

## Measuring Usability on visitvantaa.fi

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<p>This research work or better still thesis, presents a scope of evaluation of usability on visitvantaa.fi. The research will cover possible usability problems in using visitvantaa.fi and possible recommendations for improvements</p> <p>In this research, definitions of usability plus some literature reviews, formed a solid base with which, a balanced analysis of results were obtained. The results of this study were obtained through a test procedure known as the think aloud test protocol, involving a total of five participants. The think aloud testing type used for this research is the traditional in the lab testing method. The participants had a total of ten questions/tasks to complete and at the end of each question had to give their feedback plus recommendations.</p> <p>The usability testing for this research was conducted within a two weeks' timeframe from the 5<sup>th</sup> of November 14<sup>th</sup> of November. Part of the test was conducted in Hotel Haaga and RAUHANLITTO, which is my place of work. The test process participants were allowed to verbalize their thoughts as they performed tasks, while the moderator observed and took notes.</p> <p>The tasks completed by participants, brought out some fundamental usability problems of visitvantaa.fi website. In the process of analysing these problems, they were grouped according Nielsen's severity of usability problems which is on a scale of 0 to 4, with 4 being the most severe problem.</p> <p>The results of the finding revealed a series of usability problems on visit Vantaa.fi. According to Nielsen's severity of usability problems, two aspects were identified and that need immediate attention. The problem of links that do not redirect to details were identified and placed under catastrophic problems. Secondly, there were links that had only Finnish language, this was placed under category 3, major usability problem which also demand priority fixing.</p>	
<b>Keywords</b> Usability, ease of use, made to made-to-medium, emotion, <a href="http://visitvantaa.fi">visitvantaa.fi</a> , tourism websites, Internet, tourist	

## Table of contents

1	Introduction .....	1
1.1	Aim and objectives .....	2
1.2	Structure of the thesis .....	2
2	Introducing visitvantaa.fi.....	4
3	Usability of webpages and user experience .....	5
3.1	Definition of usability .....	9
3.2	Some key aspects when creating a website.....	9
3.3	Usability heuristics .....	10
3.3.1	Visibility of system status .....	11
3.3.2	Match between system and the real world .....	11
3.3.3	User control and freedom.....	11
3.3.4	Consistency and standard.....	11
3.3.5	Error prevention .....	12
3.3.6	Recognition rather than recall .....	12
3.3.7	Flexibility and efficiency of use .....	13
4	Research Methodology .....	14
4.1	Research Method.....	14
4.2	Usability testing.....	16
4.2.1	Types of usability testing .....	17
4.2.2	Traditional moderated/in-lab usability testing.....	18
4.2.3	Online testing/remote usability testing .....	18
4.3	Data Collection and analysis .....	19
4.3.1	Observation approach/mode .....	19
5	Analysis.....	21
5.1	Task success data per participant.....	21
5.2	Usability test of Visitvantaa.fi website.....	23
5.2.1	Test participants profile and selection .....	24
5.2.2	Positive reaction and comments from participant .....	24
5.2.3	Negative reaction and comments from participant.....	25
5.3	Recommendations .....	27
5.3.1	Challenges .....	27
6	Conclusion and future recommendations .....	29
	References .....	30
	Appendices.....	34

Appendix 1. Questions/tasks for think aloud participants.....	34
Appendix 2. Test participants profile.....	36
Appendix 3. Moderators checklist.....	37

# 1 Introduction

The concept of usability which is the main subject matter for discuss in this study has evolved into an important aspect of software development. This explains the reason why there should be some level of interaction between the user and the interface which will either result good or bad user-experience on the web.

Several definitions on usability have been defined by several authors which will be mentioned repeated in subsequent chapters in this study. According to (Nielsen, 2006) usability is the ease of use, which in effect implies, how easy it is for users of webpages to complete or accomplish a task(s) without difficulties.

However other studies have shown that; there is a best-known definition for usability, which is from the International Organization for Standardization ISO, (9241-11): which defines usability as the extent to which a product can be used by specified users to achieve specified goals with the effectiveness, efficiency and satisfaction in a specified context of use, (Barnum 2011, 11).

The above definition of usability thus brings to the fact that, usability comprises of three main components, (satisfaction, efficiency and effectiveness). Usability is thus considered pivotal to user experience (UX). As rightly stated by (Tullis & Albert 2013, 5) usability is usually considered as the ability of the user to use a thing to carry out a task successfully, whereas user experience takes a broader view, looking at an individual's entire interaction with the thing, as well as the feelings, thoughts and perception that result from the interaction.

From the above definitions of usability, and more that will be discussed detail in subsequent chapters, some core aspects of it will be discussed. In subsequent part of this research, subheading: usability test of visitvantaa.fi website, will be the actual test of this study.

The main purpose of this study is to examine the aspect(s) of Vantaa city tourist's information website which might require improvement so as to increase customer satisfaction and usability. In regards to these, the main research question(s) and sub questions will be as thus:

- i. What is the overall level of usability and user experience with visitvantaa.fi, and how can it be improve?

And the corresponding research sub-questions are:

- i. What are the most important aspects of the website to tourists?
- ii. What are the least important aspects of the website to tourist?

iii. How satisfied and loyal are the users/customers?

Internet has offered consumers with a more rapid and instant tourism information. The introductions of Web 2.0 to websites have especially offered consumers with the possibility to communicate and collaborate with each other even more effectively and efficiently. Consumers now have more roles to play in the demand of tourism products and services. Consequently, several tourism destinations such as Vantaa city in Finland realized these possibilities and developed [visitvantaa.fi](http://visitvantaa.fi). The website was created in order to offer potential tourist with information about hotel, restaurants, parks, shopping malls, nightlife and other natural attraction like lake and rivers. The subsequent paragraph will be Introducing Visitvantaa.fi with basic information on its creation and management staff.

### **1.1 Aim and objectives**

The sole aim of this study is to evaluate the level of usability on [visitvantaa.fi](http://visitvantaa.fi). As earlier mentioned above, [visitvantaa.fi](http://visitvantaa.fi) is a tourism website, designed to provide tourists with information on what to do, see, visit and explore. In this regard this research will help provide a knowledge on how satisfied tourists are with the website usability.

This study will help identify possible usability problems that may be or occur with [visitvantaa.fi](http://visitvantaa.fi). These usability problem(s) will be identified by carrying out a test that will involve tourist's participation. The outcome of the results will provide recommendations for improvements.

### **1.2 Structure of the thesis**

The structure of this study comprises of seven sections. The first section offers an introduction to topic background information, the choice of research topic and the main goal and research questions of the study. The second section represents theoretical framework of the study by presenting the popular concepts used for measuring usability on web pages. The third section presents the methodology, which will constitute about 10 to 15 users selected to evaluate [visitvantaa.fi](http://visitvantaa.fi) web site. This section involves that the users should have some background knowledge on webpage and internet experience which will involve male and female. The fourth section involves presentation of the analysed results. Representative quotes, transcribing and tables. Lastly, the fifth section will give a summary of the whole study process, the possible developmental suggestions, how the research has contributed to marketing and possible shortfall of the study.

However there might be possible limitations to this research/study in the following way; the research quality might solely dependent on my individual skills which might result in bias, secondly the volume of data might make analysis difficult and time consuming to interpret, thirdly the research respondents would be students and some groups of individuals which might limit the level of expertise and experience, finally presence and issues of anonymity might pose a problem when presenting results.

To accomplish this research/study, I will be using the think aloud method by (Nielsen, 2012), which is a tool that involves specific number of users who interact with a system or webpage individually, and also web site usability model by, (Venkatesh & Agarwal, 2006). The above-mentioned tool and model will be explained in detail in a subsequent chapter.

## 2 Introducing visitvantaa.fi

Visitvantaa.fi was created in the year 2016, it is a part of the Business Development unit of Vantaa City council. The main objective for creating was to market Vantaa city as a unique tourism destination. The management consist of two staffs. The main office is located in Vantaa but there are other small branches strategically located within some major parts of Vantaa such as Tikkurila, (Vantaa Kaupunki, 2018).

