How do users react with offered user interface and the website's design? Therefore, the outcomes of heuristic evaluation, behaviors and the interview responses were carefully analyzed throughout data analysis.

### **3.5 Validity and reliability**

As previously stated, Heuristic Evaluation was performed by one evaluator in this thesis owing to time and money restrictions. According to the clarification of responder selection, the proportion of usability issues discovered by one evaluator was only approximately 35%. Minor issues might be unnoticed due to the small number of evaluators (Nielsen, 1995). There is likely following bias. In particular, evaluator's perceptual bias can influence evaluation results. The user and the evaluator do not share same thought. As a result, certain usability concerns detected throughout the testing process may cause false positives. The severity evaluations are also done by an evaluator, which might lead to subjectivity (Ballav, 2017). When the heuristic evaluation is

conducted in isolation, without the participation of either the end user or the client, incorrect assumptions and misunderstanding are more prone to occur. Also, there is a distinction between the evaluator's and the genuine user's pain points (Puig, 2022).

As heuristic assessment alone is insufficient to discover all possible usability issues, it is recommended that the two approaches be coupled to improve usability (Fard, 2022). Consequently, to ensure data authenticity and dependability, the thinking aloud approach was employed with the participation of 5 evaluators, allowing over 75% of the flaws to be detected. Nielsen cautions, however, that the evaluator's suggestions and clarifying inquiries may result in interruption, affecting participant behaviour (Nielsen, 2012). Recording video is used with the thinking aloud approach to enable verifying and getting more trustworthy data (Güss, 2018). To improve data validity, the evaluator tries to maintain the experimental condition as under control as feasible. Because the assessment is done in a third language, neither the evaluator's nor the participant's native language and the default languages of tested website are only available in Finnish and Swedish, the quality of data interpretation potentially decrease throughout the process of translating and transcribing. The concurrent thinking-aloud procedure is preferred over the retrospective method because of its more validity. The post-purchase interview is then verbalized instantly after the testing procedure to stabilize the participant's response.

## 4 RESULTS

### 4.1 Results of Heuristic Evaluation

The author used heuristic evaluation to investigate the K-ruoka website's five primary sites, which are the homepage, store site, product page, recipe page, and "In Season now" page. They are examined using ten heuristics. If usability issues are discovered, they are rated with a severity rating and are discussed in further detail. Table 4 depicts the evaluator's discovery of a usability problem, which includes a description of applicable heuristics and a severity assessment.

*Table 4. K-ruoka website's heuristic evaluation*

Number	Found Issues	Relevant Heuristics	Rating of Severity
1	The call-to-action message for member log-in below the homepage's footer is challenging to recognize	- System Status's Visibility - Recognition rather than Recall	2
2	There is no clear differentiation between the headlines and brief descriptions in the topic area on the homepage	- System Status's Visibility	1
3	The search tool in the navigation bar takes the visitor to a separate site.	- Connectivity between the System and the Real World - Recognition rather than Recall - Freedom and Control of User	2
4	The layout design varies from site to site	- Design Aesthetics and Minimalism - Rules and Uniformity	1
5	Some product items and sections have unappealing illustrative images	- Design Aesthetics and Minimalism	3

6	Neither arrow navigation nor label navigation are highlighted in the sliders on the "In season now" page.	- System Status's Visibility - Design Aesthetics and Minimalism	1
7	The error warnings given in the contact information area on the right column of the product page are insufficiently descriptive to prevent users from making mistakes.	- Error Avoidance	2
8	There is no English version available for foreigner customers	- Accessibility and inclusiveness	3

**Problem 1: The call-to-action message for member log-in below the homepage's footer is challenging to recognize**

Right above the footer and list of K brands, there was a call-to-action for customers to log in their account for further benefits located right above K-brand list and footer. Nevertheless, if they did not pay close attention to their actions, they would not recognize the navigation to the log-in page embedded in the word "log in." It was categorized as a minor issue because it had no substantial impact on the needs of customers. Users would find it more visible if it looks like other embedded links, with the text highlighted and an illustrative icon (Figure 13).

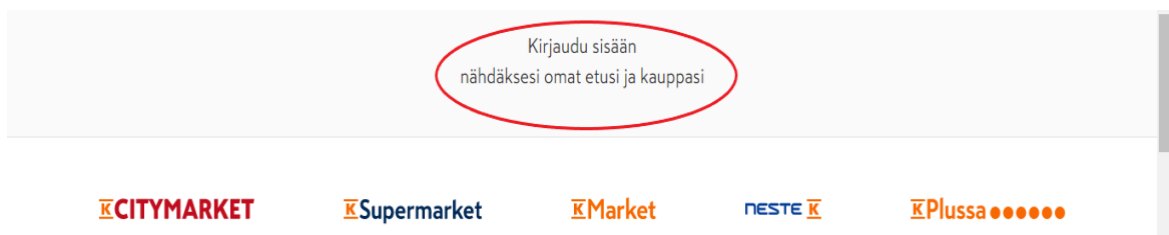


Figure 13. Test description for log-in suggestion

**Problem 2: There is no clear differentiation between the headlines and brief descriptions in the topic area on the homepage**

Also, on the front page, concerning the post section by topic, even though there was a font-size difference between the headline and the brief description, the highlight of the headline was difficult to distinguish, which had an effect on the exposure of the headline. It was categorized as a cosmetic issue because consumers might identify it, but it was not critical to remedy right away. Yet, the organization might consider switching to bold headers instead of normal text (Figure 14).

