IMPROVING USABILITY OF BANKING WEBSITES
– BY IMPLEMENTING USER-CENTERED DESIGN

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Abstract

Researchers in the area of web usability dwell on the importance of simplicity in a website design so that users can achieve a specific task with effectiveness, efficiency and satisfaction. If a banking website misses one of these characteristics of usability users may get lost in the middle of the website or become frustrated and “will seek information elsewhere”. This study assesses what are the main issues behind the current banking websites through a questionnaire with 74 participants the result of this questionnaire shows that there are still unsolved problems in the current banking websites that impacts the quality of use. This study performs a thorough theoretical study to find out more about the subject understudy and by combining together with qualitative interviews; the study comes up with a proposed solution to improve banking websites’ usability – by implementing a user-centered design.

Keywords: User-Centered Design (UCD), Characteristics of Usability, Web Usability, User Experience (UX), Usability Evaluation, User Model.
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1 Introduction

1.1 Background

The Internet has challenged and changed the marketing of products in fundamental ways. It has emerged as an important channel for marketing products to consumers, causing worries for traditional retail channels. As a new medium for advertising and interactive marketing and as a new distribution channel, the Internet has become the mainstay of electronic commerce strategies of a rapidly growing number of organizations (Subramaniam, Shaw, & Gardner, 2000). Today almost all of the organizations in the world are choosing the web as the main channel of communication for keeping their reputation and servicing the needs of the customers in an easy manner.

Today, virtually every organization has a website to communicate or to address the needs of their users. But different companies have different intentions and purposes for their websites, perhaps the most important reason is as a communication channel with their customers. George (2008) pointed out that “the information they will provide will differ from company to company depending on the type of the business they are running”.

For instance it is instructive to see the following three different industries and the information provided to the users. Airline companies use it to handle booking, flight schedules, and to inform the kind of service they provide to their customers. A university or college website is mainly concerned with updating students, faculty and other members of the school with what is going on around the compound every day. It also facilitates book borrowing, registration for exams and other things that are related to the teaching-learning process. The banking industry uses the Internet to handle their customers’ banking activities in a seamless and swift manner. These activities encompass both transactional and non-transactional activities. Non-transactional activities are concerned with actions that do not involve exchange of money like viewing recent transactions, checking account balance and downloading bank statements. On the other hand transactional activities deal with the transfer of money between accounts as well as performing bill payments.

We immediately notice that all the three industries share one common feature – the need to address or provide the necessary information to their intended users easily. To achieve this very important objective, companies generally prefer using a corporate website as the main point of communication with their users. If the website is easy to use and the information is useful and easy to find, download, save or print, users are more likely to continue to use the website and even return at a later time. George (2008) argues that “if the information is hard to find or users get lost in the middle of the website, they will seek information elsewhere.” Therefore, to avoid the loss of current and potential customers, it is essential to design a website that is easy for them to use.

According to the standard ISO (1998), “usability is a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” In the context of websites usability can be expressed as “… a broad discipline of applying sound scientific observation, measurement, and design principles to the creation and
maintenance of websites in order to bring about the greatest ease of use, easy of learnability, amount of usefulness, and least amount of discomfort for the humans who have to use the system” (Pearrow, 2000). But, unfortunately, not all websites can be described as being usable. One reason for this state of affairs is most web designers’ tendency to forget the most important concept of simplicity. “Simplicity always wins over complexity: especially on the web where every free bytes saved is a millisecond less download time” (Nielsen, 2000).

Knowing what our users is looking for is important for designing a usable website, system or product. (Pearrow, 2000) defines User-centered design (UCD) as “both a technique and a philosophy that puts the user’s needs ahead of anything else”.

User-centered design (UCD) is a broad term to describe design processes in which end-users influence how a design takes shape. It is both a philosophy as well as a variety of concrete methods that are applied during web design and development. There is a spectrum of ways in which users are involved in UCD but the important concept is that users are involved in one way or another (Abras C, 2004). (Constantine & Lockwood, 2002) pointed out that, “Usage-centered design uses abstract models to systematically design the smallest, simplest system that fully and directly supports all the tasks users need to accomplish.” According to (Abras C, 2004) “at the opposite end of the spectrum there are UCD methods in which users have a deep impact on the design by being involved as partners with designers throughout the design process.” User-centered design is the approach of choice to fully understand what the users really look for in the website just as well as how the website should provide it to them.

As it is described in the definition above UCD takes the users as the center of the process. As a consequence it helps designers to know their users and understand what the users’ need from the system they are designing. Throughout the year we observe that, most web designers blatantly ignore usability and design for their own pleasure (or worse, the boss’s pleasure) instead of trying to satisfy user needs (Nielsen, 2000). UCD also helps in assuring the design is based on the end users interest rather than on the interest of the designers.

To develop a system that is usable by the end users, different system development companies apply UCD using a variety of usability tools and methods including card sorting, cognitive workload assessment, eye-tracking, personas and storyboarding.

This study circles around on the methods that can be applied to develop a usable banking website by implementing UCD as an integral part of the design process. The main idea is to discuss how to come up with a usable banking website that is easy and effortless to its users.

1.2 Statement of the Problem

As described in the background section, many organizations are focusing their marketing strategy to the web. Depending on the level of their interest, these companies come up with different website designs with the expressed objective of providing information to their users. “But the truth is that some of the industries come up with a design that makes the users frustrated and get lost in the middle of the webpage. In addition to this they even forget to design for the needs of their customers” (Nielsen, 2000).
Designing or developing a website that is effective, efficient and satisfying to the audience requires going through quite a large set of processes intended to give the end product these qualities. This is especially true in the banking industry as the kind and the number of users is enormous and their requirements from the website can be wildly variable. These users come from very different educational backgrounds, belong to the entire spectrum of age groups, might vary in their language abilities and preferences and their level of technical skills is generally diverse. Whatever design process is selected, it must take the variability of the characteristics of the intended users into consideration. This study focuses on the concepts of web usability, user centered design, and user experience design in this context.

Briefly, the problem of the study can be defined as: how to design a usable website for the banking industry by taking into consideration the users as the center of the design process by using a user centered design.

1.3 Purpose of the Study

Today many Internet users spend their valuable time looking for different information, ordering products, making transactions and the likes. Many websites are intended to cater to the needs of such users and provide some form of reimbursement to their owners. The intended use of such websites is providing the necessary information with the minimum effort and time. But, unfortunately, that is not the case. Some websites frustrate their users and often take too much time to complete even simple tasks.

Therefore, the purpose of this study is discussing what major challenges user’s encounter while using banking websites, what are the challenges to design a usable banking website and find out the basic concepts and principles that are important to design usable banking websites.

1.4 Research Questions

The aim of the research is to suggest ways that improve the usability of a banking website by implementing user centered design. To fully achieve this aim observing or evaluating current banking websites with respect to usability is essential. Finding out what are the characteristics of a usable website helps to check whether current websites fulfill the characteristics that a usable website must have.

The research question in this project is:

**How can the implementation of user centered design in the development process improve the usability of a banking website?**

To fully address the above research question, the following sub questions should be addressed and answered:

1. What are the main characteristics of usability that a banking website needs to fulfill?
2. Are there any challenges to the user in the current banking websites?
3. What are the challenges to developing a usable banking website?
4. What are the possible solutions to overcome the challenges to develop a usable banking website?

To answer the preceding sub-questions and to gain insight into the subject area it is important to look at previous researches. By analyzing the theoretical background, the research will then identify what has already been done in the past and what has been left out unseen in the subject area.

Usability can be defined from human factor, human computer interaction and user centered design point of view. (Heaton, 1992) argues that, “the key to any definition of usability is the user”. Many different definitions and lists of rules have been created intended to codify what constitutes a usable web site design. Some of them even agree with each other. But they all have the same principle at their core: users need usable products (Garrett, 2002). The study uses the definition of usability from a user centered design point of view in a way that can define usability of a website.

To identify usability characteristics one needs to identify what properties should be available to make the system or the website easy to use and also to refer to the ISO standard on usability. According to (Guenther, 2003) what's defined as "usable" and the criteria considered in testing are different for each website – determined by the purpose of the site and the audience it serves.

To make sure that all the necessary characteristics are appropriately implemented it is good to evaluate every step of the life cycle of the design process. To measure or test that a website has all the necessary characteristics, it can be tested by applying heuristic evaluation and usability testing. These two constitute the most common assessment parameters in the industry. “Heuristic evaluation helps to evaluate the website any point in the design stages and early in the cycle to provide a means of identifying major problems early” (George, 2008) and usability testing can be applied through all the steps of the process in user centered design.

There are different issues that prove to be the main challenges in the development of a usable website. Of the many different issues, this study mainly focuses on one problem area – disregarding end users and their needs during the process of the design.

According to (Pearrow, 2007) “design without knowing the real user is the most common mistake in the industry. Products and services often fail because designers never asked the people who would be using the product what they needed or how they currently performed their job with existing products.” Despite the vital strategic importance of user experience to the success of a web site, the simple matter of understanding what people want and need has been a low priority for most of the history of the web (Garrett, 2002). (Faulkner, 2000) “it would be wrong of me to argue that working with users isn’t without its problems. Users are people and so are designers. People can be tiresome as well as interesting and fun. Sometimes, working with users is problematic but the alternative – to ignore them would be foolhardy.”
To design a system that meets the end users’ needs, it is necessary to take them into consideration and understand their perspective at the design stage.

The important point is taking the real users into consideration during the design process. It is necessary to think carefully about who the users are and how to involve them in the design process. Obviously users are the people who will use the final product or artifact to accomplish a task or goal. But there are other users as well. The people who manage the users have needs and expectations too (Abras C, 2004). Businesses have now come to recognize that providing a quality user experience is an essential and sustainable competitive advantage. “It is user experience that forms the customer’s impression of the company’s offerings, it is user experience that differentiates the company from its competitors” (Garrett, 2002). This has a big impact on usability. Usability is all about ease of use by the end user. If the design takes what the users need in to consideration it will have its own consequences in the market share or the success of the company.

Without users, all you’ve got is a dusty web server somewhere, idly waiting to fulfill a request that will never come (Garrett, 2002). Consequently, today’s Web-based applications must often compete for users’ attention and usage. For example, if users find one Internet search engine difficult to use, they quickly switch to a more user-friendly search engine that accomplishes the same task. Similarly, a corporate Web site with low usability may cause users to use alternative methods to contact the company, such as making a toll-free call, which adds to the company’s cost of doing business. Therefore, usability is essential to the success of all Web-based information systems, including corporate Web sites (Albert, 2003). It is necessary these days to make the end users a part of the design process so that the designer can easily capture the needs of the users in a coherent manner.

At the end, this project addresses what should be done to answer the above sub questions and come up with a possible solution to improve the usability of banking websites.

### 1.5 Target Groups

This study will give an explanation on usability, user centered design, user experience design and website design. Because this project focuses on web usability and user-centered design within the field of Informatics, from an academic point of view, the study is targeted towards researchers in the area of web usability, user-centered design and user experience. In other words, one of the target groups in this study are researchers who are studying about how to design and implement a usable website and how to implement user-centered design to come up with a usable banking website. Additionally, researchers who have knowledge and are interested in web design in general and website for business particularly for the banking industry will also find interest in this study.