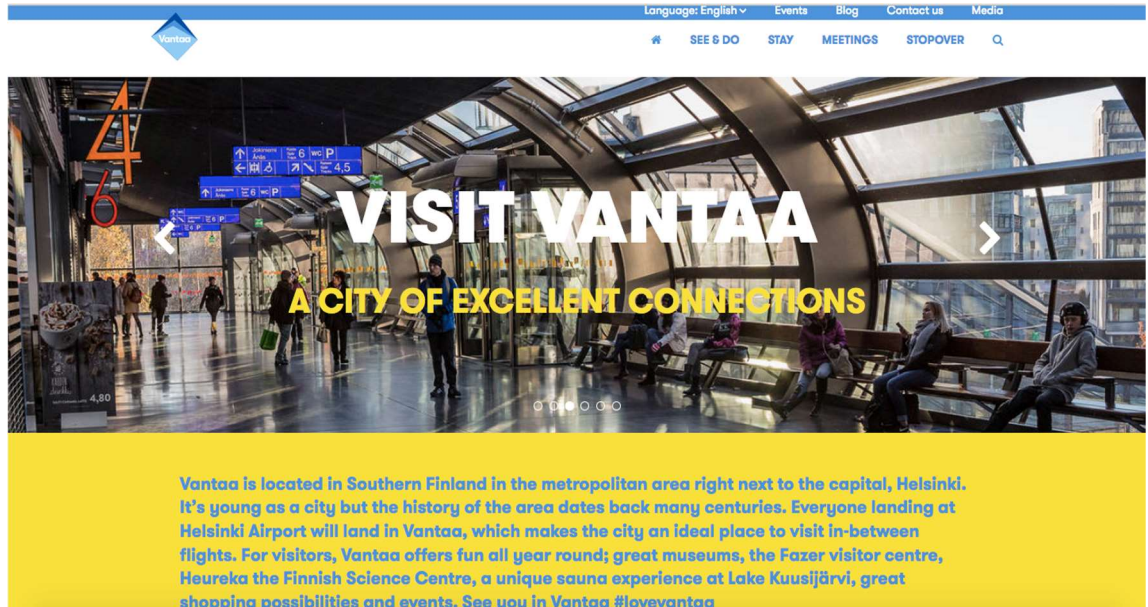


Figure 1. A screenshot of front page of visitvantaa.fi (Vantaa Kaupunki 2018)



### 3 Usability of webpages and user experience

In recent years, several researches have been made and tested results regarding website, usability, performance and satisfaction to online users, with different ways in which users react and perceive specific aspects of a website. This helps in comparing several studies and be able to come up with their commonalities and differences, which will act as basis of question(s) in a questionnaires or interview. Below are useful tips when creating a tourist web site like visitvantaa.fi. Links and menus are the most important of a webpage and hypertext media (Nielsen & Kara 2010, 114). Regarding this, users will need to look at website menus to find leading clues to what they are searching.

Thus, menus should be easy to read, navigate and further be persistent and consistent. People cannot always look at all the things they are confronted with on most web pages and so develop defences such as banner blindness or selective disregard (Nielsen & Kara 2010, 16). They will definitely ignore some item because of probably too much text or pictures.



Figure 2. Heat map from Eyetracking (Nielsen 2007). Reused under CC license, Ed Kohler Flickr.com.

Qualities of a product/service and customer satisfaction are very important factors of a business performance as confirmed by many studies. Consumer need to be satisfied with a product or service for them to want to consume more of it. Satisfaction is the fulfilment of one's wishes, expectations or the pleasure derived from something, (Oxford Dictionary). It is important to engage web users through more targeted search referrals. Until recently, people focus on using key words to attract a target audience to content, but keywords are not the only aspects of Web content that determine whether content is relevant (Mathewson, Donatone, & Fishel, 2010, 5.)

It is thus possible for a user to find content on a webpage relevant for one month and after that irrelevant as key words usage determines relevance, so it is important to constantly update and monitor the pattern with which consumers use your web. In case were a visitor to one of your webpages has viewed all information on it, but there has not been any new relevant updates since then, the content might then still be relevant for visitor but not relevant enough to reread (Mathewson, Donatone, & Fishel, 2010, 5).

There are many variables that affect relevance of web usability not just for a targeted audience but also for potential users. One of the many important variables in creating relevant content on a web site beyond keywords that will determine whether visitors/users will find the content relevant is: purpose, (Mathewson, Donatone and Fishel 2010, 6). That said it is important to design a webpage with activities that your visitors hope to accomplish or get in this case you stand a better chance in getting them engage with the content, as engagement is one way of measuring relevance.

Reviewing past findings and studies, will make it possible to evaluate and measure the web effectiveness of visitvantaa.fi to its target audience as fundamental marketing tool to its tourist attractions. According to, Mathewson, Donatone and Fishel (2010, 12), you can know the volume of web visitors a web page gets by using analytical tools such as Unica Netinsight to know where your visitors are coming from then filter to know those who come from Google. In addition to this, it is also possible to do report on Web analytics tools which will show keywords that brought visitors to a page.

It is important for every Web page management to know if its target users are doing what he/she expects them to do. It will be necessary for Visitvantaa.fi to know how many users are taking a survey, leaving feedbacks and also writing comments. As further written by Mathewson, Donatone and Fishel (2010, 13) search efforts scarcely perform as was drawn up, most often there will be things in a search effort that perform below expectation. When the aforementioned occurs, it will give you an opportunity to go back and fine-tune the content on your webpage to better suit your targeted audience. At some point if there is high bounce rate it is necessary to change language on webpage to better suit and develop better engagement with target audience (Mathewson, Donatone and Fishel 2010, 13).

According to past and present studies one could understand that; an effective and functional web site is that which is easier to use, (usability). Usability is a quality attribute that assesses how easy user interfaces are to use (Nielsen 1996). Users do not want to think too much and wonder if they will get desired information they need. Nothing important should be more than two clicks away (Krug 2006, 11). Looking at a web page should be self-explanatory.

Most web users spend very little time reading in detail what is on a web page. It is a common phenomenon to just look for catchy phrases and further click on the link. Users are mostly in a hurry having the desire to save time. A few well documented and established facts on web use is that user or people tend to spend limited or little time reading web

pages, they scam through looking for phrases of words that catch their eye (Krug 2006,22). Adding to the above, there could be a problem of trustworthiness on the part of the web user to its provider leading them to possibly just scam through a web page. To solve this problem, you can show trustworthiness by providing links to many complimentary resources, using short descriptive phrases (Mathewson, Donatone and Fishel 2010, 27).

The aspects of relevance, audience and search seem to be one of the most important aspects when creating a web site for whatever purpose. The findings of this research will help answer the question whether tourists find [visistvantaa.fi](http://visistvantaa.fi), relevant, easy to navigate and search of information. The subheading below will detail a bit more some key aspects to consider or take into account when creating a web page.

It so happens that, over the years, usability and user experience are been often used as being the same. It is evident of course that both are indivisible from the user and the product perspective.

There are however some slight differences amongst them. Thus, to measure user experience it is important to know what it is and what it is not, that user experience involves three main defining attribute, (a) a user is involve, (b) the user is interacting with the product, system, or really anything with an interface, (c) the user experience is of interest, observable and measurable (Tullis & Albert 2013, 5).

As opposed to the above definition of user experience some other authors have it different. User experience encompasses all aspect of the end-user's interaction with the company, its services, and its products, (Nielsen, 2012). Thus, with an understanding of this, user experience should meet the exact needs of the customer.

Nielsen, (2006, 22) further mentioned; web users are extremely impatient: in our study they spent an average of 27 seconds on each web page. He further asked why the rush? Because there is too much junk on the internet. I find this question and the answer particularly interesting an important.