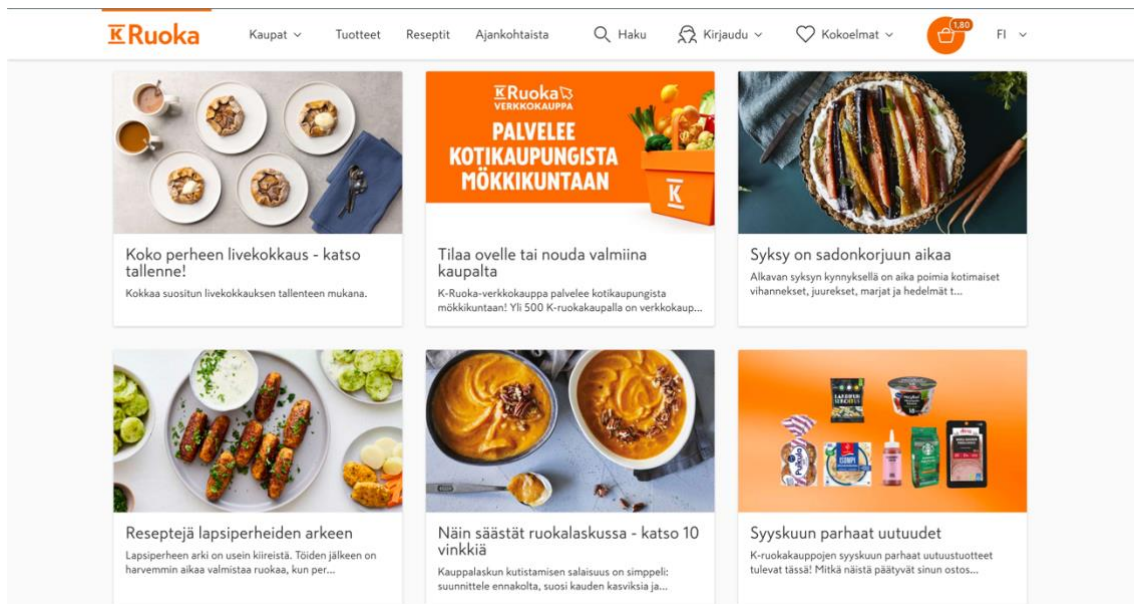


Figure 14. The unclear difference between headline and description

**Problem 3: The search tool in the navigation bar takes the visitor to a separate site.**

The search bar feature was easily visible due to the pictorial icon. Unfortunately, the evaluator was confused with how this function appeared. Specifically, the search tool was typically shown in a little frame on the main page. However, when the search option was used on the K-market website, it navigated to a different site and did not allow the user to exit easily. In this situation, there were concerns with the system's relationship with the user's habit, and they could not locate where to actively stop the search function. Users might find it tough at first, but they would quickly adapt (Figure 15).

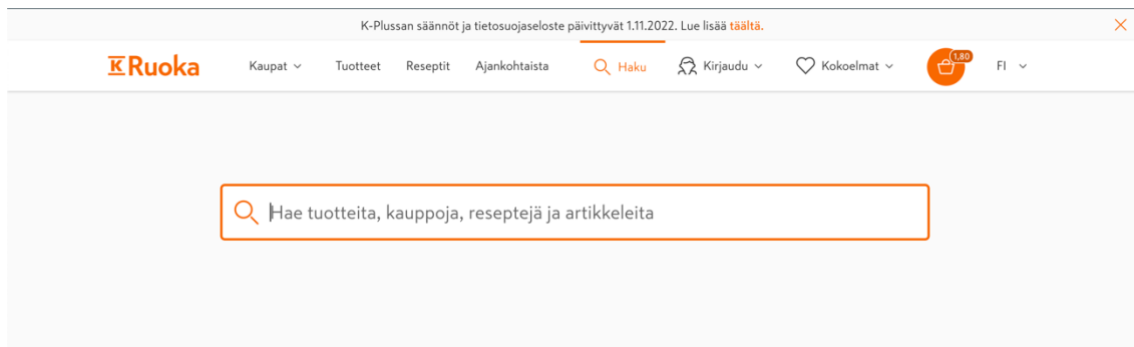


Figure 15. The navigation of searching bar

#### **Problem 4: There is no typographic synchronization between sites**

This issue was connected to the layout of the website's main pages which included store page, product page, recipe page, and 'In season now' page. Each of them was organized independently, giving the assessor the impression of inconsistency, and making the site less visually appealing. The problem was classified as cosmetic one since it might be addressed in the future when a usability improvement was performed. Furthermore, user views were varied, and the concept of evaluator is one of them.