For IT professionals in the field it will show how to bridge the gap between the users and the system by implementing a user centered design approach. In addition, it can give an understanding of how to capture users’ experience through the process of user centered design. Finally the banking industry or any other organizations that uses the web as their
main business communication tool, are provided with systematic methods on how to address the needs of their users and take the users as the center of the design process.

This study can also be a guideline for students who are interested in the area of information systems. Particularly to those whose interests lie in one or more of the following topics: user centered design, user experience design, human computer interaction, system development, and interaction design. This is because the study mainly focuses on discussing web usability and user centered design and both concepts have quite a large role in the above fields.

1.6 Delimitations

A plan was made to conduct interviews with three different bank help desk managers. However, due to different reasons it was impossible to conduct these interviews. Therefore, the research outcome is limited to the questionnaire collected from university of boras students and interview with practitioners in the area of usability and user experience design.

Furthermore, the study does not attempt to compare the merits of the different usability evaluation methods, instead it provides insights into which method is most effective for varying scenarios. This is because the aim of the study is identifying ways to improve usability of a banking websites through user-centered design and a comparative analysis of usability evaluation methods is beyond its scope.

1.7 Expected Outcomes

The study of this paper mainly focuses on improving usability of a banking website through a user centered design approach. The results from the main research question should provide a clear and deep understanding of how a banking website’s usability can be improved through the application of UCD. In addition, the results of this research are also expected to provide full insights in to the characteristics of usability and the importance of UCD in the development of usable banking websites.
1.8 Structure of the Thesis

Figure 1.1 The structure of the thesis
2 Research Design

A research design provides a framework for the collection and analysis of data. A choice of research design reflects decisions about the priority being given to a range of dimensions of the research process (Bryman & Bell, 2011). According to (Yin, 1994) “every type of empirical research has an implicit, if not explicit, research design. In most elementary sense, the design is the logical sequence that connects the empirical data to a study’s initial research questions and, ultimately, to its conclusions.” Therefore this chapter will focus on describing the research perspective and research strategy that has been used in the study and the procedures used to collect and analyze data.

According to (Kothari, 2004) “the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money.” In addition, it helps “to avoid the situation in which the evidence doesn’t address the initial research questions” (Yin, 1994).

2.1 Research Perspective

The objective of this research is to create an understanding on how to improve usability of a banking website by implementing UCD. The study focuses on the status of current websites’ design with respect to usability, what has been missed or left uncovered in the current design process, how to improve the process and attempt to create an understanding of usability principles, practices of UCD and how to implement UCD in the design process.

As (Bryman & Bell, 2011) discussed it “an epistemological issue concerns the question of what is(or should be) regarded as acceptable knowledge in a discipline.” There are two major epistemological perspectives which are the positivist and interpretivist perspectives.

Positivists generally assume that reality is objectively given and can be described by measurable properties which are independent of the observer (researcher) and his or her instruments (Myers, 1997). In addition it advocates the application of the methods of natural sciences to the study of social reality and beyond (Bryman & Bell, 2011). Positivist is mainly implemented to test theories, if it fulfills the criteria the theory is sound otherwise it needs to be revised; there is no in-between.

Hermeneutic is a term drawn from theology, which, when imported into social sciences, is concerned with the theory and method of the interpretation of human action (Bryman & Bell, 2011). The aim of the hermeneutic analysis becomes one of trying to make sense of the whole, and the relationship between people, the organization, and information technology (Myers, 1997). As a philosophical approach to human understanding, it provides the philosophical grounding for interpretivism (Myers, 1997). This approach tries to create human understanding and also interpreting text correctly. It can be used as an underlying philosophy or data analysis techniques.

Form the epistemology point of view “interpretivism observes the researcher and the one which is being researched together. The known and the knower influence each other”
(Pickard, 2007), and from methodological stance, “interpretivism take the stance that any research activity will leave the subject of that research in an altered state” (Pickard, 2007).

Interpretive research in IS and computing is concerned with understanding the social context of an information system: the social processes by which it is developed and construed by people and through which it influences, and is influenced by, its social setting” (Oates, 2006).

This study attempts promote knowledge and to give insight on the selected subject area. It means the study will try to find out the relationship between the users and the web in a way that creates an understanding of how the users feel and perceive the web. The hermeneutic approach supports the kind of study that creates an understanding between people, organization and Information technology and hence is more suitable to apply in this context. According to (Neuman, 2006) this approach is sensitive to context, which are more concerned with achieving an empathic understanding than with testing law like theories of human behavior.

The study does not fully rely on qualitative data; it incorporates quantitative data obtained in the questionnaires of the empirical study. Some interview materials are capable of being supplemented by statistical analysis, and conversely statistical data also are likely to be analyzed qualitatively in part. Yet, the more operational point is that data collection and analysis can be done in both modes, and in various combinations, during all phases of the research process (Strauss & Corbin, 1998). According to (Johnson & Onwuegbuzie, 2004) the goal of mixed methods research is not to replace either of these approaches but rather to draw from the strengths and minimize the weaknesses of both in single research studies and across studies. Yin (2003) argue that “case studies need not be limited to a single source of evidence. In fact, most of the better case studies rely on a variety of sources.” Sometimes a research problem requires the use of mixed methods or qualitative and quantitative approach (Corbin & Strauss, 2008).

In this study the theoretical study and the interview provide qualitative data and the response from the questionnaire result is presented in quantitative form.

To show the objective of the research in coherent way it would be good to choose from the two perspectives the one that most suits the study. For these reasons this study will rely on the hermeneutic approach to perform this study.

### 2.2 Research Strategy

Research can be differentiated by inspecting the approach adopted by the researcher, e.g. quantitative vs. qualitative research strategies. As mentioned in the previous section the study contains both qualitative and quantitative methods.

According to (Krishnaswami & Satyaprasad, 2010) “qualitative approaches are popularly used to find the behavior of the people under study.” Qualitative methods focus primarily on the kind of evidence (what people tell you, what they do) that will enable you to understand the meaning of what is going on. Their greatest strength is that they can illuminate issues and turn up possible explanations: essentially a search for meaning - *as is all research* (Gillham,
According to (Bryman & Bell, 2011) qualitative research differs from quantitative research in several ways. Most obviously, qualitative research tends to be concerned with words rather than numbers.

Quantitative research gives emphasis on numerical data to test a theory. “The outcome of the study is presented through monetary or numerical terms” (Krishnaswami & Satyaprasad, 2010). According to (Bryman & Bell, 2011) described as entailing a view of a relationship between theory and research as deductive, a predilection for a natural science approach (and of positivism in particular), and as having an objectivist conception of social reality.

To identify which research strategy is applicable for this study it is to fully appreciate the research perspective behind the study, which is inherently hermeneutic since it aims promote knowledge and give insight on the subject.

According to (Neuman, 2006) “qualitative researches often rely on interpretive or critical social science”. That means qualitative strategy works perfectly with that of hermeneutic perspective. Therefore qualitative research would be the most convenient way to perform this study in a seamless way.

To choose the most appropriate research strategy one needs to ask what type of research question is posed by the study. A basic categorization scheme for the type of questions is the familiar series: who, what, where, how, and why (Yin, 1994). So we now need to identify in to which one of the five familiar series members the research question of this study belongs to. It is easy to notice that the research question, which is repeated below for easy reference, neatly belongs to the “how” group.

“How can the implementation of user centered design in the development process improve the usability of a banking website?”

The first and the most important condition for differentiating among the various research strategies is to identify the type of research question being asked. “How” and “why” questions are likely to favor the use of case studies (Yin, 1994). Therefore the study chooses case study as its research designs. In addition to this, case study gives the chance to combine quantitative and qualitative methods. According to (Yin, 1994) “case studies can be based on any mix of quantitative and qualitative evidence”. This allows the study to be flexible and if necessary be able to combine quantitative and qualitative methods in “any mix”.

The most commonly applied definition of case study research is provided by Yin: “an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used” (Yin, 2003). Case study can be differentiated from the other research design methods as it mainly focuses in a limited set of scenarios. According to (Gillham, 2010) “a case can be an individual: it can be a group-such as a family, or a class, or an office, or a hospital ward; it can be an institution — such as a school or children's home, or a factory; it can be a large-scale community-a town, an industry, a profession”. 

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2.3 Data Collection Procedures

According to (Krishnaswami & Satyaprasad, 2010) “data are facts, and other relevant materials, past and present, serving as bases for study and analyses” in addition they argue that, “data serves as the bases or raw material for analysis. Without an analysis of factual data, no specific inference can be drawn on the questions under study. Inference based on imagination or guess work cannot provide correct answer to research questions. The relevance, adequacy and reliability of data determine the quality of the findings of a study”.

To do this there are different kinds of procedures to collect the data depending on the research strategy and research design that the study uses. From the different of techniques the most common data collection methods are interviews, observation, and questionnaires. The study adopts interview and questionnaire as the main data collection methods.

Interviews

Interviewing is one of the prominent methods of data collection. It may be defined as a two-way systematic conversation between an investigator and an informant, initiated for obtaining information relevant to a specific study. It involves not only conversation, but also learning from the respondent's gestures, facial expirations and pauses, and his environment (Krishnaswami & Satyaprasad, 2010).

Questionnaires

Questionnaires are the most popular data collection tools in any research involving human subject compared to the other techniques. According to (Pickard, 2007) “you can reach a large and geographically dispersed community at relatively low cost, you can harvest data from large sample than would be possible using any other technique”.

There are two major kinds of data sources that can be used for data collection – primary and secondary data sources.

Primary data source, are original source from which the researcher directly collects data that have not been previously collected (Krishnaswami & Satyaprasad, 2010). The data collected through interviews and questionnaires serves as a primary data in this study.

Secondary data source, are sources containing data which have been collected and compiled for another purpose (Krishnaswami & Satyaprasad, 2010). This study uses several different scientific literatures, books, and international standards as a secondary data source.

To support this study it is a must to collect data that are appropriate and correct so that the results and conclusions at the end of the project do not become erroneous. The study uses theoretical study, questionnaires and interviews to conduct the research and to answer all the issues raised by the research question.
2.3.1 Theoretical Study

One of the most important steps in any research is reviewing the body of previous works in the research field. “In order to establish the ‘conceptual bridge’ it is necessary to determine the current state of knowledge within your topic area” (Pickard, 2007). According to (Bryman & Bell, 2011) “it provides the basics on which you justify your research questions and build your research design. The literature review also informs how you collect your data and enables you to analyze your data in an informed way.” (Welman & Kruger, 2001) justify that “by compiling a review of research findings on a particular topic that have already been published, researchers may become aware of inconsistencies and gaps that may justify further.”

Literature review will give pathway to the study by giving clear understanding about the subject area under study and gives a clear vision what the aim of the research is going to be. It also takes into consideration which articles are included for the purpose of the review and which are excluded. Selection of the right set of literature is important since there are tons of articles and books written on the field and reading all of them is practically impossible. “One of the intentions of doing literature review is that, you want to know what is already known about your area of interest so that you do not simply ‘reinvent the wheel’” (Bryman & Bell, 2011).