The above mentioned, thus emphasize the fact that usability of a webpage and user experience begins from how well a web page is build or created, which is one of the aspects discussed in this study.

It is thus a common phenomenon to always compare usability to user experience; most case authors use the same words of terms to demonstrate different concepts. Most author use the term user experience (UX), and usability indistinctly, others consider user experience an extension of usability concept (Rusu, Roncagliolo & Gonzalez 2015, 7).

According to Barnum (2011, 13), he mentioned Peter Morville as having put together many aspects of usability in a visual form as shown in 3 table below

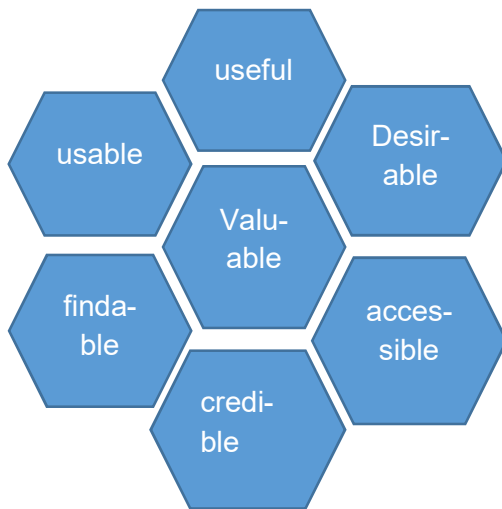


Figure 3. User Experience Honeycomb (Morville, 2016)

The aspect of the honeycomb model above involves both intangible and behavioural measures which are, (desirable, credible and valuable). Honeycomb can be used as the basis for discussion about what elements are so important to incorporate into a product so as to ensure a positive user experience (Barnum 2011, 13).

From the above analysed differences between usability and user experience, they both remain topics that need constant improvement and interpretation.

In these subsequent paragraphs I will be defining usability testing and usability evaluation, which of course are parts of my study. Usability testing involves watching a set of users attempt realistic tasks, and collecting data about what they do and say, as they interact with a product (Ritter & Winterbottom 2017, 216). Meanwhile Barnum (2011, 13) has it that, usability testing involves activities that focuses on observing users working with a product and performing tasks that are real and meaningful to them.

Approaches to measuring usability test might differ in ways of observing users, but the core definition remains the same. When planning, designing and observing usability tasks, it should be guided by these six points; effectiveness, efficiency, satisfaction, discoverability, learnability and error proneness (Ritter & Winterbottom 2017, 2017).

There are a wide range of different forms of conducting usability testing by different authors. Norlin (2001, 49) outlined the following steps, which include; forming a web team, establish goals and objectives, develop questions and tasks, write the script, recruit participants, decide on moderator and recorder, set up the room and coordinate times, test the test and work out links, analyse the data and make revision to the website retest.

### **3.1 Definition of usability**

There has been several definitions of usability, by different authors, but however there is still a wide difference in the definition of usability. However, the most widely accepted and standard definition of usability is that from the International Organization for Standardization (ISO), 9241-11, which defines usability as the extent to which a product can be used by specific users to achieve specific goals, with effectiveness, efficiency and satisfaction within a specified context of use.

According to Barnum (2011, 11), the above definition by (ISO), brings out three important elements; specific users, specified goals and specific context and also critical usability measures such as; effectiveness, efficiency and satisfaction. These aspects cover broadly what usability is all about.

However, Nielsen (2006), rather gave a more simplified definition of usability, which is “the ease of use for users of a webpage or webpages to complete or accomplish task(s) without difficulties”. One thing in common with the above mentioned definition is use of the word, (users).

From Nielsen’s definition of usability, the word (ease) of use is the very reason why owners of webpages are seeking to improve their, websites to make it easier for user to get the information they need.

### **3.2 Some key aspects when creating a website**

When creating a website just like visitvantaa.fi which is my case study, it is important or better still absolutely necessary to have an analysis of (tourists) group. This will help in creating relevant content. Knowing your audience helps in the readers (maybe even someone you know, like your advisor), and as your review or writing your own work you automatically imagine that person reading it (Mathewson, Donatone and Fishel 2010, 3).

In addition, there is a need to take in to consideration relevance in using key words. The first thing to do if you want to optimize a page for search is to find out the key words that are related to your topic or theme that are most often searched for (Mathewson, Donatone and Fishel 2010, 4). It is also important to create visual hierarchy when creating a website. The appearance of the things on the webpage, visual cues must be clear and accurately reflect the relationship between the things on the page, things that are related and those which are part of other things (Krug 2006, 31).

Furthermore, when creating a website for marketing purposes or otherwise, it is important to make it simple, clean and visually flat on screen by using simple lines as layout elements, white spaces and bright colours, (flat design). Flat design is a digital design style

that was one of the most discussed trends in 2013, characterized minimalistic look, focused on removing all extra elements and effects from a design, such as shadows, lighting effects bevels, depth, texture and every element that creates and give an extra dimension to these elements (Pratas, 2014, 20).

More on this creating website should not only depend on beautiful texts and simple colours but creating a layout where content and photo stands out this brings out the focus of the user on the content instead of the interface (Pratas 2014, 38). It is also important to use very wide and high-resolution photo of products, people and environment to showcase your product in real-life situation as it is commonly said "a picture is worth a thousand words" (Pratas 2014, 38). It is good to use pictures well to communicate your message, that will further make it possible that all elements are visually identifiable for example links, text fields and buttons must be easily distinguishable (Pratas 2014, 54).

It is also important to get a great balance between a great looking website and a functional one. According to studies mentioned above one key aspect to consider when creating a web site is; usability. Usability seems to be emphasized more frequently thus making it seem one of the most important aspects. You have less than one minute to communicate the first time a prospective customer visits your web site, as far as users are concerned, every page must justify its claim on their time (Nielsen & Hoa 2006, 21).

It is considered that, the success of a good designed web site can be measured by; how often users return to a web site, how often they recommend it to family and friends, how frequently they use it and how often they buy similar products from the same company, (Muhtaseb, Lakiotaki. & Matsatsinis 2012, 30).

### **3.3 Usability heuristics**

There are several other principles and aspects by different authors when analysing or measuring the usability of a webpage/webpages, interestingly over the years, authors often refer to (Jakob Nielsen's) writings and principle of usability. This explains why in most parts of this research his principles and concepts of usability will be often used and will as well be used to evaluate results or responses from the participants of this study.

Heuristics are the ten general concepts for interaction design, this because they are a broad range of rules and not specific usability guidelines, (Nielsen J, 1995). Although most of the usability basics by (Jakob Nielsen) date back in the 1990's his practices are as relevant now as they were in the past, (Neil T, 2009), she further emphasized the fact that looking recent Flex showcases recently, many of the applications are not built with best practices in mind. Below is an explanation of the ten heuristic practices.

### **3.3.1 Visibility of system status**

Visibility of system status is one of the heuristic principles. This means that; a system should always inform users about what is going on through feedback within an appreciated time, (Nielsen J.). This thus means that, communicating the current state give users the feeling of being in control and also taking action to reach their goal, which will influence them to trust the brand. For example, your laptop, or phone displays how much battery remains also your email informs you of how many unread email messages there is, all these functions and information allow you to effectively assess the current state of the system one is interacting with, (Harley A, 2018).

### **3.3.2 Match between system and the real world**

The second usability heuristic by Nielsen is, match between system and the real world. This aspect seeks to explain the fact that, the system should be in line or better still speak the language of the targeted group. Nielsen (1995), the system should at all-time speak the users' language, with words, concepts that are familiar to user, with phrases rather than system-oriented terms. Nielsen further explained that; by nature, human beings find comfort in familiarity. By so doing match between system and real world, as one of the principle of heuristics is one of the most important.