#### **Problem 5: Some product items and sections have unappealing illustrative images**

The evaluator discovered that some photographs utilized to visualize the product on the product page were not graphically edited with effects. They seemed to original photographs taken by amateurs. Furthermore, the usage of a white backdrop made them challenging for users to distinguish between the background of the main page and the border of photo frames. The severity of this problem was scored as 3 since the fact that the evaluator was dissatisfied and unattracted by the product's aesthetics might have a direct influence on their perception, interest, and purchasing choice. As a result, product sales suffer, which was obviously undesirable for the company. Alternatively, decorated pictures could be placed in place of the existing ones (Figure 16).



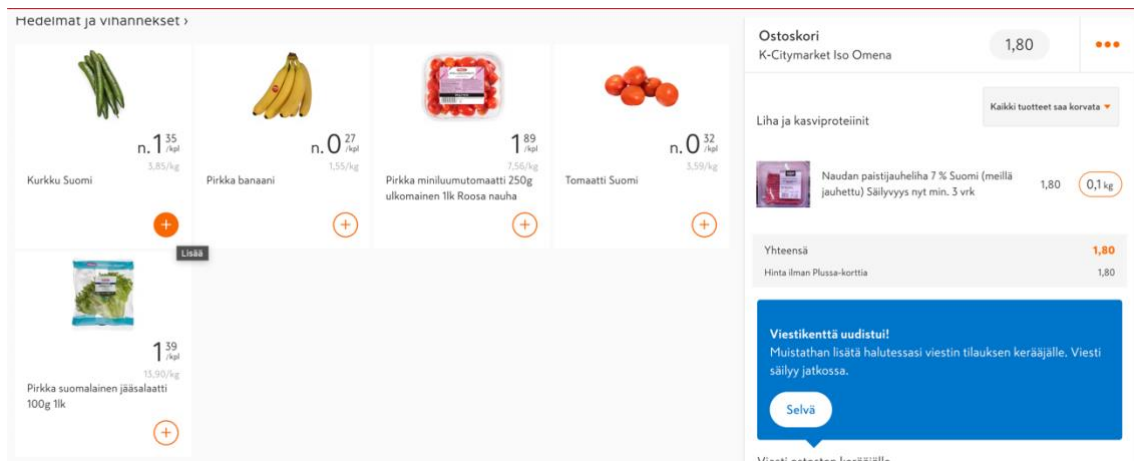


Figure 16. Unattractive product images

**Problem 6: Neither arrow navigation nor label navigation are highlighted in the sliders on the "In season now" page**

On the "In season now" page, there was a large slider at the top of the page. The applied pictures were retouched with a side of white colour blended in. Meanwhile, the two arrow navigation buttons and the label navigation bar were also white. This made recognizing slider navigations tricky, especially when slider automation was not currently accessible for the website (Figure 17).

