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Cultural-based Interface Design

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Abstract

With expanding the internet all around the world, the importance of considering different users with different cultural backgrounds getting more vital. It is not anymore possible to design a user interface without considering this wide range of users. Instead, more studies about users and target group of any digital product are needed. Studied showed that considering cultural differences in the design process is improving the usability of the system and as a result, it will increase system acceptance by the users. Although it is anticipated that cultural differences are important for improving usability of interfaces and systems, there is apparently still reluctance among designers to achieve a framework for cultural friendly user interfaces. Besides analyzing the literature, the author has conducted two explorative studies to develop a comprehensive framework that covers the key factors which could affect users' satisfaction to use interfaces. This paper aims to summarize and discuss different studies, showing how they have developed gradually, aiming to reach a satisfactory level of user experience and finally shed light on interesting results. In this thesis, this challenge was framed with three main research questions. The first question was about the best practices of interface design. This question was answered by reviewing different design principles and practices in the literature review. The second question was about different cultural dimensions and their effects on interface design. First, different cultural models were reviewed, followed by possible effects of these models on interfaces. The main challenge was answering the last question, what is the relationship between cultural dimensions and usability problems in user interface design? To answer this question, one user test and an unstructured interview with four users were hold. For this reason, www.infofinland.fi was chosen. Results confirmed that there is a direct relationship between the cultural dimension model and user satisfaction and usability of the website. Results showed that the main cultural influence that has a strong effect on the usability of the website was power distance. This means that design aspects related to power distance in interface design like navigation and data structure. As s research outcome, the results showed that designing a navigation system and data structure based on the

target group culture can significantly improve the usability of the websites and systems. On the other hand, graphical and visual elements like colors and layout do not have a strong effect on the usability of a system.

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Chapter One:

INTRODUCTION AND OVERVIEW

1. Introduction

Along with the advent of the information era, our lifestyle is changing due to IT advancement. Different IT services like applications and websites become the irresolvable part of our life. The online services and applications have a wide user range that makes it vital for designers to consider this diversity in their design. Considering the fact that most top layer of a software system and website is the user interface (Jacob, 2003), the important role of interface design in improving the usability getting more obvious (Oppermann, 2002). Heimgartner (2013) agreed with Oppermann (2002) and mentioned that rapid growth and expanding world wide web bold the important role of cultural differences and their potential problems in interface design and increasing usability of the applications and websites.

Nowadays, the main challenge as Alao, Awodele, Rehema, and Weide (2011) mentioned in their paper is not the lack of understanding of importance of cultural differences in interface design. It is about the few kinds of research have already done in this field. They also add, we have to accept that not all people read and understand in the same way. In other words, designers have to know how different people are communicating with computers in different cultures and countries. This is more crucial especially for people who are producing international products to understand these differences. (Faiola & Matei, 2005). High usability won't be achieved unless the relevant cultural parameters for intercultural user interface design are determined by using analytical research and experiential tests.

As mentioned before, it has been proved that culture has a notable effect on how a user judges a system but very few people take allocate time to research and work on that. This is the reason why research about different aspect of the culture and their effects on interface design is vital. In addition, while there are plenty of resources about problems of designing an international user interface, it is not easy for designers and developers to obtain an in-depth comprehensive of cultural-based user interface design. It is important to conduct research in this field and area by considering existing methods

with the goal of providing a new method for analyzing interactions solutions between humans and computers or systems based on the cultural differences. However, most of the methods and models are theoretical while interface design is all about rapid prototyping and is a practical process (Smith et al, 2004). Through this paper, we will try to explain different approaches to this challenge and try to reach a framework and method based on the existing cultural models.

This thesis aims to gather knowledge and best practices regarding cultural based interface design and help the designers and other development team's members in their development work. Hopefully, having a clear design framework about cultural based interface design would assist designers and development team in producing and designing websites and applications and prevent troubles and confusion.

1.1 Objectives of the research and research questions

The objective of this research is to map and identify different cultural effects emerge in the interface design. Also, it reviews best practices and principles of interface design from different researchers. And finally, providing a framework for cultural-based interface design is the last aim of this study.

Therefore, the research questions are:

- What are the best practices for user interface design?
- What are the different cultural dimensions and their effects on interface design?
- What are the key cultural effects emerging in interface design that can cause usability problems?

The results of the study are given in the form of a practical framework and guideline for designers and developers who are producing and designing interfaces. Since these factors can be different from project to project, instead of providing some specific and certain roles, a checklist which can be applied to different projects is given.

1.2 Research approach and an overview of the methodology

The overarching methodology for this study is qualitative method. As Silverman (2006) stated, qualitative approach is able to collect information related to experiences of people. He added that reliability of a qualitative research can be challenging since the outcome can be different form researcher to researcher or even same researcher at another time and place.

The main aim of the research in addition to producing new knowledge is providing a framework for designers and development teams in order to handle different interface designs to achieve better usability ratios. As a result, it leads to solve usability problems of different websites and applications in terms of cultural differences.

Figure 1.1 - Research strategy

The data for this study is gathered through qualitative in-depth interviews with four4 participants with different nationalities and cultural backgrounds. To verify the findings, usability test, interview and observation methods were used. First, a user test was performed with some different tasks for users. The platform for this user test (infofinland.fi) was chosen carefully. Also, during this user test, observation took place in order to record information related to excitement, confusion, and other psychological reactions of the users during usability test. In the following, an interview session was hold to understand deeper feeling and experience of the users as well as identifying main usability problems. And at the end, a design framework was produced.

1.3 Limitations of the study

The extent of this study is narrowed down to the effects of different cultural aspects on interface design and usability ratio of websites and applications. As the term cultural-based interface design illustrates, this study is just searching for different cultural aspects, and is not going to cover other aspects like visual design principles and other effective technical factors. Previous studies (See, e.g., Hoft, 1996; Hall, 1990; Hofstede, 1991) already approved the importance of cultural aspects in the usability ratio of a website or application.

The main aim of this study is to develop a design framework for designers and other members of developing team. However, this framework is limited to cultural aspects and is not going to cover other elements and excludes non-cultural elements. As a result, the target group of this research would be designers and developers who are designing interfaces for websites and applications.

Since the nature of study was exploratory, data and responses provided with users were limited. Also, it is possible that interview responses could be influenced by researcher presence. In addition, the outcome of research cannot be generalized to other population as outcome of qualitative researches can be different with the same participant but in a different place and time.

This study will advance the understanding of effects of different cultural aspects in usability ratio of interfaces. This knowledge is forming a framework for cultural-based interface design. Through the use of this framework, designers and developers can produce proper website and application interfaces in terms of cultural suitability.

Chapter Two:

LITERATURE REVIEW

2. Literature review

The literature review consists of two exploratory studies. The first study focuses on interface design principles and methods, while the second study enquires how cultural effects emerge in the interface.

2.1 User interface

A user interface is a dominant layer in the communication of a system with the user (Jacob, 2003). The user interface is the main part of the system which is displaying information and taking users requests. The main goal of the interaction is enabling users to manage their operations. By that, users can achieve specific goals and fulfill special tasks. Providing a smooth and easy to understand steps for the user is the main goal of a good interface. The system should provide a step to step explanation journey for the users in order to introduce new functions and expand user's knowledge (Mandel, 1997). This can build confidence in users and improves system engagement. The main goal of interface design is designing a proper system or website interface. Oppermann (2002) told that controlling and adjusting a system is possible by user interface. In addition, in an argument about the importance of the user interfaces, Stone et al (2005) mentioned that interfaces are important due to essential rules of the computers and the internet. He stressed that with the wide range of internet users who searching and browsing information on the net, service providers are building better websites and try to stay competitive. As a result, reaching an understanding of user mental models and physical and psychological abilities of the users is vital and important.

User interface design is the design of user interfaces for different machines and devices. For example, computers, mobile devices and also home appliances are areas that user interface is needed. The most important factor for an interface is usability and user experience. In other words, providing simple and efficient interaction for accomplishing user goals is the main aim of interface design.

There are various definitions for user interface but one common opinion about the interface is that the interface is the main method of communication between a machine and a user. Galitz (2007) has the most famous description of the user interface. Galitz expressed that user interface is an element that makes the user enable to interact with the system through hearing, seeing, talking, etc. He believed that user interface is the main tool for communication between a system and a user. He also pointed out that this communication is not happening unless through input and output methods. Hookway (2014) had a wider approach to the user interface. Hookway argued that interface is a platform for exchanging information. He added, this information exchange can be done with an interaction among application, hardware, circumferential devices, humans, and a mixture of them.

In another approach and definition about the interface, Stone noted that user, in order to achieve her or his goal while using a computer, needs to interacts with a user interface (Stone, 2005).

Designing for an interface could be challenging. There is a lack of understanding of what is a good user interface. Recently different researchers started to redefine the user interface based on user experience and cultural differences. The witness for this movement is the birth of user experience design (UX) as a new and innovative field of study.

2.1.1 User interface design form abstract and practical perspective

In order to understand the importance of user interface design, we have to approach it from different points of view. Abstract tries to define the user interface as a fact and aspect and asks what is it or what is not. On the other hand, the practical perspective is trying to explain different solutions which already are searched for interface design.

2.1.1.1 Abstract perspective

The need for communication existed from the time which we walked on the planet. Movement and gesture, spoken language and written language are different levels of communications methods during history. Until 1970 writing was the main method for interacting with interfaces. In the 1979s Xerox introduced another method of communications for interfaces which were using a form of gesturing, the most basic of all human communication methods. Altus, the mouse, was introduced, with a pointing function, as the primary interaction method for computer users. This introduced the system interface as is still used today (Galitz, 2007).

Computers started to have a vital role in our lives. This fact leads to an understanding of the importance of different user interfaces in everyday life. In the past, we referred to a computer system as a mixture of hardware and software. Constantine and Lockwood (1999) believe that while the interface is the overpass between users and the system, to users the interface often is the system. Galitz (2007) also mentioned that the experience of the user interface is the main element for the user to judge a user interface. Galitz (2007) stated that researchers and scientists are working on usability in interface design like never before. In order to improve the experience of users, many related fields are in a way woven together with the aim of improving interfaces, with the result that it is hard to separate them.

Galitz (2007) believed that user interface design is a part of a field of study called human-computer interaction (HCI). According to Galitz, Human-computer interaction is the study, planning, and design of how people and computers work together. He mentioned that the main goal of (HCI) is that a person's needs should be satisfied in the most effective way.

Garrett (2011) pointed out that the main concern in interface design is the arrangement of the elements in a way which enable interaction, navigation, and movement through the product proper for users. Also, Galitz (2007) took the view that the main goal of user

interface design is simple: to make working with computer easy, productive, and enjoyable. As a result, the main goal of interface design is producing proper layout of elements in order to increase productivity and joy for the user.

Stone (2005) believes that since technology is advanced so much, computers are used everywhere and almost by everyone. He stats we are using the computer and it is not important if we are aware of that or not. Computers invade our life. Stone claimed that human-computer interaction (HCI) consists of many disciplines. Computer science, psychology, ergonomics, engineering, and graphic design are some of the subjects which are forming HCI.

2.1.1.2 Practical perspective

This part discusses the different solutions for user interface design. One of the most famous methods and explanation to reach a good user interface was formulated by Galitz. Galitz (2007) claims that in order to design a proper interface, we need to consider 14 steps. These steps are important to consider for this study because it explains different steps and process of interface design that should be considered before starting talking about the cultural aspect of interface design.

Table 1. Galitz interface design method

The Galitz (2007) Interface Design Method
• Understanding users or clients is a crucial part of any design.
• Understanding business function and describing user activities, user mentalities and finally developing a system to achieve these goals. Also, in this step, we should establish design standards or style guides.
• Understanding the principles of good screen design. A screen design which is designed properly should consider the needs and capabilities of its users. Also, we have to consider both for displaying and controlling hardware capabilities.
• Developing the system menus and navigations. Choosing menu styles based on user purpose.

