



TAMPEREEN TEKNILLINEN YLIOPISTO
TAMPERE UNIVERSITY OF TECHNOLOGY

Tanja Walsh

**Online Surveys in Collecting Cross-Cultural Qualitative
User Experience Feedback**



Julkaisu 1376 • Publication 1376

Tampere 2016

Tampereen teknillinen yliopisto. Julkaisu 1376
Tampere University of Technology. Publication 1376

Tanja Walsh

Online Surveys in Collecting Cross-Cultural Qualitative User Experience Feedback

Thesis for the degree of Doctor of Philosophy to be presented with due permission for public examination and criticism in Tietotalo Building, Auditorium TB109, at Tampere University of Technology, on the 15th of April 2016, at 12 noon.

Tampereen teknillinen yliopisto - Tampere University of Technology
Tampere 2016

ISBN 978-952-15-3719-6 (printed)
ISBN 978-952-15-3733-2 (PDF)
ISSN 1459-2045

Tampere University of Technology
Department of Pervasive Computing
Human-Centered Technology
Tanja Walsh

Online Surveys in Collecting Cross-Cultural Qualitative User Experience Feedback

Central Concepts

Cross-cultural: Relating to or involving two or more cultures with different value systems. For example, cross-cultural users in our research mean that they come from different countries with different cultural values.

Cross-cultural design of technology: The process of designing technology for different cultures, languages, and economic standings to ensure positive user experience (UX) across culturally different user groups (Aykin, 2005). Different countries have different cultural values (Hofstede, 2001, 2005), which direct the way in which people interpret and use technology products and services. Therefore, to ensure that products and services are easy to use and that they provide a positive UX across cultural boundaries, there is a need to understand how local cultures may affect the use of and interaction with technology. Cultural issues affect not only the UX of technology products and services but also the UX research methods.

Cross-cultural UX research: Systematic investigation of culturally different user groups to understand users and their needs and to identify the requirements for the UX of an interactive technology product or service.

Human-Centred Design (HCD): The process in which the needs, wants and limitations of users of a product, service or process are given extensive attention at each stage of the product development process (ISO 9241-210:2010). The biggest difference from other product design philosophies is that HCD tries to optimise the products around how users can, want, or need to use the product rather than forcing the users to change their behaviour to accommodate the product (E.g. Beyer and Holzblatt, 1998; ISO 9241-210:2010; Jordan, 2000).

Online survey: A questionnaire that the target user group representatives, respondents, complete over the Internet.

Product or service: A description of a concept, a prototype, or a functional version of an interactive technology product or service targeted at specific user groups. In this work, the focus is on consumer products and services.

Qualitative UX feedback: Qualitative feedback about the UX of a product or service collected from users or potential users. Qualitative UX feedback is typically descriptive data and useful for studies to find out, in depth, the ways in which people think or feel about an interactive technology product or service. Cross-cultural qualitative UX feedback is collected from users coming from different countries.

User Experience (UX): A comprehensive concept describing user's subjective experience resulting from the interaction with, and/or anticipated use of technology (ISO 2010). UX is an important quality attribute and a business-critical asset in the design of interactive technology products and services (Hassenzahl, 2003)

Abstract

Globalisation of markets means that many interactive technology products and services need to be usable and provide a positive User Experience (UX) to people in various target market areas. Simultaneously, over the last decade, positive UX has become an important quality attribute and a business-critical asset in the design of interactive technology products and services. Different countries have different cultural values, which direct the way in which people interpret and use technology products and services. Therefore, to ensure that products and services are easy to use and that they provide a positive UX across cultural boundaries, there is a need to understand how local cultures may affect the use of and interaction with technology. Cultural issues affect not only the UX of technology products and services but also the UX research methods. Culture itself is a complex concept affecting a vast area of human life and interaction. Consequently, designers are facing challenges in creating a delightful UX for an increasing number of users from different cultural backgrounds.

In this thesis work, we aim to produce original contributions by investigating and developing better online survey tools and insights about their applicability in cross-cultural remote online UX research. Remote online methods are needed in increasing cross-cultural UX research, and they are considered practical, and may have extensive and wide scale samples suited to cross-cultural UX research. In particular, we aim to understand how an online survey fits into a cross-cultural UX research in terms of collecting qualitative feedback. As the goal is to understand online UX surveys and users in different local cultures it is our aim to gain knowledge about what kind of cultural issues affect these surveys and how they should be taken into consideration in human-centred design (HCD). We focus on studying how qualitative material such as textual and visual materials can be used in cross-cultural online UX surveys. We reflect on the practical implications of the results in a theoretical concept of cross-cultural online UX survey process. Our research has a multiple-case research design strategy and most of our case studies were executed in a real product development context with an emphasis on the qualitative research.

We found that online surveys with sentence completion, diaries and storyboards are well suited to cross-cultural UX research in collecting qualitative feedback. The central cross-cultural issues having implications for cross-cultural, qualitative online UX surveys concerned textual and visual materials. With regards to the textual material in collecting cross-cultural, qualitative UX feedback, we found that there are cultural differences in how respondents understand, interpret and share their experiences in an online UX survey. For example, culture has an effect on language and communication style, which in turn have an effect on the answers. Furthermore, we found that the use of the sentence completion method in an online UX survey is relatively fast and easy way to collect a large amount of cross-cultural, qualitative UX feedback regarding the different UX dimensions for product development purposes. The use of Hofstede's cultural dimensions in the data analysis gives a better understanding of the impact of specific cultures on the results.

Concerning the visual material, we found that storyboards assisted respondents in providing rich answers to a long survey because of a sound understanding of the intended situations, and ease of imagining themselves in different usage scenarios. The use of internationalised and localised storyboards allowed us to collect UX feedback, even though respondents had never used or seen the intended product. They were able to give feedback and ideas for design in the early phase of product development in requirement gathering. Using culture as a resource for design involving local users in the design process supports HCD principles. We presented the main phases in a theoretical concept of cross-cultural online UX survey process to help designers include cultural issues in the design of a cross-cultural online UX survey.

Acknowledgements

The journey of my PhD has come to an end and it is my pleasure now to thank people who made my PhD possible. The journey begun in 2009 as a part-time project when I started to work at Tampere University of Technology in the Unit of Human-Centered Technology as user researcher in Suxes research project. Previously, I had been working at Nokia since 1997 in UI SW localisation and it was exciting to start PhD in an area where I had been working for over 10 years in the industry.

I would sincerely wish to thank for my supervisor, Professor Kaisa Väänänen for her guidance, patience and valuable suggestions for the Introduction of my thesis. Her experience and advice helped me to finish the work. I would like to thank for Dr. Sari Kujala for starting the PhD journey with me and for continuing to support me throughout my dissertation work. I would also like to thank for Professor Timo Saari for his help and comments during my PhD.

I am grateful for my experienced reviewers, Professor Torkil Clemmensen at Copenhagen Business School and Professor Matt Jones at Swansea University. I wish to thank them for their thorough inspection and improvement suggestions, which were essential in completing my thesis. I would especially like to thank Professor Clemmensen for his help to better reflect and bring the practical results into more abstract level. I am honoured that Professor Gilbert Cockton at Northumbria University has agreed to act as an opponent in my public thesis defence. I would like to thank for Professor Helen Petrie at University of York for her inspiration, time, help and support during the last three years in a research exchange in UK. With her mentoring I have been able to develop my research further and hopefully continue the exciting cross-cultural studies in HCI in the future.

I warmly thank for all my colleagues at Tampere University of Technology and at University of York. I especially thank for Piia Nurkka, Tiina Koponen and Jari Varsaluoma for their contributions to the research, co-writing and carrying out user studies. It has been a real pleasure working with them, and without their support and encouragement my work would not be ready. I would also like to thank for the co-authors Liinu Lassila, Jaana Olsson, Marian Crisan, Olufunmilayo Odutola and Anqi Zhang. Their help in user studies was invaluable. I would also like to thank Dr. Heli Väättäjä, Dr. Teija Vainio, Dr. Kati Kuusinen, Professor Tommi Mikkonen and Professor Guy Boy for their feedback and guidance. I would also like to thank for Hilikka Losoi, Tapio Vaaranmaa and Ulla Siltaloppi for their help. I would also like to thank for Professor Arja Rosenholm at University of Tampere for an idea years ago of being a researcher when I finished my Master's Degree in 1999.

I am grateful for having received funding from several sources that have enabled this PhD. My research started in Suxes research project (2009-2011) funded by TEKES. The main goal of Suxes was to build up a practice of remote user experience research to support the internationalization and competitiveness of Finnish enterprises. The collaborating companies in Suxes were Nokia, Paf.com and Suunto. Suxes was followed by Delux research project (2012-2014), also funded by TEKES enabling to continue the case study research with collaborating companies. I was fortunate to receive two graduate school places first at Doctoral Program in User-Centered Information Technology (UCIT) during 2012-2013 and then at Doctoral Program at Tampere University of Technology during 2014-2015 to concentrate full-time on my thesis.

I wish to thank for all industrial collaborators in the research projects. I especially thank for Sara Belt, Dr. Heli Rantavuo, Tiina Taskinen, Christian Nordström and Taneli Hölttä for their vision and experience in the area of user experience research. I would also like to thank for my former colleagues at Nokia in different teams for inspiring me to study localisation.

I warmly wish to thank my family and friends always being there for me during the thesis work and reminding me that there is life outside PhD. I would like to thank Rod for listening, being patient and giving good advice when needed. I would like to thank my three children Max, Amelia and Alex, who are the most precious things in this world for me. I wish that they will always enjoy learning and find their ways of understanding the world. And finally, I wish to thank for my parents Riitta and Veijo, who have always believed in me and encouraged me in studying.

Harrogate, 16th February, 2016

Tanja Walsh

Supervisor: Professor Kaisa Väänänen
Human-Centered Technology
Department of Pervasive Computing
Tampere University of Technology
Finland

Pre-examiners: Professor Torkil Clemmensen
Department of IT-Management
Copenhagen Business School
Denmark

Professor Matt Jones
Department of Computer Science
Swansea University
United Kingdom

Opponent: Professor Gilbert Cockton
Department of Media and Communication Design
Northumbria University
United Kingdom

Content

Central Concepts.....	i
Abstract.....	ii
Acknowledgements.....	iii
Content.....	vi
1.1 Background.....	1
1.2 Motivation and Research Gap	4
1.3 Research Objective.....	5
1.4 Research Questions.....	6
1.5 Relevance to Human-Computer Interaction	6
1.6 Structure of the Thesis	7
2. Related Work	8
2.1 Globalisation.....	8
2.2 User Experience.....	9
2.3 Concept of Culture.....	11
2.4 Hofstede’s Cultural Dimensions.....	13
2.5 Human-Centered Design of Technology	15
2.6 Cross-Cultural Design of Technology.....	16
2.6.1 Culture and UX	17
2.6.2 Internationalisation and Localisation	18
2.6.3 Approaches to Cross-Cultural UX Research	19
2.6.3 Cultural Issues in UX Research Methods	22
2.7 Online Surveys	25
2.7.1 Cross-Cultural Surveys	25
2.7.2 Online Surveys in HCI and UX Research.....	26
2.7.3 Advantages of Online Surveys.....	28
2.7.4 Challenges of Online Surveys.....	30
2.8 Summary.....	31

3. Research Setting	34
3.1 Research Approach.....	34
3.2 Participant Sampling.....	36
3.3. Research Ethics.....	36
3.4 Research Validity	36
3.5 Research Methods Used and Developed	38
3.5.1 Sentence Completion	40
3.5.2 Diary.....	40
3.5.3 Storyboarding.....	42
3.6. Research Projects.....	44
3.7 Case Studies and Publications	45
3.7.1 Case study 1: Cultural Differences in an Online UX evaluation of a Smartphone with Sentence Completion Method	47
3.7.2 Case Study 2: Approaches to Cross-Cultural Design: Two Case Studies with Online UX Surveys.....	48
3.7.3 Case Study 3: The Effect of Language in Answering Qualitative Questions in UX Evaluation with Online Surveys.....	54
3.7.4 Case Study 4: Internationalisation of Visual Material in a Cross-Cultural Online Storyboard Survey..	56
3.7.5 Case Study 5: Designing Mobile Technologies for Different Cultures: Issues of Assessing User Experience with Visual Materials in Online Surveys	59
3.7.6 Case Study 6: Localisation of Storyboards for Cross-Cultural User Studies	61
3.8 Summary.....	63
4. Results.....	64
4.1 Case Study 1	64
4.2 Case Study 2	67
4.3 Case Study 3	70
4.4 Case Study 4	71
4.5 Case Study 5	73
4.6 Case Study 6.....	73

4.7 Fit of Online Surveys into Cross-Cultural UX Study in Collecting Qualitative Data.....	75
4.8 Central Issues of Online Surveys in Collecting Qualitative UX Feedback from Cross-Cultural User Groups	76
4.8.1 Cross-Cultural Issues of Textual Material in Online UX Surveys.....	76
4.8.2 Cross-Cultural Issues of Visual Materials in Online UX Surveys.....	77
4.9 Cross-Cultural Implications to the Online UX Survey Process	78
5. Discussion.....	84
5.1 Development of Online UX Surveys.....	84
5.2 Qualitative Research Methods in an Online UX Survey	86
5.3 Cross-Cultural Issues in an Online UX Survey	88
5.4 Limitations of the Research.....	92
6. Conclusions.....	94
6.1 Key Findings.....	94
6.2 Contributions	96
6.3 Future Work.....	97
References.....	98

Publications and Author's Contribution to Them

This thesis consists of an introductory part and the following seven original publications. In addition to the reference information, the candidate's contributions to the publications and the studies behind them are explicated in the following. The publications are reproduced by permission of the publishers and they are referred in the thesis by **P** (publication) and numbers **1-7**.

P1 Kujala, S., Walsh, T., Nurkka, P. and Crisan, M. (2013). Sentence Completion for Understanding Users and Evaluating User Experience. *Interacting with Computers*, Oxford Journals, 26(3), 1-18.

Kujala led the planning of the journal paper consisting three case studies. Walsh helped her in writing the article, and also being the main writer, planner and executor of a case study.

P2 Walsh, T., Nurkka, P. and Walsh, R. (2010). Cultural Differences in Smartphone User Experience Evaluation. *Proceedings of Mobile and Ubiquitous Multimedia (MUM 2010)*, ACM, Article 24.

Walsh T. led the planning of the study and carried out the data gathering and analysis together with Nurkka and Walsh R. Walsh T. was the principal author being in charge of the majority of planning and writing the publication.

P3 Walsh, T. and Nurkka, P. (2012). Approaches to Cross-Cultural Design: Two Case Studies with UX Web-Surveys. *Proceedings of OzCHI 2012*, ACM, 633-642.

Walsh led the planning of the study and carried out the data gathering and analysis together with Nurkka. Walsh was the principal author being in charge of the majority of planning and writing the publication.

P4 Walsh, T., Nurkka, P., Petrie, H. and Olsson, J. (2013). The Effect of Language in Answering Qualitative Questions in User Experience Evaluation Web-Surveys. *Proceedings of OzCHI 2013*, ACM, 73-82.