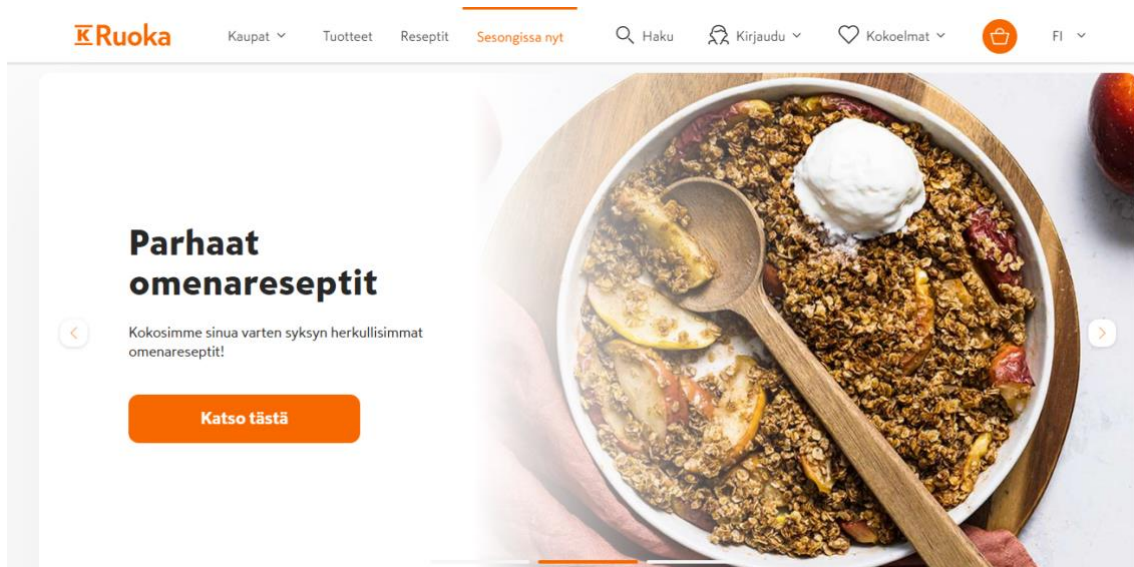


Figure 17. Slider in 'In season now' page

**Problem 7: The error warnings given in the contact information area on the right column of the product page are insufficiently descriptive to prevent users from making mistakes**

If an evaluator wished to execute an order without logging in, they had to fill out contact information on the product page. The identified issue was that the email part lacked error instructions when the respondent filled out inaccurate information, resulting in ineffective error prevention for the user. Because the evaluator could find it problematic but was able to control herself, it was classified as a minor problem (Figure 18).

The screenshot shows a contact form titled "Contact information". It contains the following elements:

- Two input fields for "First name" (containing "czc") and "Last name" (containing "dfss").
- A "Phone" input field containing "sfd", which is highlighted with a red border and a red error message: "Enter the phone number in the form 05012345678 or +3585012345678, without spaces or dashes".
- A "Mail" input field containing "sfjd", which is also highlighted with a red border and a red error message.
- A "Pluska card number" input field.
- A promotional message: "You get Pluska for your purchases" followed by the Pluska logo (a stylized 'K' icon and the word "Pluska" with five dots).
- A "Ready" button.

Figure 18. Contact form issue

### **Problem 8: There is no English version available for foreigner customers**

The final issue was the unavailability of English version. Foreigners who did not speak Finnish or Swedish may possibly enter the K-market. If they merely wanted to buy necessities, the site was not a top priority because the automated translation tool's assistance was insufficient to convince them to continue with their purchasing journey. They would rather leave the site and choose another site that is more suited for them.

## 4.2 Results of Think Aloud Method

In the think aloud approach, participants' feelings and replies are captured during testing, then transcribed and gathered into descriptions for 20 specified task and post-purchase questions.

**Task 1-3: In tasks 1 and 2, evaluators were needed to visit the website [www.k-ruoka.fi](http://www.k-ruoka.fi), analyze the front page's important components, and determine their aesthetic appeal. They then gave their thoughts on top Navigation and how it operates across major sites.**

The test began with a visit to the K-ruoka website, [www.k-ruoka.fi](http://www.k-ruoka.fi). Participants had little problem with the first task since it is known to internet users, and they used a random browser that was convenient for them to use on their own device. The second question was recorded with four out of five assessors assuming that the aesthetic of the webpage is appealing and updated for them. In their opinion, the main page is engaging since their primary colour is orange, which is related to the major colour of the company. The page's sections are nicely organized, and the search button is easily identifiable due to its symbol. The arrangement of parts makes it easier for them to find. However, the other evaluator believed that the home page was too cluttered with content, which she found tedious, and that the visuals were outdated. In response to the third question, all respondents confirmed that the navigation bar provided sufficient core functionality for a commercial website and that navigating between the main parts operated well, making it seamless for them to access desired products.

**Task 4: In task 4, the assessor had to choose a random store from the Store sections, assess the information adequacy for online ordering, and made some suggestions.**

The section supplied adequate fundamental information about a shop, including opening and closing hours, store locations, and delivery alternatives, according to the fourth question. However, two reviewers with an IT expertise provide some recommendations. One of them specifically suggested that the nearest store to their location be available, and that there be an additional tab of promotion where available promotions of the chosen store were visible to them. According to another evaluator, a comprehensive schedule of

the entire week should be presented because the operating hours may vary on special days or weekends and the user was unaware of this.

**Task 5: Respondents gave their understanding of product page navigation, explained whether they were interested in a certain product, and rated the correspondence between product names and images.**

Concerning the fifth task, the majority agreed on the relationship between visuals and subject, apart from some outliers observed in the bakery and sushi sections. According to one evaluator, the headline was about bakery, but the image revealed no relation of bakery, a year of origins, which was perplexing for her, a foreigner, if she intended to hunt for bakery through image. Another evaluator responded that the images of certain sushi dishes were not visible. When it came to making an immediate purchase choice from the website, their replies were emphatically negative. When compared to other ecommerce sites, users detected no noticeable impact of product visuals. The photographs appeared to be taken without editing or adding effects and were unappealing. The product presentation was recognized with empty space seen as "empty space" of goods loose, which resulted in their unwillingness to purchase.