Table 1. (continued)

• Designing and choosing proper windows based on usage and goals.
• Using and choosing correct device-based controls.
• Choosing the correct screen-based controls or proper graphics objects to represent properties or operations of different objects.
• Producing clear text and messages which is one of the main reasons for system acceptance.
• Providing proper and effective feedback, guidance and assistance to the user.
• Internationalization and accessibility for people from different cultures and languages.
• Creating meaningful graphics, images, and icons for the interface.
• Choosing a proper color theme for improving the organization of the screen.
• Layout and position of the panels in a clear and meaningful way. This part is an important specialty for improving comprehension of information which leads to faster and better execution of user tasks.
• Test, test, and retest! Late testing is costly and time-consuming. Creating, evaluating and modifying prototypes are the main steps in this last phase.

Stone (2005) describes that design not only focuses on understanding users but also it should recognize different tasks and actions that users will perform. It could be simply observing users or using psychological based user modeling during developing a product. Stone stresses that user involvement should happen in the testing and evaluation of the system during development. He also wrote that by an iterative process we can be sure that we can improve the interface based on the user's feedback.

2.1.1.3 Summary

In this part of the thesis, the user interface and its importance for a system was explained. Also, I explained about the history of user interface design and big players in this field. Finally, I chose one practical approach for designing interfaces and I tried to go through this list briefly and explain different steps.

2.1.2 Designing for good user interface

Galitz (2007) believes that principles of a good interface design did not start till the 1970s when IBM introduced its new system, text-based terminal. Before that, developers were designing interfaces. Good interface design and assists in completing a task without drawing unnecessary attention to itself (Norman, 2002). Norman also mentioned that graphic design and typography are employed to provides usability and increases the aesthetic of the design. In a similar approach to design a good design, Galitz (2007) pointed out that good design is consisted of understanding many things like consideration of people and user's minds, knowledge of how we see, understand and think and also understanding of information visualization. Galitz also mentioned that a good design should always consider hardware and software limitations.

Stone (2005) argued that before, computers were designed for some specific tasks and they were employed mostly with special computer users. That time users were supposed to the learning system and adapt to it. But now the situation is changed and designers and developers should design a system based on user's behaviors and characteristics. Stone also wrote that a good interface can lead to higher staff productivity, lower staff turnover, higher staff morale, and finally higher job satisfaction.

To answer these question, I want to refer to Stone`s (2005) explanation about the mechanism a good interface. Stone (2005) has noted that good interface design can boost a clear, logical and attractive interaction between a user and a system and it grants users to accomplish their tasks. Forgetting that a user is using a machine or system during performing a task, is another sign of good interface design.

2.1.2.1 Principles of user interface design

Many researchers and writers tried to decide what are the principles of interface design. In this part, some of this basis and assumptions are discussed. The first approach to this topic is related to Xerox STAR. Smith, Harslem, Ibry, Kimball, & Verplank (1982)

guided these principles which were the groundwork for graphical design (Smith, Harslem, Ibry, Kimball, & Verplank, 1982).

Table 2. Xerox principles of user interface design

Rules	Purpose
The illusion of manipulable objects	Visual objects should be selectable and manipulable. Objects should be meaningful and able to be selected. Also, it should be clear that they are selected and they are a stoplight and focal point which leads to the next action. Verplank called this "Graphics with handles on it".
Visual order and viewer focus	In order to grab the attention of the users, we should use visual contrast, animation and sound effect can be used. Also, always feedback should be provided for the user.
Revealed structure	The gap between the user`s aim and the effect should be decreased.
Consistency	In order to improve learning, we should keep consistency during the system. It could happen by different methods like sort shapes, element location, etc.
Appropriate effect or emotional impact	The emotional effect for the product and market should match with the feeling that interface transfers to the user.
A match with the medium	In terms of device capability and design should be a great match. It could be the resolution of the screen.

Former, Xerox START principles for user interface design is briefly explained. The importance of these principles is related to their primacy of them to other principles in terms of time. In the following general principles of user interface design will be reviewed.

Leonard's golden rules: Another popular approach to interface design principles is Leonard (1996). She introduced a kind of golden rules in order to prevent bringing bad into an interface experience. She stated that you have to behave to others like you like they behave to you. Her approach to interface design is more philosophical. Since the industry was updating, he introduced two sets of principles back to 1997 and 2011.

In addition to Leonard golden rules, Mandel (1997) also introduced a model based on the Leonard golden rules. In the first rule, Mandel mentioned that giving control to the user is a vital part of interface design. Instead of making a hard wireframe and prediction of user`s needs, it gives users enough freedom to choose to want they want to do and want to reach.

Table 3. Leonard's golden rules (first rules)

Rules	Purpose
Modeless	Use modes with determination.
Flexible	Flexibility to choose using keyboard or mouse for users.
Interruptible	Providing permission for users to change focus.
Helpful	Providing expressive messages and text for users.
Forgiving	Supplying users with instant and two-sided actions, and feedback.
Navigable	Allow users to experience meaningful paths and exits.
Accessible	Provide users with different skill levels.
Facilitative	Transparency of the user interface.
Preferences	Providing customization ability of the interface for users.
Interactive	Providing operating and managing ability of the interface objects for users.

In the second rule, Mandel (1997) explained the importance of reducing user's memory. He believed that people are not good with remembering things and as a result user interface should always be a kind of assistant for the users in remembering things.

Table 4. Leonard's golden rules (second rules)

Rules	Purpose
Remember	Relieve short-term memory.
Recognition	Rely on recognition, not recall.
Inform	Provide visual cues.
Forgiving	Provide defaults, undo, and redo.
Frequency	Provide interface shortcuts.
Intuitive	Promote an object-action syntax.
Transfer	Use real-world metaphors.
Context	User progressive disclosure.
Organize	Promote visual clarity.

In the third and last rule, Mandel (1997) stressed the consistency of user interface. He explained how consistency can improve the usability of the interface by enabling users to predict and knowledge they already learned.

Table 5. Leonard's golden rules (third rules)

Rules	Purpose
Continuity	Sustain the context of users' tasks.
Experience	Maintain consistency within and across products.
Expectations	Keep interaction results the same.
Attitude	Provide aesthetic appeal and integrity.
Predictable	Encourage exploration.

General principles: The general principles of designing a user interface are described below. They cover all aspects of interface design. They are borrowed from different works of literature like Galitz (1992), IBM (1991,2001), Mayhew (1992), Microsoft (1992, 1995, 2001), Open Software Foundation (1993), and Verplank (1998). This table is based on Bhaskar et al (2011). He referred to Galitz (2007) for some ideas.

Table 6. User interface design general principles

Rules	Purpose
Aesthetically	An interface with the aesthetic interface can provide the first good impression for the user.
Clarity	Visual presence, concept, and language should be clear and easy to understand.
Compatibility	It can happen if user understanding truly takes place. Also, it should happen during system organization and matching with user tasks. Another aspect of compatibility can occur in product design. It means During designing a system, we should consider habits, expectations, and knowledge of the user otherwise system will be confusing and hard to learn.
Comprehensibility	Steps to finish a task should be clear and the system should be understandable.
Configurability	To improve the sense of control and personal preference, the system should be customizable. It can lead to user satisfaction and system acceptance.
Consistency	It is a vital part of any design system. It can decrease human learning.
Control	Controlling system is appealing, being control by the system is a disaster. Working with your speed and being able to fulfill tasks is proper control of the system. On the other hand, long waiting times, unable to get proper results are examples of a lack of control in a system.
Directness	Task and actions need to be clear and be performed directly. It leads to a reduction in the user's mental workload.
Efficiency	User`s energy should not be wasted. All navigation tracks should be clear and brief. Scan and skim should happen fast.
Familiarity	It is all about considering the user's existing knowledge. Let's users get started and become productive.
Flexibility	Given different choices to users to do a task. Also, system customization can be another approach for improving flexibility in a system.

Table 6. (continued)

Forgiveness	A system that accepts human errors and tolerates common mistakes is more user-friendly.
Predictability	Actions should result in the outcomes which users expect. This cannot happen unless considering user former knowledge and experience. Predictability decreases mistakes and errors and increases the speed of completing a task.
Recovery	The user should be able to undo an action.
Responsiveness:	By providing feedback to the user action, we can increase human performance and confidence.
Simplicity	By providing limited choices, we can prevent the complexity problem.
Groupings	Providing clear logic and structure for the user.
Transparency	Ability to provide a system in which the user just focuses on tasks, not technical details.
Focus and emphasis	Places that notice is needed, we need to use emphasis.
Trades-Offs	Choosing the best options among different design guidelines based on time, cost, and ease of use.

To achieve a good interface design, understanding, and applying user interface principles are an important part of interface design. By reviewing these principles in the last sections, and different approaches to them, we are ready to move to the next important topic in interface design which is elements of user interfaces.

2.1.2.2 Elements of user interface

There are different approaches to user interface elements. Affairs (2013) described that user interface elements belong to 4 main categories. The first group that mainly are related to receiving information from users. He named this group Input Control and wrote that it consists of text fields, buttons, list boxes, radio buttons, check boxes, dropdown lists, toggles, and data fields. Affairs called second group Navigational Components which includes bread crumbs, sliders, search fields, pagination, tags, and icons. The third group is Information Components like tooltips, icons, progress bars, notifications, message boxes, and modal windows. And finally, the last group that

Affairs named is Containers. An accordion is one example of this kind of elements. In another approach to user interface elements, Stone (2005) mapped another kind of categories. Stone wrote that a system can be controlled by a user through a variety of GUI widgets. He believed that these widgets grant success for the user during doing a task. In this part, we will have a look at each widget.

Table 7. Elements of user interface

Widgets	Objects	Purpose
Widgets for structuring the interaction	Primary windows	A place that main task is carried on by the user in that.
	Secondary windows	Providing additional actions for the primary window. They are complimentary for primary windows.
	Tabs	Mainly are used for classifying properties of a task in a window based on an index card metaphor.
Widgets for controlling the interaction	Menus	Most user interfaces have menus. There are different kinds of menus like a drop-down, cascading, roll-up and pop-up.
	Toolbars	They mainly consist of user commands which are represented with icons. They help to complete the menu hierarchy.
	Command buttons	Mostly they are controlling dialog boxes.
Widgets to Enter Information	Option Buttons and Checkboxes	They are used for entering information into a system. Option buttons or radio buttons are used when the user wanted to choose one or more options while checkboxes are used when user want to choose more than one option.

Table 7. (continued)

	List Boxes	It is used when the user wanted to choose from a large number of options. The user is free to choose one or multiple options.
	Text Boxes	Most flexible widget for entering information.

As can be seen in the last table, any kind of user interface element is designed to fulfill a specific task. In other words, during the last decays, deployment of interface elements reached a standard. Understanding these standards and function of these elements is important and misuse these elements can easily to decreasing usability of the system.

And finally, we come to Marcus (2013) grouping for interface components. Marcus stated that a user interface has 5 main components whether it is a website or other technologies (metaphors, mental models, navigation, interaction, and appearances). The first component which Marcus pointed out is metaphors. He explained that basic concepts communicated through words, images, sounds, and tactual experiences. In the simple word, metaphors are specific knowledge that the user already has from other experiences. The main goal of using them is their similarity to physical things but also have their own properties. A mental model is the next component that Marcus is mentioned in his paper. He believed that the structure or organization of information, operations, duties, roles, and people in is closely related to the mental model of people and users. The mental model can help to shape behaviors and set an approach to solving a problem. Marcus called navigation the third component of interface design. He believed that navigation should be designed based on mental models. And for the next component, he pointed out that interaction like input/output, feedback, should happen through different interaction like typing on a keyboard, using a microphone, pens, etc. And finally, the last component which he mentioned is appearance. He believed that visual and tactile characteristics of design are another key component. He mentioned choices of colors, fonts, verbal style all belong to this group. Marcus approach to

interface components is more abstract. As a result, four main categories can be identified: container elements, navigation elements, user-input elements and finally information elements. Container elements are related to the layout of the interface and page. Navigation elements are related to defining interaction models for the interface. User input elements choosing different methods and ways which user can request their information. And finally, information elements are related to different types of information should be displayed for the user.