Walsh led the planning of the study and carried out the data gathering and analysis together with Nurkka, Petrie and Olsson. Walsh was the principal author being in charge of the majority of planning and writing the publication.

P5 Walsh, T., Nurkka, P., Koponen, T., Varsaluoma, J., Kujala, S. and Belt, S. (2011). Collecting Cross-Cultural User Data with Internationalized Storyboard Survey. *Proceedings of OzCHI 2011*, ACM, 301-210.

Walsh led the planning of the study and carried out the data gathering and analysis together with her colleagues. She was the principal author being in charge of the majority of planning and writing the publication.

P6 Walsh, T., Petrie, H. and Odutola, F. (2014). Developing Mobile Technologies for Different Cultures: Issues of Assessing User Experience with Visual Materials. *Proceedings of OzCHI 2014*, ACM, 470-479.

Walsh led the planning of the study and carried out the data gathering and analysis together with Petrie and Odutola. Walsh was the principal author being in charge of the majority of planning and writing the publication.

P7 Walsh, T., Petrie, H. and Zhang, A. (2015). Localization of Storyboards for Cross-Cultural User Studies. *Proceedings of Mobile and Ubiquitous Multimedia 2015*, MUM 2015, ACM, 200-209.

Walsh led the planning of the study and carried out the data gathering and analysis together with Petrie and Zhang. Walsh was the principal author being in charge of the majority of planning and writing the publication.

1. Introduction

The topic of this thesis is online surveys in collecting cross-cultural qualitative user experience (UX) feedback for technology product and service design. In this chapter, we briefly introduce the background and the motivation for our research and the existing research gap. Furthermore, we outline the research objectives, our research questions and the relevance of our work to Human-Computer Interaction. Finally, we present the structure of our dissertation.

1.1 Background

Over the last three decades, the world has become a truly global market place in which technology products and services are being developed and intended to be sold to people in various target market countries. Consequently, this *globalisation* of products and services poses challenges for designers as users' local cultures can vary significantly from one to another. Different countries have different cultural values (Hofstede 2001, 2005), which direct the way in which people interpret and use technology products and services in their own local cultural context.

Simultaneously with globalisation, over the last decade the demand for producing a *positive UX* has become an important quality attribute and a business-critical asset in the design of interactive technology products and services (Hassenzahl, 2003). UX is regarded as a comprehensive concept describing the subjective experience resulting from the interaction with, and/or anticipated use of technology (ISO 2010). It encompasses the usability aspect: the extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use (ISO 1998).

According to ISO 2010 UX includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments that occur before, during and after use (ISO 2010). The UX is a consequence of brand image, presentation, functionality, system performance, interactive behaviour, assistive capabilities of the interactive system, the user's internal and physical state resulting from prior experiences, attitudes, skills and personality, and the context of use (ISO 2010). In general, it is agreed UX depends on the person and contextual factors and is temporally evolving (Law et al., 2009). In short, UX is subjective, contextual and temporal.

Thus, users globally expect more from their technology products and services than mere utility and usability: they are looking for experiences. UX design should take into account users' cultural context because, in designing UX, there is a greater focus on content, brand and emotions than when designing

mere usability (e.g. ISO 2010, Marcus, 2006). Much of the cognitive reasoning depends on social norms and background culture (Ito et al., 1996), and this cultural diversity makes it unrealistic for designers to only rely on intuition or personal experience when designing for good UX in cross-cultural contexts (Smith et al., 2005). Cultural issues affect not only the UX of technology products and services but also the UX research methods (Ouygi et al., 2008). Therefore, to ensure that products and services are easy to use and that they provide positive UX across cultural boundaries, understanding the concept of culture and how it impacts UX, becomes an essential part of the study and design of UX. Consequently, designers are facing challenges in creating a delightful UX for an increasing number of users from different cultural backgrounds.

How can the UX be designed and adapted to different cultural user groups? *Cross-cultural design of technology* is needed to ensure a positive UX in products and services aimed at global markets. According to Aykin (2005), cross-cultural design is the process of designing technology for different cultures, languages, and economic standings to ensure good usability and UX across cultural boundaries.

Culture itself is a complex concept. It includes a vast area of human life and interaction from religion to economy and to domestic routines. According to Keesing and Strathern (1998) most cultural anthropologists agree that culture is a learned behaviour consisting of thoughts, feelings and actions and is transferred in social interaction. According to Keesing and Strathern (1998) some anthropologists would like to limit the concept of culture to national and ethnic cultures, but most seem to agree that social interaction is the most important prerequisite for producing and maintaining a culture. In our study, we look at culture as national and ethnic local entities, because most technology products and services are targeted at specific countries. Culture necessitates aspects such as collective identity, shared experiences and memories, and common frames of reference for sense making- the patterns for behaviour- including shared understandings, interpretations and assumptions that guide action of the cultural members (e.g. Keesing and Strathern, 1998; Smircich, 1983; Wenger, 1998).

As culture is such a complex and vast concept, it can be extremely challenging to pinpoint cultural issues in the context of the UX design of interactive technology. Understanding how cultural issues may affect the UX of interactive technology and the methods and materials used in cross-cultural UX research to design such technology has become vital. One reason is that technology products and services are aimed at different target market areas with people from a range of different cultural backgrounds. As noted by Chavan et al. (2009), it is clear that users from varying cultural backgrounds may not receive a single version of a technology product or service in the same manner. It has also been

shown that a lack of consideration for cultural differences can lead to technology product or service design catastrophes (Chavan et al., 2009). To succeed in markets in different cultures it is important to study all target market segments with users from the appropriate cultural backgrounds and value systems (Aykin, 2005). As we will discuss further, culture can be observed from many different perspectives, but from the UX design point of view it is vital to study and understand cultural differences in the context of the actual product or service. As, for example, according to Honold (1999), the key factors differentiating cultures from one another need to be clearly identified in order to adapt technology products and services to local cultures.

As Ouygi et al. (2008) discuss, an understanding of cultural differences in how people use interactive technology as well as cultural differences in the way people respond and react to different UX research methods are both important issues to consider in UX design. Thus, cultural issues affect not only the UX of a technology product or a service but also the UX research itself.

How then, can we study the cultural issues in UX research? *Cross-cultural UX research* is a systematic investigation and/or evaluation helping to understand users and their needs and to identify the requirements for a product UX involving two or more different cultures. We argue that cross-cultural UX research can take two approaches. The first one is to study existing theories and knowledge of cultures such as Hofstede (2001, 2005). This is considered cost-efficient and helpful, but may also risk being a superficial, “quick and dirty” method, as it does not involve local users in the design process. It can reinforce stereotypes and does not take into account that cultures are also developing, especially in the use of technology.

The second approach is to use human-centred design methods to discover user insights for each specific target culture, either on-site and/or remotely. This second approach takes into consideration cultural issues in technology design with human-centred design activities (e.g. Aykin, 2005). It involves local users to help to identify internationalisation and localisation needs for the design. Cross-cultural UX research on-site or remotely will help to understand what needs to be internationalised and localised.

On-site UX research provides the most reliable information as users are researched in their own environment. This is often expensive and too time-consuming in fast phased product development life cycles (e.g. Väänänen-Vainio-Mattila et al., 2008). According to Putnam et al. (2009), the ability to perform first hand on-site UX research can be challenging without extensive local knowledge, and product time frames can limit the feasibility of field research.

Nevertheless, growing global markets demand fast and reliable collection of UX feedback, and according to Väänänen-Vainio-Mattila et al. (2008) remote methods appear to be very attractive in terms of collecting cross-cultural UX feedback. This is because the remote methods such as online UX surveys and remote usability tests are cost-efficient and can reach large samples of participants across many geographic locations in a short time. Online UX surveys, especially, are low-cost and may be relatively quick for designers to distribute and analyse, and for participants to complete, making them an attractive method for both research and industry (Evans and Mathur, 2005, Väänänen-Vainio-Mattila et al., 2008). In addition, a variety of different question types can be presented to collect both quantitative and qualitative feedback and the use of multimedia is now also possible in online UX surveys (Evans and Mathur, 2005). Remote methods are seen as an attractive alternative or complimentary for on-site UX research methods (E.g. Putnam, 2009, Väänänen-Vainio-Mattila, 2008).

To conclude, cross-cultural UX research can be approached by studying existing cultural theories such as Hofstede (2001, 2005), and/or by using human-centred UX research on-site or remotely. To optimise the cost and effort, all these above-mentioned approaches can be used simultaneously, depending on the product's design, project's resources and timeframes.

1.2 Motivation and Research Gap

The motivation for our research comes from the fact that there is a growing need to gather cross-cultural UX feedback (e.g. Väänänen-Vainio-Mattila et al., 2008), but there are *not yet many methods for cross-cultural online UX research* (e.g. Monahan et al., 2008). Although previous research (e.g. Monahan et al., 2008) has shown that online surveys are suitable for cross-cultural UX research, the area has not yet been researched to a great extent.

Thus, online UX surveys as a method for collecting cross-cultural UX feedback need development. Consequently, it is then vital to understand what research methods should be used to elicit UX feedback in online surveys. The qualitative research approach with responses about user's experience is seen as one of the best ways to understand UX. This is because the focus in qualitative research is on the meaning of using technology and what kind of implications it has for the user. Qualitative research methods emphasise the details and richness of description (Bargas-Avila and Hornbaek, 2011). Therefore, in our research too, we concentrated in using research methods eliciting qualitative UX feedback - sentence completion, diary and storyboarding.

Consequently, the research gap is to understand firstly, how an online survey as an instrument and method fit into a cross-cultural UX research in collecting qualitative feedback. Secondly, the research

gap is to investigate, what kind of surveys, practices, and methods are needed to elicit cross-cultural qualitative UX feedback.

1.3 Research Objective

Our research objective is to develop the knowledge of cross-cultural, qualitative online UX surveys in UX research. We aim to understand how cross-cultural issues have been studied in Human-Computer Interaction (HCI) summarising existing literature, and furthermore through multiple-case research design strategy in order to develop the knowledge of cross-cultural, qualitative online UX surveys. We aim to understand what kind of surveys, practices, and methods are needed to collect cross-cultural, qualitative online UX feedback.

We use UX research methods that are easy to incorporate into an online survey and that will allow the collection of qualitative UX feedback. Because UX evaluation focuses on lived experiences (Law et al., 2009), we were interested in using UX research methods eliciting qualitative feedback such as sentence completion methods and diaries. These methods are designed to expose personal experiences, as they allow users to express themselves in writing and they are suitable for online UX surveys.

In addition to sentence completion and diary methods in online UX surveys, we also wanted to gain an understanding of how visual material can be used in an online survey to help to collect more UX feedback. This is because, in UX research, especially in the requirement gathering phase, it is often essential to collect information from target user groups about a particular concept or scenario involving an interactive system that does not yet exist. Vermeeren et al. (2010) suggest that in early phases of design, when there are no actual systems that participants can interact with, participants must use their imagination to be able to evaluate future interactive systems. However, there are methods to help participants imagine and evaluate possible future systems. For example, visual representations such as photographs and storyboards can be used when designers need to convey a particular concept or scenario to participants.

Our aim is to produce some original contributions, for example better online UX survey tools and insights into their applicability in cross-cultural UX research. The results of this study will give academic researchers, as well as UX practitioners in the industry, knowledge of how to approach cross-cultural, qualitative UX research with online surveys, especially in relation to localisation and internationalisation issues that exist in the process. Thus, the aim is to develop cross-cultural, qualitative UX research practices and guidelines. These practices aim to improve the competitiveness of interactive technology products and systems in global markets. As the focus of this work is to develop the

knowledge of UX research methods - cross-cultural, qualitative online UX surveys - the analysis of the actual UX results gained in our case studies is out of scope. Some of the UX results are documented in the publications that are part of this thesis, and which are listed above, but their thorough analysis is out of the scope of this thesis.

1.4 Research Questions

The main research question, research question 1 (RQ1), of this dissertation is:

- **How can an online survey fit into a cross-cultural user experience (UX) research in collecting qualitative feedback?**

In order to answer our main research question, we needed to ask the following question with research question 2 (RQ2):

- **What are the central issues when designing and implementing online surveys for collecting qualitative user experience (UX) feedback from cross-cultural user groups?**

To pinpoint and focus on the central issues referred to in RQ2 we used supporting research questions. In our research, we focused on understanding how textual and visual material can be used in cross-cultural user experience (UX) surveys. Therefore, we had two supporting research questions, research questions 2a (RQ2a) and 2b (RQ2b):

- **What kinds of cross-cultural issues need to be considered when using textual material in the online user experience (UX) survey?**
- **What kinds of cross-cultural issues need to be considered when using visual material in the online user experience (UX) survey?**

We aim to reflect the practical implications of the results in a theoretical concept of a cross-cultural online user experience (UX) survey process to present our findings. To this end, the third research question (RQ3) is:

- **What are the cross-cultural implications to be taken into account in an online user experience (UX) survey process?**

1.5 Relevance to Human-Computer Interaction

The desired outcome of our research is to add knowledge to the body of work in Human-Computer Interaction (HCI) to better understand the effect of culture on the design and development of technology. The results of this research will bring insight into HCI of how to take cultural aspects into consideration in cross-cultural, qualitative online UX surveys. Gaining knowledge through different cross-cultural UX

research cases will give some guidelines and best practices for cross-cultural UX research using remote online surveys. As mentioned previously, remote methods can be fast, light and preferred by industry to gather cross-cultural UX feedback (e.g. Monahan, 2008; Väänänen-Vainio-Mattila et al., 2008). The results of this study will bring knowledge to both academia and industry and help to understand how to collecting cross-cultural, qualitative UX feedback, which will help to design more competitive products and services for international markets.

1.6 Structure of the Thesis

The introduction to the publications consists of the following: In the first chapter of this thesis we introduce the background and motivation for our research and the existing research gap. Furthermore, we outline the research objectives, our research questions and the relevance of this study to HCI. In the second chapter, Related Work, we discuss the key concepts, including Globalisation, User Experience, the concept of culture and Hofstede's cultural dimensions. Furthermore, we present the principles of human-centred design of technology and explain what cross-cultural design of technology is and discuss about culture and UX. We then explain what internationalisation and localisation processes are. Furthermore, we present the approaches to cross-cultural UX research and discuss cultural issues in UX research methods. In addition, we present and discuss the online surveys in UX research. In the third chapter, Research Setting, we explain the research approach and methods used in our study. Furthermore, we describe the research projects in which our research was carried out and summarise the case studies and publications. In the fourth chapter, we present the results. In the fifth chapter, we discuss and reflect the relationship of our research to related work. Furthermore, we discuss the limitations of our research. In the sixth chapter we conclude our findings, present the contribution of this research and discuss some possibilities for future work. Finally, at the end, are the references, the conference articles and the journal papers this thesis uses.