Sampling literature

Scientific literatures and books contain results of their study in a coherent way with scientific theories and practices that would be used as an input for further studies. Therefore it is essential to find scientific literature to identify the level of research covered in previous studies. To perform this it is good to set search parameters.

In this study research materials that were identified by the following topic areas were chosen for review: website usability, user centered design, user experience design, and usability evaluation. In addition to these topic areas review was made to additional literature materials from the topics of interaction design, human computer interaction and information system development to get additional information that supplement the study.

The above keywords or parameters formulated based on the research question so that the scientific articles that would be found through these criteria will give a clear understanding and detailed scientific explanation on the study under investigation.

Theoretical Information Search

A literature search relies on careful reading of books, journals, and reports in the first instance. Once you have identified keywords that help to define the boundaries of your chosen area of research (Bryman & Bell, 2011).

To gather information for this study use was made of several databases that contain journal articles, books, dissertations, and conference proceedings. The literature review is discussed in Section 3. Mainly the literature search of this study is based on the University of Boras
library search service as it was the most comprehensive bibliographic resource available for searching bibliographic databases and Journals and conference proceedings. This service also provided access to other databases: ACM digital library, IEEExplore digital library, Scopus, and Emerald. The above listed digital libraries contain the most up-to-date scientific articles across the world and with great number of collections. Different keywords and parameters were used to conduct the search including terms and phrases like web usability, user centered design, user model, user experience design, and usability evaluation.

2.3.2 Empirical Study

Asking questions is an obvious method of collecting both quantitative and qualitative information from people. Questionnaires are a particularly suitable tool for gaining quantitative data but can also be used for qualitative data (Walliman & Walliman, 2010).

In this study the questionnaire mainly contained closed questions with a few exceptions. One or two open ended questions were included. The study uses a self-administered questionnaire, “which saves on the researcher’s time and means that more people can be asked to complete the questionnaire. The respondents are also less likely to try to please the researcher by giving what they perceive to be the ‘correct’ or ‘desired’ answer” (Oates, 2006) and contains closed question mainly because it is easy to process the answers. On the other hand open ended questions take more time to process the answers and analyze all the respondents’ response. Therefore the study formulates the questioner with closed ended question and one or two open ended questions. To perform this process the study will uses 74 participant students as sample respondents who are doing their masters and bachelors at the school of business and informatics.

This study will apply a semi-structured interview with a combination of open ended and closed question to fully get the necessary data from the respondents. According to (Pickard, 2007) “open-ended interview all interviewees are asked the same, open-ended questions but allowed to respond in a way they feel is appropriate.” The open-ended questions give the chance to all respondents to get the same questions in addition they can add more about what they feel.

2.4 Data Analysis Procedure

Qualitative analysis is applied in any study that focuses on emerging theory, using the inductive analysis process to arrive at an understanding of the phenomenon under investigation. When applying qualitative analysis, the purpose is to generate a hypothesis based on the data gathered and interpretation of the data (Pickard, 2007). According to (Strauss & Corbin, 1998) grounded theory is a “theory that was derived from data, systematically gathered and analyzed through the research process.” Grounded theory research should lead to theories that have particular relevance for the people in the situation studied. This means that the researcher’s explanations of events or situations should ‘make sense’ to the people involved, and ideally should help them address their practical needs (Oates, 2006). Understanding these processes is therefore an important aspect not only of
doing qualitative research, but also of reading, understanding, and interpreting it (Thorne, 2000).

Among the different data analysis procedures the study will adopt constant comparative analysis that is best suited for qualitative research. Constant comparative analysis “was originally developed by Strauss for use in the grounded theory methodology” Pickard (2007).

According to (Pickard, 2007) constant comparative analysis demands that the creation of categories is driven by the raw data and not established a priori, although it is inevitable that priori research will have the salient issues: ‘The original version of grounded theory stress the idea that theory emerged from, and was grounded in, data. The data found from interviews and questionnaires will be analyzed by using the findings of the theoretical study and findings from the empirical studies will be compared with what have been found in the theoretical study.

The main task in perform the analysis in this study is to do coding. Coding according to (Bryman & Bell, 2011) is the key process in grounded theory, whereby data are broken down into component parts. Therefore, by applying coding to the interviewing transcripts, attempt will be made to come up with component parts and examine and compare what the respondents have in common about the questions raised and what their differences are.

(Pickard, 2007) argues that “this study involves taking one piece of data and comparing it with all others that may be similar or different in order to develop conceptualizations of the possible relations between various pieces of data”.

Each incident in the data is compared with other incidents for similarities and differences (Corbin & Strauss, 2008). Initially, indicators are compared to indicators, where the analyst is forced to confront similarities, differences and degrees of consistency of meaning among the indicators. Through this laborious and often tedious process, concepts are generated and indicators are then compared to the emerging concepts. This sharpens and clarifies the concept to achieve the best fit to the data. Meanwhile, further properties of the category are generated until the codes are verified and saturated yielding nothing much new. In this model the concepts have “earned their way into the theory by systematic generation from data (Strauss, 1987). Ground theory is a particular approach to qualitative research where the intention is to do field research and then analyze the data to see what theory emerges, so that the theory is grounded in the field data (Oates, 2006).

Therefore, the study uses mixed approach as it is mentioned Section (2.1) the data found from interviews and questionnaires will be analyzed and summarized by applying constant comparative analysis.

2.5 Strategy for Validating

Some writers have suggested that qualitative studies should be judged or evaluated according to quite different criteria from those used by quantitative researchers (Bryman & Bell, 2011). Interpretive research in IS and computing is concerned with understanding the social context of an information system: the social process by which it is developed and construed by
people and through which it influences, and is influenced by, its social setting (Oates, 2006). As it is mentioned above the study follows an interpretive research to check quality in interpretivist research the study uses the following criteria:

Conformability: have we been told enough about the study to judge whether the findings do flow from the data and experiences in the settings (Oates, 2006).

Credibility: focus on, is the inquiry carried out in a way that ensured that the subject of the inquiry was accurately identified and described so that the research findings are credible (Oates, 2006)?

Transferability: refers to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings. From a qualitative perspective transferability is primarily the responsibility of the one doing the generalizing (William 2006).

To make sure that the study provides an accurate result, the study uses conformability, credibility, and transferability as the main criteria to validate its trustworthiness.

2.6 Result Presentation Method

The way you present your research will depend on the nature of the research and the audience (Pickard, 2007). According to (Berndtsson, 2008) “when writing a report, you should communicate the results to the target reader groups as efficiently as possible. This means that the language and structure must enable the reader to understand the contents with minimum effort. Efficient communication does not imply anything about the length of the report, since efficient communication is not about the text being short or long”.

Therefore it is a must to know who will be the audience of the research report. Because those are the one who will read this report, “After a research completes a project or a significant phase of a large project, it is time to communicate the findings to the others through a research report” (Neuman, 2006). This research will be presented in a report form in a way that can be understandable and presentable to the target groups and also in a way that meets the criteria of scientific writings so that it can be descriptive and communicative by itself. The report also contains tables and diagrams that support the study with detailed descriptions of each table and diagrams.
3 Theoretical Study

3.1 Key concepts

Words that stand for ideas contained in data. Concepts are interpretations, the products of analysis (Corbin & Strauss, 2008). These sections of the study mainly focus on giving a clear and concise description of the main concepts that are discussed throughout the study.

Web Usability

Web usability refers to the extent to which websites can be used by specified users to achieve specified goals to visit with effectiveness, efficiency, and satisfaction in a specified context of website use (Agarwal & Venkatesh, 2002). Those website that are designed with the users in mind are the ones that are usable at the end of the day. There are three components or characteristics of web usability: effectiveness, efficiency, and satisfaction. They will be discussed in more detailed in Section 3.5.

User-Centered Design

User-Centered Design (UCD) is the process of designing a tool, such as a website’s or application’s user interface, from the perspective of how it will be understood and used by a human user. Rather than requiring users to adapt their attitudes and behaviors in order to learn and use a system ("Introduction to User-Centered Design "). In Section 3.6 the study discussed in detail about user-centered design including involving users, the design life cycle and user model.

User Experience

User Experience (UX) is not about how a product works on the inside (although that sometimes has a lot of influence). User experience is about how it works on the outside, where a person comes into contact with it and has to work with it (Garrett, 2002). Section 3.7 of the study mainly focuses and discusses about user experience design.

Usability Evaluation

This concept spins around evaluating the website or the application that came through different design process by applying the two most commonly used techniques, user testing and heuristic analysis. The study discuss in Section 3.8 in detail which technique works good in which situation.
3.2 Subject Areas Relevant for the Research

The above figure illustrates the relationship between the relevant research areas and the research questions in a way that shows which research area answers or address the research questions under study.

As it is illustrated in the figure the research comprised different area of studies web usability, usability heuristics, user centered design, human computer interaction and user experience design to answer all research questions in a scientific and verifiable way. Each of the study areas studied and presented in detailed way from different researcher’s point of view in a way that it gives a clear understanding the question under study.

3.3 Previous Research

Web is a specific interactive system which is in a wide range of application areas, but there are with different degrees of usability problems. Therefore, it is necessary to provide a design method for Web usability (Pei & Jiao, 2010). According to (Fernandez, Insfran, & Abrahão, 2011) “the challenge of developing more usable Web applications has led to the emergence of a variety of methods, techniques, and tools with which to address Web usability issues.”

Looking at the studies that have been made on web usability separately from usability of products and software, it is evident that its important has risen significantly with the rising popularity of the Internet. “On the Web, usability is a necessary condition for survival. If a website is difficult to use, people leave” (Neilsen). Considerable effort has been expended to identify website usability factors, as well as examining their effects on online consumer perceptions or behaviors across multiple disciplinary areas including marketing, human-computer interaction (HCI), and IT acceptance (Y. Lee & Kozar, 2009). The overarching
goal of a majority of the HCI work has been to propose techniques, methods, and guidelines for designing better and more “usable” artifacts (Agarwal & Venkatesh, 2002). Researchers in the field have emphasized the successful interaction between a human and a computer as a key factor in designing and implementing a variety of computing systems (Younghwa Lee & Kozar, 2012).

3.4 Relevant Literature Sources

The relevant literature sources used in this study are the elements of user experience:

- **User-Centered Design for the Web by (Garrett, 2002):** It elaborates what the main elements of user experience are and how they can be captured in the design process.
- **Web Usability Handbook by (Pearrow, 2007):** gives ideas on what the main usability characteristics are in the context of developing a usable website.
- **Don’t Make Me Think: a Common Sense Approach to Web Usability by (Krug, 2006).** He states don’t make me think as the first principle of usability and discuss a number of web usability principles.
- **User-centered Library Websites: Usability Evaluation Methods by (George, 2008).**
- **The Design of Everyday Things by (Norman, 1998)** in his famous book Norman advocates user-centered design in a detailed way.
- **The Inmates are Running the Asylum: Why High-tech Products Drive Us Crazy and How to Restore the Sanity by (Cooper, 2004).** In this book the author mention a lot of examples about high-tech designs that are usable by the end users.
- **useit.com the Alertbox on Usability** by usability guru Jakob Nielsen

3.5 Web Usability

In many scientific articles or incorporated standards usability described as “quality in use” in simple words it means how users understand and use a product or a system with a minimum effort. According to the International Organization for Standardization (ISO-9421, 1998), usability refers to “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” and takes effectiveness, efficiency and satisfaction as the three dimensions of usability components.