2.1.2.3 Best practices for designing an interface

There are different approaches to interface design. Among all of them, Garrett (2011) is the most practical and popular. Garrett argued that in order to design an interface with high usability, we need to consider some principles in mind. The first thing that he mentioned is contrast and uniformity. Garrett wrote that contrast is the vital method and tool to grab user's attention. A design without and contrast would be a gray screen. In the following, he argued that all parts of the system should have consistency. He wrote that the system is not about some tiny and small beautiful well-designed objects. A system is about internal and external consistency between all components. Color and Typography are the next elements which should be considered during the design process. He claimed that color is the main element for communication and brand identity in design. Also, this can be achieved by using the right typefaces and typography.

2.1.2.4 Summary

Visual design has a vital role in most of the products we are using. Some people may think about visual design as an aesthetic matter of a design, but a proper visual design can be both aesthetically pleasing and working very well for a system.

In this part, the importance of a good user interface was explained. Also, the different principles and approaches of user interface design were reviewed, and best practices of visual interfaces.

2.2 Cultural aspects of interface design

2.2.1 What is culture?

The definition of culture varies. Kluckhohn (1962) wrote that a definition of reality like language, values, and rules which are a frame of the behavior of a group of people called culture. Also, there is another explanation about the culture by Evers and Day (1997) which confirmed that what is shaping people behaviors, communications and attitude to world culture. Evers and Day believed that it has roots in history, values, tradition, and surroundings. Hall (1959) defended the idea that culture is a border and shape of reference grown by a group of people. For Hall (1990) the important arguments for developing this border and frame are different approaches to life, behavioral patterns, attitudes, and material objects.

Sapienza (2008) pointed out that the word culture also has a root in the Latin word "colere" (to inhabit). He wrote that this word was used in biological science (for example, a bacterial culture). About 1850, this word used for social development of humans.

The most accepted definition of culture belongs to Ernest Gellner (1997). "the socially transmitted and sometimes transformed bank of acquired traits" (Gellner). Sapienza (2008) stated that while culture is a social occurrence, biological aspects are also connected to it. For instance, we assume that people with similar skin color and body type belongs to the same culture.

Definition of culture as mentioned before are countless. In the following, there is more briefly and different definition to conclude this part. Greenbaum and Kyng (1991) stated that culture is an order of significance and values that underscore customary treatment and manner in life. In another approach Borgman (1986) defined culture as frame which consisted of race, ethnicity, behaviors, presumption. He also added that values and mental and communication models are fitted in this frame and all shape a specific culture.

Marcus (2013) has a new viewpoint of the culture. He stated that before culture was related to a group of people in a specific environment. Now, culture is mostly related to a choice of the way of living, a lifestyle. As a result, designers should choose how they want to apply the traditional concept of culture to current product design. Kamppuri, Tedre, Tukiainen, (2005) claimed that culture is a phenomenon that is hard to determine, but it should be explained in interface design. This is critical as it underpins the approach that researchers perceive culture has a direct effect on techniques and consequences.

2.2.1.1 Terminology

Human-machine interaction (HMI) or human-computer interaction (HCI) is the name of the process in which information is exchanged between a user and a computer or system through a user interface (Heimgartner, 2013). Heimgartner also stated that in the scientific text, the concepts, "intercultural", "cross-cultural", "cultural-centered" and "cultural-oriented" are employed interweave with more associated concepts like globalization, localization, localization, internationalization, ionization, and culturalization.

2.2.1.2 Theoretical background

There is no doubt that cultural differences have an important role in the interaction between the user and a system. For this reason, considering cultural problems and issues are vital in order to design a system with high usability. Alao, Awodele, Rehema, and Weide (2011) in their paper mentioned this problem. They wrote while cultural issues have an important role in screen design and improving usability, few kinds of research have done already in this field. In another approach to the importance of culture in user interface design, Xinyuan (2005) stated that the way that people interact with each other in a society, can effects how people interact with computers.

Till now the most famous origins of cultural theory in interface design have been cross-cultural psychology and cross-cultural communication (Kamppuri, Tedre, Tukiainen, 2005). They wrote that this approach is considering culture as an individual aspect of

the user. As a result, there is a need for some theories that address the relationship between systems and society in interface design.

2.2.2 Culture based interface design

Cultural-based interface design is one of the new area in interface design which playing an important role. It is clear that no business visual communication is complete in the absence of an interface.

But by looking at the statistics we can realize that companies are not happy with websites and apps that just look good. Now designers need to work hard on cultural aspects and usability in their designs. Xinyuan (2005) believed that the main reason for this need is improving the rate of engagement and loyalty of the user to the system. He claimed that achieving these goals are possible only through providing a proper culture-based user interface design.

Heimgartner (2013) stressed that by the rapid growth of world wide web, the need to respect and understand cultural differences getting more important for designers. Designers have to know how different people are communicating with computers in different cultures and countries. He mentioned that this skill is more crucial especially for people who are working in international business. In line with this, Faiola and Matei (2005) have noted that as a result of increased usage of online platforms in everyday life of people, understanding user cultural preferences in designing elements getting more important. They added that it is been proven that information-seeking tasks are done in platforms which were design by designers in the origin country by their own culture.

Nielsen (1996) in his book international user interfaces expressed that to meet the needs of the diverse market, it is necessary to localize software products and Internet sites for the target market.

2.2.3 Cultural issues in interface design and usability

During the past few years, the tendency to develop localized websites increased. The main target of these websites is national users and cultural user groups. In designing websites, culture is a vital element to consider. We have to accept that not all people read and understand in the same way. (Alao, Awodele, Rehema & van der Weide, 2011). Sturm (2002) stated that in developing a product for the foreign market, cultural background always brings the challenge. One has to deal with this problem in 4 different perspectives. First is technical issues like technical standards of electricity. Second is a linguistic challenge like a translation of words in the interface. The third is cultural level including problems in meaning and context of use which is the main focus in this paper and finally is the cognitive level which is related to the presentation of the device functions.

2.2.4 Influence of objective culture on interface design and usability

Hoft (1996) wrote that objective culture is the most tangible and easy to examine a feature of the culture for text orientation, metaphor, date and number formats, page layout, color, and language. Next, he mapped objective cultures as follows:

Color: Shen et al (2006) mentioned that color is connected to feeling in different cultures has different meanings. He referenced Barber and Badre (2001) paper as an example of color-culture differences in different countries and culture. Barber and Badre explained how red color in China means happiness while it represents anger and danger or for Egyptians it is the color of death. Also, Shen et al mentioned that in large scale websites and products, we should be aware of the association of color with different religions. Shen et al wrote that in traditional Christianity red, blue, white and gold are different symbols while green is the important color for Islam. Consequently, during designing large scale websites, we have to be careful about choosing colors.

Metaphor: Shen et al stated that using the metaphor is one of the most important aspects of designing an interface. He noted that metaphor is a strong tool for translating

the technical events which are happening in the backstage of a system to the concept that makes sense to average users through an interface. He added, since most apps and websites are developed in the United States, their interfaces are based on American metaphor.

Language: Tong and Robertson (2008) stated that the most important characteristic of a culture is its language. "Language is the building block from which users gain information from a website" (Cyr and Trevor-Smith, 2004, pp.5). Also, Shen et al (2006) mentioned that most developing and Asian countries are considering English as a part of their websites while some other countries, especially in Europe, prefer to maintain their national language mostly because of national pride. As English is one of the most important international languages, Shen et al advised that designers consider English as the first language of their websites and after that use a translator to provide local languages.

Page Layout: Shen et al (2006) argued that the layout and arrangement of an interface are different from culture to culture. Then we can consider layout as a cultural component. He mentioned flow direction which could be horizontal or vertical varies from culture to culture. Let's explain this by providing some examples. French sites most likely have a centered layout (Cyr and Trevor-Smith, 2004) while in Islamic countries, page layout will flow from top to bottom. In addition, text flow is different from culture to a culture which can be very vital element during designing an interface.

2.2.5 Influence of subjective culture on interface design and usability

Cultural dimensions models try to evaluate and differentiate cultures by using a number of cultural factors. Hall (1990) mentioned four factors while Hofstede (1991) consisted of five factors. A seven-factor model by Trompenaars (1993) was introduced during his study in 1993. The most former and complex one belongs to Khaslavsky (1998) that integrated both Hall`s, Hofstede`s and Trompenaars models. The most cited cultural dimension model is Hofstede`s. He studied hundreds of IBM employees in 53 different

countries and summarized that there are 5 different fundamental culture dimensions. In the following, we will briefly check the main aspects of any dimension in the visual and interface design.

Hofstede's model consists of five main factors including Power distance, Uncertainty avoidance, Masculinity vs. Femininity, Individualism vs. Collectivism and Time orientation. Hoft (1996) outlined subjective culture as the psychological feature of culture, including assumptions, beliefs, values, and pattern of thinking. Ford (2005) stated that the effect of subjective culture on human-computer interaction (HCI) is the main issue which decreasing usability in systems. Ford continued that most researches in this field had no outcome. One of the examples of these researches is Marcus and Gould (2001) paper. They applied Hofstede's framework to web and user interface design. Based on Marcus and Gould (2001) the effect of each Hofstede's cultural dimension on web design and usability are as follows:

2.2.5.1 Power distance

This cultural dimension is related to acceptance ratio of unequal power distribution among less powerful members within a culture (Marcus & Gould, 2000). We believe that the Power distance can affect different aspects of the interface design. The affected areas can be information approachability, different pecking order in mental models, underscore on social and moral instruction, are some of the areas which can be affected (Xinyuan, 2005). Marcus and Gould (2000) wrote that people from a high power distance cultures like China, like more clear and understandable hierarchical navigation structure. He noted that they also prefer more symmetry layouts in web design. For example, they studied a Malaysian university website and they realized that concentration on the power structure is very clear and most space is devoted to items such as faculty, buildings, and administration. On the other hand, they in comparison to a university website in the Netherlands, which is a country with low power distance, pictures, and visual elements were mostly about students. In addition, the asymmetrical layout was used to show a less structured power hierarchy.

Figure 2.1 - High power distance: Malaysian University Website. (Marcus & Gould, 2000)

Figure 2.2 - Low power distance: Dutch Educational Website. (Marcus & Gould, 2000)

Figure 2.3 - Low power distance: Dutch Educational Website. (Marcus & Gould, 2000)

2.2.5.2 Individualism/collectivism

Marcus and Gould (2000) stated that individualism in cultures suggests insecure and detached ties between people. On the other hands, collectivism implies that people are unified together due to birth, social group, etc. According to Sudhair et al (2007), in individual societies like US and Australia, we can see a great silence on websites design while on collectivist societies like Taiwan and Pakistan, we can see more symbols of national agenda. In sample websites chosen for these part, we can see that the main feature of the American website is the importance of visitor as his/her goals. In contrast, the Costa Rican website stressed on nature and national agenda (Marcus & Gould, 2000).

In a new approach to this topic, Xiuyuan (2005) stated that in individualistic cultures representing an image of success by demonstrating materialism and consumerism is accepted. He also added emphasis on change and new and unique instead of tradition and history is another characteristic of design for individualism cultures.