To emphasise the importance of the second heuristic, by Nielsen, there is classic example by, Duggirala (2016); Neil Patel could very well say "Sign Up" on his landing page. Instead, he chose to say ambitiously "Yes, I want Neil to teach me how to grow my Business", this speaks the language and sets the context.

### **3.3.3 User control and freedom**

In addition, the above mention heuristic principles, the third one is; user control and freedom. This explains the fact that users often choose system function by mistake and will need a clearly marked emergency exit to get out of the unwanted situation, without having to go through an unclear process, (Nielsen, 1995). The user control and freedom heuristic principle can be illustrated best by the Gmail's flash message with the undo action when we accidentally delete an email, (Duggirala, 2016).

### **3.3.4 Consistency and standard**

The forth usability heuristic is consistency and standard, which means that; website users shouldn't wonder or get confused whether different words, actions and situation mean the same. This means that a Sign in button on one page, has to be and look the same across the website on any page that the user navigates to. To summarize it all, standards ensure a consistent vocabulary, but don't limit designer's freedom and responsibility in design issues and also guidelines for design standards and writing, (Nielson, 1999). To further buttress this aspect of heuristic principle, Nielsen outline some design standards of interface that must be followed: to be well illustrated with examples, make sure examples fully

comply with standards, have standard experts available both to review new design in formal standard inspections, be a living document under control of standard, just to mention a few.

### 3.3.5 Error prevention

Error prevention is the fifth heuristic principle. A good design should prevent a problem from happening in the first place. For example, how many times does your outlook remind you of no attachment in your email, even though you mentioned that something is attached? Outlook scans email for such key words and alert users before sending, (Duggirala, 2016). A classic example of error prevention is given by, Laubheimer, (2015), users are often distracted from the task at hand, prevent errors that may occur unconsciously by offering possible suggestions, being flexible and use of constraints. Figure 4, below gives a picture representation of error prevention.



Figure 4: Google Search trying to correct spelling, (Duggirala, S. 2016).

<https://blog.prototypr.io/10-usability-heuristics-with-examples-4a81ada920c>. Accessed: 11. September, 2018.

### 3.3.6 Recognition rather than recall

This paragraph explains the sixth usability heuristic principle which is; recognition rather than recall. This principle explains the fact that web users, should not have memory load when using a website: actions and objects must be clearly visible. This aspect of heuristic principles of one those that, I will be focusing more on, to see or find out in my study if users of visitvantaa.fi find it hard or easier without having to think a lot in getting information that they are looking for.

The above mention heuristic principle brings in the issue of recognition versus Recall. In everyday life, it is a normal or common phenomenon to use a combination of recognition and recall to help us retrieve information from memory, often starting with information that is easier to recall, to help we narrow our choices, then going to through the resulting choices one by one to recognize relevant ones, (Budiu, 2014). In conclusion and to put it in more plain term, the user of a website should not have to remember information from



one side of a dialogue to another, instructions for use should be retrievable and easily visible, (Nielsen, 1995).

### **3.3.7 Flexibility and efficiency of use**

Flexibility and efficiency of use is the seventh heuristic principle by (Nielsen). The website should cater and be friendlier to both experience and inexperience users. To emphasize the importance of this heuristic principle of usability, it has been mentioned in previous chapters of this research and I will be focusing on this, during my findings in this research.

Aesthetic and minimalist design is the eight-usability heuristic principle. This means in simple term that; irrelevant information or not needed information on websites should be avoided at all cost. Every information in a dialogue should compete with relevant units of information and diminishes their visibility, (Nielsen); this aspect was also written by, Krug (2006, 31), on website creation and ease of use.

The ninth and tenth heuristics are: help users recognize, diagnose, and recover from errors and help in documentation, respectively. This mean error messages should be simple and written in plain language, not with code, (Nielsen).

## 4 Research Methodology

The empirical part of the research will be conducted using the qualitative research method. The think aloud method/technique will be used to collect data from tourist visiting Vantaa. During the process, tourists will be required to browse on [visitvantaa.fi](http://visitvantaa.fi) as they perform some tasks and there after giving their feedback on the ease of use and finding relevant information they need. My assessment criteria will be based on some of the usability heuristics. Several popular tourists' locations such as Vantaa city museum, Tikkurila train station, park, Vantaa airport etc., will be chosen for the empirical study, of which the potential target group will be tourists who speak and understand English language.

In addition, the research will be created in evaluating different users' perspective on the existence of usability characteristics that affects the success of tourism web site and the level at which usability activities a considered on [visitvantaa.fi](http://visitvantaa.fi).

### 4.1 Research Method

Think aloud method or better still protocol, is a method that involves group of users who interact individually on an interface, vocalizing their thoughts while performing some required tasks (Nielsen 2012). The think aloud method is widely popular because it is cheap and easy to use. Think aloud should be your number one tool in your user experience (UX) tool box even though it entails some risks and does not solve all problems (Nielsen 2012)

However, some authors described think aloud as not normal for most people and could be so unnatural. Barnum (2011, 19), although think aloud is not normal to most people, the added dimension of having users share their thoughts, pain, pleasure and reactions, helps you understand better about their experience. Furthermore, according to Nielson (2012), allowing users verbalize their thought helps to facilitate the identification process of major misconception from users on an interface.

To run a basic think aloud usability study, there are just three things needed; recruitment of representative users, give them representative tasks to perform, and finally shut up and let them do the talking (Nielson 2012).

With above mentioned, one will say that think aloud protocol helps website designers and developers understand how end-users think.

In this research I will also be using website usability model proposed by Vankatesh and Agarwal (2006), to gain a deeper understanding of usability. The model differentiated usability by applying the International Organization for Standardization (ISO) definition on usability, which is "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, satisfaction, efficiency in a specified context of use". The model is shown on figure 4 below.

<b>Usability Elements</b>	<b>Sub-categories</b>
Ease of Use	View, Select, Add to Cart, Remove to Cart
Made-to-medium	Product Categorization Accessibility & customer service
Emotion	Users Feelings
Content	Information Layout

Table 1. Usability Elements (Venkatesh & Argawal 2006).

From the table above, medium to medium indicates to, design of webpage that corresponds to users need, emotions is related to user's feelings in using the website, ease of use entails cognitive efforts in using the website and finally content is describing the page or website layout.

Think aloud analysis being the tool with which this study will be using to analyse usability and evaluate customer satisfaction on visitvanta.fi, can never be better achieved without mentioning factors that affect customer satisfaction on websites.

The concept of customer satisfaction is related to the concept of quality (Kennett. and Salini 2012, 12). There is usually a perceived service quality from the customers. A perceived service quality is defined according to the difference between the consumers' expectation and perception (Kennett and Salini 2012, 12). Other studies have it that, customer satisfaction is a measure of how services and products supplied by a company surpass or meet customer expectation (Muhtaseb, Lakiotaki, & Matsatsinis 2012, 33). In marketing history, it is deeply considered that the greater the degree of customer satisfaction the higher the level of individual loyalty, (Muhtaseb, Lakiotaki, & Matsatsinis 2012, 33).

There have been many studies that evaluate consumer satisfaction by comparing consumer expectation and the product and service performance. Consumers will definitely feel dissatisfied if the consumed product falls short of their expectation and vice versa. On the other hand, Robson, (2012, 18) explains that consumers form opinions and make judgements of a business based on the employees with whom they interact. Apart from expectation and performance as main attributes that affect satisfaction, other factors such as values, loyalty, attributes and moods also affect satisfaction on websites (Oliver 2006, 6).

According to other related studies, web site user satisfaction depends on elements such as web page downloading time, responsiveness and appeal of graphics, content and ease of use (James, Mohammad, & Karen 2000, 3). Interesting there are different aspects researched over the year by different authors that they find most important as a factor affecting web user satisfaction, for example James, Mohammad & Karen (2000, 5) stated that; response time continue to be the number one problem facing web users with 63% respondents stated downloads take too long. Other studies also emphasize web page responsiveness. Studies have also proven that consumer satisfaction could enhance and be maintained by continuously improving the performance of some attributes.