This study discusses different product usability issues. In the end, all products or a system need to be easy and usable by the end user. According to (Badre, 2002) “the same basic HCI principles that govern software interface design apply just as effectively to designing Web sites and Web applications. Just as a badly designed user interface can doom a software product despite its complex functionality or the power of its technology, a poorly designed Web interface, despite its impressive graphics, can propel the user to another site with one click of the mouse”.

(Agarwal & Venkatesh, 2002) gives a definition on web usability that would be suitable for the purpose of this study, “web usability refers to the extent to which web sites can be used by specified users to achieve specified goals to visit with effectiveness, efficiency, and
satisfaction in a specified context of website use”. Therefore the study will adopts the above three components or characteristics of web usability effectiveness, efficiency, and satisfaction.

**Effectiveness**: represents the accuracy and completeness with which online users achieve goals (e.g., purchase, information gathering) while visiting a website (ISO-9421, 1998).

**Efficiency**: represents the resources expended in relation to achieving goals while visiting a website. The users perceive efficiency when they can achieve goals with a quick visit without putting forth much cognitive effort (Younghwa Lee & Kozar, 2012).

**Satisfaction**: “How pleasant is it to use the design?” (Nielsen, 2000). This is the final component for many researchers in the area is satisfaction. If any website fulfills the above list of characteristics then it has a high probability of satisfying the users.

![Figure 3.2 Usability Measures](image)

To have a usable product or website the above three components must be in the same page. If the design of a website misses efficiency, the site will be satisfying but the chance to be usable by its end users is difficult or unthinkable. That is why different researchers in the field argue that it is a must to give priority to the end users.

According to (Nielsen) on the web, “usability is a necessary condition for survival. If a website is difficult to use, people leave. If the homepage fails to clearly state what a company offers and what users can do on the site, people leave. If users get lost on a website, they leave”. Thus, "web usability" is a broad concept that encompasses many aspects of design including a website's presentation, its navigational features, and its functionality or usefulness to visitors (James & Zhenyu, 2007). Different researchers in the area of web usability stress out the importance of simplicity, predictability, and ease of use in website design. If a website is not usable if its features or design irritates, confuses, or frustrates users in their quest to perform desired operations - many users will simply access another site that better meets their needs (James & Zhenyu, 2007).
The human-computer interaction field proposed multiple usability factors for an objective assessment of website design quality. They have, in general, taken an engineering approach in an attempt to identify a set of principles and common practices that ensure usability of website design (Younghwa Lee & Kozar, 2012). According to (Spool, 1999) “ease of use, readability, content quality, fun, productivity, completeness, and relevance are the main usability factors of a website”. (Gehrke & Turban, 1999) suggested that “page loading, navigation efficiency, download time, successful search rate, error rates, task completion time, and frequency of cursor movement as usability factors”.

3.6 User Centered Design

User-centered design (UCD) is both a technique and a philosophy that puts the user’s needs ahead of anything else (Pearrow, 2007). In his book–The Psychology of Everyday Things–(POET) Norman advocates user-centered design from philosophical point of view. UCD is a philosophy based on the needs and interest of the user, with an emphasis on making products usable and understandable (Norman, 1998). Both practitioners agree on one issue – user’s needs take the priority of any design to come up with a product that is usable by its users. Other practitioners on the field give attentions to users. “Every step of the way, take the user into account as you develop your product” (Garrett, 2002). Most importantly it is characterized by early and frequent interaction with the real user community to solicit feedback and to gain foresight into the future of the design (Pearrow, 2007).

According (Norman, 1998) it is necessary “to make sure that (1) the user can figure out what to do, and (2) the user can tell what is going on”. It means that as far as is humanly possible, when I look at a web page it should be self-evident. Obvious. Self-explanatory. I should be able to “get it” - without expending any effort thinking about it (Krug, 2006).

3.6.1 Involving Users

Most designers are used to designing for the end users. They often make a design based on their own experience or by taking some findings from marketing research. To elaborate this idea Nielsen mention in one of his research papers what most companies think. Most companies think that the feedback from their customer is enough. “We don’t need usability, we already listen to customer feedback” Jakob Nielsen stress on this by mentioning “Market research methods such as focus groups and customer satisfaction surveys are great at researching your positioning or which messages to choose for an advertising campaign. They are not good at deciding user interface questions—in fact, they’re often misleading” (Nielsen, 2003, September 8).

Another practitioner in the field supports Nielsen argument, “user-centered designers engaged with potential users directly, believing that understanding the details of individuals’ experience gives greater insight than the aggregated reports of marketing research” (Black, 2007).

According to (Pearrow, 2007) “collecting information from the users is the first thing in the process of UCD. Before writing a single line of code, it is necessary to find out what the users are interested in. The goal of early user involvement is to determine users’ likes, dislikes,
hopes, and expectations”. Therefore, it is best to involve the users in the design process. It allows the designer to come up with a solution that makes them happy.

3.6.2 The Design Lifecycle

All agree that a user-centered design focuses on how easily end-users, those for whom the website is targeted for use, can accomplish their tasks (George, 2008). Before a usable website can actually be designed it is important to understand the essential characteristics of usability. Web design must directly face “users with specific needs”, and must ensure that users are pleased to successfully complete tasks on the website. Web design usually adapts a design evaluation iterative design process to improve its usability. Web usability design includes the following three main elements: research users, Web design, and usability evaluation (Pei & Jiao, 2010).

The website of a living and growing organization is never truly completed. UCD are actually just segments of a closed loop that will be played out many times over the lifetime of a website. This cyclic design concept is called iterative redesign and is a key concept in UCD and usability (Pearrow, 2007). Iterative design is the best way to increase the quality of user experience. The more versions and interface ideas you test with users, the better (Neilsen). The figure illustrates the iterative design cycle proposed by Pearrow in his book “Web Usability Handbook”.

![Iterative Design Cycle](image)

Figure 3.3 The iterative design cycle (Pearrow, 2007)

Testing is an iterative process. Testing isn’t something you do once. You make something, test it, fix it, and test it again (Krug, 2006). According to (Pearrow, 2007) “after initial user input has been assembled and at least a prototype of the site has been crafted, it’s time to get real users try it out”. To do the testing the real users are the ones to be involved, not the designer or people from the usability team. User testing can occur at any stage in the design life cycle, and it should happen as often as it is economically feasible and meaningful (Pearrow, 2007).
3.6.3 User Model

Alan cooper introduced the use of persona in his book The Inmates Are Running the Asylum which is published in 1998. “Personas are not real people, but they present them throughout the design process. They are hypothetical archetypes of actual users. Although they are imaginary, they are defined with significant rigor and precision” (Cooper, 2004).

The actual method that works sounds trivial, but it is tremendously powerful and effective in every case (Cooper, 2004). To make up this is true, there will be fictitious users and all the design is for these users, they are called persona.

Personas will help you determine what that data means, convey that meaning to product team members in a compelling and memorable way, make better design decisions, and build consensus around a direction (Goodwin, 2009) and “Personas help us to understand and capture the individual needs by looking into the individual history, goals and relationship with the intended product. One thing that makes persona different from the other user modeling tools, personas help makes user-centered design possible” (Quesenbery, Design, & Redish, 2008).

As it is discussed in the previous sections user-centered design is a process that mainly relies on user research, which is an intensive process of gathering data from the end. To bring the gathered information into a suitable and usable form to the designers, user-centered design applies personas as a tool.

Creating personas involves identifying the critical behavior patterns and turning them into a set of useful characterizations (Goodwin, 2009). Creating a persona does not strictly stick to a linear process. The more specific we make our personas, the more effective they are as design tools (Cooper, 2004). They help the team focus on specific users, not on broad demographics. Paradoxically, limiting choices by focusing on a small, specific set of personas can help clarify design decisions (Quesenbery, et al., 2008). If the design process is more specific there is no need to worry about elastic user that forces users to fulfill their needs from a product or a service that doesn’t satisfy their needs at all.

It is possible to apply persona as a design tool in different design process like website, product and system design. Goodwin in his book “Designing for the Digital Age” describe some areas that personas can be applicable and come up with a concrete design solution. Personas can help to design pretty much anything that will be used or experienced by a human being, such as enterprise and consumer products, Web sites, services, internal business processes, organizational structures, events, advertising campaigns, documents, courses, and environments (Goodwin, 2009).

3.7 User Experience

These days the success of products, services, webpage and software depends on the attention given to user experience. To come up with a product or a web page that is usable, the customers need to get it and understand the purpose of the product or the web page.
According to (Kraft, 2012) “the success of products, services, Webpages, and even companies and brands comes back to one single thing: successful user experience innovation”.

User experience can be applied to almost all kinds of businesses. The user experience may seriously influence your brand, customer loyalty, and the amount of new customers considerably (Kraft, 2012). It doesn’t matter you came up with a fancy web design with dozens of features the main thing that matters is what the users experience. Therefore it must be taken seriously that the concept of user experience has a lot to do with the success and failure of a webpage or any digital product. “A product’s end-user experience is the cornerstone to its success. A good user experience doesn't guarantee success, but a bad one is nearly always a quick route to failure” (Kuniavsky & Ebooks, 2003).

James Garrett in his book “The Elements of User Experience” pointed that on the web, user experience becomes even more important than it is for any other kind of product.

It is not technology but user experience that is responsible for failure of a webpage. According to (Garrett, 2002) “web sites most often fail because, nobody bothered to answer two very basic questions”.

1. What do we want to get out of this site?
2. What do our users want to get out of it?

Therefore, answering these two basic questions leads to a design that takes user experience into consideration. Answering the first question gives insight to the needs of the company that is obviously reflected on the site. The second question is about user needs. It is all about the objectives of the users reflected on the site. (Garrett, 2002) Together, site objectives and user needs form the strategy plane, the foundation for every decision in our process as we design the user experience.

Let’s skip the first question and focus on the second one which is the need of the users. Creating a design by considering the designer him/herself as a user and expecting users will be using it generally leads to complete failure. The reason behind this is quite simple; the designer is not the real user. To solve this issue (Garrett, 2002) proposes that “we need to understand who they [our users] are and what they need.” According to (Kuniavsky & Ebooks, 2003) “user research provides a consistent, rapid, controlled, and thorough method of examining the users’ perspective. It is a must and basic thing first to know or understand what things really the users need from our website”. To understand what users are looking for, it is helpful to perform surveys or interviews. “Generally, the more time you spend with each individual user, the more detailed the information you will get from the research study” (Garrett, 2002).