2. Related Work

In this chapter we will describe related work for our research. We will discuss the phenomena of globalisation and the impact of it on the design of technology. We will then explain the phenomena of user experience (UX). Furthermore, we present some main theories of the concept of culture and Hofstede's cultural dimensions, which have been widely used in HCI to understand cultural issues in the design of technology. We will then briefly discuss what human-centered design is. We then define what cross-cultural design of technology is and present what we mean by cultural issues in UX. Furthermore, we explain the internationalisation and localisation processes. We then present the different approaches into cross-cultural UX research and then discuss the cultural issues in UX research methods. And finally, we present online surveys.

2.1 Globalisation

The world has become a global marketplace: Since the late 1980s, the world has witnessed large-scale economic, political, technological and social changes. These changes are often brought together under the term globalisation (LISA, 2011). According to LISA (2011) (The Localization Industry Standards Association) the shift towards international business integration is felt at every level around the world and in the beginning of new millennium information and communication technology has become pervasive, being now part of people's everyday life all over the world. According to LISA (2011), globalisation refers to all of the business decisions and activities required to make an organisation truly international in scope and outlook. Globalisation is the transformation of business and processes to support customers around the world, in whatever language, country, or culture they require.

Due to globalisation, technology products and services are being sold worldwide and the users in various target markets usually expect to be able to use products and services in their own language, fit to their needs in their own local cultural context (e.g. del Galdo, 1996; Aykin, 2005). This global spread of interactive technology products and services means that the customer base can include people from very different backgrounds and contexts of use; people with different social, economic, educational, financial and cultural backgrounds. Global markets have created a need for a better understanding of these differences, including cultural differences while designing for and dealing with consumers from different cultural backgrounds (e.g. Aykin, 2005).

2.2 User Experience

In addition to globalisation of interactive technology products and services, there has been a significant change that has made the understanding of cultural context of use of technology important: the shift from usability to user experience (UX). Pervasive technology has expanded from being solely a productive work tool to other aspects of human life, and has made technology a means for human experiences (Karat et. al, 2004; Marzano, 2009). As Hassenzahl and Tractinsky (2006) describe, UX goes beyond the task-oriented approach of traditional HCI and focuses on hedonic aspects of use such as fun and pleasure. The hedonic aspects of UX are those that satisfy universal human needs but do not necessarily have any utility value as such. Thus, technology users globally expect more from their products and services than mere utility and usability: they are looking for positive experiences.

UX is a broad concept and there is little common agreement on its full nature and scope (Law et al., 2009). The ISO CD 9241-210 (2010) definition summarises in brief the concept of UX: UX is “*a person’s perceptions and responses that result from the use and/or anticipated use of a product, system or service.*” Thus UX is the outcome of interaction between a human and a system in a certain context of use. Notes for the ISO definition of UX add that user experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments that occur before, during and after use (Note 1). Furthermore, user experience is a consequence of brand image, presentation, functionality, system performance, interactive behaviour and assistive capabilities of the interactive system, the user's internal and physical state resulting from prior experiences, attitudes, skills and personality, and the context of use (Note 2). Usability, when interpreted from the perspective of the users' personal goals, can include the kind of perceptual and emotional aspects typically associated with user experience. Usability criteria can be used to assess aspects of user experience (Note 3).

Discussion about UX and definition of UX has been and is active in the HCI community: There are multiple views and definitions on what UX is and what it consists of. Hassenzahl (2003, 2004), for example, defines UX as pragmatic (manipulation) and hedonic (stimulation, identification, evocation) product attributes. Whereas pragmatic attributes emphasise the fulfilment of individuals’ behavioural goals, hedonic attributes emphasise individuals’ psychological well-being (Hassenzahl, 2003). Or as Jordan (2000) describes it as a pleasure-based approach to product design that can be seen as an approach considering all of the potential benefits that a product can deliver. Based on Law et al.’s (2009) survey of 275 UX researchers and practitioners, UX is agreed to be dynamic, context-dependent

and subjective. Many researchers also highlight the importance of emotions (Forlizzi and Battarbee, 2004; Hassenzahl and Tractinsky, 2006; Isomursu et al., 2007; Mahlke, 2005) and the holistic and phenomenological nature of UX (McCarthy and Wright, 2004; Swallow et al., 2005). In brief, UX offers a more holistic view on usage of a product or service than mere usability.

It is also known that people do not just passively undergo emotional experiences, but they actively interpret the meaning of these experiences and construct memories of them (Holland and Kensinger, 2010). Accordingly, UX is frequently seen as constructive (Battarbee, 2003; Sanders and Dandavate, 1999; Vyas and van der Veer, 2006; Wright et al., 2003) and sense making (McCarthy and Wright, 2004). For example, Vyas and van der Veer (2006) state that users are not concerned with products as such, but with the values and meanings products bring to their lives.

As the concepts of usability and UX differ, so do some of the methods of measuring them. Traditionally, usability tests tend to focus on task performance: Usability can be measured with quantitative methods, whereas user experience is more subjective (Law et al., 2009). Therefore, objective usability measures, such as task execution time or a number of clicks, are not sufficient measures for UX (Law et al., 2009) where feelings, motivations and expectations have an important role. UX evaluation focuses on lived experiences (Law et al., 2009), and so in our research too we were interested in using qualitative methods, such as sentence completion and diary methods. These methods are designed to expose personal experiences allowing users to express themselves in writing. Qualitative research looks at users' actual behaviours in order to gain an in-depth understanding of the how and why users behave. Therefore sentence completion and diary research methods would appear suitable for eliciting qualitative UX feedback. These methods give information of how users themselves describe their behaviours and reactions.

According to Kamppuri's (2011) Dissertation thesis about theoretical and methodological challenges of cross-cultural interaction design, she argues that the design in HCI has moved from usability engineering to human-centered design and from human-centered design to its current, third, stage which is designing for a good user experience. In this stage of HCI it is emphasised that the technology design should start with values. For example, Harper et al. (2008) discuss about designing technology that reflects the values people hold and also provides opportunities for expressing them. Harper et al. (2008) define values as ideas that people have about what is desirable in a given situation, context or society, and which guides their judgements and actions. Such values, they argue, should be discussed in the context of new technological developments and their consequences.

According to Cockton (2006), values have been discussed in HCI mainly in two different meanings. Firstly, value in commercial terms has been understood as something that can be added to consumer products to convince the customers that what they get is worth their money. Secondly, there is a design approach called value-sensitive design (Friedman, 1996), which emphasises moral and public values as well as ethical issues in technology design. Cockton (2004), however, discusses value in singular, taking it as a broad term that includes but is not restricted to the two above mentioned ways in which values have been discussed in HCI. To avoid further confusion with the concept of value, Cockton (2006) replaces it with that of *worth*. He defines worth as something that people value and in which they are thus motivated to invest money, time, energy and commitment. According to Cockton (2006), worth depends on the users, situation and context: there is no “product quality” insofar as that refers to intrinsic, universal value in technology. Harper et al. (2008) also emphasise that people value different things in different contexts. The values and worth should play a major role also in cross-cultural design.

Kamppuri (2011) argues that it is in this third stage of HCI design that culture plays an important role. It is now clear that the people using technology have different cultural backgrounds and that these cultural differences play a role in the way technology is used, experienced and valued. Once designers became aware of this, they began to consider and understand cultural differences in the design of interactive technology. Consequently, there is a need for UX research methods that can be used effectively in cross-cultural contexts.

2.3 Concept of Culture

Culture is a concept that has been studied for decades and more recently by designers as well, although, there is no plain agreed-on definition of culture. This may be due to the fact that culture is dynamic and does not consist of parts that can be always objectively measured. Even though there is no simply accepted definition of culture, it is widely recognised that the understanding of culture and cultural differences provides vital insight into the behaviour of individuals and societies as a whole. This insight could be beneficial in cases where intercultural communication is required; the global market in which technology now exists has made technology one of such areas. Stewart and Bennett (1991) would describe cross-cultural problems as arising from cultural differences in thinking, behaviours, values and assumptions. Stewart and Bennett (1991) also state that a deeper understanding of cultural differences will improve the understanding and management of cross-cultural situations.

It would seem that the most prominent strategy for acquiring a better understanding of cultural differences is to model culture and to bring it in to more practical level for a designer: Of what it

consists of and in what levels. Many researchers in the field of anthropology have studied objects, patterns of behaviours and thinking that differentiate one culture from another. For instance, Stewart and Bennett (1991), Trompenaars and Hampden-Turner (1991), Hofstede (2001, 2005), Hall (1976) and Hoft (1995) have compiled these into cultural meta-models. In the following we will briefly present their meta-models of culture.

Stewart's and Bennett's (1991) Objective Culture and Subjective Culture Model presents the culture by organising it into two groups where there is the objective culture consisting of the institutions and artefacts of a culture, such as economic system, social customs, political structures and processes, arts, crafts and literature. The objective culture is visible, easy to examine and tangible. The second part is the subjective culture which the psychological features of a culture, including assumptions, values, and patterns of thinking exist. The subjective culture is more difficult to examine, because it operates outside of conscious awareness (Stewart and Bennett, 1991).

Hoft (1996) presents a meta-model that is popular in the cross-cultural communication. The model is called the Iceberg Model providing a useful metaphor for describing the layers of culture and how aware we are of their influence in our lives. The analogy drawn in the Iceberg model is that only 10% of the cultural characteristics of a target audience are easily visible to an observer and 90% of our cultural characteristics are hidden from view. Therefore they are easier to ignore and more difficult to identify and study (Hoft, 1995).

The Onion model of culture by Trompenaars and Hampden-Turner (1991) has three layers. In their model the outer layer consists of the artefacts of the culture such as food and art. This layer closely resembles the objective aspect of culture as defined by Stewart and Bennett (1991). The middle layer consists of norms and values, which contain the shared idea of the difference between what is acceptable and what is not. The core layer consists of basic ideas about human existence.

Hall (1976) uses context as a perspective from which to view culture. Context, according to Hall, gives additional information necessary to comprehend the meaning of a piece of information. Hall describes a high context cultures as one in which many things are left unsaid and people are less verbally explicit. In high context cultures, the understanding of what is communicated is internalised and only little needs to be said for much to be understood. Conversely, in low context cultures, people are more verbally explicit and rule oriented. In low context culture, knowledge is public, external and accessible.

Hofstede (2001) defines culture as *"the collective programming of the mind which distinguishes the members of one group of people from another"*. This means that culture cannot be understood by

studying only one individual, but rather that culture can only be read clearly as a set of shared characteristics within a group of people that affects the behaviours of individual members by providing norms for that group.

In practical design work the cultural meta-models can help to understand the different levels of culture and can serve as a useful background for further study. In the further study one could continue with cultural modeling (Hoft, 1996). In practice this means building one's own cultural model (e.g. a model about Spanish culture) with the so-called international variables.

These international variables can focus on objective issues that lie on top of the Iceberg surface (if one wants to use the Iceberg as a metaphor). These cultural characteristics on the surface level are easy-to-reach cultural differences such as the language, the writing system, time and date conventions etc. (Hoft, 1996).

The international variables can focus also in finding the more hidden and subjective cultural characteristics. If one uses the Iceberg metaphor, the unspoken and unconscious rules include variables such as symbols and etiquette and even deeper hidden areas such as non-verbal communication, a sense of time, the rate and intensity of speech, values etc. (Hoft, 1996)

Once it has been established what needs to be found out, it makes the comparison of differences and similarities between two or more cultures possible: for example, national cultures, corporate cultures, the cultural diversity of groups of users, international markets, depending on the target product and target market area.

The goal for any cultural model is to gather data that helps to design products more closely addressing the cultural needs of users worldwide in different target market areas. A cultural model can be used to identify different issues such as global information for internationalisation, cultural bias or cultural metaphors. It can be used to assess the degree of necessary localisation or to avoid making offending or misleading cultural mistakes. It can be also used to evaluate the effectiveness of an international user interface (Hoft, 1996).

2.4 Hofstede's Cultural Dimensions

Hofstede (2001, 2005) conducted one of the most popular and also one of the first large scale cross-cultural studies. Hofstede's study had over 116,000 participants from over 50 countries. The idea was to compare cross-cultural differences. Based on the data and additional data from the Chinese Value Survey, five cultural dimensions in which cultures differentiate were found for 75 countries and regions

(See Table 1 below). Each country was given a ranking on how ‘high’ or ‘low’ they score on these values. The cultural dimensions are measured on a scale from 0 to 125.

Power Distance		It is the extent to which less powerful people in a society expect and accept that power is distributed unequally.
Uncertainty Avoidance		It is the extent to which people tolerate ambiguity and risk or feel threatened by change.
Individualism vs. Collectivism	vs.	It is the extent to which people are integrated into tight social networks and act on the basis of their own needs or the needs of their social groups.
Masculinity vs. Femininity	vs.	According to Hofstede, the duality of sexes is a fundamental fact with which different societies cope in different ways. The main issue is the implications the biological differences between the sexes should have for the emotional and social roles of genders. The dominant values in a masculine society are achievement and success and the dominant values in a feminine society are caring for others and quality of life.
Long vs. Short-term time orientation		It is the degree with which the society embraces, or does not embrace, long-term devotion to traditional values.

Table 1: Hofstede’s five cultural dimensions (Hofstede, 2001, 2005)

Hofstede’s cultural dimensions (Hofstede, 2001, 2005) have been found useful in cross-cultural design of technology as a tool to understand cultural differences (Marcus, 2005). Application of Hofstede’s cultural dimensions to UX research have been found helpful when planning and executing studies in different cultures and also when analysing the results with users from diverse countries (e.g. Schumacher, 2010).

Despite being a useful tool for understanding cultural differences, Hofstede’s work has been criticised for instance for the fact that his study assumes that national populations are homogeneous wholes, but most nations consists of different ethnic units. Or that nations are not proper units of analysis (e.g. Jones and Alony, 2007; McSweeney, 2002). Clemmensen and Roese (2010) reviewed the current practice in how cultural issues in HCI have been studied. Firstly, they found that Hofstede's (2001, 2005) cultural dimensions have been the dominating model of culture in HCI. Secondly, that the participants have been picked because they could speak English and thirdly, that most studies have been large scale quantitative studies. They argue that in order to balance this situation, more researchers and practitioners should perform qualitative, empirical studies.

Despite these criticisms, Hofstede’s findings have served as a valid foundation on which to conduct cross-cultural user studies (E.g. Schumacher, 2010). Hofstede’s five cultural dimensions (2001) provide one alternative to understand the influence of cultural differences on HCI.

In the next section we will shortly describe the principles and main activities of human-centered design of technology.

2.5 Human-Centered Design of Technology

Human-centered design (HCD) is a process in which the needs, wants, and limitations of end users of a product, service or process are given extensive attention at each stage of the product development process (E.g. Beyer and Holzblatt, 1998; Jordan, 2000; ISO 9241-210:2010). The main stages in the product development process are 1) Requirement Gathering 2) Design 3) Testing 4) Maintenance. The biggest difference from other product design philosophies is that human-centered design tries to optimise the product around how users can, want, or need to use the product, rather than forcing the users to change their behaviour to accommodate the product (E.g. Beyer and Holzblatt 1998; Jordan 2000; ISO 9241-210:2010).