**Task 6-7: In task 6 and 7, evaluators were expected to look for Karl Fazer full Hazelnut milk chocolate bar 200g from the product group's dropdown list on the current product page, to discover the instruction for online shopping with K-ruoka on the general product page, and to assess its ease of location with recommendations.**

In response to the sixth task, half of the respondents said they were first confused if they had to follow exactly the work instructions. They could still be able to locate the thing in the end. The remainder of the group were struggled with product searching, gave up, and searched product with search bar eventually. The seventh question probed assessors' identification of the guideline element of the product page. Two respondents admitted that they completely ignored the existence of the guideline since they subsequently stated that the position of the guideline on the right corner was not apparent to them. They nearly did not believe it without the evaluator's support. One assessor noticed it because of her buying habits. The other two assessors were puzzled, but they were able to finish the work on their own. The page's layout was nice to them, yet hard to catch up with all of contained information because of the information overloading

**Task 8 – 11: Evaluators were expected to describe their decisions about adding things to their shopping carts and determining where to adjust the quantity or amount of a product, along with comments and suggestions, from task 8 to task 11. It was mandatory to monitor error warnings helping form completion while filling out contact information.**

The purpose of task eight is to determine the reasons behind the shopping cart's selection of each assessor. Different evaluators chose their carts for various reasons. They explained the reasons such as individual interest or demand, inexpensive product price, random selection, and brand loyalty. Based on the replies of five participants, the findability of where to adjust the quantity or amount of goods was 40% for question nine. Two participants responded that they quickly recognized the quantity change button. In comparison, three assessors, two of whom had an IT experience, claimed that the button was unclear for users. There was no noticeable indication of a quantity-update function. More illustrative symbols, such as the plus and minus sign, were suggested in order to better visualize for the user. In response to the tenth question, three business students responded that the red line of error warnings is sufficient for them to finish the form. However, when two IT students pretended to enter the phone number and email address inaccurately, other difficulties were uncovered. They tried to input a phone number with more than ten digits and were still authorized. Either way, there were no error messages associated with the wrong email address. The eleventh task was to look at how users handled the following step with their shopping carts. In general, they employed two approaches in this task. They were either doing the following steps directly in the shopping cart or clicking the basket button on the navigation bar. The basket icon was picked since it was similar to those used on previous pages. Evaluators had concerns with the shopping cart feature. The evaluators were not fond of shopping carts that were integrated directly into product pages. It overloaded the product page with a lot of information and made consumers feel rushed to complete their order.

**Task 12-14: From task 12 to task 14, assessors were required to visit the recipe page and offer their comments on the website's interface design, search bar, and so on, as well as to elaborate on whether they preferred instruction with video or without. There were also opinions given about the site's aspect.**

Tasks 12-14 were tied closely to the recipe page. Task 12 addressed to reviewers' perceptions of the holistic interface of the recipe page. Every evaluator remarked on the task in a unique way. Due to the prominence of the rating system and the ability of adding 'favorite item,' a first respondent stated that the site appeared more like a site for food delivery than a website for food recipes. The second respondent was similarly pleased with the website because she would want to use the "show tip" of recipe advice based on the ingredient chosen by her. The other three participants, on the other hand, highlighted some of the site's shortcomings. Two participants observed that recipes with two or three ratings and complex instructions were placed at the top of the page, which significantly influenced user behavior and led them to believe that the recipes were unsuitable for them. One more evaluator suggested that recipes by eating purpose should be available. To capture the user's attention, a few typical filtering alternatives should be shown alongside the filter function. In question 13, two participants were interested in recipes with video instructions, while two others preferred the standard text version. The group in favor of video attachment said that the video was more descriptive and easier to comprehend for them. The other group stated that they found it more straightforward to follow step-by-step instructions and did not have to pause the video. Concerning task 14, five evaluators consented that it was a good concept for both marketing and catering to client need. When people were interested in the recipe, they looked for ingredients to buy rather than going to another page to add product.

**Task 15: Respondents were requested to identify the electronic receipt's instructions, rate the readability of the language, and make recommendations if necessary.**

The fifteenth task required assessors to pinpoint the place of e-receipt instruction. However, the task feedback demonstrated the participant's annoyance when seeking for the item on the webpage. Two participants refused to utilize this feature because they assumed that an e-receipt was included with their online transaction or was sent to their email address rather than being available exclusively in the mobile app. The other assessors claimed that it was difficult to distinguish since the text size was too tiny to view and there was no clue to relate to. Furthermore, the instruction's explanation was so lengthy that they did not have the time to scroll through the entire provided material.