Figure 2.4 - High individualist value: US National Park Website. (Marcus & Gould, 2000)
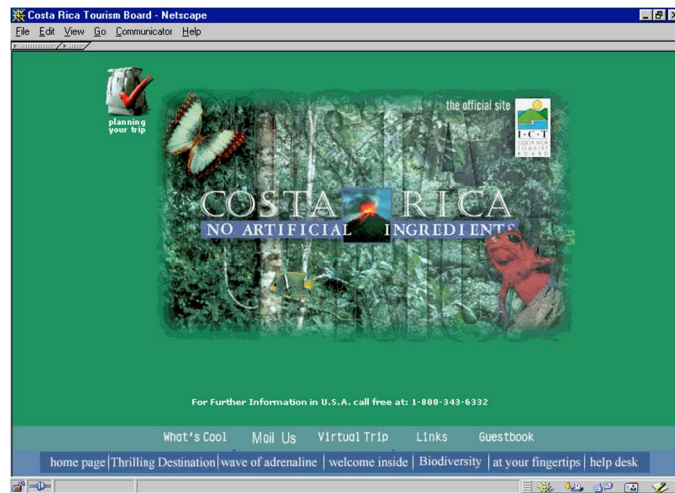
Figure 2.5 - Low individualist value: Costa Rican National Park Website. (Marcus & Gould, 2000)

2.2.5.3 Masculinity/feminism

Aykin (2007) told that masculinity and femininity is all about the difference of roles and responsibilities between men and women. Masculinity vs. femininity (rules vs. relationship) is another cultural dimension that can have an effect on user interface design. High masculinity cultures are more considering traditional gender/family/age differences. Also, a task with quick results is appreciated. Having full control of navigation is another important aspect of masculine interface design. On the other hand, in feminist cultures, blurring gender rules, mutual cooperation, visual aesthetics are the main values and goals.

Sudhair et al (2007) acknowledged that societies like Japan and Australia which are masculine, tend to be hero worshippers while more feminine countries like Sweden and the Netherlands, tend to sympathize with victims and underdogs. As a result, we should address success, winning, strength in masculine cultures while in feminine cultures, charitable causes and family oriented images are more accepted.

The first example considers a Japanese website with high masculinity. This Website narrowly orients its search portal toward a specific gender, which this company does not do in other countries. On the other hand, The ChickClick USA Website consciously promotes the autonomy of young women. And finally, the Excite Website from Sweden, with the lowest MF, makes no distinction in gender or age.

Figure 2.6 - High Masculinity Website: Excite.com for women in Japan (Marcus & Gould, 2000)

Figure 2.7 - Medium Masculinity Website: ChickClick.com in the USA. (Marcus & Gould, 2000)

Figure 2.8 - Low Masculinity Website: Swedish Excite.com (Marcus & Gould, 2000)

2.2.5.4 Uncertainty avoidance

Uncertainty avoidance is related to the level of anxiety of people about uncertain or unknown matters. High-UA cultures consider simplicity, clarity, less error system models and reduced color, typography, sound in their interface design. On the other hand, complexity, acceptance of wandering, having less control on navigation, using coding colors and typefaces are characteristic of low-UA interface designs (Marcus & Gould, 2000). Also, Sunhair et al (2007) believed that countries with low UA like Denmark and Sweden, handle uncertainty and obscurity with little discomfort while countries with high UA like New Zealand like websites and systems that prevent users being lost.

As an example let's have a look at a website from Belgium with high UA level. This example shows how UA can effect on user interface design. In this example, the homepage is very simple, clear and it is providing a few choices for the user. On the other hand, one British website can easily reflect the design characteristics of a low UA culture. In this example, complexity in content and choices is clear. Also, hidden contents, different typefaces are another aspect of design for high AU cultures.

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Figure 2.9 - High uncertainty avoidance: Sabema Airlines Website from Belgium. (Marcus & Gould, 2000)
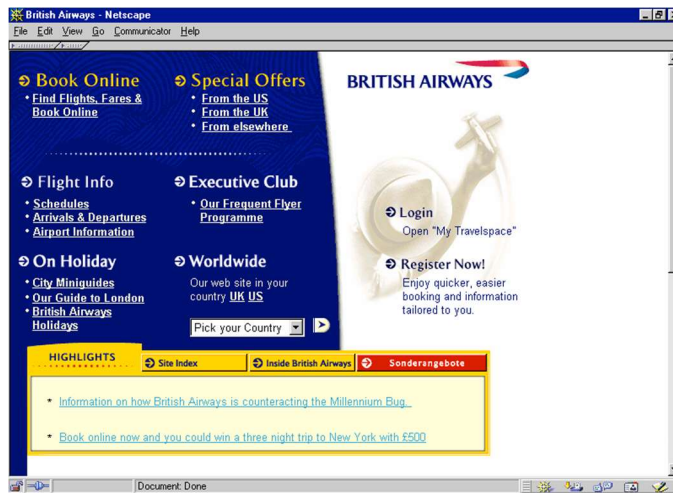
Figure 2.10 - Low uncertainty avoidance: British Airways Website from the United Kingdom. (Marcus & Gould, 2000)

5.2.5.5 Time orientation

Time orientation is the last cultural dimension which we are going to discuss here. Since long-term orientation has an important role in eastern cultures, during 1980s Hofstede decided to add it as the fifth dimension. Based on this category, while designing interfaces for high LT cultures like Asian countries, we have to consider these features: content focused on practice and practical value, relationship as a source of information, patients in achieving results. In contrast, in low Lt cultures, truth and certainty are important. Rules as a source of information and credibility and having a desire for urgent results of goals are important.

As an example, the Siemens website from Germany with low LT shows an ordinary layout of western countries. A clean and crisp design on this website aimed at achieving goals in a fast and quick process. In contrast, the Chinese version of the same website needs more patience to fulfill tasks (Marcus & Gould, 2000).
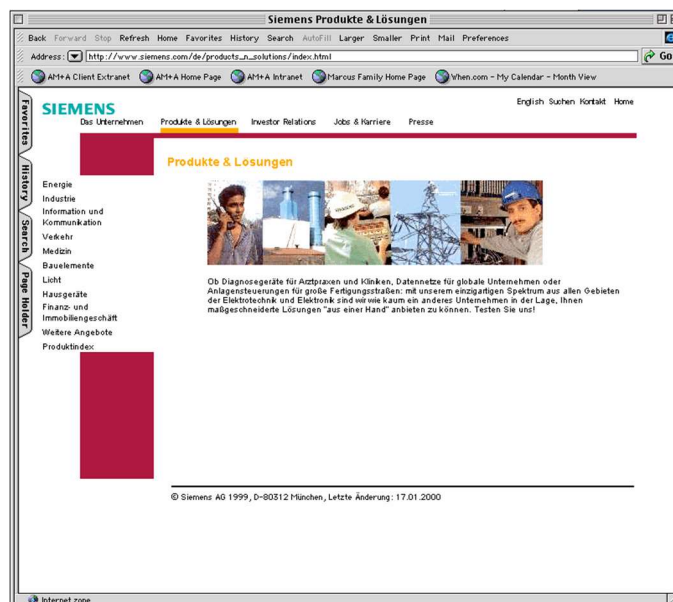
Figure 2.11 - Low Long-term orientation: Website form Siemens Germany. (Marcus & Gould, 2000)

Figure 2.12 - High Long-Term Orientation. A website from Siemens in China. (Marcus & Gould, 2000)

To answer the question of how different cultural dimensions, emerge in the interface and summarize cultural dimensions' effects on interface design, we have to study the Reinecke (2011) theory. In his study, he explained the relation between the mental model of different users with design characteristics in interfaces. In the following table, relationships between Hofstede's cultural dimensions and UI design aspects are listed (Reinecke, 2011).

Table 8. Cultural dimensions emerge in interface. Existing Guidelines adapted from (Zhu, 2015)

Rules	Low Score	High Score
Power Distance	More navigation and access options; nonlinear navigation	Less links and navigation options; Linear navigation
	Unstructured data	Structured data
	Interface level information presentation, and less deep navigation	Little information at first level, and deep navigation
	Amiable error messages	Precise error messages
	No support is needed	Strong support and help is needed
	Normal people appear in pictures	Leaders appear in pictures
Individualism	Classic and common colors and images	Encoded information via colors
	High image-to-text ratio	High text-to-image ratio
	High polymodality	Low polymodality
	Colorful interface	Monotonously colored interface
Masculinity	Less saturated colors	Saturated and bright colors
	Different paths and navigation options	Less navigation options
	Personal presentation of content and friendly communication with the user	Use encouraging words to communicate
Uncertainty Avoidance	Complex interfaces with lots of information at the first level	Hierarchical information organization
	Nonlinear navigation	Linear navigation and user position indicator
	Coded colors, typography	Use unnecessary signals to reduce vagueness
Long Term Orientation	Low information denseness	Most information at first level
	Peripheral information arrangement	Focal information arrangement

In a more general list, Reinecke (2011) mentioned that what are the main adaptations and considerations in interface design related to cultural influences like language, religion, etc. He mentioned that these cultural elements have the effect of on perception and preferences of the users.

Table 9. Cultural influences and UI adaptations

Cultural Influences	Suggested UI adaptations Reference
Language	Objects in focus, versus objects embedded in the context
Reading/writing direction	Left-to-right alignment, right-to-left alignment, or right-to-left/top-to-bottom alignment of all interface elements
	Place elements at the starting point of a person's reading direction if they require full attention
Religion	Different numbers of religious symbols, exchangeable for each religion
	Different color schemes: colorfulness, brightness, and contrast
Political Orientation/ Social structure	Objects in focus, versus objects embedded in the context
	Different levels of hierarchy in the information presentation
	Variable complexity/information density
Education level	Different levels of support
	Variable numbers of navigational cues
Form of instruction	Nonlinear navigation versus linear navigation with instructions
	Different levels of support

Xinyuan (2005) believed that some people criticized the usage of rigid Hoft`s cultural model in cross-cultural interface design. Also, he noted that former experiments in applying Hofstede's model to usability were contradictory and leads to debatable findings. For example, Gould et al. in a study found out that Malaysian websites mostly are linked to website administration, which corresponds in the high power distance for Malaysian society. On the other hand, he did not explain why a country like the United States with low power distance also using those links on their websites.

2.2.6 Existing cross-cultural theories and practical interface design

Due to technology advancement, foreign ideas and culture can be spread easily and can be pick up with people all around the world. But we need to consider that not all people have the willingness to be multicultural. For this reason, cross-cultural interface design is increasingly demanded day by day (Jange, Smith, Duncker, & Curzon, 2004).

Heimgärtner (2013) wrote that expanded and advanced HCI cross-cultural design approach is related to cultural diversity and differences between targeted culture which system developed for that. To achieve this goal, there are many different approaches. One of the methods for the design of intercultural human-machine systems is "method of culture-oriented design" (MCD). MCD method is based on combining concepts of cultural-oriented design and HMI design.

The thesis considers which are created based on existing cultural models do not necessarily work. We can divide these existing works into three categories:

1. Theoretical studies that use existing cultural models.
2. Empirical studies that use existing cultural models.
3. Theoretical works that use existing models combined with other approaches.

Heimgärtner method. Heimgärtner (2013) mapped the cross-cultural interface design method as following:

1. Investigation: Heimgärtner stressed that "determination of user behavior, identification of social and cultural factors and assessment of different indigenous user attitudes" are the first steps of cross-cultural design.
2. Translation: Heimgärtner wrote that after gathering information from the first phase, we need to produce a consistent cultural model in order to recognize and light up likeness and dissimilarity of the user groups.
3. Implementation: Using culture model in order to produce internationalized/localized prototype to conduct usability tests with user groups.
4. Evaluation: in the last phase, Heimgärtner described the analyzing, optimizing and iterative process to reach the final product.

Heimgartner method is one of the few methods that truly is based on cultural differences and cultural dimension models. As mentioned his method in the latter list, investigation in user's behavior and producing a cultural model based on that is the first phase of interface design. He added that using this cultural model to produce a prototype for the user tests and analyzing prototype based on the outcome of user test and iterate the process to reach a final product are next steps of the interface design process. This approach in interface design is rare and groundbreaking.

To a more advanced approach to the role of cultural differences in interface usability ratio, in the following chapters, we are going to examine the relationship of different cultural dimensions in increasing or decreasing user satisfaction and usability of a system.

2.2.7 Summary

While considering the culture of the users is a vital and important part of a design and has a direct influence of user acceptance rate, very few people take allocate time to research and work on that. It has been proved that culture has a notable effect on how a user judges a system. This is the reason why we need to have a better approach to interface design by considering cultural and usability needs of the users. The gap between designers and users is one of the main problems in interface design. This problem is more comprehensible cross-cultural interface design. As a result of this problem, the probability of misunderstandings, surprises, and lost opportunities in software projects increases (Kamppuri, Tedre, Tukiainen, 2005).