After collecting all the valuable information from the users the next thing is to change the user information into a user model. According to (Garrett, 2002) “you can make your users more real by turning them into persona”. (Cooper, 2004) “we make up pretend users and design for them”. The main reason why personas work best is not because humans are
familiar using models. According to (Goodwin, 2009) “because they encourage us to relate to users in uniquely human ways.”

The figure below illustrates the five elements of user experience building from the abstract strategy plane to the concrete surface plane.

![Figure 3.4 User experience elements the five planes (Garrett, 2002)](image)

### 3.8 Usability Evaluation

It is essential to create a well-designed web site that is highly usable. The question is one, of deciding what constitutes a well-designed site and how to evaluate the same? The previous section mentions different ways on how to come up with a well-designed usable website. This section discusses ways to evaluate it.

Throughout the years different usability evaluation techniques have been developed and incorporated into the design and development of web sites. Among these techniques, user testing and heuristic analysis are perhaps two of the most popular ones (Tan, Liu, & Bishu, 2009).

Heuristic evaluation is a usability engineering method in which a small set of expert evaluators examine a user interface for design problems by judging its compliance with a set of recognized usability principles or heuristics (Manzari & Trinidad-Christensen, 2006).

Usability testing focuses on the end user, observing what is working and what is not while the user performs a set of real tasks.

In general, heuristic evaluation is difficult for a single individual to do, it is possible to improve the effectiveness of the method significantly by involving multiple evaluators.
(Nielsen, 1994). Figure 3.4 below shows the curve proportion of usability problems with number of evaluators. Therefore the use of multiple experts will catch more flaws than a single expert, but using more than five experts does not produce greater results (Manzari & Trinidad-Christensen, 2006).

Different researchers argue about which evaluation method is best. It is recommended to use both methods as a complementary to each other. Heuristic evaluation answers some problems that are not covered by usability testing and vice versa. “In comparisons of heuristic evaluation and usability testing, the heuristic evaluation uncovered more of the minor problems while usability testing uncovered more major, global problems. It is recommended that both methods be used complementarily, particularly with an iterative design change between the heuristic evaluation and the usability testing” (Manzari & Trinidad-Christensen, 2006).

![Figure 3.5 Proportion of usability problem with number of evaluators](image)

Importantly emphasis must be on the users needs. If the users are at the center of the design process then it is possible to know what is working for the user and what is not. It is necessary to observe users performing real tasks on the website like making a transaction, or locating current exchange rate. This helps to find out what users are feeling about the banking website and if there were any difficulties and frustrations.

“Usability testing gives you this access to your users using your product to perform tasks that they would want to do, which are matched to goals that are realistic for them” (Carol, 2010). Nielsen supports the idea of watching user performing real life tasks as an opportunity to improve performance. “People don’t know to ask for these new things, but you can spot prospects for great design when you observe users wasting time on workarounds — or simply giving up even on trying to accomplish desirable tasks” (Nielsen, 2012).
4 Empirical Survey

This chapter mainly focuses on the empirical survey of the study. The empirical data was collected through two methods – questionnaires and interviews.

4.1 Purpose

The purpose of this empirical survey is to come up with concrete evidence and attest findings. The empirical study provided the opportunity to obtain a broad understanding of the respondents experience and opinion about the usability of banking websites. It also allowed identifying which usability aspects, if any, need improvement. The data collected from the empirical survey is checked and analyzed against the theoretical study to provide answers to the research questions.

4.2 Sampling

Performing a population survey, in this instance, is quite a daunting task approaching the impossible as the population size comprising of all banking website users is humongous. Apart from the difficulties of accessing each banking website user, the task is expensive and requires an enormous number of people to gather and analyze the data. The approach taken in this study was, therefore, to take a small sample size selected among the University of Boras students. The email based questionnaire was sent to 74 students selected from the school of business and informatics.

The survey was performed in a short period of time and, as can be expected from e-mail based questionnaires, the response rate was quite low, even so the result was surprisingly revealing. Of the 74 recipients just 41 participants responded to the questionnaire, which meant that the response rate for the survey stood at 55.4%.

4.3 The Interview

The second data collection exercise was performing interviews. The interviews conducted over the telephone, was targeted not at end users but at those involved in the design and/or development of banking websites.

Two individuals were selected for the interview. The first interviewee was a usability specialist while the second doubled as a graphic designer and arts director. Both respondents had about 20 years of experience and are quite knowledgeable about usability issues and conversant with the jargons of the field.

A total of six open-ended questions were provided and the respondents were allowed to express their thoughts and observations freely using their own words. This was so that the captured data “comes as close as possible to providing a ‘mirror reflection’ of the reality that exist in the social world” (Silverman, 2004).

The interview questions were designed to explore and reveal ideas that the respondents might have about aspects of banking website. Both interviewees were given the same set of questions.
In Sections (4.3.1) and (4.3.2) conceptual labels for the two interviews is presented. These conceptual labels that are based on memos reflect my interpretation of the interviews. The entire raw transcript of the interviews is presented in the Appendix at the end of this document. Both interviews were conducted in 2012 and the interviewer was the author of this document.

4.3.1 The First Interview

The first interviewee currently works as a senior usability specialist. He has a working experience of about nineteen years as a practicing usability and user-centered design specialist. His consultancy works had focused on improving products and systems from a user’s perspective. He had supported the development of a variety of applications, web sites and interactive products for organizations in Sweden and abroad. His involvement in these projects covered the spectrum of tasks encompassing early requirements analysis and conceptual design through to evaluation of prototypes and implemented systems.

Memo 1: Characteristics of Usability

According to the international standard ISO 9241-11 usability is defined as "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."

When we talk about usability of internet banking it is necessary to consider the following three main characteristics of usability: effectiveness, efficiency and satisfaction. Effectiveness deals with ‘can users do what they need to do?’ Efficiency is about ‘how much effort does it require?’ Satisfaction ‘how do they feel about their interaction? Or how do they experience it?’

In the first few lines, the interviewee is defining usability according to ISO 9241-11. He mentions that the three main “characteristics of usability” are effectiveness, efficiency and satisfaction.

He continues explaining each of the three characteristics of usability from the three characteristics. He pointed out that satisfaction is the most “subjective aspect” compared to the other two characteristics. According to him “the usage situation may affect the users experience where and how they are using it, in the office or in a cyber café and on a mobile phone, on a tablet or on a PC.” On the other hand, effectiveness, for the case of a banking site, deals with questions like “Can the user pay a bill?” Or “Can the user transfer money to another account?” And efficiency is about measuring effort expended to perform a task “Does it take an hour to pay a bill?” Or “Does it take too much effort to complete a single task?”

Finally, he summarized everything by indicating the necessity to make sure that users do what they want to do, do it with a minimum of effort and have a pleasing experience while doing so.

Memo 2: Involving Users and User Testing
The most common ones [difficulties for end users] are terminologies and some transactions by historical reasons they are complex therefore it takes effort to complete a task like filling an OCR number. There are difficulties concerning about language issues and terminologies these two issues will affect the process to complete a task.

Characteristics of the user interface sometimes will affect the result. Because it is a banking application it has a security features it involves extra steps.

The interviewee mentions some of the difficulties that the end users face in the current banking websites. The first one is terminology these are terms that are too technical to the end users to understand and there are also some historical reasons as he mentioned it “OCR Number” brings some levels of difficulties to the users.

In addition, the interviewee mentioned that as an inherent feature of banking websites, additional security features are required, which bring extra steps to the design process. And hence, occupied with capturing the security features, the designers, during the design phase, tend to overlook what their users really need.

He proposed a possible solution to solve the above difficulties both from the user and the designer sides. It is advisable to involve the users in the design process to perform usability tests. These tests involve the observation of users while they are performing real tasks like paying bills and identifying elements that slow down their actions or that they find confusing.

**Memo 3: User-Centered Design**

As a design process we mainly use the concept of user centered design combining with different tools and methods. We can use tools and methods in different stages in the development process depending on which tool is good for which stage and the like.

The interviewee started by pointing out which design method he applies to design and develop a usable banking website or other system development projects. He also mentions the focus of user-centered design “making products usable”.

His choice of the user-centered design process is because it involves end users. He also mentioned the value of obtaining users’ feedback early on at the start of the design phase and re-designing prototypes in light of their feedback and comments.

**Memo 4: User Experience**

My opinion may change overtime. When we look satisfaction what you test this year and if you make the same test after five years you will find different result depending on the users experience through the years.

The interviewee mentioned that experience may change over time. Finally he pointed out that if we gave the same task to the user over a time separation, for example, two years the user may perform better in relation to effectiveness and efficiency but we might find that the user satisfaction has actually dropped.
4.3.2 The Second Interview

The second interviewee currently works as a graphics designer/Art Director in Sweden. He has a working experience around 20 years in the digital media. He describes himself as a cross media artist. As an AD/graphic designer, I help our clients to visualize their ideas and thoughts. To keep up with an industry that is rapidly evolving as our need to adapt and offer various types of communicative design.

Memo 1: Accessible and Easy to Use

A banking website needs to fulfill the needs of its users. The design should be easy to use and accessible to its end users. In addition, the process to complete a task should not take too much effort and the designer needs to reduce the graphic mess and come up with a pleasing design.

The interviewee started his statement by mentioning the importance of fulfilling the needs of users and continued by adding that banking websites should be “accessible” and at the same time need to be “easy to use”.

He is concerned about the look and the feel of the website, he pointed out that the design of any banking website needs to reduce any kind of graphical mess and the time to complete a single task to gain the usability of the design. The interviewee doesn't give a list of characteristics. Instead, in his view, there are two essential building blocks of usability – “view accessibility” and being “easy to use”.

Memo 2: Speaking to the Audience and User Involvement

The main and the important issue I would like to mention is the web doesn’t speak to the audience, therefore the design needs to consider the different kinds of audience that the bank has. The language issue and too many technical terms give the end users some levels of difficulties. These two issues influence the effort to complete a task in one or another way.

Here the interviewee mentioned that there are some difficulties in the current banking websites. One of the reasons for this issue is disregarding users. This disregard manifests itself in two ways – not knowing who the real users of the site are and failing to involve users in the design process at all. This leads to a design that doesn’t speak the audience.

Speaking to the audience is another aspect the interviewee deemed as very important to solve the difficulties that occur in the banking website. He also pointed out that the designer needs to look or consider the different needs of the users which he prefers to refer to as audiences.

Finally, he mentioned that language issue and including too much technical jargon bring some level of difficulties to the users. To overcome these kinds problems he, pointed out that involving users at early stage of the design process and perform user test before implementation.

Memo 3: Agile Methodology
From the different methods that are available today, I prefer to use agile methodology which is the most popular and it is relatively simple to implement it.

From the different kinds of available methodologies, his method of preference is the agile methodology, which he uses most of the time. From the different variants of agile methodologies, he often uses the scrum method, which he uses to come with a usable design.

**Memo 4: Responsive Design**

*The responsive layout works seamlessly, although the design process was a learning curve. From this perspective, I found that a designer has to adapt another method of caring for all those pixels.*

Together with intense UX work and GUI programming they all become relevant to each other.