Despite the increased and significant research done on web user satisfaction there has been little research made on the measurement of user satisfaction on web-based information system (Xiao & Dasgupta 2002, 1149).

Judging from past studies and research, there still exist a gap between webs site user expectation and system performance. Reading from several sources, to derive satisfaction from a web site, its usability is of prime importance. Muhtaseb, Lakiotaki & Matsatsinis (2012, 31), personalizing as an attribute of usability is the process of tailoring pages for particular users, as a way and means to satisfy users. The above-mentioned attribute has not been commonly used by other researchers.

As already mentioned the theoretical framework for this study is based on, the think aloud method by (Nielsen, 2012), which is a tool that involves specific number of users who interact with a system or webpage individually, and also web site usability model by, (Venkatesh & Agarwal, 2006).

## **4.2 Usability testing.**

Usability testing definition may vary as per different authors. Usability testing can be defined as the compatibility of an ordinary web user to find out how to perform actions and tasks smoothly and efficiently while using computer or artefacts (Krug 2014, 9). Usability testing process should involve participants who are from a targeted audience and an age group to access the level at which a website meets usability criteria.

To further have an in-depth knowledge of what usability testing is, I referred to other definitions by scholars who have written on usability testing. The activity that focuses on observing users working with a product, performing tasks that are meaningful and real to them Barnum (2011, 13).

Much has changed in the ways of testing usability, which also includes the possibility of not observing users when conducting remote testing, but the sore definition remains unchanged. Some benefits of usability testing are that it helps in identifying early problems with a website. As Barnum, (2011,13 &14) rightly explains, changes in technology, includ-

ing access to users anywhere at any time, coupled with changes in scope of testing (from very big to very small studies) which means that the definition of usability testing needs to embody the practices and methods that support testing in many different conditions and environments.

Furthermore, usability testing ties with some of Nielsen's heuristic principles just like; visibility of systems which relates to the title "Don't make me think", a book written by (Krug. S 2006). During the testing process of this research I will be keen to observe if tests participant take so much time in finding an information and if in the process they think too much.

Usability testing is very important when creating a website and also even after creation, to asserting this: if you want a great site, you have got to test, after you have worked on the site for a few weeks, you can't see it fresh any longer, there is the tendency of you-know-too much, the only way to find out if it really works is to test it (Krug 2006, 133).

As earlier mention in previous paragraphs, I will be using thing aloud method for this research, reason being that; I find it most relevant method and recommended by renowned authors such as Barnum (2011, 19) who recommended think aloud protocol.

The analysis of the results will also be supported by theories from other authors mentioned in previous chapters principally Nielson's heuristic principles.

In this test, I will be creating tasks-based scenarios since it is not a huge study, by giving participants a specific task to perform, using a maximum of 5 participants. Tasks should be embedded within scenarios, which are realistic descriptions formed around users', and as they are given a description of their goal you can then observe them as they perform the tasks (Barnum 2011, 19).

The chapter below will be explaining different type's techniques, ways and methods of testing usability and ways of analysing results.

#### **4.2.1 Types of usability testing**

Testing the effectiveness of websites is getting more and more important and popular nowadays. The choice of the testing method depends on the individual organizing the test and result that he or she will want to get. Fundamentally there are two types of usability testing: remote usability testing and traditional in-lab usability testing. According to most authors, the most common usability testing is the in-lab testing, which is what will be used in this research to test usability on [visitvantaa.fi](http://visitvantaa.fi).

#### **4.2.2 Traditional moderated/in-lab usability testing**

Traditional usability testing or better still in-lab testing is the most frequently and commonly used/applied usability testing method, which involves in most common scenario 5 to 10 participants (Tullis & Albert 2013, 53). In this case it is usually a one-on-one between the moderator and the test participants as he asks questions which the participants are supposed to respond to. The participants are liked, to be thinking aloud, as the moderator records the participant's responses and behaviour (Tullis & Albert 2013, 53).

It is worth noting also that; testing in-lab comes with some benefits, for example providing a testing environment that is quiet, that which also provides space for the moderator and basic requirements for the testing and finally also accommodating any special requirement for the testing (Barnum 2011, 27).

As a condition, to facilitate the in-lab usability test a few recommendations are made such as: a microphone that will project everything the participant says, a camera to record that session, a logging computer mostly a laptop etc. (Barnum 2011, 27 & 28). This is a bit more detailed way.

As a recommendation it is better and convenient to use one participant at a time. In usability test, one user at a time gives the moderator the conducive time to keenly observe the participant and make reasonable notes or remarks (Krug 2006, 133).

#### **4.2.3 Online testing/remote usability testing**

Remote usability testing or online usability testing could somehow be similar to in-lab usability testing in most cases in terms of structure. One of the main differences is that, the moderator and the participants are in two different geographical locations (Schade, 2013). Online usability involves testing with many participants at the same time, which could be an excellent way to collect a lot of useful usability data from several participants at different geographical location at a relatively short time (Tullis & Albert 2013, 54).

Remote usability testing extends your reach to your user, as it provides opportunities and option to learn from users wherever they might be (Barnum 2011, 41). Rather than participants going to a particular location to participate in the test, they have the convenience to stay in their own home which in most cases is convenient and easier for them. There are two types of remote usability testing: moderated usability testing and unmoderated.

Moderated remote usability testing allows for contact between moderator and participant, because both are in contact, which give opportunity for a possible interactive session (Schade, 2013). It also means that the moderator is remotely present when the test is taking place presenting an opportunity where both the moderator and participant could ask questions (Barnum 2011, 41).

Unmoderated remote usability testing is completed alone by the participant. Which mean that the test is completed by the participant alone without the presence of the moderator, using a web-based application to conduct the testing (Barnum 2011, 41). The one difference is that; user or participants do not have real time to ask any questions if there may be in unmoderated remote usability testing (Schade, 2013).

Moderated remote test is also similar to traditional in-lab testing, but the significant difference is the spatial difference. In a moderated testing a moderator can quietly nudge a participant to ask how he or she is doing.

### **4.3 Data Collection and analysis**

As earlier mentioned the think aloud protocol shall be used in collecting data from participants to evaluate the level of usability on visitvantaa.fi. Because this research is focused on tourism website, there is a need to define a participant(s) profile or better still target group. In this case except otherwise, this research shall focus on all who use visitvantaa.fi. Both as local but mostly international tourists, specifically those of whom speak English. The reality in this case is that, budgets are low and or small for testing, thus whatever usability testing you must do must be done quickly, so that your understanding of the product could be added towards the development of the product, in this case; visitvantaa.fi, (Barnum 2011, 18).

Therefore, as mentioned in previous chapters above, remote-in- the lab testing shall be used to conduct this study, and for this study to make sense and yield good results, participants will have to complete specific tasks (Barnum 2011, 19). Adding to these, those who are patient, calm, empathic and a good listener, (Krug 2006, 143).

#### **4.3.1 Observation approach/mode**

Observation techniques are meant to gather data in the process watching participants completing assigned tasks while interacting with an interface. Observations/observing your participants yields good feedback, as qualitative feedback is gathered by noticing how and what participants do while engaging or involved with a product, (Barnum 2011, 138).

Observation during usability enables and reminds you that not everyone thinks the way you do, knows what you know, uses the web the way you do (Krug 2006, 134). This add thus to the fact that, the reactions from the participants during the test process will help this study observe some mistakes or better still errors in effective usability of users on visitvantaa.fi.

More to these, to accompany the observation process; questions will be asked to each participant, at the end of each session of the testing (Barnum 2011, 173).

Based on the fact that visitvantaa.fi is a tourism website, participants for the study were all chosen to fit the main purpose of the website (tourists). This is intended to help make the results of the findings relevant.