It is important to conduct research in this field and area by considering existing methods with the goal of providing a new method for analyzing interactions solutions between humans and computers or systems based on the cultural differences. Heimgärtner (2013) stressed that till now the most important objectives in intercultural HMI design is the way which developers can produce a product which can properly be offered in the global market. Due to this, one of the most parts of the development of any digital product should be an exploration of intercultural differences like the meaning of colors and cognitive styles.

Worth to mention that several studies independently proved that such methods like talking-loud which have been developed in western countries are not suitable for all cultures. For example, consider an Indian user, it is very hard for them to give a negative or individual opinion. In this situation, the designer should use another method by considering cultural factors of the user (Kamppuri, Tedre, Tukiainen, 2005). That could reveal the importance of designing a cultural model based on the user's culture for the purpose of localizing software or websites.

Chapter Three:

METHODOLOGY

3. Data and methods

3.1 Introduction

The general concepts and reasons for this study were about the importance of cultural differences on users and usability of the interfaces. Through this thesis, I tried to understand best practices for designing interfaces from different approaches and point of views. Also, I have found out about different theories about cultural dimensions and their potential effects on the interface design process. Furthermore, I wanted to have a deeper understanding of user problems related to cultural differences by holding some qualitative interviews with some users from different cultural backgrounds.

This chapter consists of the explanation of research design and methodology, the research participants, the research setting and tools used for the research. Finally, the chapter also considers the method for data analysis. The main goal of this section is to map the methodological approaches undertaken to find out the main reasons for user frustrations from a cultural perspective. This chapter will present the intention of the research and methodological approaches which were adapted. By this, the data collection method will be explained and the process of data analyses will be explained.

3.2 Research questions

This thesis had three main questions that needed to be answered. The first question was related to different practices and principles of user interface design. To answer this question, during the literature review, I analyzed different approaches to interface design and tried to compare and contrast different practices. One interesting fact about all of them was a similarity and overlaps between them. To answer the second question about different cultural dimensions and their effects on interface design, in the second part of the literature review, I went over the most important approaches to cultural dimensions and tried to reach to a framework of elements and characteristics which have a strong effect on usability and user satisfaction in interfaces. For the last

question, how cultural differences can cause user frustrations? I hold a user test session with a website following a qualitative interview with different users in order to find answers to my last question.

3.3 Research structure

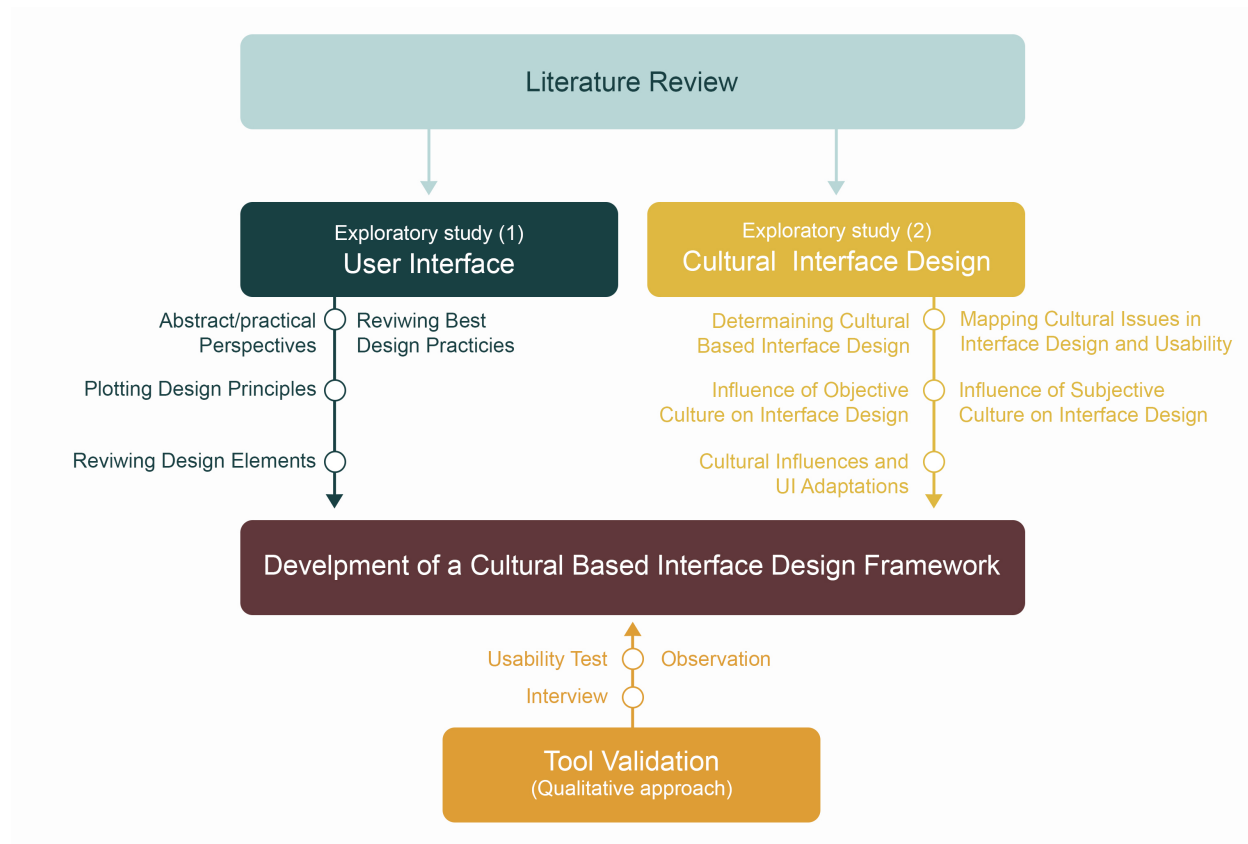Figure 3.1 - Research conceptual framework for this study

Using qualitative research methods for meeting new information and data gained popularity for the past two decays (Strauss & Corbin, 2006). Denzin and Lincoln (1998) mentioned that qualitative researchers stress the socially constructed nature of reality... They seek answers to questions that stress how social experience is created and given

meaning. The main difference between quantitative and qualitative research is the difference between symbolized numerically outcome of quantitative research approach to linguistic results of the qualitative research approach (Heppner, Kivlighan, & Wampold, 1999). This kind of research causes silenced experiences of people to be revealed.

This research started with a user test performing some tasks on the infofinland.fi website. During this phase of the study, the observation method was used for gathering and recording some information related to excitement, and other psychological reaction of the users during performing tasks. As Morgan stated, leading and actionable information is the observer`s role (Morga, 2015). After finishing the requested tasks by the participant, a semi-structured interview related to user's experience of the website was. Since the goal of the interview was having a semi-structured interview session, it was acceptable to let interviewees answered questions in an unconstrained way and mentioning everything that came to their minds. In order to check the participants feeling about the test and interview, a pilot test and interview session were carried out.

For this study, four4 participants were interviewed. They were from different cultural backgrounds and nationalities. Sampling took place based on the experience of participants in living in different countries (in my case Finland) and different ages. Any test session and interview lasted 30-45 minutes. The language which was used in all phases were English and all interviews were recorded. The interviewees were promised anonymity and gave permission to tape record the interview.

In this research, it was decided to employ a blend of different qualitative methods in order to get a wider picture of the phenomenon under study. It was decided to employ the following methods: Think-aloud as an evaluation method (user usability test) and qualitative interviews to study this area. The following table, summaries the research approach, methodologies and data collection.

3.4 Qualitative approach

As the main method for gathering information and for this study, the qualitative approach was chosen. A qualitative method was chosen since it can provide more volume and capacity to tackle these research questions. The qualitative approach is able to information on the individual's experiences of the users of interfaces. On the other hand, a quantitative approach is more related to scales and numerically based information and with no doubt, it could not be the appropriate choice for this study.

To explain why the qualitative approach was the better method for this study in comparison to the quantitative method, I will introduce fundamental differences. Adams, Khan, and Raeside (2014) wrote that there are two basic and important categories for research methods: qualitative and quantitative. For collecting data that are not numerical, a qualitative approach is the right method. Some examples of this method would be open-ended questions and observation. As a result, qualitative data should be translated into descriptive statistics. In contrast, the quantitative approach does the opposite. The outcome is some numerical information which should be placed in different categorize (Johnson & Christensen, 2008). In the case of this study, a qualitative method would be the better choice for gathering information related to user experiences based on their cultural differences. Patton (2002) had a similar opinion about the differences between qualitative and quantitative methods. He stated that quantitative methods are a kind of systematize processes for measuring social phenomena through numbers and fixed variables. Critics of this method argue that this approach does not have enough contact with people and outcomes of this method could be random (Silverman, 2006). Also, Strauss and Corbin (1990) stressed that the outcome of qualitative methods is not based on statistical methods and systems. As a result, their outcome lies in an in-depth understanding of opinions and experiences.

The main criticism of the qualitative approach is related to the validity and reliability of data. As Silverman (2006) stated, reliability refers to it in case of repetition of the research by another researcher or even by the same researcher at another time and

place, the outcome of the research would be similar or not? Achieve this goal is especially more difficult for qualitative researches. As Taylor and Bogdan (1998) mentioned that It is not possible to achieve perfect reliability if we are to produce valid studies of the real world. This is true especially for interviews since the data depend on the environment and circumstances which the interview is conducted (Pole & Lampard, 2002). The possibility of having different outcomes for the same interviews are high due to the changing context.

3.4.1 Descriptive/Interpretive

Descriptive or interpretive research is related to the existing literature or past achievements, in addition to actual present happenings. Also, to justify the methods which are selected for study and showing that the research is contributing something new, literature review is the important part of the research. In other words, no research should be started without discovering what is already known in the body of knowledge prior to the introducing the research study. The power of this method of research is its ability to reflect reality and an in-depth self-validation process. On the other hand, the potential problem with this method can be misunderstanding of the results of a research which researcher may be unfamiliar. In this research, this approach was chosen to review the literature related to the study subject.

3.5 Different means for gathering data

Table 10. Methodologies

No	Methodology	Users	Literature	Tool
1	Usability test	Yes	Yes	Exploratory interviews
2	Qualitative interview	Yes	Yes	Exploratory interviews
3	Observation	Yes	Yes	Exploratory interviews

3.5.1 Usability testing (www.infofinland.fi)

For achieving a direct of the usability of a system, researchers conducting qualitative testing sessions. Usually, researchers observing users struggling with some specific user interface element and by that researchers can understand which part of the interface has a problem. Also, asking participant following up questions about the interface and their experience is always possible. It can help the researcher to gain more information about a specific problem in the design. Based on the researcher experience and the possibility of holding more user tests, the researcher can redesign or change an element of the interface.

As Budiu (2017) mentioned, qualitative studies are the best method for identifying the main problem in design. Qualitative data can reveal the weakness and strength of design. In this method, the outcome of the test always depends on the experience of the researcher and explanations of the actions to the user. Also, we have to consider this fact that different users find different problems in a user interface (elevator`s effect). Budiu continued and mentioned that qualitative testing involves a small number of users (5-8) and can directly identify the main usability problems.

For this study, I chose the www.infofinland.fi portal. This website is designed for providing different information regarding the move to Finland for different reasons. It

provides information in 12 different languages and it is the first rank website in the google search for keyword move to Finland, the second rank for immigration to Finland after www.migri.fi and sixth rank for keyword study in Finland in the Google search engine. They promise high usability for different cultures and users by providing information in 12 languages. For this thesis, I decided to use this portal as a platform for and observing user frustrations and answering the main question of my study: How cultural differences can cause user frustrations?