This study uses human-centered design principles in the design of technology. According to ISO 9241-210:2010 these principles include: 1) The design is based upon an explicit understanding of users, tasks and environments. 2) Users are involved throughout design and development. 3) The design is driven and refined by user-centered evaluation. 4) The process is iterative. 5) The design addresses the whole user experience. 6) The design team includes multidisciplinary skills and perspectives.

ISO 9241-210:2010 standard describes the best practice in human-centered design. The standard provides principles and recommendations for human-centered activities throughout the life cycle of design of interactive systems. According to ISO 9241-210:2010, there are four human-centered design activities that need to start at the earliest stages of a project. These are to: 1) understand and specify the context of use 2) specify the user and organisational requirements 3) produce design solutions 4) evaluate designs against requirements 5) iterate when appropriate. The iterative nature of these activities is illustrated in Figure 1.

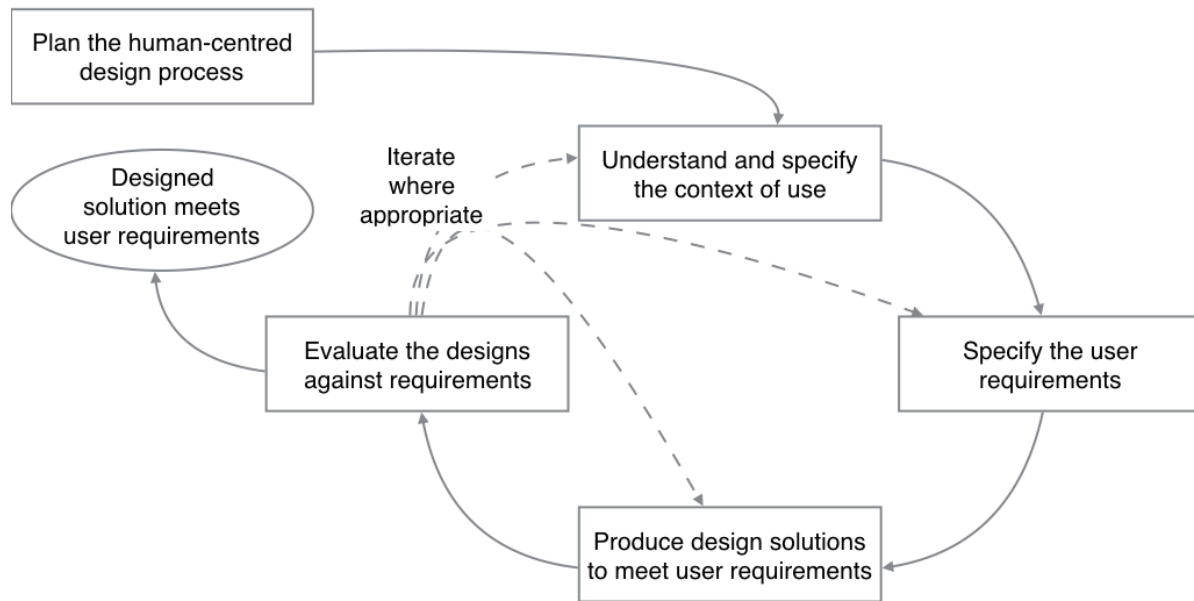


Figure 1: The Interdependence of Human-Centred Design Activities according to ISO9241-210:2010.

The sequence in which these are performed and the level of effort and detail that is appropriate varies depending on the design environment and the stage of the design process (ISO 9241-210:2010). Cross-cultural issues should be taken into consideration in all of these activities and integrated as part of the human-centered design activities. In the next section we will discuss what cross-cultural design of technology is and how it has been approached.

2.6 Cross-Cultural Design of Technology

As discussed earlier, in the field of Human-Computer Interaction cultural issues are studied in the area of cross-cultural design of technology. Cross-cultural design is designing technology for different cultures, languages, and economic standings ensuring usability and user experience across cultural boundaries (e.g. Aykin, 2005). As mentioned previously, the demand and opportunity for cross-cultural design has rapidly risen due to globalisation and demands for more holistic user experience of technology products and services. As companies are expanding their customer basis across national and cultural boundaries, cross-cultural issues have practically landed on designers' desktops and made them think about the cultural elements in design (e.g. Sun, 2012; Aykin, 2005). Whether it is about designing mobile phone applications, web sites, tractors, cranes, lifts or washing machines, designers need to think about the users all around the world in different cultural contexts.

2.6.1 Culture and UX

UX design should take into account users' socio-cultural context because in designing UX there is a greater focus on content, brand and emotions than in designing mere usability (Marcus, 2006). Therefore, understanding of the concept of culture and how it impacts UX becomes an essential part of study and design of UX. Thus, in the design of delightful UX the understanding of culture is needed.

In the studies of Clemmensen and Roesse (2010) it was found that during recent years that the interest in the relationship between cultural aspects and Human-Computer Interaction (HCI) has grown significantly. Chavan et al. (2009) propose that the rise of emerging markets has actually created a global marketplace, a vast, wired global network of manufacturers, programmers and designers who can be anywhere. Still, the users are always local having different cultural backgrounds. As a result, according to Chavan et al. (2009), this has also lead to a situation that when it comes to developing successful products and services for these users, there is an almost infinite number of ways to get it wrong.

It has been shown that the lack of consideration for cultural differences or even improper consideration of such differences could lead to product design catastrophes (Chavan et al., 2009). Chavan et al. (2009) mention for example a washing machine targeted for Indian markets but consequently was not suitable at all for washing South Indian clothes, which are very delicate. It took the washing machine company years to recoup its losses and regain significant market share in the subcontinent.

According to Aykin (2005), considering cultural aspects seem to be a fairly new area in the ICT industry. Nevertheless, companies have quickly realised the importance of making products international by not only localising the product texts, but also looking into product design issues with the goals of making products suitable, usable, and preferred by the users in the target market areas (Aykin, 2005). The success of any product or service in international markets requires a good knowledge of customer needs in the planned variant market areas and appropriate localisation of the product to fit the local needs and culture (Aykin, 2005). Despite the importance of cultural factors in product design, little research has been performed to study them (Choi et al., 2005).

Ouygi et al. (2008) summarise that cultural issues have an effect on the product UX and also on the UX research methods (Ouygi et al., 2008). Ouygi et al. (2008) categorised two areas in the design of technology that can be affected by culture:

- 1) *In relation to the actual product of development*, cultural differences in signs, meanings, actions, conventions, norms or values raise challenging issues in the design of usable localised artifacts (Oyugi et. al, 2008). This means the actual artifact that is being created, for example, a web site.
- 2) *In relation to the process of development*, cultural differences potentially affect the manner in which users are able to participate in design and act as subjects in evaluation studies (Oyugi et. al, 2008). This means in practice that some human-centered research methods might work better in some cultures than in others and vice versa.

2.6.2 Internationalisation and Localisation

Irrespective of how culture is viewed during design, the two main approaches used while designing for cross-cultural users of technology in the field of HCI are internationalisation (often abbreviated i18n) and localisation (often abbreviated L10N) (e.g. Aykin, 2005; Young, 2008).

Internationalisation is the designing and engineering of a technology product or service in such a manner that it does not need to undergo changes to its core application in order for it to be adopted for various local target markets (e.g. Aykin, 2005; Young, 2008). During internationalisation the product is designed to be culturally neutral. Design specifications may be influenced to some point by culture but they are generic in nature and the intended outcome of the internationalisation method is a homogenous product that is usable across cultures (e.g. Aykin, 2005; Young, 2008).

Localisation means that a technology product or service is adapted to suit the specific culture and language of local target cultures thereby making the product usable and acceptable by members of the target cultures (e.g. Aykin, 2005; Young, 2008). In this case, the use of culture-specific content is encouraged during the design process. Young (2008) would argue that localisation requires authentication of the design through methods like ethnographic research to make sure that the design specifications are authentic or truly representative of the local target cultures. Chavan et al. (2009) also support the idea of authenticating localisation. As was shown in the study by Chavan et al. (2009), it is not enough to design products based solely on the designer's understanding of cultural differences. It is also important to involve users from the local target culture in the design. This is done with the aim of giving the resulting material some kind of authenticity and also making sure that the localisation process does not rely on the knowledge of the researcher alone. Therefore, methods for UX research in cross-cultural context are needed to collect user feedback from different local cultures.

Although it would seem that localisation requires a better understanding of the target cultures than internationalisation, a thorough understanding of target cultures is required for both approaches. It is

important during internationalisation to ensure that culture-specific material is avoided. To do this, one must have a good understanding of the target cultures.

How then to bring the cultural understanding to design work? How find out what to internationalise and to what extent to localise? And what methods could be used and are available and what should be taken into consideration? Although technology researchers and practitioners have long been aware of the challenges of the global markets, there are still many unsolved problems concerning the extent to which culture may affect the product design and how to evaluate and analyse it (e.g. Smith et al., 2005; Schumacher, 2010).

2.6.3 Approaches to Cross-Cultural UX Research

As discussed earlier, in the development of new interactive technology products and services, gathering user feedback is necessary to minimise the risk of failure in the market. UX should be adapted to different cultural user groups. Where and how to collect data from users are relevant questions in cross-cultural design of technology. Cross-cultural UX research is a systematic investigation and/or evaluation helping to understand users and their needs and to identify the requirements for a product UX involving different cultures. We will next define and discuss approaches to cross-cultural UX research.

According to e.g. Honold (1999) in order to create a basis for internationalisation and localisation of product design, the key factors differentiating cultures from one another need to be clearly identified (Honold, 1999). We argue that cross-cultural UX research can take two approaches: The first one is to study existing theories and knowledge of cultures “from top-to-bottom” such as Hofstede (2001, 2005). It is considered cost-efficient and helpful, but also may be seen as a “quick and dirty” method as it does not involve local users in the design process. It can also reinforce stereotypes and does not take into account that also cultures are developing, especially in the use of technology.

The second approach is to use human-centered design methods to find out more customer insights for each specific target country/culture either on-site and/or remotely, which is more “from bottom-to-top” approach (See Figure 2). This human-centered design approach supports cross-cultural issues in design of technology with human-centered design activities (e.g. Aykin, 2005) involving local users to help to identify internationalisation and localisation needs for the design. Cross-cultural UX research on-site or remotely will help to understand what needs to be internationalised and localised. Human-centered design on-site provides the most reliable information as users are researched in their own context, but is also often expensive and time demanding. Remote human-centered design methods such as

questionnaires, diary studies and remote usability tests are more cost-efficient, but not many methods exist yet (e.g. Monahan et al., 2008) and therefore development of methods is needed.

For optimising the cost and effort, all these processes and approaches can be used simultaneously depending on the product’s design, project’s resources and timeframes. To conclude, cross-cultural UX research can be approached by studying existing cultural theories such as Hofstede (2001, 2005) and/or by using human-centered UX research.

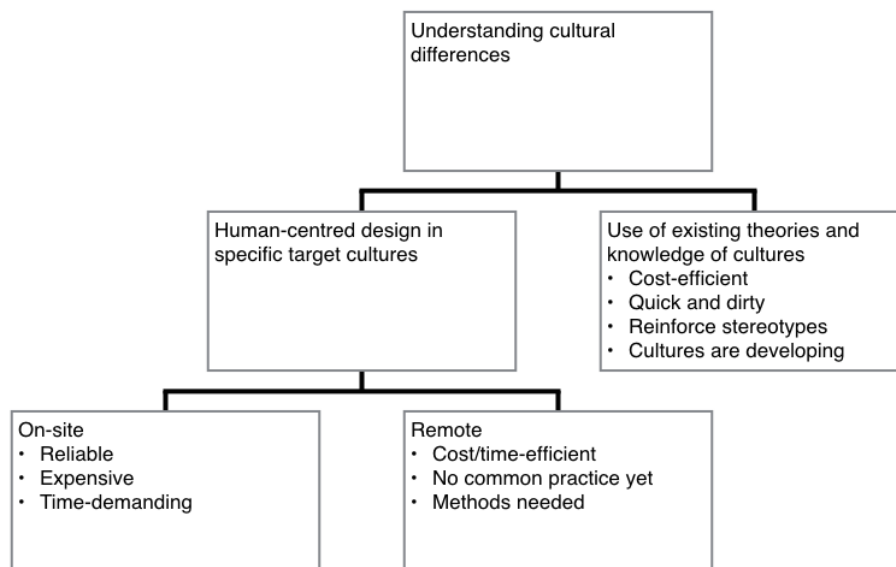


Figure 2: Approaches to Cross-Cultural UX Research (Walsh and Helkiö, 2009)

The influence of culture on UX research has received attention without much in the way of theory to support it (Snitker, 2010). Snitker argues that UX researchers often have few models and concepts of culture per se but even fewer for the implications of culture on their particular research project. Snitker (2010) argues that most UX research projects are executed in the wider context of a development project – before, during, or after the product or service is launched. He continues that the influence of culture in the research is present in all phases of a research project. Snitker lists the following: 1) Initial analysis of the market and usage context 2) Exploration and validation of the system 3) Product of service testing 4) Implementation through localisation and or internationalisation.

Two essential issues in cross-cultural design of technology are identified: Objective and subjective issues (e.g. Aykin, 2005, Smith et. al, 2005): There are objective issues, such as language and format conventions of time of day, dates and number, text directionality in writing systems etc. Furthermore, there are subjective issues such as value systems, rituals, behavioural and intellectual systems of one or more cultural groupings of users affecting the way people in different cultures interact use and accept

technology. This is in synch with the meta-models of cultures presented earlier. These “deeper” levels of culture are often hard to study without human-centered research. In anthropology an interpretive approach to the symbolic system of culture includes a long period of intimate study and participation in the everyday activities of the cultural members. Therefore the analysis is context sensitive and interpretive, and should focus on the “native’s point of view” (Czarniawska-Joerges, 1992; Iivari, 2004; Keesing & Strathern, 1998; Smircich, 1983). This suggests that with longitudinal UX research could bring knowledge of those hard to examine culture sensitive issues in design.

In the quest to include the consideration of cross-cultural issues in the design process, HCI designers have approached culture in several ways. These approaches to culture according to Kamppuri (2011) are:

- 1) **Culture as a list:** this is when culture is thought to be a *mere collection of tools, artefacts and other outward physical manifestations that need to be adjusted for in the design process*. In this approach only the observable aspects of culture are considered. This approach is characterised by things like the localisation of text through the provision of language options. There is little consideration of culture as a dynamic mental process. In studies like by Russo (1993), designers are advised to consult a checklist of issues such as texts, images and colours.
- 2) **Culture as motivation:** in this approach, *culture is used to directly motivate the design process*. The designers depend on the supposed ability of culture to predict how a technological product will be used. This approach assumes that interaction is motivated mainly by culture. Although culture has a significant influence on behaviour and interaction with technology it is not logical to assume that it is the only determining factor of how technology is interacted with. De Angeli et al. (2004) would argue that cultural dimensions like those proposed by Hofstede are too high-level to be used to directly inform the design of technology.