A total of five participant where chosen for this study. This number of participants is based on the research method that will be used (think aloud protocol), which is according to Nielsen (2000). The traditional moderate testing is the method of testing to be used for the test, which is one of the testing methods explained above. The table below describes the usability testing set-up for this study in a nutshell

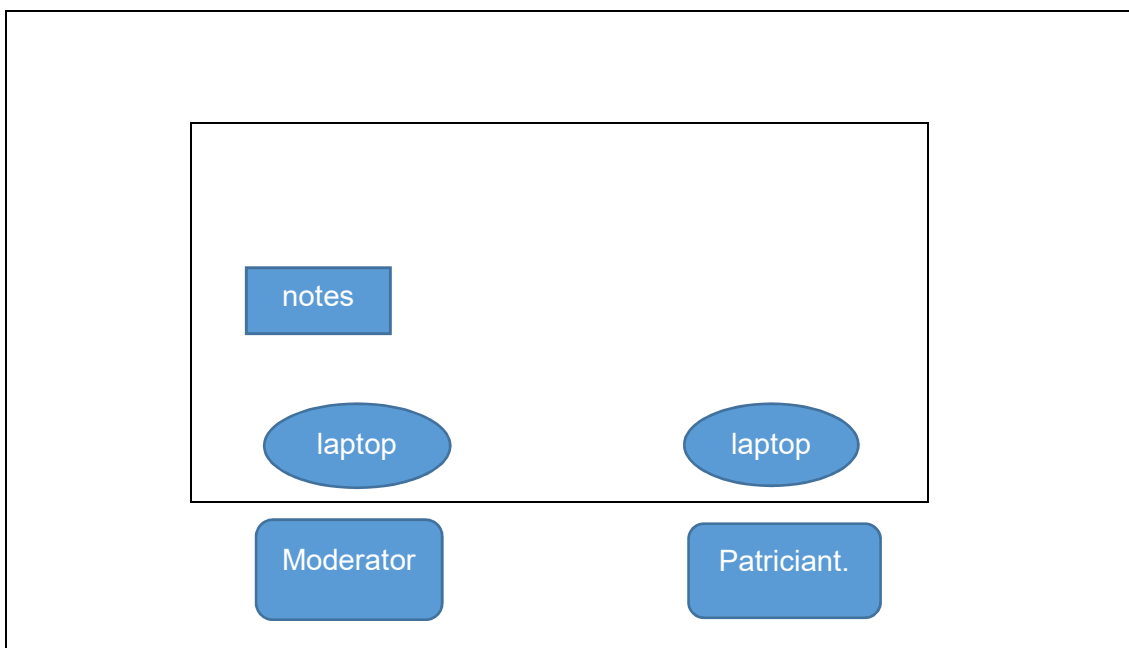


Figure 5. Usability testing set-up



## 5 Analysis

Based on the problem that this study is seeking to answer, the questions for participants to answer is solely intended to suit the research questions mentioned above in the introduction of this study. A total of ten questions were to be completed by the participants. These questions were formed by considering and using the usability heuristics by (Nielsen), explained in chapter 3.2 above. These ten questions are found at the appendix 1 of this study. From the results gathered the website usability of visitvantaa.fi is functioning but underperforming, with some major problems identified which will need immediate fixing, which author (Nielsen), describes as “catastrophic problem”.

For purposes of analysis and clarity the ten questions answered by participants is grouped into four main parts based on the usability heuristics by (Nielsen), that I find most relevant for this study and also the research question that this study is seeking to answer. These four main parts are; flexibility and efficiency of use, error prevention, consistency and standard, recognition, rather than recall and match between systems.

### 5.1 Task success data per participant

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Task 8	Task 9	Task 10	Average
Participant 1	1	1	1	1	1	0	1	1	0	0	70%
Participant 2	1	1	1	0	0	0	0	0	0	0	30%
Participant 3	1	1	1	0	1	1	1	0	1	0	70%
Participant 4	1	1	1	0	0	0	0	1	0	0	40%
Participant 5	0	0	1	0	0	0	0	1	0	0	20%
Average	80%	80%	100%	20%	40%	20%	40%	60%	20%	0%	46%

Table 2. Task success data for 5 participants.

Task 1- 10 represents question(s) 1 – 10. Found in the appendix

The task success data, table 2 above present the result of the task completed by participants as they completed tasks during the test. The tasks above number from 1 to 10 represents questions 1 to 10 that could be found in the appendix 1 of this work, for further

reading. The task used in the table above is intended to suit the presentation of the results from the table above as the participants attempted each of the ten questions.

From the table above, 1 represents successfully completed task while 0 represent un-completed tasks. The task scenario success in this study is particularly important because it helps in clearly defining how easy or difficult each task was.

The binary task success use above was chosen for this study because it is the most common and effective way of measuring task success from participants during any usability test that involves participants (Tullis and Albert, 2013, 65).

From the table above, the averages along the right represents success rates in tasks performed by each participant and the averages along the bottom represents tasks success rates for each task. From the data in the table above an average of 46% indicates the complete success rate by participant from tasks completed on visitvantaa.fi.

The 46% thus indicate the fact that there huge usability problems with visitvantaa.fi, resulting to underperformance. Most of the difficulties and errors will be discussed in subheading 5.2 below which will detail comments and feedback from the participants and the moderator during the think aloud testing process.

From the results above it is be seen that task 10 was the most challenging have a 0% response, followed by task 9 with 20%, task 6 with 20% and task 4 with 20%. The easiest with regards to the results in term of task completed is task 3 with a 100%, then followed by tasks 1 and 2 with 80% respectively.

The poorly performed task from the testing results is a clear indication that those aspects are not working properly to serve the purpose for which it is intended. They range from position of informations, recognition of icons and error prevention of visitvantaa.fi, which are all usability heuristic by (Nielsen), as detailed in previous chapters of this study. More detailed result of these shall be analyse in 5.2 below. Correspondingly, from the above result, the most performed aspects from the thinks aloud task performed by the participants that had 100%, 80% and 60% are aspect of the website that are functioning properly in other words, the usability aspects are good.

Below is a chart indicating the binary success rate for task completed in percentages, from the task table above.

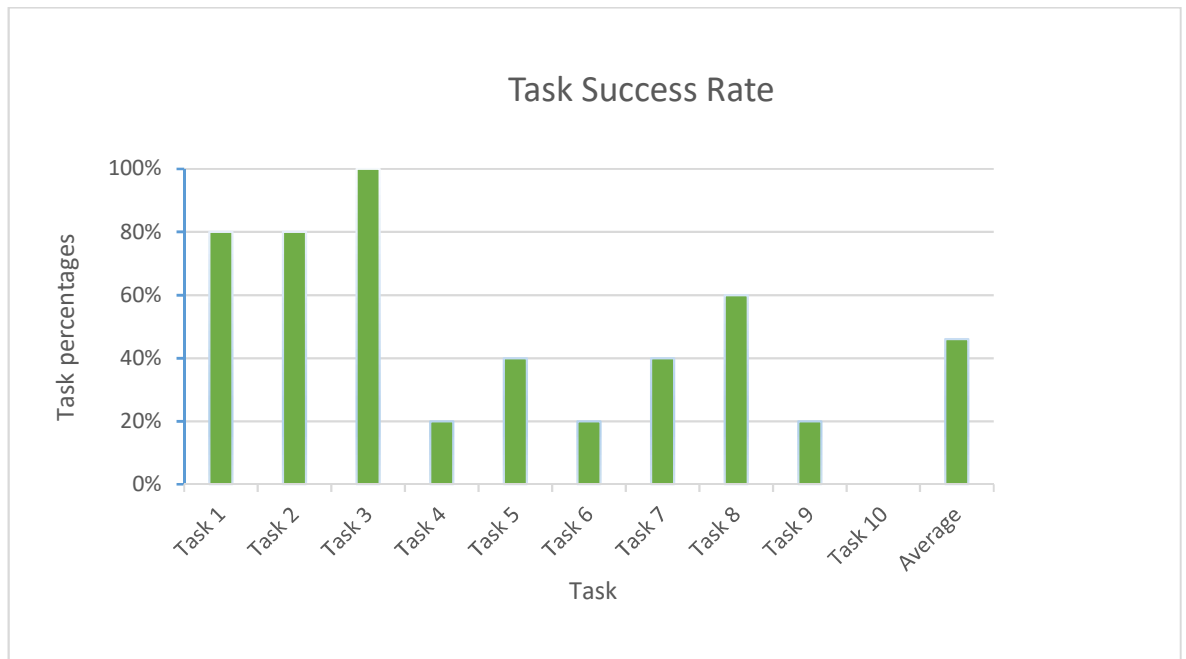


Figure 6. Task success rate summed on an average for date table 1

## 5.2 Usability test of Visitvantaa.fi website

This part of the analysis explains how the participants behaved, in term of body language, expressions and verbalization during the think aloud test and also observations from the moderator. The comment from users or participants during a test while they interact with an interface help shed light on the nature of the problem they are experiencing (Barnum 2011, 258).