The experiment took place in users places during March and April 2019.   All the participants were selected at random regardless of their age, income and gender. For this study, researcher verified that all users are familiar to the internet and using desktop websites. The sample size of this experiment was 4. Furthermore, users were given a chance to fill in an open-ended questionnaire by writing down their comments and feedback on the website, and explaining any reaction that was observed during the test. Subsequently, the researcher extracted the problems from the observer sheet and they were merged into a final master problem list.
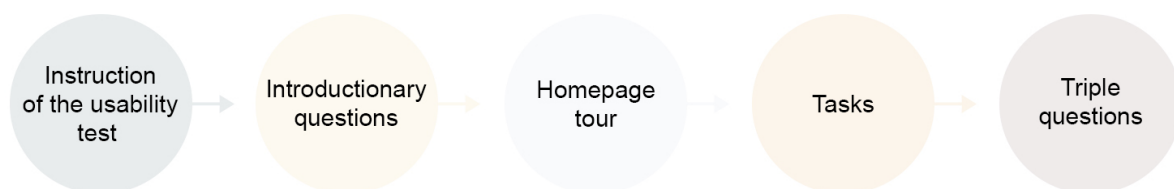
Figure 3.2 - Usability session process and steps

Usability testing requires representative users of the product to be recruited to perform a set of predesigned tasks. These tasks should be as representative as possible of the activities that real users would perform on the selected application.

Task one: Task one was structured around a specific task that was phrased around a statement and a question. The statement was phrased as: Imagine you are coming from

non-European country and want to start a business in Finland and stay as an entrepreneur. Which kind of residence permit do you need before moving to Finland?

User A managed to find information related to task one easily while for the user B started with reading all labels to understand which part of the website and which link should he click. During this process, he opened many other links in new tabs related to different topics. Very soon he lost on the website and start telling this website is complicated and I need an assistant. He also mentioned he prefers to talk to an assistant directly instead to browse no ending pages. As a result, he started searching for an assistant on the website. He added that he thinks this website has many links in the main pages which are merged in the text. He told he wish that there was a sidebar that can list information and makes the accessing to different information easier for the users. When finally, he found the page, he told that information related to this task is very summarized and it seems that he needed other websites in order to have a better understanding about information to answer the task. User C did not have a better experience with this task. She found another approach to answer the task and it was a PDF file provided at the page for starting the business in Finland. She started reading the PDF which was about 25 pages and at the end of PDF, there were some links to www.migri.fi for more information. She told I would check other websites that all information is in one place. And finally, user D mentioned that are many links without any description and it makes the experience very complicated to find the requested information. She also mentioned, there are some links to other websites in the text that can harm the consistency of reading since you need to stop and go and check another website in the middle of a paragraph. In addition, she told that too much text without proper grouping makes it hard to find information and make this website useless.

Task two: Task two was structured around a specific task that was phrased around a statement and a question. The statement was phrased as: Imagine you are from a European country and working in a company in Germany. You are coming to Finland for a short project and the duration of your stay is 45 days. Please find information about the residence permit that you need before landing in Finland. For this task, user A again

finishes the task easily. He starts with reading the main menu labels and managed to find his way to the right page. In a similar situation, user B and C were successful to find the right page and they tried to read all text on the page in order to prevent any misunderstanding. On the other hand, user D had difficulties with many options to choose and many links to click. She mentioned that she needed some explanations for the links and sections and she did not click on links since she was afraid of making mistakes and opening wrong pages. Also, she mentioned that there should be a side menu that can provide a list for users, a kind of easy access to different sections of the website.

In the final phase, I asked users to mapped three main parts of the website which they want to redesign. By this, I gave the chance to start an open discussion with users to understand more deeply about the problems that they faced during the last two tasks. Also, I had the opportunity to ask more questions related to their answers to reach a better understanding of user's problems.

User A, who finished all tasks without experiencing serious problems mentioned that he did not have any issue in finding information and he liked the clarity and simplicity of navigation. In terms of colors and layout he was satisfied as well and he told there is no need to change anything. Not surprisingly, user B had a different opinion. He mentioned that the most important issue of the website was related to the lack of proper grouping of information. On the other hand, he mentioned that colors are appealing and the information is easy to memorize. In a similar comment, user C and D mentioned that navigation in the website was hard due to overusing of links in the pages and among text. Also, both user's C and D mentioned that footer is not useful and it just repeated some information.
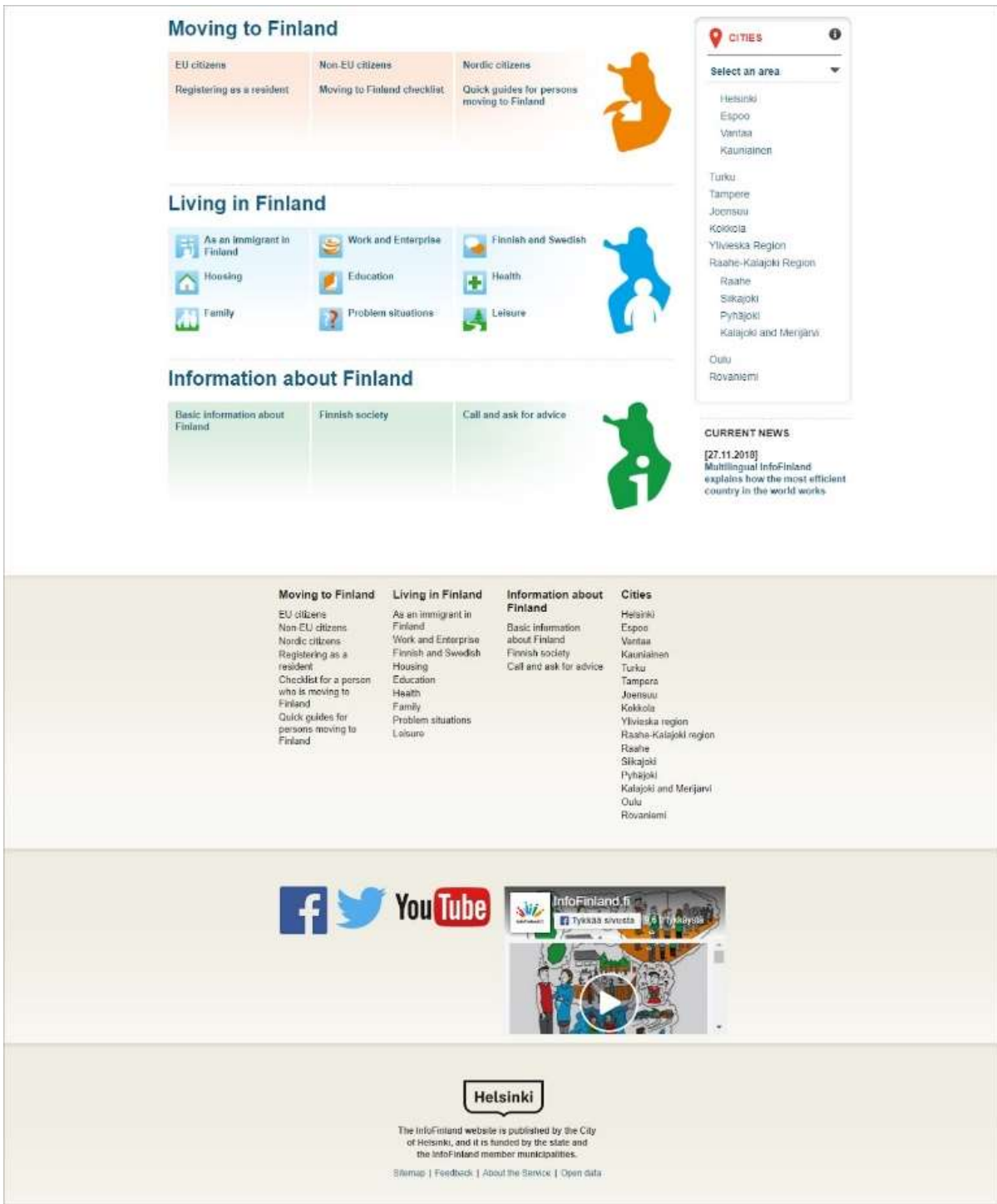
Figure 3.3 - Infofinland.fi -The main gate for gaining information before moving to Finland.

3.5.2 Interviews as a qualitative method

As mentioned before, the main method for gathering data in this study was interview. This method was chosen by considering the kind of question that wanted to be answered. This method gave the opportunity to ask open-ended questions from a small sample in order to explore user's experiences and feelings. As a result, interviews mostly have characteristics like conversations. In addition, by choosing this method, I was sure that vital cultural problems were covered in the conversation and can be categorized and help to the analysis steps. In other words, a structured interview maybe can pretend to move to deeper upcoming topics.

Usually, five to seven participants are needed in order to uncover the majority problems of a website or application. As Norman stated, 85 percent of usability problems can be uncovered by just five5 participants. The most important part of choosing participants are related to the alignment of the participants with typical users of your website (Usability.gov). For this study, I chose four4 participants with different cultural backgrounds since I wanted to measure the role of cultural differences between users in the usability of the website. Each user test and post-interview last about 45 minutes. A notebook was used for conducting the user test. All user tests and interviews took place in user's apartments during March and April 2019. Permission form and test script can be found in the appendix.

3.5.3 Collecting data through observation

As Kawulich (2012) mentioned, observation is a method for gathering data about cultures and processes in the social sciences. She stated that observation is a typical method for gaining data in the methodological approach of ethnography. There are two different methods for observation: participant observation and direct observation. As it is clear from its name, participant observation is related to the study that the observer is participating in the study as well. On the other hand, for direct observation, the observer does not need to interact with people, objects or study setting (Kawulich, 2012). As a

result, the way that you position yourself as a researcher is a very important part of the validity of the study. The importance of observation is its assistance to the researcher for identifying and understanding the interaction of people in setting and organizations of different things in the setting. The main aim of this method is understanding what is important to people in the social setting under study. It leads to understanding how to ask questions and which questions are helpful to reach the answers of the research questions. (Schensul, Schensul, & LeCompte, 1999). In addition, observation can give the researcher the chance of taking notes which could be useful in the future. The researcher can learn about the difficulties of the participants about the interview as well (Marshall & Rossman, 1995).

The observation started from the first moments of the user test. In this phase, the movement and navigation of the user were observed in order to find different moments of frustration and user reaction to the tasks. Also, the feeling of being lost recorded many times for users who prefer to use a system with fewer navigation options or in some cases liner navigation models. All reactions and experiences were recorded in order to find the pain points during the user test and using these data in the next step, interview.

3.6 Research instruments

In this study, two laptops were used as the main tool and gadget for testing the website. In addition, notebook and note taking during user test were used to help to record user psychological reactions and potential and confusions. And finally, during the interview, a recording device (iPhone) was used to record the interview for data analyzing and further transcribing data and searching for Insights.

3.7 Participants

In this study, four different users have participated. As will be seen in the following, participants came from different countries with different ages. Also, the amount of time that they are spending during the day of web surfing is quite high. The youngest participant was user A with 18 years old while the oldest participant was 42 old. Three out of four participants were student. Meanwhile, three participants had either part-time or full time job. All participants mentioned that they are using internet at least 5 hours per day which can show that they were quite familiar to surfing net and using online services and different websites. User A, was using different websites and online services like emails and university modules about 7 to 8 hours per day. His favorite website was Quora (a question-and-answer website where questions are asked, answered, edited, and organized by its community of users in the form of opinions). Also, he mentioned that he was using other platforms like Facebook, online dictionary, etc. User B was a trader. He was spending about 5 to 6 hours for surfing the net and using different platforms. His favorite website was related to trading but he did not mention the name of it. In addition, he named YouTube, Google search engine and one website for real estate as his favorite websites. User C, was a student in Helsinki. She mentioned that she is using many social media and platforms during the day. She mentioned that she spent about 7 to 8 hours per day surfing the net and using different websites. Her favorite websites were YouTube, Instagram, VK (social media platform in Russia), and Facebook. User, user D was a visual designer who spent about 12 hours per day surfing the net and using different websites. Her main favorite websites and platforms were Google mail and search engine, Facebook, Pinterest and some other platforms for online shopping.