These two above mentioned approaches rely on the use of existing theories of cultures to understand cultural differences affecting the design of technology. The third one supports human-centered design principles by involving local users in the design of technology:

- 3) **Culture as a resource:** in this approach culture is used as a *means of better understanding the users, as a kind of perspective from which to understand how users may interact with technology*. This approach encourages the design process being informed by culture and not being controlled by it.

Kamppuri's categorization of approaches matches with our model (See Figure 2) in that culture as a list and as a motivation corresponds the use of existing theories and knowledge of cultures. Culture as a resource supports human-centered design in specific target cultures.

2.6.3 Cultural Issues in UX Research Methods

Despite the fact that designers now are more aware of cultural issues and include the consideration of cultural differences in the design process, there are still many ways to get it wrong when designing products intended for the global marketplace. As mentioned earlier UX researchers often have few models and concepts of culture per se but even fewer for the implications of culture on their particular research project (Snitker, 2010).

There could be cultural differences between the users and researchers and even when this isn't the case, there could be cultural differences between the people (users and researchers) and the methods and theories used (Kamppuri, 2011). It may be difficult for designers and researchers themselves to consider their culture because culture is internalised which makes cultural self-awareness difficult to achieve (Hofstede, 2005). As shown in the work by for example Shi (2008), culture does play a significant role in the way evaluators conduct user research.

Kamppuri (2011) argues that there is a failure by researchers to see the methodology itself as a product of culture. A majority of the methods used in the field of HCI to conduct user research or to involve users in the design process originated in the western world. These 'western' methods may not always be appropriate for research with users from other parts of the world like Asia or Africa (Choi et al., 2005). For example, cultural differences may affect the way a user participates in UX research studies. Therefore, it is imperative not only that designers and researchers use methods appropriate for the target cultures but that they employ them in an appropriate manner as well. Hofstede's five cultural dimensions (See Table 1) have been used to shed some light on the conflicts between non-western and western user research methods. Some of these conflicts can be found in the following methods:

Participatory design. Participatory design is a method of Scandinavian origin initially used to involve workers in the design of systems they would ultimately use (Greenbaum and Kyng, 1991). When first used, the method required interaction between management and workers further down the hierarchy of the workplace. This interaction has evolved into the present day's interaction between researchers and users in a more recent version of the method. The close interaction between people from opposite ends of the power hierarchy may bring about discomfort for people from countries where the Hofstede's PDI (2001) is high and it is out of place to speak freely before superiors.

Think aloud protocol. Think aloud protocol method requires the participant not only to speak while performing a task but also to freely share their thoughts concerning the task. The method assumes that participants have no qualms sharing their thoughts. It further assumes that participants have no issues with giving negative criticism as they are expected to speak freely. Participants from collectivistic societies may not be comfortable expressing individual thoughts independent of collective input. Clemmensen et al. (2009) conclude that the think aloud method is not appropriate for use with Asians because they are less likely to speak directly. Asia consists of countries with low IDVs (Hofstede, 2001) like India (48), Malaysia (26) and China (20) where people are used to acting collectively.

Contextual inquiry. Contextual inquiry method involves eliciting information, especially tacit knowledge, from users while they are in their actual work environment and possibly interacting with work artefacts (Greenbaum and Kyng, 1991). One of the culture-dependent rules of contextual inquiry as pointed out by Kamppuri (2011) is that the designer should turn down user requests for technical help during the inquiry session. Kamppuri would argue that in societies where there is a strong social pressure to help this rule might be difficult to follow.

Interviews. Vatrapu and Pérez-Quiñones (2006) conclude after conducting structured interviews that power distance has a significant effect on how people respond during interviews. They found that Indians were more forthcoming with information when being interviewed by fellow Indians as supposed to Anglo-Americans. They argue that this was due to a reduced perceived power distance between Indian interviewers and Indian interviewees.

In general, any method where users are expected to express themselves individually or provide criticism should be used with caution in collectivistic and low power distance societies. Methods involving highly structured tasks such as the think-aloud method and structured interviews should be used carefully in societies with a high UAI where the structure of the research method might conflict with already existing ways of doing things (Chavan et al., 2009).

Although Clemmensen and Roese (2010) suggest that more qualitative methods are needed, according to e.g. Putnam et al. (2009) the application of the common UX research methods in cross-cultural UX studies is not always viable: budgets are limited, the ability to perform first hand on-site research can be challenging without extensive local knowledge, and product time frames can limit the feasibility of field research (Putnam, et al., 2009). Thus, cross-cultural UX research is often time-consuming and expensive, and, therefore, the main requirements for cross-cultural UX research methods are that they must be lightweight, fast to apply, and relatively easy to use (Väänänen-Vainio-Mattila et

al., 2008). These criteria can be at least partly met by applying remote methods. However, according to Monahan et al. (2008) no common practice exists on how UX can be studied remotely in cross-cultural contexts, although a need for these kinds of methods has been identified (Monahan et al., 2008).

Remote UX research methods can help designers to gather feedback on UX online rather quickly compared to traditional on-site methods. Hartson et al. (1996) make a categorisation on UX research methods based on how the evaluator and the participant are located relative to one another. In local evaluation they are usually in the same place at the same time. In remote evaluation, however, they are separated in space and/or time.

One of the most popular remote UX research methods is a remote online UX survey where the data is collected over the Internet. According to e.g. Evans and Mathur (2005) there are many advantages of online surveys, such as the low cost of data collection and analysis; it is a fast way of acquiring information as respondents can answer in a time convenient for them; there can be a variety of different question types; and, the use of multimedia (like sound or video clips) is possible. In addition, there is a possibility to reach large samples of participants worldwide. Thus, the main requirements for cross-cultural UX research methods (not utilising many resources, fast to apply, relatively easy to use and data collection in many locations) (Väänänen-Vainio-Mattila et al., 2008) would be met by a remote online UX survey. However, known internationalised survey methods rely on the use of question item language translations, and it can be hard to identify cultural issues with them.

UX is context dependent and measures are thus sensitive to situational factors. Hence, it might seem that on-site or local methods are more likely to elicit realistic experiential responses (Madden et al., 2000). However, realistic experiential responses or direct observation of those are not possible e.g. when there is no concrete product at the very beginning of the development process. Vermeeren et al. (2010) suggest, that in early concept phases, where there are no functional systems that participants could interact with but they need to use imagination to be able to evaluate the concept, immersion is the only known method, and that more methods would be needed that help imagining and evaluating future experiences. (In immersion, the respondent is supposed to keep the concept in mind in her/his daily life and make notes on the applicability of the concept in different situations.) In similar cases, remote online UX surveys could be used to collect data if on-site research methods are not possible.

2.7 Online Surveys

Surveys are one of the most commonly used research methods across all fields of research. Because surveys are good at getting responses from large number of people, they are often used for collecting thousands, or even millions of responses, especially in sociology to make estimates of populations. Surveys are frequently used to describe populations, to explain behaviours and to explore uncharted waters. Surveys are a well-defined and well-written set of questions to which an individual is asked to respond. Surveys are most typically self-administered by an individual with no researcher present and therefore the data collected is not as deep and in-depth as with other research methods, such as ethnography (Lazar et al. 2010).

Internet has become an alternative to collect data replacing traditional paper and pencil surveys for scientific and market research utilising now online surveys (Singh et al., 2009). Thus, with modern technology and people's access to and knowledge of using Internet, surveys can now be designed for, implemented and administered online.

2.7.1 Cross-Cultural Surveys

One of the biggest strengths of surveys (both paper and even more online) is that they can collect a large number of responses quickly from a population that is geographically dispersed (Lazar et al., 2010). Thus, they can be used in cross-cultural research. Cross-cultural surveys (both paper and online) have been used and studied in many areas such as marketing, social, economic and behavioural sciences, policy making, educational testing and health research (Harkness et al., 2010). There is a large amount of literature on cross-cultural surveys (Harkness et al., 2010). According to Harkness et al. (2010), this is because since World War II the interest and need in conducting cross-cultural surveys has grown in many disciplines.

Within the last 50 years, cross-cultural survey research has become accepted as not only useful and desirable, but also indispensable. Cross-cultural surveys are used in many areas to collect large amount of data, mainly quantitative, for example by European Commission, the Organisation for Economic Co-operation and Development (OECD), the United Nations (UN), the United Nations Educational, Scientific and Cultural Organisation (UNESCO), the World Bank, the International Monetary Fund (IMF) and the World Health Organisation (WHO) (Harkness et al., 2010). These types of surveys tend to be large quantitative studies that address issues such as European Social Survey (2013) or Adult Literacy Survey in OECD countries (Kalton et al., 1998).

Thus, according to Harkness et al. (2010), there is considerable consensus that cross-cultural research is valuable and also more complex than single-country research (Kohn, 1987; Jowell, 1998; Kuechler, 1998; Lynn et al., 2006, Rokkan, 1969). According to Harkness et al. (2010), the special difficulties related to cross-cultural surveys often include emphasis on challenges to “equivalence” (“equivalence” here refers to the level of comparability of scores across cultures), multiple language and meaning difficulties, conceptual and indicator issues, obtaining good sample frames, practical problems in data collection, as well as the expense and effort involved. In addition Harkness et al. (2010) also point out that there are organisational demands, challenges in dealing with the varying level of expertise and different ways of working, different standards and perceptions that need to be encountered in different countries.

2.7.2 Online Surveys in HCI and UX Research

Following the increased use of online surveys in social research (Glover and Bush, 2005), in UX research too, online surveys have become desirable given their lightweight nature, speed and relative ease-of-use (Väänänen-Vainio-Mattila et al., 2008). Surveys allow capturing the “big picture” relatively quickly; of how individuals are interacting with certain technology, what problems they are facing and what actions they are taking (Lazar et al., 2010).

The difference between the use of surveys between disciplines such as sociology and HCI is that in HCI, population estimates are often not the goal and therefore the participants are more often recruited in a non-probabilistic manner (Lazar et al., 2010). As Lazar et al. (2010) point out; in HCI often there isn't a clear, well-defined population of potential participants. In some research communities for example in the fields of sociology and public policy, large national and international data sets are collected using rigorous, structured sampling methodologies (Lazar et al., 2010). Researchers can take these high quality, probability sampled data sets and perform analyses on the many variable of them (Lazar et al., 2010). This is not the model of research used in HCI where researchers must typically collect the data themselves and no large, well-structured data sets exist (Lazar et al., 2010). Such surveys may not even be practical in the context of UX research in the agile product development process. However, online UX survey research benefits from the existing body of knowledge established in the methodological research for surveys in general and for cross-cultural surveys. Cross-cultural issues such as translation and cultural values in answering pose challenges for any cross-cultural survey.

According to Guidelines for Best Practice in Cross-Cultural Surveys (2010), *“the number and scope of surveys covering many cultures, languages, nations, or regions have increased significantly over the*

past decade. This has led to a growing need to provide information on best practices across the multiple phases of cross-cultural survey design and administration to ensure the collection of high quality comparative data” (p. 1).

Although there is a large number of research in the above mentioned areas, cross-cultural, qualitative UX surveys have not been studied much. According to Guidelines for Best Practise in Cross-cultural Surveys (2010) there is very little published information on the details of implementing surveys that are specifically designed for cross-cultural research. For example, little has been published on what aspects of cross-cultural surveys need to be localised and how.

Online survey is versatile method in UX research because it can be used at any stage of the design process, for example, in investigating people’s characteristics (early concepting) or people’s attitudes to prototypes or finished products. A study on UX research methods by Vermeeren et al. (2010) reveals that around half of the UX research methods surveyed could be used remotely. Online surveys are typically used as a supplementary method alongside other UX research methods and not as the only research method (Luedemann and Muller, 2010). There is also a large variety of tools are available for creating, administering, and analysing online surveys (Luedemann and Muller, 2010).

There are two categories of online survey questions – fixed-response and open-ended. With *fixed-response questions*, respondents are either presented with a number of alternative responses to a question and asked to choose the most appropriate, or to register the strength with which they hold an opinion on a scale (typically a 5- or 7-point Likert scale) (Jordan, 2000). Benedek and Miner (2002) note that one problem with Likert scale is that the topics of the questions or anchors on the scales are assigned by the practitioner (and influenced by his cultural background and values) and often do not mean as much to a participant. In addition to that, cultural differences have been found in responses to Likert scales, for example Lee et al. (2002) found Japanese and Chinese participants to select more the midpoint frequently on the items that involved admitting to a positive emotion than did the Americans, who were more likely to indicate a positive emotion.

With *open-ended questions* participants are typically asked to comment on the product or system. Open-ended questions allow participants to answer more freely what they think than in fixed-response questions (Gillham, 2006; Soley and Smith, 2008). Therefore they are considered more culturally sensitive than Likert-type of questions. They are useful in eliciting qualitative data about personal experiences, which is pivotal in UX research.

Fan and Yan (2010) developed a conceptual model of *online survey process* to systematically review a wide variety of factors influencing the response rate in the stages of online survey process. According to their model there are four main stages in an online survey process: 1) Survey development, 2) Survey delivery, 3) Survey completion and 4) Survey return. (Fan and Yan use the term web survey similarly as we use online survey). As shown in Figure 3, the process of an online survey includes four basic steps:

The first step is the online survey development. It concerns the process in which surveyors design and develop a survey and upload it to the survey website, similar to the process of developing a mail survey and printing out the needed hard copies ready for use. The second step is the online survey delivery. It concerns the process in which surveyors develop a sampling method, contact potential respondents, and deliver the online survey to the hands of each of surveyees, like the process of mailing and distributing the mail survey to each of potential respondents. The third step is online survey completion. It concerns the process in which online surveyees receive the survey announcement, log into the survey website, complete and submit the survey, and log out from the website, like the process of finishing a mail survey. The fourth step is the online survey return. It concerns the process in which surveyors download the collected online survey data from the website to research computers in certain formats for data analysis, relatively similar to the process of handing in the completed mail surveys. In our study we are placing our results into these stages although we added and modified it to match the needs of an online UX survey.

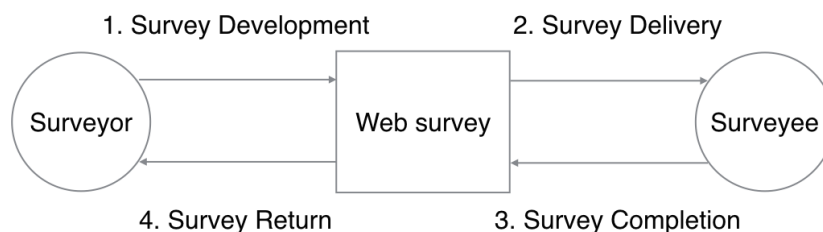


Figure 3: Online Survey Process according to Fan and Yan (2010)

2.7.3 Advantages of Online Surveys

As already mentioned online surveys have many advantages. They are considered to be cost-effective, because data collection is faster and demands less of a work force. In addition, data is ready for analysis immediately after delivery (Fan and Yan, 2010). Furthermore, samples can be bigger: increased sample size does not make much difference to the total cost of the study as it would with traditional methods (Benfield and Szlemko, 2006). Also, it is easier to reach respondents worldwide (Evans and Mathur, 2005). Internet reduces the time and distance between people, and makes communication more efficient (Ekman and Litton, 2007). It is very likely that target participants for

cross-cultural studies would be spread across different locations. Hartson et al. (1996) suggest that remote methods be used in such situations where researchers cannot easily be transported to users and vice versa. Hartson et al. (1996) go further to say that online surveys have the advantage of capturing remote user reactions while they are fresh.