**Task 16-17: They were questioned which approach they preferred for returning to the site and how they wanted such selection. They also had to show their ideas of website disruption.**

The goal of Task 16 was to identify the most often utilized methods for returning to the front page. For five participants, the solution was to click on the K-ruoka logo in the upper left corner. It was noted that using the brand symbol to get back to the site was the quickest alternative that popped into mind when they looked through the task requirement. The focus of task 17 was to assess the stability of the site's operation. Participants assigned to this task indicated that the website link frequently failed while they were testing. Without the mandated testing, they declared that they would abandon their shopping journey and try again with another site since they did not want to be disrupted with their buying experience on a regular basis and feel frustrated in making a purchase. They also felt it was pointless to stay any longer and waste their time. Due to website disruption, the observer captured a few participants' angry behavior. They admitted that if the situation occurred in reality, they would abandon the page after the second break, not after the third or more.

**Task 18-19: Evaluators were asked to complete a task with a search bar, search a product name with incorrect spelling, and determine the support of the search bar in such a case.**

The author's goal in these two assignments was to evaluate the effectiveness of the search bar feature on the site. The purpose of task 18 was to familiarize the participants with the operation. Concerning task 19, three out of five respondents answered that the feature functioned effectively even when they purposefully searched with incorrect spelling according to instruction. Nevertheless, the others revealed that the function appeared inefficient to them. They did not obtain the desired outcome because of the analogous spelling in Finnish.

**Task 20: Respondents were instructed to navigate to the homepage's footer, discover the contact section, and figure out the Chatbot with provided instruction.**

In the last task, evaluators adhered to the instructions to access to the 'Take contact page' to review the guidelines and discover the Chatbot on their own with the help of the guidelines. It was noted that, despite the usage of contact instructions, they were unable

to figure out the location of the Chatbot, which greatly irritated them. After a while, two responses were ultimately discovered. Nonetheless, they did not thoroughly assess the chatbot's visibility because it was situated vertically in the bottom left corner, which was easily overlooked when the user scrolled through the layout flow. It was a helpful tool for the user's journey; however, it did not perform properly in accordance with its relevance and necessity.

### **Post-test questions**

Following the end of testing, some overall impressions were displayed. As a result, all respondents agreed on the modernism of graphic design in respect to the overall theme, style, and the mix of color tones aligned with brand colors for the ease of identifying and the refreshing sensation. According to majority consensus, the layout arrangement was generally consistent. Constructive input, on the other hand, was offered. Specifically, despite the current graphic style, the evaluator saw an archaic pattern in content layout, with a lot of material provided on a single page. Because the assessors were all foreigners, they preferred to have access to the English version. Due to the sense of frustration and information overload, the shopping cart component suggested that it be sent to another page rather than the same product page. They were unsure if they should mention their acquaintances on the website. It was discovered that there were just a few things that were appealing to them and had a significant impact on their commitment. Lastly, the delivery charge is less competitive than those from other commercial establishments they had previously purchased from.

Based on the outcomes of both study techniques, some of the important elements were identified. Minor problems, according to the researcher, were the redirection of the search tool to another website, the ambiguity of error messages, and the obscurity of the call-to-action. In some cases, these issues were difficult and annoying for consumers to cope with, but they were not too serious. The unpleasant appearance of the goods and the lack of an English page version were considered serious problems due to their direct impact on user shopping abandonment. When the assessors mentioned these difficulties during the thinking aloud testing procedure, the significance of these issues was highlighted. In addition to these challenges, there were complaints about website instability and improper placement of the shopping cart, and the complexity of supported instruction.



## **5 DISCUSSION**

Applying appropriate theories and methodologies enabling the collection of relevant user data is considered to be very important. Such data must address the thesis's identified primary usability and usability testing challenges for the K-ruoka commercial website. This chapter intends to explore the results obtained in the preceding chapter in greater detail, as well as to identify the relationship between the results and the theoretical framework as well as methods on which they are based. The chapter is divided into two sections comprising the discussion of results and the discussion of method.

### **5.1 Discussion of results**

Usability is a wide concept which is challenging to analyze completely its meanings and implications, but it is apparent that the firms rely heavily on it to develop ecommerce websites that can meet customer demand. According to the previously given theoretical frameworks, the author gained some understanding of the definition of usability, its testing techniques, and associated theories like user experience.

Though there was no explicit application of the theories discussed in the analysis of user data, they provided author ideas for question development so that usability problems may be found and handled accordingly to the greatest extent throughout the testing process. According to Peter Morville's user experience model, the website offered users with findability, which relates to the simplicity of navigating throughout the main sites, but the criteria of accessibility and attractiveness were not totally achieved for consumers' desire. When the results were compared to Nielsen's usability theory, the website partially matched the evaluation criteria of learnability, efficiency, 'error,' and delight. As a consequence, the hypothesis restated the convenience of navigating. Moreover, website clarity, work convenience, detected mistakes, and user satisfaction were all reached to a certain degree. Similarly, with the significance of Krug theory, the website still had unnecessary words that could be minimized to focus readers' attention on valuable content in a short period of time. As a result, the website might be upgraded with more easy clicks without thinking the demand. Quesenbery theory shared connections with the effective, efficient, and engaging characteristics of usability. Learning convenience was also

emphasized. Every model or theory presented by experts, Nielsen, Krug, and Quesenbery, gave a separate classification and description of usability elements. However, their interrelationship across aspects of efficient usability can refer learnability, efficiency, or unthinking click, error avoidance, simplicity, and other factors.