In conclusion, the average age of the participants was 27.5 years. Fifty percentages of participants were male and their average age was 30 years while this number for female participants was 25.5 years. Also, they spend about 7.5 hours per day surfing the net and being online. All participants received enough information and signed the consent

form. Participants came from different countries and cultural backgrounds and they could talk in English.
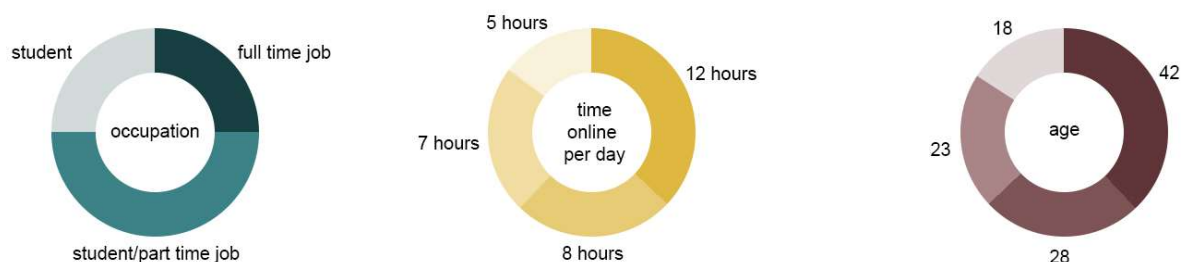
Figure 3.4 - Participants demography

3.8 Data analysis method (Open Coding)

In order to analyze the data gathering from interviews, an open coding method based on identifying key themes was used. As Gibbs (2007) wrote, open coding is a form of qualitative research analysis which involves recording or identifying transitions of text that are associated by a joint theme. This common idea or themes let you indicate the text into a different classification and as a result, you can set up a framework of thematic ideas about the text. After carefully considering the literature review, this method was chosen for analyzing the data. As a result, richer literature produces more themes (Bulmer 1979; Strauss 1987; Maxwell 1996). Bulmer (1979) also stressed that different themes come from already-agreed definitions.

For open coding data analysis, there are different methods. As Ryan and Bernard (2003) stated, these technics are based on different factors. The first and most popular methods are based on an analysis of words. Word repetitions, key-indigenous terms, and key-words-in context belong to this group. The second approach is about the careful reading of larger blocks of texts and comparing and contrasting information, and

searching for missing information. In the third approach to open coding data analysis, an intentional analysis of linguistic features like metaphors, transitions, and connectors are the main consideration subjects. And finally, in the last approach to open coding data analysis, Ryan and Bernard (2003) explained that the physical manipulation of texts like unmarked text, pawing and cut and sort procedures are the main factors for grouping and coding of data.

In a nutshell, my process for analyzing data consists of data transcription, both audio files related to interviewing and notes which were taken during the user test. In the next step, identifying data patterns took place. The third step was coding the transcripts and defining themes and identifying for patterns.

The following diagram is bold upon the literature review. The literature review was based on two exploratory studies. The first study focus on interface design principles and methods and the second study focus on cultural effects emerge in the interface. From there I was able to withdraw the open coding method and the new conceptual framework from the raw data.

Source

Descriptive/interpretive

Explotorary study (1)

Interface design principles and methods

User Understanding   Business Understanding   Design Principles   Navigation   Trades-Offs
Device-based Controls   Screen-based Controls   Text Production   Feedback   Internationalization   Color
Graphic Production   Layout   Visual Order   Data Structure   Consistency   Clarity   Aesthetically Fit
Compatibility   Comprehensibility   Configurability   Control   Directness   Efficiency   Familiarity
Forgiveness   Predictability   Recovery   Responsiveness   Simplicity   Grouping   Focus & Emphasis

Explotorary study (2)

Cultural effects emerge in the interface

Color   Metaphor   Language   layout   Navigation   Data Structure   Information Presentation
Error Tolerance   Support   Graphic Production   Text-to-image Ratio   Multimodality   Colorful Interface
Contrast   Focus & Emphasis   Religion   Reading/writing Direction

Conceptual Framework

Coceptual Framework

Comprehensibility
Compatibility
Text Production
Social Influence
Aesthetically Fit
Culture
Consistency   Predictability   Simplicity
Clarity
Visual Order   Responsiveness   Color   Metaphor
Reading/writing Direction
Graphic Production   Forgiveness   Directness   Navigation   Information Presentation   Religion
Device-based Controls   Efficiency   Familiarity   Data Structure   Colorful Interface
Trades-Offs   Control   Error Tolerance
Screen-based Controls   Business Understanding   Layout   Support   Graphic Production
User Understanding   Grouping   Focus & Emphasis   Multimodality
Internationalization   Text-to-image Ratio
Feedback   Language   Contrast
Configurability
Design Principles

Validation study (1)

Think-Aloud

Usability

Validation study (2)

Interview

Data Structure   Language   Focus & Emphasis   Layout   Social Influence   Navigation   Culture   Color

Figure 3.5 - Grouping and selecting data process and framework

3.9 Ethical considerations

As Nation (1997) mentioned, ethics is the discipline of dealing with what is right and wrong within a moral framework that is built on obligation and duty. Ethical approval is a vital part of doing research that involves human participation. Participant`s data, rights, and well-being are the primary and first consideration of the research projects. Collecting information from participants without their knowledge and their express of willingness is unethical. As a result, the researcher should make it clear to the participants that first there are participating in the test and interview completely voluntary and second they are free to leave the study and test every time they want (Kumar, 2005).

For applying the ethical approval to the study, there are some principles which should be considered. The most important principle is respecting autonomy. It mainly includes providing sufficient information for participants to help make a decision if they want to participate in the study or not. Also, you have to make sure that participants are aware that there is no force to participate or no penalty for not taking part. In addition, participants should know that they are free to leave the research and no need to provide any reason for that. And finally, protecting and respecting personal data should be considered during all stages of the study. Other principals which named for conducting a research study were maximizing benefits among others, society, science, scholarship, health, and/or the participant themselves. Also, minimizing harm to participants or others as part of your research is another important factor should be considered during the research process. And finally, being fair and behaving with integrity are other aspects for applying for ethical approval principals to the study ("Information on ethical issues relevant to CECs." n.d.).

The usability test and interview results are compared to the data from content analysis and discussed in section 4: Data analysis and results.

Chapter Four:

RESULTS & DISCUSSION

4. Results and discussion

To answer the research questions, at the first step different literatures and sources were reviewed by the researcher. The gap in the literatures was related to the lack of a system or framework for designers to equip themselves with a tool for designing interfaces with high cultural usability. To shape a framework, first different principles and methods of interface design were searched and a list of effective factors on improving interface usability were mapped. In addition, culture as a subjective and objective element in user interface design was studied and cultural effects emerge in the usability of interface design were identified. During studying the literature, the most important cultural elements in terms of repetition and their importance on improving usability of the system were mapped. The first framework and outcome of the study consisting of eight important factors was born. A check list for designers which can assure them their design is culturally fitted to the cultural and mental model of the users. To verify this list, some usability tests and interviews held and as a result the framework components were reduced to five main elements.

The results of the data analysis from the usability tests and interviews is the main source of outcome and results of this study. In order to verify the outcome of the study, obtained information from usability tests and interviews compared to literature review.
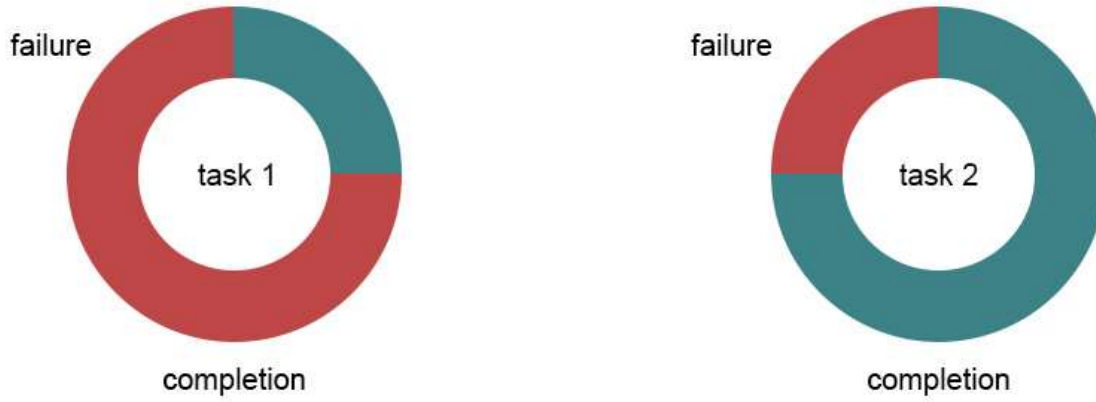
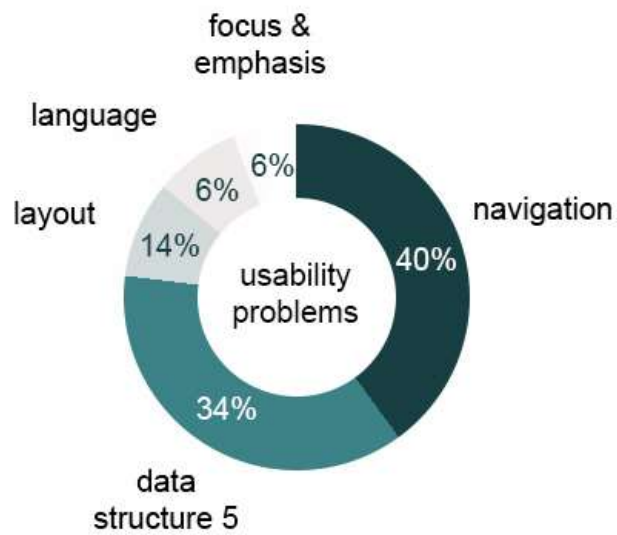Figure 3.6 - Compellation vs failure of the usability tests

Figure 3.7 - Major usability problems during usability test

4.1 Navigation system and usability

The result of the literature review showed that navigation model of the system with 40% detected problems, is the most important factor in the interface usability and user satisfaction. Actually nothing is not more frustrating that feeling lost in a website and have difficulties to find the required page and section to perform a task. As a result, the designer should consider the user mental model based on his or her cultural background before designing any wireframe of a system and website. Most of the time, inappropriate navigation system increase users drop ratio and leaving websites. This important factor could be seen less or more not only in different literatures but also in usability tests and interviews.

On the other hand, for users of websites like the sample website for this study (infofinland.fi), often users cannot find their required information in other websites and resources and they need to keep using the portal and suffer. Generally, this fact can be applied to most of the governmental websites that are design for a specific reason, in this case immigration. Also, since most of the users of the such websites are from different cultural background, using the website can be more challenging and difficult. As a result, designing website and interfaces for governmental websites with international users is more complicated and difficult.

What makes this problem and challenge even more complicated is lack of possibility to provide a website and system with different navigations models. It is clear that changing and switching between different navigation models cannot happen like changing the language a website or color theme of a system. As a result, proving a different navigation system most of the times means designing and producing a completely separate website. It is hard to imagine that a website which has many languages and users with different background provides a specific navigation system per user's group.

During usability test, three out of four users had difficulties and problems with the navigation system. For example, user B during completing task one was confused by

too many links and navigation options. "This website has many links and it is confusing. Also, it provides many links in the text that leads you to the other platforms for more information about a top. I do not like the navigation system of this website." (first usability test).

User D as a visual designer mentioned that all decisions and selections which are made during a design process, should be based a data or research outcome like user research. While some people are informed with importance of user research during a design project, most of the time because of time and budget shortage, this phase of the design is ignored by the team members and designers. Whereas this kind of working approach, makes the process more expensive and frustrating for the whole team. What happened in the reality is that a system or product is develop with a lot of usability problems which after lunching the product should be fixed.

Participants mentioned that being confusing and bad navigation model is the main reason for them to close the window and leave the website. As user C told, "Any time that I face a website that is confusing and doubled information like this (infofinlanf.fi), I feel I lost between pages and I leave the website immediately. I prefer a website with limited links and clear navigation". (interview session).

Data structure is the next important element in interface design which directly is related to usability and depends on user's cultural model. In the following section the importance of data structure and some example from user tests and interviews will be discussed.