Also, important to note is that, during this section of the analysis process, I will be making use of user comments by quoting in relation to various instance they encountered a problem or felt excited about an information. This quote will help understand user experience (UX), which is concept explained and mention in chapter 3 above (usability of webpages and user experience).

Furthermore, during this process of analysis, usability errors shall be characterised by using the Nielsen's (1995) severity ratings for usability problems, this will help give clarity and understanding to the analysis and for any ready. The severity rating scale are;

- 0 = I don't agree that this is a usability problem at all
- 1 = Cosmetic problem only: need to be fixed unless there is extra time available on project.
- 2 = Minor usability problem: fixing this should be given low priority
- 3 = Major usability problem: important to fix, so should be given high priority.
- 4 = Usability catastrophe: imperative to fix this before product can be released.

To start the analysis of this process, I will begin with the test participant's profiles and their comments by grouping them into positive and negative comments. This further strengthens and sheds more light on user experience (UX), with each instance representing a good or bad experience.

### **5.2.1 Test participants profile and selection**

The usability testing on [visitvantaa.fi](http://visitvantaa.fi) constituted a total number of five participants for the test process. One out of the five participants was aged between 20 and 30 years old, see (appendix 2) and three out of the five participants, was aged between 40 and 56 years old and finally one out of the five participants were of retirement age already, see (appendix 2).

Participant 3, see (appendix 2), happened to fall within a different age group compared to the other participants. The reason for his selection is based on the fact, he was within the target group intended for this study, who are tourists.

Selection of participants for a usability testing is of utmost importance to the reliability and outcome of the results, notwithstanding the fact that, recruitment takes a lot of time as you must keep on updating and reminding them of the scheduled test date and what it entails. Barnum (2011, 158) if you are recruiting yourself, you can take from your current customers or prospective customer, assuming you have access to them.

Important to note is that, the user profile of [visitvantaa.fi](http://visitvantaa.fi) are a tourist. To this effect, part of the recruitment process was facilitated by a Hotel Management, who granted me access to the hotel premises, to interview guests who were tourists, and who met the target participant profile for the test.

The other set of participants was gotten through my network at work place. In effect, participants for this research were gotten through; connection at current work place and hosting place for tourist, which in this case is a hotel and staff.

### **5.2.2 Positive reaction and comments from participant**

From a positive and exciting reaction from participants, question/task 1 which represents a picture representation of [visitvantaa.fi](http://visitvantaa.fi) which by Nielsen's heuristics is recognition with most common attribute being; colour and picture and per other authors mentioned above could also mean aesthetics, received 80% of completion success which was task 2, and which was the front page of [visitvantaa.fi](http://visitvantaa.fi), you could see appendix 1 for more detail. Participant (1), said "nice and simple", while participant 2 said, "Pretty easy to tell it's a tourism website" and participant (3) said "easy to get". This thus makes sense to say, the front page of [visitvantaa.fi](http://visitvantaa.fi) is a good design for a tourism website in terms of colour and picture.

Positively task 1, also got 80% but with a bit differing comments from participants. Their facial expression and reaction were not bad. Refer to appendix 1 for detail of the task. Participant 1, exclaimed “oh yes”, participant 2, 3 and 4 got it right but commented that, the events and page is only in Finnish. Participant 1’s excitement could in this case be explained by the fact that she is Finnish and understands Finnish perfectly, but participant 4, even though completed the task said “the language on this particular link is in Finnish, this makes it difficult non-Finnish speakers to understand upcoming events or to even understand the content”. Based on severity rating scale of usability problems by (Nielsen), this could be placed under scale 3, which is major usability problem; (which should be put under priority). Participant 3 with regards to question, who actually completed the tasks 1, said “a bit difficult to find” and recommended the search button or link would have been below instead of above, this pose a cosmetic problem in this regard and could be fixed when there is time.

Solving task 3 which has a score of 100% based on the fact that, every participant got it right and easy was met with positive reaction and comments. See appendix 1, for details of the question. Task 3 based on the responses is a clear indication of the fact that, positioning of said link was categorised correctly and with easy and concise language. This explains to the fact that using the right words on a website facilitates understandings of searches by users of the interface making it user-friendly which is a positive usability attribute. In this case participants could easily locate JUMBO shopping mall, which was the task, because on the front page of visitvantaa.fi you could clearly see on the top left side of page the link; SEE & DO this automatically translate to the users mind that it is a link for activities and things to do, and just when you click on it you are linked to a page also having links to, (FOR FAMILIES, SHOPPING, EAT & DRINK, INTO THE NATURE and ATTRACTIONS). A click on the link, (SHOPPING), gives you a variety of shops with JUMBO clearly seen. In all these positive and exciting comments from the participants, the most outstanding one came from participant (5), who said “the shop is easy to find, with just two or three clicks”.

### **5.2.3 Negative reaction and comments from participant**

This segment of the analysis is intended to bring out the aspects of visitvantaa.fi which are a usability problem. From the task success data above, it could be seen that there are more usability problems with visitvantaa.fi, the comments from participants in this segment will further assert the problems.

During the test process, task 10 posed a far bigger problem to all the participant, as it got a zero response. See appendix 1 for the detail of the task. This task was particularly frustrating to participant, because some could not even find the healthcare icon. Furthermore, clicking on the link, does not give any information. This could be term a catastrophic problem, following the five points of (Nielsen’s) severity of usability problems.

Finding AIRBNB Vantaa is the task that got some negative comments from the test participants (task 7). Participant 3 was observed scrolling up and down of the interface to get

the information, after spending some time he finally got it. He said, "There would have been a different colour to separate the links". Having made this comment which of course could also be a recommendation, demonstrates a problem of poor design and presentation. This could be classified under a minor usability problems that could be given low priority.

Still on finding AIRBNB in Vantaa, three of the participants did not get, possibly posing a problem of structure and position of links on the web site, adding to the fact that sleeping and accommodation is sure one of the most important for tourist.

For the two participants who completed the task in finding the AIRBNB, complained that the page in only in Finnish, could be a serious handicap for potential tourists who do not understand Finnish language and considering the fact that, it is a tourist website. This problem according Nielsen's severity of usability problems should be classified under category 3 which is: major usability problem, needed to be fixed urgently.

More seriously is the fact that, to the left side of the AIRBNB page, there is link where you could navigate up and down. There it is written host and bookings in (English language) and upon clicking on it the information only comes in Finnish language. Below are screen shots from the webpage that explains this usability problem.

## Host and booking

Pikavaraus, Supermajoittaja

## Huoneet ja vuoteet

Sängyt, Makuuhuoneet, +1 lisää

Figure 8. A screen shot before clicking on Host and booking (Vantaa kaupunki 2018)

[https://www.airbnb.fi/s/vantaa/homes?refinement\\_paths%5B%5D=%2Fhomes&s\\_tag=3SRvLhSG&allow\\_override%5B%5D=&section\\_offset=4&items\\_offset=18](https://www.airbnb.fi/s/vantaa/homes?refinement_paths%5B%5D=%2Fhomes&s_tag=3SRvLhSG&allow_override%5B%5D=&section_offset=4&items_offset=18) . Accessed: 16 November. 2018.