Here the interviewee talks about responsive design. Nowadays, usage patterns vary with the hardware platform users habitually use to access the Internet. Designs, therefore, must be platform adaptive to address the needs of users that employ tablets, smartphones, laptops or other devices. The design needs to respond in unique ways depending on the platform that the user prefers to use.

### 4.4 The Questionnaire

The questionnaire comprised 14 questions of which 2 were scale type questions, 3 were open ended and the other 9 were multiple-choice questions. Effort was taken to make the questions clear, concise and to the point. Furthermore, a simple and informative description was included in the questionnaire to explain the purpose of the research to the respondents.

The questionnaire was designed with the objective of obtaining end users views on web usability in the context of the research questions raised by this study. The results from the questionnaire will provide answers to the research questions and is expected to reveal insights in web usability.

Section 4.5 presents the results for the 9 multiple-choice questions using a summary table and charts and graphs. A discussion is also provided for the 3 open ended questions.
4.5 Presentation

The response from the questionnaire presented in table, graph and textual form below.

Summary of the Responses in a Table Form

<table>
<thead>
<tr>
<th>Gender</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>18-25</td>
<td>26-30</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>What kind of information you are looking in a banking website?</td>
<td>Information about Loans and Credits</td>
<td>Information about interest rate</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Do you have any experience of visiting different banking websites?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>0</td>
</tr>
<tr>
<td>If yes, How many banking websites do you visit?</td>
<td>Two</td>
<td>Three</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>15</td>
</tr>
<tr>
<td>How often you use your banking websites?</td>
<td>Once a week</td>
<td>Twice a week</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Do you encounter any difficulties during your experience with the banking websites?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Which is the most ease to use banking website according to you?</td>
<td>Handelsbanken</td>
<td>Nordea</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>How easy do you think the website of your bank?</td>
<td>Very difficult</td>
<td>Difficult</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>How did you get the service provided by the website?</td>
<td>Poor</td>
<td>Satisfactory</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>25</td>
</tr>
</tbody>
</table>

N.B. 0 means no respondent

Table 4.1 Summary of the responses in a table form
From the respondents, 36.58% (N=15) were female and 63.41% (N=26) were male the chart shows the percentage in the nearest round off.

Figure 4.1 Gender distribution of respondents

The majority of the respondents age group were 26-30 which is 41% (N=17), age group 31-35 27% (N=11), 19% (N=8) and 12% (N=5) for 36-40 and 18-25 age group respectively.

Figure 4.2 Respondents age
According to the response collected through the questioner 51% (N=21) of the respondents were use the banking website mainly to make transactions, 20% (N=8) were looking information about interest rate, 17% (N=7) were looking information about loans and credits and the rest 12% (N=5) are interested in other information.

Figure 4.3 Kind of information.

The experience of using more than one bank website, Two 41% (N=17), Three 37% (N=15), and More than Three 22% (9).

Figure 4.4 Number of banks the respondents used
How often use a banking website: Very often 34% (N=14), Once per month 12% (N=5), Twice a week 22% (N=9), and Once a week 32% (N=13).

**Figure 4.5 How often you visit the bank website**

This chart shows the number of respondents face difficulties when they use the banking website according to the questioner 61% (N=25) of them encounters difficulties and 39% (N=16) of the respondents say it there is no problem.

**Figure 4.6 Difficulties when using banking websites**
Which banking website is easy to use, Nordea were chosen by 68% (N=28) and Swedbank 32% (N=13).

Figure 4.7 Easy to use banking website

Most of the respondents replied moderate to the easy of usability 58.53% (N=24) it is easy to 24.39% (N=10) of the respondents.

Figure 4.8 Degree of usability
4.6 Empirical Research Result

This section presents the study findings on the empirical survey in relations to the research questions.

4.6.1 Statistical Summary

The responses to the questionnaire were collected through e-mail. The study had a total of 41 respondents out of 74 participants.

From the total 41 respondents, Males accounted for 63.41% (N=26) and females were 36.58% (N=15). The highest number of the respondents aged in a range of 26-30 which is 41% (N=17), 31-35 27% (N=11), 36-40 19% (N=8) and 12% (N=5) of them were 18-25, there is no any respondent above 40, 0.0% (N=0). This result indicates that most of the respondents are male students and they are grouped 26-30 years old.

From the total respondents, 51% (N=21) are mainly using banking websites to perform transactions, 20% (N=8) were looking for information on exchange rates, 17% (N=7) were looking for information on loans and credit, and the rest of the respondents 12% (N=5) are interested in other information. The result shows that most of the respondents use banking websites for transactional activities, which includes paying bills, transferring funds to other accounts and online ordering or paying utility expenses.

Roughly a third of respondents use their respective banking websites very often which is, 34% (N=14). An almost equivalent number 32% (N=13) use such sites once a week. 22% (N=9) of the respondents reported using such sites twice a week, while 12% (N=5) reported usage frequency of just once per month.

Most of the respondents are mainly performing transactions often or on a daily basis. Therefore the two groups of respondents give the chance to observe whether they are comfortable or not with the banking website while they are doing transaction and shows how easy or difficult is the banking website that currently using.

If we look their experience of using different banking websites 41% (N=17) were use two banking websites, 37% (N=15) had experience of using three banking websites, and 22% (N=9) were using more than three banking websites. Those who had experience of using two banking websites and who had experience of using three banking website have a small percentage difference between the respondents. Those figures indicate that the respondents are not new to the technology and they have different banking websites experience. This gives to the study a chance to get valuable information from their experience.

Most of the respondents had difficulties while they are using the banking websites which is 61% (N=25) the difficulties differ from respondent to respondent some of them reported that there are too many technical terms, too many fields and language issues. 39% (N=16) reported to have never encountered difficulties while using their banks websites.

About the degree of usability, most of the respondents 58% (N=24) rated their banks as moderate, 24% (N=10) as easy, 7% (N=3) as very easy, and 10% (N=4) as very.

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4.6.2 The Empirical Findings and the Research Questions

The questionnaire and the interviews were designed to answer the research questions together with the theoretical study. This section addresses the possible problems in relation to the research sub questions.

Sub Questions One:

What are the main characteristics of usability that a banking website needs to fulfill?

According to the first interviewee, effectiveness, efficiency and satisfaction are the main characteristics of usability that a banking website needs to have to be usable. He also mentioned that from the three characteristics satisfaction is the most subjective aspect of usability.

The second interviewee generalized the three characteristics of usability that are mentioned by the first interviewee as two specialized characteristics being accessible and easy to use.

Sub Question Two:

Is there any challenge to the users in the current banking websites?

Here both the interviewees mentioned that there are still difficulties concerning different language options and too much technical terms that will have an impact on the effort to complete a task in one or another way.

The first interviewee pointed out that terminology and some transactions by historical reason brings some levels of difficulties to the end users like filling OCR numbers. For example when you pay a bill you need to fill in the OCR number that is not the easiest thing to do. In addition to this the effort that it takes to complete a single task is deemed by him as too much.

According to the second interviewee the main difficulties arise because the web doesn’t speak to its audience. The design need to consider the different audience that the bank has, which could be a student, a banker or a lawyer.

Sub Question Three:

What are the challenges to develop a usable banking website?

The first interviewee mentioned that the characteristics of the user interface sometimes will affect the result in addition to this when we talk about satisfaction what you test this year may have different result of satisfaction after five years depending on the user experience through the years. The user may perform better do what they want to do with a minimum amount of effort but their satisfaction may go down.

Both interviewees explained that due to the sensitivity of banking websites, the design involves extra steps to capture the security features and the designers focus to fully capture these features mean they tend to disregard the needs of the end users.
Forgetting or not considering the needs of the user in the design process is mainly caused as a result of some designers’ failure to consider involving users in the design process probably because they believe they know what users want.

Sub Questions Four:

What are the possible solutions to overcome the challenge to develop a usable banking websites?

The first interviewee mentioned that involving users and performing usability tests before implementation give us the opportunity to reduce terms that are too technical or vague to the end user. Involving users in the design process by giving them a simple prototype and testing the site based on a realistic task, allows observing how they do it, what slows down them and what confuses them.

Implementing the concept of user centered design as a design process with different tools and methods can solve the above problems. He lists some of the tools that work with user centered design, card sorting, persona, eye tracking, storyboarding and heuristic evaluations. It is possible to use tools and methods in different stages in the development process depending on which tool is good for which stage and the like.

According to the second interviewee, from the different methods available today he prefers to use agile methodology. He lists a number of variants of agile methodologies: DSDM, Scrum and XP. From the list scrum is the most popular and it is relatively simple to implement. In addition to this coming up with a design which is responsive would be a viable solution to the current usage situation to give the users a pleasing experience.
5 Analysis and Result

5.1 Analysis

In this section the theoretical findings that are found in Section 3 and the empirical findings that are found in Section 4 are analyzed and compared to check the validity of the result. The study focuses on analysis of the data that are found from the empirical study and the theoretical study by applying constant comparison method. “As any theory emerges, it is checked out against all the data collected so far. In this way, the researcher’s emerging theory is always closely linked to (that is, grounded in) the empirical data” (Oates, 2006).

The result from the theoretical and empirical parts of the research are analyzed and compared with one another. The similarities and differences between the empirical findings and the theoretical results are identified.

What are the characteristics of usability that a website needs to fulfill to be usable?

In many scientific articles or incorporated standards usability described as “quality in use” in simple words it means how users understand and use a product or a system with a minimum effort. In Section 3.5 usability defined by the International Standard Organization refers usability as “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” and takes effectiveness, efficiency and satisfaction as the three dimensions of usability components.

When we talk about usability of banking websites, it is necessary to consider the following three main characteristics: effectiveness, efficiency and satisfaction. Effectiveness is concerned about ability to perform tasks. Efficiency is a measure of the effort or time taken to complete a task. And satisfaction is a subjective aspect measuring the user’s attitude or feeling while performing the task.

Banking website needs to fulfill the needs of its users. The design should be “easy to use” and “accessible” to its end users. In addition the process to complete a task should not take too much effort and the designer needs to reduce the graphical mess and come up with pleasing design.

Comparison between the theoretical study and the empirical findings shows a similarity about the characteristics that constitutes a usable banking website. As the first interviewee attested and theoretical findings shows effectiveness, efficiency and satisfaction are the main components that a website needs fulfill to be usable. Whereas the second interviewee generalized the three main characteristics of usability as “easy to use” and pointed out accessibility as one of the characteristics of usability which is concerned about users who have difficulty of seeing or hearing can use it too.

The three characteristics of usability puts a clear line how it is necessary to come up with a design that is easily understandable, perform tasks with a minimum effort and pleasing one by its end users depending on the situation they are using it.
Is any challenge to the user in the current banking websites?

From the response of the questionnaire the result shows the banking website that they are currently use had difficulties which is accounted 61% (N=25) which indicates that more than half of the users had challenges of using the current banking websites for various reasons.

In Section 3.6.1 it is stated that “before writing a single line of code it is necessary to find out what the users interested in the goal of early user involvement is to determine users’ likes, dislikes, hopes, and expectations”. Therefore it is best to involve the users in the design process it gives the designer to come up with a solution that makes the end users happy.