To some extent, a website with strong usability is anticipated to maximize the user experience. If the user's or consumer's needs are not met, they may abandon their shopping cart quickly. In reference to the heuristic evaluation method, the theoretical description of ten Nielsen heuristics was clarified explicitly in the theoretical chapter, allowing the researcher to take further consideration for study approach.

It is perceived that K-website succeeds in delivery certain aspects of usability to the website's "users". According to the findings of the research, evaluators were pleased with the quick navigation across the main pages of the K website, as well as the aestheticism of color application for brand identity and modern theme, which links to the components of either efficiency or engagement involved in the theoretical chapter. Nonetheless, there are obvious things that the K-ruoka website should examine for improved usability in terms of suggested features. They might develop more straightforward guidelines or address errors that are interfering with user experience, referring learnability, the removal of unnecessary words, or an erroneous component in experts' hypotheses.

## **5.2 Discussion of method**

Since the applied research methods had been measured both benefits and drawbacks, they predominantly proceeded according to the author's objective. As previously stated, the heuristic evaluation was performed alone by the author, and the proportion of issues discovered was insufficient. As a result, the second strategy, think aloud, was used in addition. They were meant to complement each other by looking deeper and discussing more identified usability shortcomings on the K-ruoka website.

The assessment of evaluators in both methods provided the author with valuable information concerning the usability of the K-ruoka website. When it comes to testing difficulties, they were more noticeable in the think aloud testing method. There were up

to 20 tasks that required participants to spend a significant amount of time completing. The assessors appeared fatigued in the final few questions, which impacted their task execution speed and the detail of their replies. It was challenging for participants to test and speak at the same time. When it was required, the observer had to remind participants to speak out. From the author perspective, selected methodologies for the thesis are suitable for study aim and the available condition of the author, which was to examine thoughts and insights of users towards website' usability using qualitative research method. These strategies are inexpensive and simple to implement for student academic research.

Concurrent thinking aloud utilized, which maintained a greater validity and reliability. However, the evaluator's perceptual bias could not be totally prevented during the testing process. Consequently, they might be viewed as suggestions rather than obligatory guidelines to follow. The researcher attempted to properly follow standards and usability expert's instructions for heuristic evaluation and grading severity of problem to eliminate subjectivity of evaluation as much as feasible. To boost the degree of thesis validity, the author was able to integrate heuristic evaluation and the think aloud approach, as well as perform an instant post-purchase interview.

## 6 CONCLUSIONS

The last part of this thesis summarizes the entire usability research for the K-ruoka commercial website. The usability testing of the K-market website was performed, and the conclusions were compiled based on the theoretical framework and methodological chapters.

The aim of website usability testing was specified in earlier chapters, and the usability of the K-market ecommerce website was studied for data collecting. The collected data provided the author with a basis for answering the research questions in the thesis's introductory chapter.

In response to the first question, the current usability of K-commercial market's website was assessed using the findings reported in the results chapter. Overall, the site is deemed being essentially useable by users. In particular, the platform offers the essential functionalities and sub-pages for an ecommerce site, such as the homepage, product page, search bar, and shopping cart. Respondents highly value the ease of navigating throughout the sites. For brand identification, the consistency was then considered in the layout arrangement and brand colors. The correspondence between image and description is built with high accuracy. The basic information of a store seller is properly structured on the store page. The search bar is clearly identified using a pictorial icon and performs adequately. The product features are discretely integrated into the recipe and 'In season now' pages, allowing users to add in-demand goods without having to browse to another website. This guarantees that utilization is efficient and effective. Furthermore, the documentation and support section of the website is inclusive. Every website has imperfections, and the K-market website is no exception. Along with accordance with participant's feedbacks and ideas for website usability enhancements. The conclusions were consistent among respondents, suggesting that several website features could be modified to make a more accessible version. In addition to user suggestions, the consequences of usability issues discovered in both heuristic assessment and think aloud testing methods can potentially benefit the investigated site's usability modification.

Concerning the second research topic of examining user involvement with the website's user interface and designs, all assessors commended the K-ruoka commercial website design's layout uniformity and minimalism. They agreed once more that there was consistency in the use of colors for brand identification, specifically orange and white, as well as the page's ease of navigation. Furthermore, the website's concept conveys a sense of modernism. However, participants believe that there are still flaws in the user-interface experience, so they react with neutral attitudes for holistic review.