## Host and booking

### Pikavaraus

Kohteet, jotka voit varata odottamatta majoittajan hyväksyntää

### Supermajoittaja

Majoitu arvostettujen majoittajien luona

[Lisätietoja](#)

Figure 9. A screen shot after clicking on Host and booking (Vantaa kaupunki 2018)

[https://www.airbnb.fi/s/vantaa/homes?refinement\\_paths%5B%5D=%2Fhomes&s\\_tag=3SRvLhSG&allow\\_override%5B%5D=&section\\_offset=4&items\\_offset=18](https://www.airbnb.fi/s/vantaa/homes?refinement_paths%5B%5D=%2Fhomes&s_tag=3SRvLhSG&allow_override%5B%5D=&section_offset=4&items_offset=18) . Accessed: 16 November 2018.

The participants also mentioned the fact that, even after clicking on an apartment or room, the information and directive on how to book for it are still all in one language (Finnish).

The subsequent chapters in this study will be recommendations, which will be placed in priority according to Nielsen's severity of usability

### **5.3 Recommendations**

Every research study requires a recommendation at the close of the findings. The recommendation from this study will be made actionable, things that need to be fixed immediately and those that should be given urgent attention and finally taking into consideration the impact of the problem. As earlier mentioned, Nielsen's severity rating for usability problems shall be used.

It is recommended that, the link on [visitvantaa.fi](http://visitvantaa.fi), that when clicked on for further information gives a blank page, need to be fixed urgently, which according to this finding falls under scale (4) of Nielsen's severity usability problems which is called or termed a catastrophic problem.

Second recommendation will be that of design and positioning for AIRBNB found under the link SLEEP from the STAY link on [visitvantaa.fi](http://visitvantaa.fi). It would have rather been placed at the top of the page not at the bottom for easy view and recognition. The fact that [visitvantaa.fi](http://visitvantaa.fi) is a tourist webpage sleeping is an important part of tourist's activities, also adding to the fact, most tourists won't speak nor understand Finnish it is a major problem to have AIRBNB only in Finnish language. Thus, making this a major usability problem that need to be given major priority for fixing, putting it under scale 3 of Nielsen's severity ratings.

Further recommendations for [visitvantaa.fi](http://visitvantaa.fi) will be that of error prevention. It could incorporate the system of Microsoft word office, which puts up an icon at the bottom right of the page reading "pick up from where you ended". This will ease the pain of users going back to the search button to research a page that they mistakenly closed.

#### **5.3.1 Challenges**

In completing every research study, there are bound to be some major challenges that may range from having the right resources, timing etc. This study was no exception. The biggest challenge encountered was having the right people to perform the think aloud test

and having their time to perform and complete their tasks, which could affect the reliability of the findings.



## 6 Conclusion and future recommendations

Ever since the advent of computers and internet decades back, the studies for webpage usability became something that several authors started developing and paying attention to, with one of the most prominent authors usability the world has ever known, Jakob Nielsen. The rate of internet and computer usage has been changing rapidly over the years since the advent of internet and computer, prompting most businesses to go digital and online with their marketing.

The above trend also has also prompted consumers to reduce the level of traditional face to face contact with products, and rather prefer to shop and acquire services from the comfort of their computer screens. This tendency has also accelerated the rate a witch, website owners want to know how user friendly their websites are. Thus, website usability is an important aspect of a webpage. The question one will ask is, what will be the future of websites and usability in 20 to 25 years to come?

Importantly the purpose of usability is to improve interaction between the user and the webpage, thus making it an interactive affair and making it an item that will always be improved and never-stop issue.

For future research and development, more studies on usability problems should be compared and possible correction of such problems. Future research should be able to find research gaps from previous studies of usability problems and with that form the basis for a research to be carried out. This will help eliminate repetition of findings, but instead concentrate in finding and solving more isolated and complicated usability problems.

In conclusion this research paper, has given me the opportunity to be able to review other write-ups in the field of usability and further helped in widening my understanding of usability and user experience on webpages. It has further made me understand some of the common difficulties that users of an interface encounter when interacting with it.

Above all in the process of review of this paper, the objective critic and feedback from my supervisors gave, me an added advantage to further research on usability as a topic making me gain an even deeper understanding of the concept.

Furthermore this study has helped evaluated my competences and weaknesses in terms of research and its ethics. I have been able to understand how to compare different studies and understand their differences and similarities, which gives you an understanding of what is a research gap and that thus helps direct your own line of findings.

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## Appendices

### Appendix 1. Questions/tasks for think aloud participants

Participant(s) Question

Question: 1. You are a tourist visiting Helsinki for one month and are interested in attending an event or festival, could you find out what events are coming up within days and weeks in Helsinki and Vantaa?

*Please let us know when you have finished the task!*

Question: 2. Front page scenario. As I turn on the front page of this website, could you tell what you noticed that explains the purpose of the website in terms of *color and picture*?  
*Five seconds.*

*Please let us know when you have finished the task!*

Very easy 1	Easy 2	Difficult 3	Very difficult 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question: 3. You are on a stop-over in Vantaa, and desire to shop for some Finnish item, could you find a shopping mall in Vantaa called Jumbo that has more than 100 shop?

*Please let us know when you have finished the task!*

Question: 4. You have to travel to Helsinki-Vantaa airport for your flight to London, can you locate the HUB train station called DIXI Tikurilla which links the airport and Helsinki Centre?

*Please let us know when you have finished the task!*

Very easy 1	Easy 2	Difficult 3	Very difficult 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question: 5. You are a tourist who was visiting Helsinki, while on transit to the Vantaa airport at Tikurilla train station you lost your hand luggage, could you find or locate the number/contact to lost and found at Tikurilla DIXI shopping center?

*Please let us know when you have finished the task!*

Question: 6. You are on a short stay in Vantaa-Tikurilla, and want to get more information on the management of DIXI-Tikurilla shopping and train station, could you get the contact details of the shopping center Director?

*Please let us know when you have finished the task!*

Very easy 1	Easy 2	Difficult 3	Very difficult 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question: 7. You arrived Helsinki for an emergency stop-over and eventually need to sleep-over, could you find the AIRBNB VANTAA, link on visitvantaa.fi?

*Please let us know when you have finished the task!*

Question: 8. You need further information and need a contact person, could you find any contact number or information?

*Please let us know when you have finished the task!*

Very easy 1	Easy 2	Difficult 3	Very difficult 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Question: 9. You need information on healthcare service by using visitvantaa.fi, can you visually identify healthcare service icon just by looking without any description?

*Please let us know when you have finished the task!*

Question: 10. You arrive Vantaa airport with your child and need a health care service counselling for him/her can you find child healthcare contact information?

*Please let us know when you have finished the task!*

Very easy 1	Easy 2	Difficult 3	Very difficult 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix 2. Test participants profile

### Participant(s) Profile

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
<b>Gender</b>	Female	Female	Male	Female	Male
<b>Age</b>	56	!!	26	37	45
<b>Nationality</b>	Finnish	British	Taiwanese	Pollish	Dutch
<b>Profession</b>	Office as- sistant	Retired me- dia desig- ner	Sales & marketing	Logistic analyst	Senior supply chain ana- lyst
<b>Level of education</b>	University	College De- gree	University degree	University	MBA



### Appendix 3. Moderators checklist

#### Checklist

- Read out the question and instruct the participants to think aloud while completing the task(s)  
—
- Tell participants to verbalize their thoughts, (what they are looking for, decisions that he/she is making, stuck on something or having it easy as they use the interface)  
—
- At the end of the session each participant should write down the most difficulty he/she encountered.  
—
- Recommendation/possible solutions.