As it is mentioned in Section 3.6.4 the idea of watching users performing real life tasks gives the opportunity to improve user performance. “People don't know to ask for these new things, but you can spot prospects for great design when you observe users wasting time on workarounds — or simply giving up on even trying to accomplish desirable tasks” (Nielsen, 2012).

Most common ones are terminologies and some transactions by historical reasons they are complex therefore it takes effort to complete a task like filling out OCR Number. Involving the user in the design process and make usability test by giving them a real task and observer what slows down and confuse them.

The main and the important issue is that the web doesn’t speak to the audience therefore designers need to consider the different kinds of users that the bank has. It is advisable involving users at early stage of the design process and performs a usability test before implementation.

The comparison between the theoretical and empirical study shows a clear similarity on challenges in the current banking websites. From the questionnaire, 61% of the respondents indicate that there is a possible difficulty in the current banking website. The first interviewee believes that terminologies and some transactions by historical reasons bring this problem and the second interviewee believes that the design doesn’t speak to the users. Both the respondents and the theoretical study mention that to solve this problem it is necessary to involve the users at early stages of the design process and perform user testing.

What are the challenges to develop a usable banking websites?

In Section 3.7 it is stated that “web sites most often fail because, nobody bothered to answer two very basic questions”.

1. What do we want to get out of this site?
2. What do our users want to get out of it?

The characteristics of the user interface will affect the result because it is a banking application it has a security features which leads to extra steps in the design process.

We can mention different challenges to develop a usable banking website. Because of this security constraints the designer may mainly focus on how to capture the security features.
Some designers thinks that coming up with a fancy web design would resolve the issue of usability but that is not the case; knowing the users and involving them in every phase of the design process will reduce the challenge of designing usable banking website.

The comparison between the theoretical study and the empirical study shows some degree of similarities. It is clearly stated in both findings that forgetting the users or failing to consider their needs in the design process leads to failure. In addition to this, both interviewees agree about the prominence of security features in banking website as a result of their inherent sensitivity.

**What are the possible solutions to overcome the challenges to develop a usable banking website?**

In Section 3.6 it is stated that User-centered design (UCD) is both a technique and a philosophy that puts the user’s needs ahead of anything else (Pearrow, 2007) and in Section 3.6.1 it mentioned that “collecting information from the users is the first thing in the process of UCD” Therefore involving the users at early stage of the design process gives the designer a clear path way and continue to the next design phase in seamless way.

Section 3.6.2 states that *iterative redesign* is a key concept in UCD and usability and “testing isn’t something you do once. you make something, test it , fix it, and test it again” (Krug, 2006).

In Section 3.6.3 “Personas help us to understand and capture the individual needs by looking into the individual history, goals and relationship with the intended product. One thing that makes persona different from the other user modeling tools, personas help makes user-centered design possible” (Quesenbery, et al., 2008)

As a design process the first interviewee proposed the user centered design process together with different tools and methods. He believes that user centered design involves users in every step of the design process. Depending on the stage of the design process the tools or the methods that can be used may differ.

From the different development methods available this days the second interviewee mentioned agile methodology and preferred the scrum methodology.

In section 3.7 it is mentioned that “the success of products, services, Webpages, and even companies and brands comes back to one single thing: successful user experience innovation” (Kraft, 2012). User experience can be applied to almost all kinds of businesses. The user experience may seriously influence your brand, customer locality, and the amount of new customers considerably (Kraft, 2012). Also in the same section it is clearly pointed out that “a product’s end-user experience is the cornerstone to its success. A good user experience doesn't guarantee success, but a bad one is nearly always a quick route to failure” (Kuniavsky & Ebooks, 2003).

Users experience may change over time and the user’s usage situation varies depending on the kind of platform they are using on their day to day life this will affect the result of
satisfaction that we get from the end user. To address all the different kinds of users that are using different kinds of devices responsive design should be a possible solution.

The comparison between the theoretical and the empirical findings show some degree of similarity. According to the result from the theoretical and the empirical study the possible solutions to overcome the challenges to develop a usable website is to adopt a user-centered design. As it is stated in the theoretical study user model/persona makes user centered design possible. Whereas the second interviewee mentioned that agile methodology would be good and from the different agile methodologies he prefer to use scrum. As it is mentioned above the theoretical study and the first interviewee come up with a similar concept whereas the second interviewee prefer different concept of development.

The table below illustrates the category or concepts identified from the two interviewees in a way that can be used in constant comparison method.

<table>
<thead>
<tr>
<th>Categories/concepts</th>
<th>Interviewee #1</th>
<th>Interviewee #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics of usability/ Accessibility and easy to use</td>
<td>The three main “characteristics of usability” are effectiveness, efficiency and satisfaction. Satisfaction is the most “subjective aspect” compared to the other two characteristics.</td>
<td>The design should be easy to use and accessible to its end users. The designer needs to reduce the graphic mess and come up with a pleasing design.</td>
</tr>
<tr>
<td>Involving users and user testing/ Speaking the audience</td>
<td>Most common ones are terminologies and some transactions by historical reasons they are complex. Characteristics of the user interface sometimes will affect the result and Security features will bring to the design process extra steps.</td>
<td>The web doesn’t speak the audience and the language issue and too many technical terms give the end users some levels of difficulties. Because of this security constraints the designer may focus on how to capture the security features.</td>
</tr>
<tr>
<td>User-centered design/ Agile Methodology</td>
<td>In User-centered design process the chance and the ability to involve users is very high.</td>
<td>Agile methodology which is the most popular and it is relatively simple to implement it.</td>
</tr>
</tbody>
</table>
Experience may change over time that will affect the result of satisfaction. These days the user’s usage situation varies depending on the kind of platform. Therefore to full address the needs of the users it is advisable to come up with responsive design.

Table 5.1 Constant comparison

| User Experience | Experience may change over time that will affect the result of satisfaction. | These days the user’s usage situation varies depending on the kind of platform. Therefore to full address the needs of the users it is advisable to come up with responsive design. |

5.2 Result Summary

What are the characteristics of usability that a website needs to fulfill to be usable?

The theoretical and the empirical study attest that there are three main characteristics of usability which are effectiveness, efficiency and satisfaction that any product or system needs to fulfill to be usable by its end user. In the empirical study the second interviewee mentioned that accessibility should also considered as one criteria or characteristics of usability. In general the study found out that effectiveness, efficiency and satisfaction are the main characteristics of usability that a banking website needs to have to be usable.

Is any challenge to the user in the current banking websites?

As it is mentioned in the empirical study, both interviewees mentioned that there is still some level of difficulties in the current banking websites. Most of the difficulties arise from too many technical terms and due to lack of language options.

To overcome this issue the theoretical study and the empirical study proposed that involving users at early stage of the design process and performing usability test before implementation would be a viable solution.

What are the challenges to develop a usable banking website?

The theoretical and the empirical findings shows the main challenge to develop a usable banking website arise from not considering the end user in the design process. As it is mentioned in the theoretical findings nobody bothered to answer two very basic questions what do we want to get out of this site? And what do our users want to get out of it? In addition to this in the case of banking websites its sensitivity affects the design process.

What are the possible solutions to overcome the challenges to develop a usable banking website?

In the empirical study, the first interviewee proposed that the possible solution to overcome this problem is by applying a user centered design together with different designing tools like persona, scenario, or eye tracking depending on the case. The second interviewee proposed agile methodology is a good solution and from the different agile methodologies he pointed out scrum would be viable.
The user-centered design gives the designer room to understand what the end users’ needs to have and what things they don’t want by involving users throughout the design process whereas agile methodologies like SCRUM which is mainly focus on agile way of project management, iterative and incremental approach and always focus on delivery.

The theoretical study clearly supports the first interviewee idea by providing different arguments that shows the concept user centered design is the possible solution for improving usability.

In the empirical study, the first interviewee looks satisfaction as a subjective concept from the other two characteristics. Satisfaction may vary from time to time depending on the experience of the customers through time.

The second interviewee mentioned that it is now the time to come up with a design that works in all the different devices and platform. The theoretical study holds these two ideas together and stated that the success of products, services, webpage and software depends on the attention given to user experience. According to (Kraft, 2012) “the success of products, services, Webpages, and even companies and brands comes back to one single thing: successful user experience innovation”.
6 Discussion

6.1 Conclusion

The main goal of this study is to determine what are the challenges that users encountered in the banking websites, what are the challenge to design a usable banking websites and find out the basic concepts and principles that are important to design a usable banking website. In building a usable banking website it is necessary to take into consideration following concepts: characteristics of web usability, user centered design, user experience design and usability evaluation. The findings from the theoretical study lay foundations that make possible the process of designing usable banking website.

6.1.1 Web usability

In designing a usable banking website it is important for a designer to consider the three characteristics of web usability. Any product or website to be usable by its end users it needs to fulfill effectiveness, efficiency and satisfaction all together. As it is mentioned in the empirical study having one of the characteristics doesn’t guaranty usability at all. From the three characteristics satisfaction is a kind of subjective criteria depending on the exposer and the experience that the user had from time to time. After all any product, system or webpage that will be used by human being take into consideration that the product or the system should be usable therefore it is necessary to fulfill the above three characteristics of usability.

6.1.2 User-centered design

To come up with a usable design it is good and acceptable way to involve the users in the design process. One of the best solutions to do this is adopt a user-centered design. User-centered design gives a big room to the users. It involves them in each and every steps of the design process. User-centered design is mainly relay on intensive user research that will give the designer detail information what the user want from the design. Persona/ user model helps in presenting this reach form of user information to the designer in a meaningful and descriptive way. In addition to this user centered design follows iterative design that gives the chance to evaluate every step of the design process before implementation.

6.1.3 User experience

As it is mentioned above knowing the needs of the users is an important thing to design a usable banking website. Designers can understand who the users are and what they need by implementing user experience design. In this changing and technology era websites should work in different devices and have in mind responsive design which gives the users the chance to use their banking website anywhere any time using different platforms.

6.1.4 Usability Evaluation

The above sections discus which characteristics should a banking website needs to be usable, which design process will brings all the components to gather to build a usable banking website and together capturing the experience of the users but all the above process needs to be evaluated or checked that the final product is free of defects so that it can be usable by its
end users. Therefore to come up with the best result one of the possibilities is applying a heuristic analysis and the other one is user testing as it is elaborated in Section 3.8 both the techniques are complementary to each other.

6.2 Implication of Informatics

Informatics deals with development and implementation of information systems. Information systems is collecting, storing and processing data in a way that can be understandable and useful information. In this study it can be seen from the use of user-centered design to design and implement a usable banking website. The implication of the study shows that it is necessary to understand and implement the basic characteristics of usability in the design process of a banking website so that the customers can get the information that they are looking easily. In addition to this involving the end users and understand their needs is one way to come up with a usable banking website design. It will give the financial industry to understand what kind of resource their users are looking for and in what kind of format they need it.