4.2 Data structure

After navigation system, data structure with 34% of all detected is the next important element in cultural based interface design. Data structure or in the other word the way that data is presented for the users is the second important element in improving

usability. Like last element, navigation, data structure model can be different from culture to culture.

As the first task of the usability test introduced to the users, they tried to understand the structure of the data by looking at the main menu and different labels and bottoms in the page. This is the place that users were trying to find a familiar pattern for data structure. In the sample website (infofinalnd.fi), most of the users could find some familiar patterns or learn the general data structure model of the website.

Solving the problems related to data structure is vital. One key to achieve this goal is using familiar and trend structures that already is exist in different websites and platforms with similar usage. As user B mentioned, "I like the way information is ordered and grouped. I mean collecting and grouping data is nice like immigration to Australia portal". As it can be seen, user B immediately referred to his similar experience to find if the website has the similar pattern.

Like developing navigation system, designing data structure or architect should be done with considering mantel model of end users from the first day of the design process. In this process one challenge could be identification the right problem and section of the system which needs to be fixed or improve. As it accrued in the usability test, some problems where identified by the researcher which users did not have the ability to explain or name it. As a result, in these kind of tests and interviews, researcher as a facilitator has a vital effect on the outcome of the research.

4.3 Layout

Layout in the interface is related to the placement of the visual elements. Not surprisingly, layout has an important effect on increasing or decreasing the usability of a website or system. There are few literatures about the relation about layout and the cultural differences in the interface design. For example, French users prefer to use

websites with central focus and layout while people from Islamic countries prefer a layout from top to the bottom of the page (Cyr & Trevor-Smith, 2003).

This factor plays an important role in usability of the user interface that further studies and researches should be done to reach to a solid framework. But considering the fact that Master thesis gas limitation in terms of time and research, the present amount of literature and outcome of user test and interviews in this study is satisfying.

As the design role about layout, the most important element of a page should be located at top left side of the page. This is the role that should be applied to the English countries and other western countries with the similar writing systems. Also, information that is placed on the top of the page is always more important than information in the footer. During usability test, the importance of this factor was revealed. User B which was from a country that writing is from right to left, mentioned that he would like to move side bar to the right side since he though it is the wrong place to place a side bar with some important menus. As a result, this happened for different elements like social media.

4.4 Language

With a lower importance, language is standing at the forth rank in cultural based interface design. For language as a cultural player in interface design, there are two different approaches. First approach is related to left-right vs right-left alignment. As a matter of fact, it is woven to gather with layout. In other words, it is about the placement of different elements of the page by considering the language of the user. Naturally, it can effect objects in focus in a design. Since the Internet and application development are mostly developed in the United States, English language is the dominant language in the interface design. It caused that English be an accepted of most of website around the word. It can be seen as an advantage for users as well as developers and designers. On the other hand, it is ignoring different cultures and languages. Recently, some European countries starting to finish this domination by providing their websites in their languages. It can be an advantage and assist to cultural diversity. Also, no doubt

that it can improve the usability of their website by providing local language for the users.

During this study, language as a main representative of a culture was considered. In both usability tests and interviews researcher tried to address user language as an element in interface design. The outcome of this research revealed that users mostly are more comfortable to use websites in their languages. For example, user B, decided to choose his language during usability test while he was able to communicate and use website in English. Not surprisingly the first problem was revealed. By changing the language of the website, layout of the website was stable and it was very strange for the user to use the website. As a result, he decided to switch to English language again.

Adding a new language to the website is not enough anymore. Users during past decade experienced many good platforms and their expectations are grown rapidly. Best approach for the considering different languages in user interface design is having English language as the main language and based on the user's language and culture add new languages to the website or any other systems by considering alignment differences and their effects on the layout of the page.

4.5 Focus and emphasis

As it already can be seen, most of the elements that are already mentioned by the researcher have some over lapping. Focus and emphasis is not an exception. This element has the less importance in this framework since it has already some overlapping with language element as well as social structure of the user. For example, during usability test, user B mentioned that he preferred to find a list of grouped information in the sidebar instead of scrolling a page, a kind of quick access by providing focused information. "Instead of scrolling in the page, I wish I could find information in the sidebar like a kind of titles of different information". In a similar comment, user B told "Information is messy. I would prefer to see information in one place". As it can be seen from two former examples, both users mentioned focus and

emphasis structure of the website messy and problematic. While these problems can be occurred because of lack of focus and emphasis of the information in the website, they can be studied under other categories like navigation system or data structure as well. In other word, by considering other former factors in design process, this factor will be covered. This fact, can effects on the importance of this factor in improving usability of websites and application and as a result can reduce the importance of it.

Chapter Five:

CONCLUSION

5. Conclusion

5.1 Research summary

This research sheds some light on usability levels of (infofinaland.fi). Also, it revealed the most important cultural elements and their effects on the usability of the websites and interfaces. The outcomes can contribute both stockholders and owners of infofinland.fi and other designers which need to produce and develop interfaces for different users. Exploring the users cultural background, especially at the very beginning of starting a design project can prevent wasting time and budget of companies. Therefore, the aim of this research was to highlights the most important cultural factors which have effects on the usability of a website or interface. A kind of checklist that needs to be considered in order to design a cultural based interface.

The results mostly showed that the usability level of the selected website was quite low. There are a number of reasons that can justify the results and this claim. One reason could be the lack of solid framework for cultural interface design which can be employed with different people like developers and designers. This is because few studies done in this field and mostly they could not move from the theory to a practical phase. In addition, providing a platform which can be fitted for a wide range of different cultures looks impossible. The main reason for this issue is related to navigation system and data structure were are the most important elements of usability of a website and cannot be vary in a same platform. Providing a clear and simple platform with few links can be an answer to the problem. Considering usability tests and interviews, this solution can be more believable. On the other hand, designing a localized website is always possible. It improves the user experience and usability of the website dramatically.

With reference to the results of the user tests and interviews, this study is able to provide a framework of the cultural based interface design based on the five elements:

1) Navigation system
2) Data structure
3) Layout
4) Language
5) Focus and emphasis

All of the above elements can provide a better usability and experience for users. Also, designers and other stockholders can use this checklist as an introductory guide for designing better interfaces with higher usability. The results of this study could be further validated using other usability methods and could be also applied to a larger number.

CULTURAL BASED INTERFACE DESIGN

DESIGN FRAMEWORK

NAVIGATION
Nonlinear navigation vs linear navigation

DATA STRUCTURE
Structured data vs nonstructured data

LAYOUT
Central layout vs top to buttom layout

LANGUAGE
Different alignments and placements of the elements

FOCUS & EMPHASIS
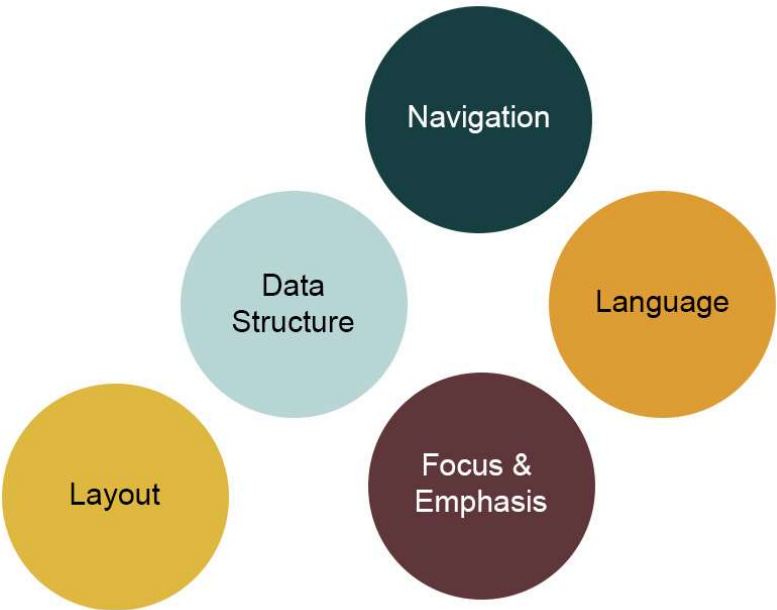Objects in focus, versus objects embedded in the context

Figure 5.1 - Cultural based interface design framework

Designing an interface with high usability ratios can be challenging. Most of the time, designers and developers are being stuck in choosing colors and fixing technical issues of the websites and application. What is missing that has direct effect on usability of the system is cultural differences. As a result, the need for having a framework for designers and developers in order to improve usability of the system is vital. The aim of this framework is making life of the designers and developers easier by considering important cultural differences and their potential effects on usability of the systems.

5.2 Recommendations for further research

This thesis studied the possible effects of different cultural dimensions on usability and user's satisfaction of websites. Also, during this study, the most important kinds of usability problems have been discovered during user tests and unstructured interviews. There are plenty of possibilities to continue this study. Right now there is not any model and system which can assist designers and developers with designing interfaces. Most of the time, wireframes of the websites and applications are produced with developers who do not have enough information about this issue. In addition, visual designers who are working on interfaces and layout of the interfaces mostly care about principles of graphic design such as colors, layouts, and typography. As can be seen, cultural differences most of the time are completely ignored with the product team. It reveals the value of the existence a framework for product team which assist them with cultural considerations and challenges in website and app design.

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APPENDIXES

Appendix 1:

Permission form

Thank you for participating in our usability research. We will be recording your session to allow me and in case teacher of the course who benefit from your comments. Please read the statement below and sign where indicated.

- -

I understand that my usability test session will be recorded. I grant Hossein Tabandehpour permission to use this recording for study use only, for the purpose of writing his thesis.

Signature: _____

Print your name: _____ Date: _____

Appendix 2:

Test script

Instruction section

My name is Hossein, and I'm going to be walking you through this session today.

Before we begin, I have some information for you, and I'm going to read it to make sure that I cover everything.

You probably already have a good idea of why we asked you here, but let me go over it again briefly. We're asking people to try using a Web site that we chose so we can see whether it works as intended. The session should take about 40 minutes.

The first thing I want to make clear right away is that we're testing the *site*, not you. You can't do anything wrong here. In fact, this is probably the one place today where you don't have to worry about making mistakes.

As you use the site, I'm going to ask you as much as possible to try to think out loud: to say what you're looking at, what you're trying to do, and what you're thinking. This will be a big help to us.

If you have any questions as we go along, just ask them. I may not be able to answer them right away, since we're interested in how people do when they don't have someone sitting next to them to help. But if you still have any questions when we're done I'll try to answer them then. And if you need to take a break at any point, just let me know.

You may have noticed the microphone. With your permission, we're going to record what happens in our conversation. It helps me, because I don't have to take as many notes.

If you would, I'm going to ask you to sign a simple permission form for us. It just says that we have your permission to record you, and that the recording will only be seen by the people working on the project.

Questions sections

OK. Before we look at the site, I'd like to ask you just a few quick questions.

First, what's your occupation? What do you do all day?

Roughly how many hours a week altogether—just a rough estimate— would you say you spend using the Internet, including Web browsing and email, at work and at home?

What kinds of sites (work and personal) are you looking at when you browse the Web?

Do you have any favorite Web sites?

The homepage tour

OK, great. We're done with the questions, and we can start looking at things.

First, I'm going to ask you to look at this page and tell me what you make of it: what strikes you about it, whose site you think it is, what you can do here, and what it's for. Just look around and do a little narrative.

You can scroll if you want to, but don't click on anything yet.

Tasks section

Thanks. Now I'm going to ask you to try doing some specific tasks. I'm going to read each one out loud and give you a printed copy.

I'm also going to ask you to do these tasks without using Search. We'll learn a lot more about how well the site works that way.

And again, as much as possible, it will help us if you can try to think out loud as you go along.

Task one:

Imagine you are coming from a non-European country. You want to start a business in Finland and stay as an entrepreneur. Which kind of residence permit do you need?

Task two:

Imagine you are a German citizen which your company in Germany sending you to Finland for doing a project. The duration of your stay will be 45 days. Please find out which kind of visa or permission do you need for your stay in Finland.

Triple questions section

Please mention three parts and places of the website that you would like to change to improve usability and user experience.