Online surveys may be more convenient to respondents as they can answer when suitable for them. Furthermore, real-time randomisation of survey questions can be used, the questions can be tailored according to the respondent's demographics or his/her answers to particular questions, and thus, each respondent gets only the pertinent questions (Evans and Mathur, 2005). Moreover, there are more design and question diversity options than in traditional paper-and-pencil surveys, and the use of multimedia (like video) is possible. It is also possible to control the order of answering to the questions (Evans and Mathur, 2005).

Evans and Mathur (2005) summarise the advantages of online surveys by mentioning the following (most of these advantages will be discussed in relation to cross-cultural studies to highlight aspects of online surveys that make them appropriate for cross-cultural studies):

Global reach: the number of Internet users across the globe who would have access to an online survey is ever increasing. This means that online surveys can be used in a wide variety of locations, which is useful in cross-cultural studies.

Convenience: respondents may answer the questions at a time that is most convenient for them. In most cases, they may also spend as much time as they would like answering the questions.

Question order: unlike mail surveys, online surveys can have the respondents answer the questions in a particular order. This could be useful in cross-cultural studies where researchers wish to expose respondents to a certain order of questions depending on their nationality.

Low administration cost: online surveys are usually self-administered and therefore do not require extra cost for interviewers and postage. In addition, self-administration and therefore the absence of an interviewer may also contribute to the elimination of a perceived high power distance between a respondent and evaluator, which has been shown to be a potential problem faced by cross-cultural studies.

Large sample is easy to obtain: the simplicity with which online surveys can be sent to respondents and the low cost of doing so mean that a relatively large sample of respondents can be reached.

Question diversity: online surveys are capable of including several question types and can also include multimedia like photos and videos. This is useful when conducting UX research around complex ideas and concepts and which may need to be conveyed to respondents.

2.7.4 Challenges of Online Surveys

Besides many advantages, online surveys face some challenges. Similar to paper surveys, researcher needs to know what are the right questions to ask to elicit the needed data. The quality of the research may be threatened by errors in the coverage: although Internet coverage is wide globally, not everybody has access or uses Internet as Internet penetration is not evenly distributed across segments of the population. For example, among the countries of European Union the percentage of Internet access at home varies from 89 % (in the Netherlands) to 31 % (in Romania) of the households (E-Communications Household Survey Report 2010). If comparing worldwide coverage, 57 % of EU households (E-Communications Household Survey Report 2010) in comparison to only 10.9 % of the population of Africa (Internet Usage Statistics, 2010) have Internet access.

Skewed samples by attributes may be a challenge also because there are demographic differences between Internet vs. non-Internet users: Internet users tend to be younger with higher educational levels (Nie and Erbring, 2000) and they tend to live in more urban areas than the general population (E-Communications Household Survey Report 2010). In fact, Fricker and Schonlau (2005) point out that university population often tend to have greater access to the Internet, and refer to Walsh et al. (1992) who found a positive correlation between propensity to respond electronically and amount of network usage. This finding is in line with studies with college populations: online surveys are found to have higher response rate than mail surveys among them (Shih and Fan, 2008).

However, the problem with the Internet coverage in general is diminishing with time: Internet usage around the world is constantly increasing (Internet Usage Statistics, 2010), and the experience and expertise to use Internet among general populations will escalate. This will offer new opportunities to perform UX research with an even wider population providing respondents have access to the Internet and other needed equipment.

On the other hand, even a 100 % Internet coverage does not mean the respondent will actually be reached: if the invitation is sent by e-mail, the respondent never gets it if the spam filters screen it as spam (Evans and Mathur 2005). Therefore, the invitations must be carefully designed a way that avoids filters. What is more, technological issues including both the type of Internet connection and the computer of the respondent might cause problems (Evans and Mathur 2005). Slow Internet connection

means the survey might take longer time to complete (especially if it takes a long time to download) increasing the possibility of dropouts. In addition, the use of different browsers or monitor sizes may change the layout of the survey making it harder for the participant to fill it out (Evans and Mathur, 2005), and possibly leading to dropouts. In any case, online surveys need to have particularly clear answering instructions as there usually is not, at least not direct, human contact to ask for advice (Evans and Mathur, 2005).

Another challenge to tackle and to take into account is the participant's concern for privacy and security violation that online research may pose (Evans and Mathur, 2005). One of the main challenges in online surveys however, is low response rates: in a meta-analysis conducted by Lozar Manfreda et al. (2008) the results show the response rates in online surveys are on average 11 % lower than of other survey modes. A similar result was found in a meta-analysis by Shih and Fan (2008), who found on average a 10 % higher response rate in mail than in online surveys.

Fortunately there are examples of the opposite: Glover and Bush (2005) have gained better response rates with online surveys than traditional postal surveys in a study with head teachers. An implication is that with some populations online surveys may be preferred over traditional surveys. However, it is reasonable to be aware that the quality of research may be threatened: low response rates may lead to biased results. When studying user experience, non-response should be considered as a possible threat to the validity of the study.

2.8 Summary

In Chapter 2 we presented the related work for this research. Due to globalisation, technology products and services are being sold worldwide and the users in various target markets expect products and services to be fit in their own local cultural context. Localisation is one of the key issues in developing successful technology products and services and, in order to localise, one needs to understand cultural issues that may affect the design.

In addition to globalisation, there has been a significant global change that has made the understanding of cultural context of use of technology important: the shift from usability to user experience (UX). Consequently, technology users globally expect more from their products and services than mere utility and usability: they are looking for experiences. Therefore, culture plays an important role in UX design as technology users have different cultural backgrounds and ways of understanding and using technology.

The concept of culture is complex though and the most popular strategy for a designer to understand cultural differences has been to model culture somehow: For instance, Stewart and Bennett (1991), Trompenaars and Hampden-Turner (1991), Hofstede (2001, 2005), Hall (1976) and Hofst (1995) have compiled these into cultural meta-models. Hofstede's cultural dimensions (2001, 2005) have been found useful and dominating in HCI as a tool to understand cultural differences, especially in web site design. Application of Hofstede's cultural dimensions to UX research has been found helpful when planning and executing user studies in different cultures and also when analysing the results with users from diverse countries, but it is not enough to bring understanding of the realtime local cultural context and its' effect to UX design. Therefore, more UX research methods are needed for cross-cultural contexts.

Cross-cultural design of technology is designing for different cultures, languages, and economic standings, ensuring positive UX across cultural boundaries. It supports the human-centered design activities involving local users in the design process. Although cultural issues have an effect on the product UX and also on the UX research methods, little research has been performed to study those issues. The two main approaches used while designing for cross-cultural users of technology in the field of HCI are localisation and internationalisation.

We argued that cross-cultural UX research can take two approaches: One can study existing cultural theories or to use human-centered research methods to find out more customer insights for each specific country/culture either on-site and/or remotely. Cross-cultural UX studies are often time-consuming and expensive, and, therefore, the main requirements for cross-cultural UX evaluation methods are that they must be lightweight, fast to apply, and relatively easy to use. These criteria can be at least partly met by applying remote methods. However, no common practice exists on how UX can be studied remotely in cross-cultural contexts. One of the popular remote methods is a remote online survey where the data is collected over the Internet with online surveys.

Online surveys are typically used as a supplementary method alongside other UX research methods and not as the only research method. There is a large variety of tools are available for creating, administering, and analysing online surveys. We discussed that there are two categories of online questions – fixed-response and open-ended. Open-ended questions allow respondents to answer more freely what they think than in fixed-response questions, and therefore they are considered more culturally sensitive than Likert-type of questions. They are useful in eliciting qualitative data about personal experiences, which is pivotal in UX research. We also presented the conceptual model of

online surveys developed by Fan and Yan (2010). Furthermore we presented through literature advantages and challenges of online surveys.

The objective of this research is to develop the knowledge of remote online surveys in UX research in cross-cultural context. We are using UX research methods, sentence completion, diary and storyboards, that are easy to implement into an online survey and that would allow collection of qualitative UX feedback. Although previous research has shown that online surveys are suitable for cross-cultural research, the area has not yet been studied much in UX research context. ***The research gap is to understand what kind of surveys and practices and methods are needed to collect cross-cultural, qualitative UX feedback.*** The results of this study will give academic researchers as well as UX practitioners in the industry knowledge in how to approach cross-cultural UX research with online surveys, especially the localisation and internationalisation issues in the process. In next chapter we will present our research setting.

3. Research Setting

In this chapter we describe the research approach, participant sampling, research ethics and research validity. We then briefly describe the research methods and present the research projects in which the case studies were executed and furthermore, summarise the case studies and publications.

3.1 Research Approach

The research objective of this thesis is to develop the knowledge of remotely run online UX surveys in collecting qualitative feedback in cross-cultural UX research. We seek to understand the central issues when designing and implementing online surveys for collecting qualitative UX feedback and the cross-cultural implications to be taken into account in an online UX survey process.

To be able to gain insights about the ways in which UX feedback can be provided via online surveys, we chose a qualitative research approach. It means “*the research is interested in analysing the subjective meaning or the social production of issues, events, or practices by collecting non-standardised data and analysing texts or images rather than numbers and statistics*” (Flick, 2014, p. 542). With qualitative research in HCI, the emphasis is not on measuring and producing numbers but instead on understanding the qualities of technology and how people use it in their lives, how they think about it and how they feel about it (Adams et al., 2008). This approach fits well in UX research where the focus is on understanding the broad concept of user experience including for example user’s feelings, emotions and expectations, which can not be researched only with quantitative methods.

Our research has a multiple-case research design strategy (Yin, 2013; Dubé and Paré, 2003). As Yin (2013, p. 13) defines “*a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly defined.*” Multiple case studies, six altogether, were performed to understand the influence of variability in context and to gain more generic research results (Yin, 2013). In case study research the researcher explores a case bounded by time and activity: a system, event, activity, process, community, organisation, or one or more individuals (Creswell, 2007; Creswell, 2009; Yin, 2003).

The multiple-case research design strategy was chosen because our research aims to produce new theoretical concept of a cross-cultural online UX survey process (See Figure 6) that is grounded to qualitative feedback collected during our research. Eisenhardt et al. (2007) claim that since the theory building approach is deeply embedded in rich empirical data, a case study research is likely to produce theory that will be accurate, interesting and testable.

Because the products and services in the case studies of this research (see Chapter 3.7) were provided by the collaborating technology companies, the majority of the research took place in association with real-life product development environments. A multiple-case research design strategy would suit our study because we could gain understanding from the phenomenon of cross-cultural, qualitative online UX surveys in different contexts including for example different product development environments, different products and services and different cross-cultural user samples. The variability of context would make our results more generalisable.

We had six case studies (see section 3.7). The first four of them were executed in real product development environments with collaborating technology companies in wider research projects (see section 3.6). Collaboration between academia and industry was beneficial in a sense that it offered a possibility to use both current theories and real industrial practices in UX research. Case Studies 5 and 6 were based on the findings of Case Study 4, but were not executed in real product development environment. The research questions of this dissertation were planned together with the companies from the very beginning of the research projects so that the interests and needs of both collaborating companies and the academic researchers would fit well together. As Obrist et al. (2011; 2013) discuss there is a need to further explore and strengthen the interdisciplinary dialogue on the relationship between theory and practice when talking about user experience. Our industrial case studies would support that idea of the interdisciplinary dialogue of theory and practice by studying the phenomenon in its real practical context.

The research design used theory and prior literature in creating an initial conceptual framework. In order to understand the current practice and theories, we first explored, through literature, the main concepts related to our research. We studied the concepts of UX and cross-cultural design of technology in HCI. We also explored the concept of online surveys in UX research. Furthermore, we studied UX research methods of sentence completion, diaries and storyboarding, which we used in our case studies to collect qualitative, cross-cultural UX feedback.

As findings emerged in the case studies, the theories of the above mentioned main concepts of UX, cross-cultural design of technology, online surveys and UX research methods were revisited to search explanations and refine the theoretical framework. Multiple single case studies were carried out to strengthen the generalisability of the findings beyond a single case study. A within case analysis was conducted for each of our case study (Eisenhardt, 1989; Miles et al., 1994). Furthermore, we used cross-case analysis where each case study gathered empirical evidence that was compared to other case study

results (Lilienfeld et al., 2000) with a data-driven content analysis by at least two researchers in each case study. A cross-case synthesis (Yin, 2003) was carried out for proposing a theoretical concept of cross-cultural online UX survey process based on Fan and Yan's online survey process (2010).

3.2 Participant Sampling

The sampling approach was mostly non-probabilistic sampling (Lazar et al., 2010). In most of the case studies our participants were selected from the respective collaborating technology companies' customer panels or from the samples of volunteered university students and employees. Some of the participants in our case studies were foreigners in Finland and UK where the research was conducted, but the majority were physically located in their own countries. We had 1369 participants from 27 different countries representing different cultural values (Hofstede, 2001, 2005) (See Table 4). The participants spanned several nationalities and cultures. They were affluent, literate and educated with a desire to use sophisticated products and services. They also had access to Internet and knowledge to use technology and answer the surveys.

3.3. Research Ethics

The term ethics refers to the moral standards or values by which human conduct is judged (Rosnow and Rosenthal, 1997, p. 115). When applying ethics to research in the behavioural science, ethical guidelines allow judging the morality of scientific conduct no matter who the researcher is, as long as the research situation is similar (Rosnow and Rosenthal, 1997, p. 115). In Finland, where this study originated from, external evaluation of ethical processes and governance in HCI research is not required by Tekes (the funding agency) or by the university when no underage participants, nor mental or physical stress are involved in the research. However, we followed the generally accepted ethical rules on anonymisation and data storage. We explained to the participants by whom, what for the research was made, how the results would be used, that the participation in the research is voluntary and how the data is stored. These issues are the central ones that the Finnish research ethics authority TENK (Finnish Advisory Board on Research Integrity) recommends to be addressed in research projects.

3.4 Research Validity

Research validity refers to how trustworthy the results of the research are, and to what extent the results are not biased by the researcher's subjective point of view (Runeson et al., 2012). Yin (2003) and Runeson et al. (2012) present four aspects of research validity that need to be considered in case studies, namely construct validity, internal validity, external validity and reliability.

According to e.g. Runeson et al. (2012) and Swanborn (2010) the *construct validity* reflects to what extent the operational measures that are studied really representing what is investigated according to the research questions. This aspect focuses on if the questions and tools used are measuring the concepts they are intended to measure.

According to e.g. Runeson et al. (2012) and Swanborn (2010) the *internal validity* reflects causal relations and whether there is a risk that the investigated factor is affected by a third factor (Is the relationship between variables really causal?). The *external validity* denotes the property of an empirical study where the result is generalisable to other contexts. *Reliability* is about to what extent the data and the analysis are dependent on the specific researchers.