The commercial website of K-ruoka can be upgraded based on the test findings. Some potential modifications proposed by usability testing for Kesko group consist of:

- To improve graphics and catch consumers' attention, illustrative pictures for items should be changed with more aesthetic and appealing ones.
- The operation of the website should be prevented against disruptions that may cause users to terminate their shopping experience sooner.
- For foreign users, an English version of the website should be offered.

## **6.1 Limitations of the study**

In addition to the examination of website usability and testing, the thesis report discusses the possibility of limitations throughout the research process. Due to the time constraint and a limited number of respondents, the quantity of usability issues discovered is expected to describe assumed users' perceptions of the usability of the analyzed website. As an outcome, distortion in assessors' judgment is inevitable, resulting in subjectivity in the study. Assistance from the observer throughout several stages of the testing procedure, as well as off-topic responses from participants, impacted the observer's observation efficiency and the thought flow of the participants mutually, bringing misleading in the reported result. The shortage of time for task completion in the research caused an effect on validity for usability assessment.

## **6.2 Suggestions for further studies**

The proposal for additional study could be to employ metrics, including statistical ones, and to enroll a larger number of test participants to provide more statistical insights.

Alternatively, it would be advisable to integrate multiple usability testing methodologies for research to obtain comparable data between approaches. User experience is linked to usability and is critical to a website, but it was cited as a significant usability theory in this study. Future study on user experience might be conducted to broaden the scope of the investigation. In addition to website usability, individuals of all ages like to access online shopping on their smartphone, thus usability on mobile applications should be handled for research consideration too.

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## APPENDICES

### Appendix 1. Material of Thinking Aloud test

#### List of 20 task to perform

1. Open your browser and navigate to K-ruoka's website – [www.-ruoka.fi](http://www.-ruoka.fi)
2. Examine the front page's key sections and determine whether they are visually appealing and up to date. If so, why?
3. Select one of sections included in the top navigation bar Stores, Products, Recipes, or In-season categories and tell us what you think of the Top Navigation, and how well it helps you navigate around different sites?
4. Please select a random store from the Store section. Is the information described sufficiently for you to pick it for online ordering? What can be improved better?
5. Open general product page, describe your navigation and are there any product groups or specific goods that entice you to explore or buy them right away? Do the web page's item names and images correspond to its theme?
6. Please browse to the actual product page containing Karl Fazer full Hazelnut milk chocolate bar 200g from the product group's dropdown list of the current product page.
7. Do you notice the guidance for online purchasing with K-ruoka on the general product page right away? Is it simple to locate? What are your thoughts on its layout, and do you have any suggestions?
8. Continue to the main product page and select a product to add to your shopping cart. Is there anything specific that influenced your decision? If so, what is it (for instance, color, graphic, and so on)?

9. Do you know where to change the number or amount of a product in the shopping basket on the right column? Do you become perplexed by that? What are your recommendations?

10. If you do not have a personal account, you must fill out your contact details. Begin filling out the form, however it is presumed that you will fill out either of areas incorrectly. Comment on the outcome and indicate whether red error warnings can assist you in completing the form and whether the mistake clarification is detailed enough to correct the problems. What else may keep you from filling out the form incorrectly?

11. Which feature of the site do you prefer using to take a further step with your shopping cart? Why do you make that decision?

12. Visit the recipe area, and what are your initial thoughts of the website in terms of interface design, search bar, tool tip, layout, or anything else you can think of?

13. Choose a random recipe with and without instruction video respectively, is it properly organized and simple to follow in those situations? Which version do you prefer and what is your suggestion?

14. Scroll down to see information on category classification and product suggestion. What are your thoughts on these components in a recipe website?

15. Return to the main page, could you find information on the availability of electronic receipt? If yes, then look for instructions on how to use an electronic receipt. Is the text easy to grasp? What are your thoughts and recommendations on the current page?

16. Which feature of the present site do you prefer using to quickly return to the home page of this website? Why do you make that decision?

17. Is the site occasionally interrupted while you go between sites? If so, will you become irritated and discontinue your shopping trip?



18. Search for any of the K-ruoka product using Search bar

19. Utilise the Search bar and make an error in the spelling of the product name you wish to look for (e.g., chicken chicket). Please enter the product name incorrectly. Are the search results helping the situation and getting you closer to your goal?

20. Navigate to the homepage's footer. Go to Take contact, scroll down to Chat with us, and read the instructions for directing to the Chatbot automatically. Could you figure it out using the instructions?

### **Post-testing questions**

1. What was your overall impression of K-ruoka website?

2. Do you like the K-ruoka website's user interface? What are your thoughts on the present website's basic style and structure, such as color scheme, text content, and visuals? Is it, in your perspective, consistent?

3. What would you modify about the K-ruoka website if it were possible?

4. Would you suggest K-ruoka website to others? Why?