From the user’s perspective, the implications of results in this study have a great influence because the results came up with a proposed solution how to give the users an easy to use banking website. If it is seen from the banking industry, it gives them the chance to be selected by their users, save recurring cost for maintenance and a good return over investment.

6.3 Method Evaluation

In the theoretical study section, the author mainly focuses on reviewing previous researches on the area it acquaint the researcher from previous researches. It helps the author to examine the research question with previously published sources which includes scientific articles, journals, and books.

To attest the theoretical study the author performs two interviews with professionals in the area. The interview questions are open-ended so that the respondents can express their thoughts and expertise in their own words without any limitation. The interview conducted with both the interviewees is through a telephone conversation.

The main challenge in the empirical study was some of the respondents of in questionnaire did not respond on time so it takes me time to collect all responses from them. The empirical study is fully based on the two interviews and the respondents of the questionnaire.

6.4 Result evaluation

As it is mentioned in section 2.5 of the study uses three criteria to validate the research. The study incorporates the theoretical findings and the empirical study that is found from the questionnaire and the interview.

The theoretical finding gives the author a concrete base to develop a sound theory how to improve the usability of banking website by implementing user-centered design. To make sure that the study is depend on the theoretical findings the study implement empirical study
as well. In addition to this the study answers the sub questions by counter check from the theoretical findings and from the empirical findings.

Confirmability refers to the degree to which the results could be confirmed or corroborated by others (William 2006). To make sure that the study keeps its confirmability the author documents the procedures so that the study can be checked again and again.

Reference to literature and findings by other authors that confirm the inquirer’s interpretations can strengthen confirmability of the study in addition to information and interpretations by people other than the inquirer from within the inquiry site itself (Williams, 2011).

To assure the credibility of the study the author makes sure that findings are acute and the result can be justifiable. The interpretivist takes credibility as; “the conscious effort to establish confidence in an accurate interpretation of the meaning of the data” (Carboni, 1995).

As it is mentioned in section 2.5 transferability concerned transferring or generalizing findings to wider context. Even if the study employees a case study and conduct the study in small samples the author try to make sure that the finding can be transform to the case that is under study.

6.5 Possibilities to transferred

This section looks into the possibilities to transform; the main question here is can the finding of this study can be transferred to another? (Oates, 2006) argues that each research situation is in some respects unique, it could still be a single example of a broader class of things so that some generalization is possible.

The empirical study provides a concrete evidence to make sure that the theoretical findings are capable of ensuring the research is objective. The empirical results are gathered through questionnaire and interviewee. Those who participated in the questionnaire had exposure of using different banking websites and the two experts that are participated in the interview process provide and describe their expertise on designing a usable website. The theoretical finding states the current stat of the art to design a usable banking website from different concepts. Therefore it is possible to say that the result of the study can be transferred to other banking websites.

6.6 Idea for Continued Research

While carrying out this study, the author has come across some very intriguing ideas that can be further investigated. The ideas those described below are not done in this study because of the time limit and scope of the study.

The first idea for further study is conducting a thorough study about combining user-centered design with agile methodology in order to get the full advantage of intensive user research from the user-centered design side and to complete tasks in a timed frame with good project management from the agile methodology point of view.
The second idea is to do further research on use of persona as a tool in user-centered design. Persona will give a good idea for the designers about user’s information in a way that the designers fully understand for whom is designing.

The third idea for further study is conducting a deep study on the impact of the security feature of the banking application in the design process of a usable banking website, even know a days some banks trying to separate their service website from the banking website.
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Appendix

Full Transcript of the First Interview

What are the main characteristics of usability that a banking website needs to fulfill to be usable?

Currently most of the banks separate the information website from the internet banking websites except some small banks. Before answering what are the main characteristics of usability at first we need to see what usability is?

According to the international standard ISO 9241-11 usability defined as "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."

When we talk about usability of internet banking it is necessary to consider the following three main characteristics of usability effectiveness, efficiency and satisfaction. Let as look each separately:

Effectiveness deals with can users do what they need to do? To our case can the user pay a bill? Or can the user transfer money to another account?

Efficiency is about how much effort does it require? Maybe they pay a bill maybe it takes hour to do that or it takes to much effort to complete a single task.

Satisfaction how do they feel about their interaction? Or how do they experience it? It is the most subjective aspect. The usage situation may affect the users experience where and how they are using it, in the office or in a cyber café and on a mobile phone, on a tablet or on a pc.

Therefore when we design an internet banking website we need to keep in mind to make sure that users do what they want to do and do it with a minimum effort and have a pleasing experience.

Do you see any difficulties to the end users in the current internet banking websites?

Yes, the most common ones are terminologies and some transactions by historical reasons they are complex therefore it takes effort to complete a task like filling an OCR number.

The proposed solution would be involving the user in the design process by giving them a simple prototype and testing with them. Based on a realistic task maybe paying bill or make a transaction then we observe how they do it, what slows down them, and what confuses them.

As I mentioned it above we need to see how they react when they perform realistic tasks like making transaction or paying bills. Therefore iterative testing with different users by giving real task before it is implemented at different phase of the design process will give the chance to change or redesign the design which makes the users confuse ease down the difficulties they encounter.
Do you think effort to complete a task, language issues, and too much technical terms will affect usability of a banking website?

Yes, as I mentioned in the previous question there are difficulties concerning about language issues and terminologies these two issues will affect the process to complete a task. I have different cases that I had the experience to observe that users had a difficulty to find a menu because of the terminology that is used. Therefore the best solution would be involving users and perform usability test by giving the users a prototype and see while the users perform task or follow think aloud method.

What are the challenges to develop a usable internet banking website?

Characteristics of the user interface sometimes will affect the result. Because it is a banking application it has a security features it involves extra steps. In addition to this for some historical reasons some transactions are complex: For example when you pay a bill you need to fill in the OCR number that is not the easiest thing to the users to do. The other case will be terminology, the terminology they use in the internet banking website make some difficulties to the end users.

Therefore to resolve the above issues it is advisable to make usability test as I mentioned above by giving a real task to the users and watch how they do it and find out what slows down them and what confuse them?

In order to achieve a good usability it is recommended to user-centered design Usability testing will give you the basis for making key design decisions:

- Usability evaluation is a central element of any user-centered development process - early and continuous testing with users is the key to a more successful product.
- Usability evaluation will identify the problems with your product's interface and we can recommend and discuss design solutions with designers and developers.

What kind of design process or method that you follow to design a usable internet banking websites?

As a design process we mainly use the concept of user centered design combining with different tools and methods. User-Centered Design is an approach to software or product development that focuses specially on making products usable. It typically involves end-users throughout the development cycle, during requirement activities, obtaining their feedback on early designs and re-designing prototypes designs in light of their feedback and comments.

We can use tools and methods in different stage in the development process depending on which tool is good for which stage and the like. Some of the methods we use are:

- Card sorting
- Scenarios and personas
- Eye-tracking
- Storyboarding
In general what is your opinion about the usability of banking websites?

My opinion may change overtime. When we look satisfaction what you test this year and if you make the same test after five years you will find different result depending on the users experience through the years. The user may perform even better but the satisfaction may go down. What we have now is not bad and I believe there is a room for improvement.
Full Transcript of the Second Interview

What are the main characteristics of usability that a banking website needs to fulfill to be usable?

A usable banking website needs to fulfill the needs of its users. The design should be easy to use and accessible to its end users. Even if the users use the banking website in a different situation maybe from a mobile phone, tablet or a personal computer. In addition to this the process to complete a task should not take too much effort and time. The final point is the graphical presence of the website, the designer needs to reduce the graphic mess and come up with a pleasing design.

Do you see any difficulties to the end users in the current internet banking websites?

Yes, there are some difficulties to the end users in the current banking website design. The main and the important issue I would like to mention is the web don’t speak the audience. The audience in this case maybe a student or a lawyer therefore the design needs to consider the different kinds of audience that the bank has.

Do you think effort to complete a task, language issues, and too much technical terms will affect usability of a banking website?

Yes, the language issue and too many technical terms give the end users some levels of difficulties these two issues influence the effort to complete a task by one or another way. The best solution would be involving users in the design process and make iterative test with different users before implementation. This process gives us the chance to observe what kinds of terms are vague to end users.

What are the challenges to develop a usable internet banking website?

We can mention different challenges to develop a usable banking website because of tis security constraints the designer may focus on how to capture the security features in the design process mean while designer forget about the needs of the end users. The solution I will propose for this kind of issue is to involve the users every steps of the design process and perform a user testing.

What kind of design process or method that you follow to design a usable internet banking websites?

There are different kinds of design methodologies that designers follow to come up with a website design that can be easy to end users. From the different methods that available today I prefer to use agile methodology. There are various methodologies that are collectively known as agile the most popular ones are:

- DSDM
- Scrum
- XP (Extreme Programing)
From the list Scrum methodology is the most popular and it is relatively simple to implement it.

**In general what is your opinion about the usability of banking websites?**

In this day and age of financial worry and fluctuating global financial climates, it would be wise for financial websites to portray trust, control, experience, safety, and structure, a sense that things are in control and are in safer hands.

If you take a look at a majority of these sites, you can see many are falling behind web standards, or already have.

- Sites that cram in as much information as possible to try and solve their bad UX solutions. Information that is displayed without any real relevance to each other.
- Design that has been left alone and forgotten about years ago, plus user interaction that is outdated.

The responsive layout works seamlessly, although the design process was a learning curve. From this perspective, I found that a designer has to adapt another method of caring for all those pixels. When devices rule the layout, there has to be room for design ‘compensation’ in the sense that pixels will be lost, replaced, moved according to the format of the used device as opposed to being static. But, keep the base idea alive. Make the layout work in a way that these pixels are not forgotten but become part of the complete picture whether they sit permanently or temporarily have a purpose to the overall visual imprint. Together with intense UX work and GUI programming they all become relevant to each other.
University of Borås is a modern university in the city center. We give courses in business administration and informatics, library and information science, fashion and textiles, behavioral sciences and teacher education, engineering and health sciences.

In the School of Business and IT (HIT), we have focused on the students' future needs. Therefore we have created programs in which employability is a key word. Subject integration and contextualization are other important concepts. The department has a closeness, both between students and teachers as well as between industry and education.

Our courses in business administration give students the opportunity to learn more about different businesses and governments and how governance and organization of these activities take place. They may also learn about society development and organizations' adaptation to the outside world. They have the opportunity to improve their ability to analyze, develop and control activities, whether they want to engage in auditing, management or marketing.

Among our IT courses, there's always something for those who want to design the future of IT-based communications, analyze the needs and demands on organizations' information to design their content structures, integrating IT and business development, developing their ability to analyze and design business processes or focus on programming and development of good use of IT in enterprises and organizations.

The research in the school is well recognized and oriented towards professionalism as well as design and development. The overall research profile is Business-IT-Services which combine knowledge and skills in informatics as well as in business administration. The research is profession-oriented, which is reflected in the research, in many cases conducted on action research-based grounds, with businesses and government organizations at local, national and international arenas. The research design and professional orientation is manifested also in InnovationLab, which is the department's and university's unit for research-supporting system development.