To strengthen and demonstrate the validity of our research we used a technique called *triangulation*, which is a common technique especially in qualitative research (Denzin, 2010). Triangulation facilitates the validation of data through cross verification from two or more sources and it can be divided in to *data, investigator, theory and methodological triangulation* (Denzin, 2010).

For demonstrating data triangulation we used multiple data sources when collecting online UX feedback from several companies (Nokia, Suunto, paf.com) about different products and services (Smartphones, mobile sports computers, online gaming sites, online social sports diary) from a large sample of participants (1369) from a wide variety of countries (27). This strengthened the construct, internal and external validity of our research results.

For demonstrating investigator triangulation we had two or more researchers designing, conducting and analysing the case studies. In the qualitative data analysis, for example sentence completion answers, diary and open-ended questions, we used content analysis (e.g. Krippendorff, 2004; Corbin and Strauss, 2008). Krippendorff (2004, p.18) defines content analysis as “*a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use*”. Lazar et al. (2010, p. 285), summarise that “*content analysis is an in-depth analysis that searches for theoretical interpretations that may generate new knowledge*”. The content analysis in our research was data driven, aiming to answer the research questions by deriving and developing concepts, themes, patterns, and interpretations out of data. The content analysis was done always by two or more researchers to make ensure different people code the same text in the same way, which increases the reliability of the content analysis (Weber, 1990).

For demonstrating theory triangulation we studied and used theories from different disciplines, mainly from HCI, psychology and sociology. As for methodological triangulation we used several

research methods in collecting feedback with online UX surveys, mainly sentence completion, diary and storyboards.

3.5 Research Methods Used and Developed

In this section we will present the UX research methods, sentence completion, diary and storyboarding that were used for collecting cross-cultural, qualitative online UX feedback in our research. The above mentioned research methods were also researched and developed with the multiple-case research design strategy while they were used to collect the online UX feedback. Thus, they were both the means as well as the object of our research.

Our main research question about how an online survey as an instrument and method fit into cross-cultural UX study in collecting qualitative feedback was investigated in all of the case studies. For our research we selected UX research methods that would be suitable for online survey implementation. Because UX evaluation focuses on measuring lived experiences (Law et al., 2009) we wanted to find methods that would allow users to express themselves more freely e.g. in writing rather than giving readymade options for answers. Vermeeren et al. (2010) consider qualitative methods being methods without predefined measures. This means that participants can describe their experiences freely in their own words. Many UX researchers prefer to use qualitative methods as predefined choices of answers might reveal only a fraction of the whole UX (Vermeeren et al., 2010).

The qualitative approach with responses about user's experience is seen as one of the best ways to understand experiences that are constituted around themes such as aesthetics and affect (Bargas-Avila and Hornbaek, 2011). The focus then is on the meaning of using technology and what kind of implications it has for the user (Bargas-Avila and Hornbaek, 2011). Qualitative methods emphasise the details and richness of description (Bargas-Avila and Hornbaek, 2011).

UX research is challenging as participants in UX studies may find it difficult to express their experiences if directly asked to. Projective techniques have been used in psychology to bypass or circumvent the conscious defences of participants to gain unconscious information from them (Lilienfeld et al., 2000). Also, in consumer research projective techniques have been successfully used to yield a wide range of responses providing understanding of a consumer's thoughts and feelings, experiences and motives (Doherty and Nelson, 2010). In addition, projective techniques are often inspiring to participants as using them is fun and engaging for both participants and researchers alike (Doherty and Nelson, 2010; Will et al., 1996). The experiences of projective techniques in consumer

research are positive and thus, it seemed likely that the same techniques could be applied for UX research, although they are relatively unknown in HCI and UX research.

Since UX is multidimensional and the relevance of the dimensions can vary from one product to another, it is difficult to design good scales. In some situations therefore, it may be more useful to gather inspirational data, stimulate discussion and get a deeper understanding about what is important to users and how they interpret their experiences with products. Therefore, projective technique such as the sentence completion method (e.g. Soley and Smith, 2008), and diaries allowing free text feedback (e.g. Alaszewski, 2006, Lazar et al., 2010, Gillham, 2006) would appear suitable for collecting qualitative UX feedback. These methods give information of how users themselves describe their behaviours and reactions.

In addition to textual material in cross-cultural online UX surveys we also wanted to gain understanding of how visual material could be used in an online survey to help to collect more user feedback. This was because in UX research, especially in requirement gathering phase, it is often needed to collect information from users about a particular concept or scenario involving an interactive system that doesn't exist yet. Vermeeren et al. (2010) suggest that in early phases of design, when there are no actual systems that participants can interact with, participants must use their imagination to be able to evaluate future interactive systems. However, there are methods to help participants imagine and evaluate possible future systems. For example, visual representations such as photographs and storyboards can be used when designers need to convey a particular concept or scenario to users. To provide visualisations of interactive system concepts or scenarios, designers have used different kinds of visual materials including videos, photographs and storyboards (e.g. Kolli, 1993; Lelie, 2006). Aikio et al. (2005) note that photos and storyboards are easier to create or obtain than videos, and that it is easier to modify photos and storyboards than videos, although the modification of photos can only go so far. Lelie (2006) argues that storyboards provide a means of conveying a message in a common visual language that can be understood by people from different cultural backgrounds.

We aimed to find out what are the central issues of online UX surveys in collecting qualitative feedback from cross-cultural user groups. These central issues were related to the design and use of textual and visual material in the online survey. Therefore we looked at what kind of cross-cultural issues need to be considered when using textual and visual material in the UX survey. Consequently, issues of localisation of the language of the online UX survey texts as well as the issues of localisation and internationalisation of the visual material used in the online UX surveys were studied. To analyse

the data we used descriptive statistical methods for the quantitative data and content analysis for the qualitative data. Cultural theories (e.g. Hofstede, 2001, 2005) were used mainly in the analysis of the gathered data.

We aimed to reflect the practical implications that should be taken into account in a theoretical concept of a cross-cultural online UX survey process. Next we will introduce the research methods we aimed to develop with our research in collecting cross-cultural UX feedback with the online surveys.

3.5.1 Sentence Completion

In our study we were interested to explore how applicable a projective technique called sentence completion would be in collecting qualitative, cross-cultural UX feedback. According to Boddy (2007) projective techniques, such as bubble drawings, collage, personification, word association or sentence completion, are a collection of practical research methods which, when used skilfully, can help the researcher gain a deeper understanding from the participants than would be possible with more direct questioning (Boddy, 2007). According to Boddy's research (2007) projective techniques allow participants to feel freer and less inhibited about the answers they give by de-personalizing those answers or allowing them to express their answers in non-threatening ways such as via pictures or stories about people other than themselves (Boddy, 2007).

In sentence completion, the respondents are provided with beginnings of sentences that they then complete in ways that are meaningful to them (Soley and Smith, 2008). By providing only the beginning of the sentence, a researcher does not decide what exactly is going to be asked, but the respondent has the freedom to choose. Thus, the results from sentence completion will be more representative of the respondent's point of view and attitudes than those of the researcher. Sentence completion tool can be used to assess motivations and attitudes (Soley and Smith, 2008). In addition, sentence completion tool has been successfully utilised to identify user values (Kujala and Nurkka, 2009a; Cockton et al., 2009) and meanings (Kujala and Nurkka, 2009b), and thus it seemed promising for studying also how the product UX aspects are understood in different cultures. Interestingly, Soley and Smith (2008, p. 144) point out that the sentence completion tests appear to be more useful across cultures than are positivist-type measures, such as bipolar scales, because they are less likely to be culturally biased.

3.5.2 Diary

Another research method we were interested in using in our research was diary method in eliciting UX feedback. A diary is a document created by an individual who maintains regular recordings about

events in their life, at the time that those events occur (Alaszewski 2006). Diaries have a long history as a research tool in sociology and history, but have only recently been adopted as a research tool in HCI. A diary study requires participants, or observers of participants, to keep track of activities or events in some form of diary or log for a particular period of time (Lazar et al., 2010).

Diaries in history have been used to understand feelings, experiences and stories of both famous and unknown figures. Personal diaries of famous people give insight to historians while personal diaries of unknown individuals allow documentation of the lives of those who are often left out of the official record of history. In sociology, diaries are used to understand what individuals experience, but otherwise seems ordinary and unremarkable and might be hard to understand by outsiders (Alaszewski, 2006). Other fields, such as medicine uses diaries to find out data that is not objective, for example, individual's feelings of pain or fatigue, which can be best understood through a use of diary (Alaszewski, 2006).

Diaries allow collecting more detailed user-defined research data than pre-defined questions, which give little flexibility to participants. Diaries are more accurate than many other methods in recording information that changes over time for example moods or multiple events occurring within a day. Diaries explain the actual context of use and help to understand not only what, but also why (Lazar et al., 2010).

Diaries gather more contextual data in comparison for example to interviews where situations are mostly memorised. Contextual information helps to understand users' needs and motivations related to the use of technology and to gather user requirements for design. Not just "what" but also "why" something happened. Diaries can help people to notice and understand everyday experiences and become prepared to discuss them in interviews and create ideas in participatory design (Lazar et al., 2010)

Two main approaches exist for diary studies: psychological and anthropological (Gillham, 2006). In the psychological approach, participants record the frequency of predefined events of their daily life. In the anthropological approach, subjects record any information about their day-to-day activities or environment, which they feel is important to them. In our Case Study 3, where we used diary, we used the psychological approach.

Benefits of diary studies include that they can be used to study real context – which is an important cultural factor (e.g. Gillham, 2006) –; they can reveal unexpected information and challenge designers' assumptions (Gillham, 2006); are relatively cheap; can be used to gather data in parallel – which allows

side-by-side comparison and analysis (Gillham, 2006; Dray and Siegel, 2005) –; and can be employed to record any sort of behavior.

Diary studies are a useful design alternative for cross-cultural work because they are promising as a means of extracting some of the rich information provided by ethnographic methods, but demanding less costs, time and skilled resources (e.g. Gillham, 2006; Röse, 2001). Diaries can also be implemented as online surveys.

3.5.3 Storyboarding

Besides sentence completion and diary research methods, we used storyboarding method in our research. Storyboarding is a method for presenting ideas visually to users to help them to understand the use cases and to identify themselves with the situations within the stories (Van den Hende et al., 2007). Storyboards are sequences of pictures resembling comic strips. The origins of storyboards lie in the film and animation industry where storyboards are used in visualising scenes and working as a guide for production (Hart, 1998). In HCI, storyboards are mostly used to present user interfaces and contexts of use, and to illustrate interaction between the system and the user (Holzblatt et al., 2005; Nielsen, 1990). According to Roto et al. (2009) storyboards can be rough hand drawn sketches, stylish detailed illustrations made by design tools, or anything in between. Usually storyboards are closer to the former, aiming to support in testing and evaluating work practices and system features without worrying about the details (Roto et al., 2009).

Besides evaluating user interfaces and prototypes, storyboards can also be used in evaluating product concepts as Roto et al. (2009) have shown. In these cases when no user interfaces yet exist, particular attention should be paid to describing the context since user experience depends also on the context of use. Storyboards help the participants to step into the situation and boost imagination (Van den Hende et al., 2007). Storyboards are attractive for cross-cultural design and UX research, because they can be implemented into remote online surveys, which enable quick and cost-efficient concept evaluation early in different use contexts in different parts of the world (Roto et al., 2009).

According to Couper et al. (2007) images are contextual stimuli and, like prior questions, they can systematically affect responses when their content has relevance to the survey questions. Couper et al. (2007) suggest three categories for the uses of images in online surveys: Firstly, images may be used to replace words in survey questions, providing the visual stimulus that forms the core of the question. Secondly, images may be used to supplement the survey questions, e.g. by clarifying the meaning. Thirdly, images may be used to motivate or entertain the respondent, in which case the images are not

intended to influence the responses but rather to increase participation or reduce break offs (Couper et al., 2007).

The challenge of using the storyboarding method with cross-cultural users is to understand how the images are perceived in different cultural contexts. Localisation of the survey, i.e. adapting the survey material to each of the local target cultures and making several local versions, is one option, but this is often infeasible due to cost and time constraints. Through internationalisation it is possible to use the same visual material with participants from different cultures, which can save resources when compared to localising material for each remotely participating culture, and this has not been demonstrated or proven in prior art. In our studies we used both internationalisation and localisation.

Internationalising visual material means finding elements that are familiar to users from all target cultures and avoiding culturally sensitive elements in the material (Aykin et al., 2005, Horton, 2005). Horton (2005) presents instructions for internationalising user interface graphics. Many of the instructions are applicable also for internationalising visual material in general for example for UX research. Horton's main principles are: 1) Research target cultures thoroughly. 2) Use images representing globally common experiences. 3) Generalise images. 4) Test visual material with target cultures. 5) Involve persons from target cultures in design. 6) Eliminate culture-specific symbols.

Research of target cultures through literature can provide useful background information for designing internationalised visual material. Also, interviewing cultural experts may provide important insights about the suitability of the visual material. However, involving end users from target cultures in the design and iteration of the visual material is recommended. The required level of internationalisation depends on the target cultures and user groups. Culture is not limited to nationality, language, and religion, but also includes age, gender, caste and social class, wealth, and level of education (Horton, 2005). Therefore the target cultures, possible sub-cultures and user groups should be clearly defined.

Horton (2005) argues that internationalised images should represent globally common experiences and situations. In addition, the used symbols should be commonly known for the target cultures. All characters (human and animal), gestures, text and colours should also be generalised. According to Horton (2005), people can be presented as cartoons, line drawings and stick figures, because realistic images of people may carry cultural and racial identifiers. Furthermore, recognisable hairstyle, clothing and implications of status and power should be avoided and the indications of skin colour should be omitted. Moreover, signs of economic and social class should be minimised and people in the picture

should interact in polite and professional way. Hand gestures should not be used and the right hand should be shown performing interaction with objects (Horton, 2005). Animals can have different symbolic meanings and should be used with care in visual material. For example, a piggy bank represents thriftiness in US but for Muslims the pig may be seen as an unclean and unholy animal (Horton, 2005). If images contain text, any jokes and plays-on-words should be avoided (Horton, 2005). Sense of humour is cultural and personal trait related (Jones et al., 1992) and, for instance, English puns may not be familiar even among English speakers. Colour also has a varying symbolic meaning for different cultures (Aykin et al. 2005; Horton, 2005; Madden, et al. 2000).

3.6. Research Projects

The research consisted of literature reviews and case studies concentrating on the cross-cultural UX evaluation of different interactive products and services. The cases were conducted in research projects at Tampere University of Technology, in the Unit of Human-Centered Technology in Finland and at University of York, in the HCI Group in UK. In the following we will briefly introduce the research projects where our case studies were executed.

Suxes Research Project, Tampere University of Technology, Finland

Three out of six case studies were executed in a Suxes research project in collaboration with three Finnish companies with international customer base: Nokia, Paf.com and Suunto during 2009-2011. The main goal of Suxes research project was to build up a practice of remote user experience research to support the internationalisation and competitiveness of Finnish enterprises.

During the project, tools, measures and guidelines were developed to collect UX feedback from desired markets and to utilise this feedback in product development and marketing. Suxes research project aimed at developing tools that could be used remotely and in different phases of usage. Hence, feedback could be collected simultaneously and cost-efficiently from several market areas of interest. Furthermore, the goal of the project was not just to evaluate existing UX, but to identify the underlying factors, such as aesthetics, meanings, values, images, associations and symbolism, that cause or contribute to particular experience. By understanding the underlying factors, it is possible to find ways of improving the experience and customer satisfaction.

UX framework and UX design practice were developed during the project in connection with literature review and case studies. The aim of the literature review was to form a basic understanding of the concept of UX and the different factors that influence it, as well as how cross-cultural issues

understood and taken into account in HCI. The research project was multidisciplinary and combined knowledge from psychology, consumer research, marketing, human-centered design, and industrial design. Case studies were conducted in close cooperation with the industrial partners, and each one was planned to focus on issues of particular importance or interest for that partner. Different research methods in online UX surveys were assessed experimentally in the case studies in order to come up with an appropriate set of tools to implement the UX research practice.

In Suxes research project we studied and used remote online surveys in evaluating UX in real industrial case studies with mobile devices and applications, technical sports watches and online gaming sites in several different target market areas. The remote online UX surveys which were designed and developed in the case studies included UX surveys gathering both qualitative and quantitative data from cross-cultural user samples with different question types such as questionnaires with multiple-choice answers using different scales, sentence completion and storyboards.

Delux Research Project, Tampere University of Technology, Finland

After Suxes research project a new project called Delux research project followed and it was possible to continue our research in that context. One out of six case studies was executed in Delux research project in collaboration with four Finnish companies with international customer base: Nokia, Fiskars, Paf.com and Suunto during 2011-2013. The main goal of the Delux research project was to investigate the long-term user experience in order to understand how to improve customer satisfaction and loyalty in prolonged product use. The objective was to develop methods, tools, and practices for measuring how the users experience products in the long-term use, and analysing the gathered data for design purposes. The project further developed and tailored new long-term measurement methods and software tools together with Finnish enterprises.

Case Studies at University of York, UK

Two out of six case studies were executed at University of York, UK, in the Department of Computer Science in the HCI group while the author was there in a research exchange.

3.7 Case Studies and Publications

The research consists of six case studies in which altogether 1369 respondents answered. Respondents were from 27 different countries including Australia, Belgium, Brazil, Canada, China, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, Malaysia, Nigeria, Netherlands, New

Zealand, Norway, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, UK, USA and United Arab Emirates. Table 4 lists all the case studies, publications related to case studies, application, practical case study problem, amount of respondents, number of countries, methods used and countries included. We will then shortly present the case studies.

Cases Study	Publi-cation	Application	Practical problem	Amount of respondents	Number of Countries	Methods	Countries
1.	P1, P2	Smartphone	UX evaluation in a late phase of product development with a cross-cultural sample to find out how to elicit qualitative feedback online with sentence completion method.	97	10	Sentence completion	10 (China, Denmark, Finland, Germany, India, Japan, Singapore, UK, USA, United Arab Emirates)
2.	F3	Online gaming service, online sports diary	UX evaluation of 2 different existing services eliciting qualitative feedback with sentence completion and diary methods.	642	7	Sentence completion, Diary	7 (Sweden, Spain, Belgium, Netherlands, Switzerland, Germany, USA)
3.	F4	Sports computers	UX evaluation of two different sports computers.	253	17	Sentence completion, Open ended	17 (USA, Australia, Canada, UK, Ireland, Italy, Malaysia, New Zealand, Canada, South Africa, China, Netherlands, Finland, France, Germany, Norway, Sweden, Thailand)
4.	F5	Smartphone	Collecting user feedback on concept ideas from several target market areas.	252	5	Storyboard Internationalization	5 (USA, Brazil, Finland, India and Italy)
5.	F6	Smartphone	Collecting user feedback on concept ideas online with localized visual material.	92	5	Storyboard and visual material localization	5 (Nigeria, UK, Australia, Canada and Ireland)
6.	F7	Smartphone	Collecting user feedback on concept ideas online with localized online Storyboards.	33	1	Storyboard localization	1 (China)
			Total:	1369	27 different countries		27 different countries

Table 4: Summary of the Six Case Studies

Table 5 presents a summary of case studies and timing of the online UX surveys in product development process. In Case Studies 4, 5 and 6 the online survey was executed in the Requirement gathering phase, where participants had no prototypes available. In Case Study 1 the online UX survey was executed in late phase of product testing where participants had had a mature Smartphone prototype in use for five months before they answered to our survey. In Case Studies 2 and 3 the online survey was

executed in a maintenance phase. The feedback in Case Studies 2 and 3 were collected from existing customers who had been using the products and services already.

	1. Requirement gathering	2. Design	3. Testing	4. Maintenance
Case Study	4, 5 and 6	-	1	2, 3

Table 5: Summary of Case Studies and Timing of the Online UX surveys in Four Phases of Product Development Process

3.7.1 Case study 1: Cultural Differences in an Online UX evaluation of a Smartphone with Sentence Completion Method

In Case Study 1 we used a sentence completion research method in our industrial partner’s product development case to gather qualitative feedback of UX with an online survey. The research questions regarding this dissertation in Case Study 1 were 1, 2a and 3 (See Table 2). Case Study 1 is documented and the results reported in a journal article P1 and in a conference article P2. Our industrial partner in Case Study 1 was Nokia, whose products were sold worldwide. Nokia was interested in evaluating the UX of a Smartphone in a late phase of testing of product development with a cross-cultural user sample. Nokia was also interested to develop their remote UX evaluation toolset in gathering cross-cultural, qualitative UX feedback.

The response rate in Case Study 1 was 75%: 97 out of 130 invited Nokia employees from 10 different countries (China, Denmark, Finland, Germany, India, Japan, Singapore, UK, USA and United Arab Emirates) participated. They were invited by an email including a link to an online survey.

The survey itself was a relatively short asynchronous online survey. Remote asynchronous survey is characterised by both a spatial and temporal separation of participants and evaluators (Bruun et al., 2009). The survey was made in English and the respondents were expected to answer in English. The survey was implemented in Nokia’s own online survey tool, which our respondents were already familiar with. The survey was open for 7 days. Our study included 14 sentence completion tasks (See P1 and P2) of which the total of 90.9% of tasks were completed. Sentences were designed so that they would collect feedback widely from different UX dimensions presented in relevant literature (e.g. Jordan 2000; Hassenzahl and Tractinsky, 2006): Usability, utility, context, meaning, aesthetics (visual/haptic/acoustic), identification, socio- & ideo-pleasure, brand & image and culture.

We used the affinity diagram method to analyse the feedback from completed sentences (Holzblatt et al., 2005). Our aim with this method was to find the most common answer categories from the raw qualitative data for each sentence, and to find out how respondents experienced different areas of the product. A vast amount of qualitative data disclosed from 10 countries in a short time enabled to form meaningful results for design purposes and to get a good overall view of product UX. After finding the most common answer categories for each sentence and having gained a good overall view of the product UX, we continued our analysis by selecting 5 countries from the biggest user groups. The countries selected were USA (24 users), China (16 users), UK (11 users), Denmark (12 users) and India (9 users). Our aim then was to cluster the data according to the countries and to see if there were cultural differences in experiencing the product. Furthermore, we organised the data so that the distribution of responses was correlated pair-wise between each country. For analysing the cultural differences and the possible reasons for them we used Hofstede's (2001, 2005) cultural dimensions and index values of cultural differences for each country.

3.7.2 Case Study 2: Approaches to Cross-Cultural Design: Two Case Studies with Online UX Surveys

Case Study 2 includes two online UX evaluations of two different services. The research questions regarding this dissertation in Case Study 2 were 1, 2a and 3 (See Table 2). Case Study 2 is documented and the results reported in a conference article P3. In the following we will describe shortly the methods used in the two studies executed in Case Study 2. We will first present the methods used in Study 1 and then Study 2.

Study 1 of Case Study 2 was conducted in collaboration with Paf.com, which is an online monetary gaming company. Paf.com's (See the screenshot in Picture 1). From Paf.com point of view the aim was to investigate what would be an ideal online monetary gaming experience for Swedish and Spanish users and, whether there were cultural differences between these two countries in gaming habits and attitudes towards online monetary gaming. The online UX survey was executed in maintenance phase of product development process.



Picture 1: Screenshot of the Paf.com Online Monetary Gaming Site

Response rate in Study 1 was 6%: 632 out of 11238 (188 out of 5112 invited Spanish and 444 out of 6126 invited Swedish) registered customers of the Paf.com online gaming site responded. They were invited by an email including a link to an online survey. It is good to note that the response rate was thought to be lower than usual because of inactive online players were not answering, but this was not verified. The respondents were segmented into three categories according to the answers they gave in the background questions. Consequently a total of 120 respondents were selected (60 Spanish and 60 Swedish). The main prize was a gift card worth 200 EUR in a local store (1 in Spain and 1 in Sweden). As a second prize, three black premium backpacks worth 60 EUR, were raffled in both countries.

Sentence completion was selected as a UX research method in Study 1 and the sentence completion tasks were implemented using Wepropol online survey tool. In total, there were 18 sentence completion tasks to elicit user's habits and attitudes towards online monetary gaming. Out of 18 sentence completion tasks a total of 80% of tasks were completed (82% Spanish and 78% Swedish).

The sentences were translated to Spanish and Swedish from English, and the respondents answered in their own mother tongue. The answers were then translated into English for analysis. Figure 4 demonstrates the localisation process of the survey.

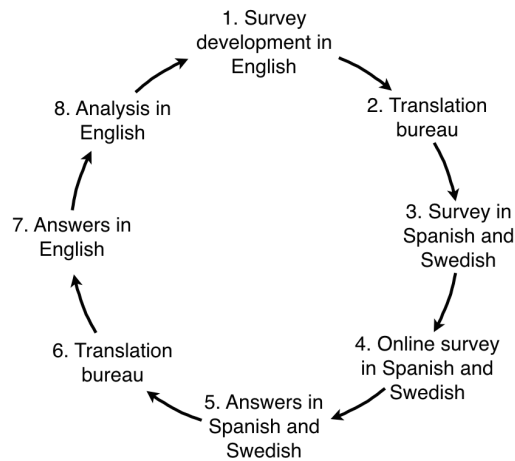


Figure 4. Localisation Process of the Survey in Study 1 in Case Study 2

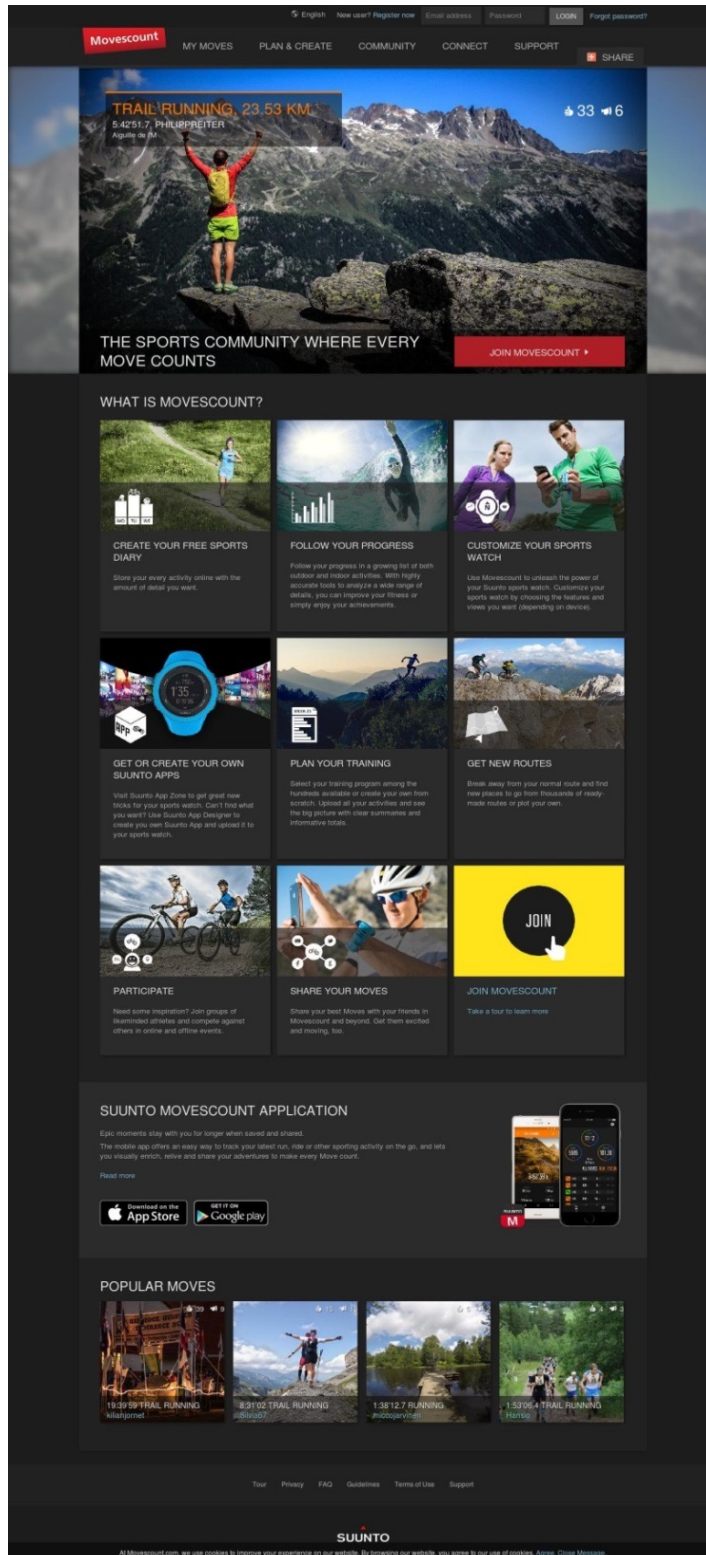
The results of the UX evaluation in Study 1 were analysed by a content analysis by grouping similar answers together in a spreadsheet by two researchers. The answer rate on average for 18 sentence completion tasks was 80 % (78 % for Swedish and 82 % for Spanish). In analysing the sentence completion tasks with the help of Hofstede’s (2001, 2005) cultural dimensions, we recognised cultural differences in the answers between Spanish and Swedish respondents.

In Study 2 of Case Study 2 we evaluated a service called Movescount (See Pictures 2 and 3), which is an online sports diary, where users can share their sports data and interact with other users. Movescount is developed by a Finnish company Suunto, who was interested to study online surveys in UX research as it too has a global customer base and a need of collecting UX feedback from all over the world. Movescount is compatible with other other Suunto products such as heart-rate monitors and sports watches. Suunto designs technical sports watches, dive computers and other instruments used by active people.

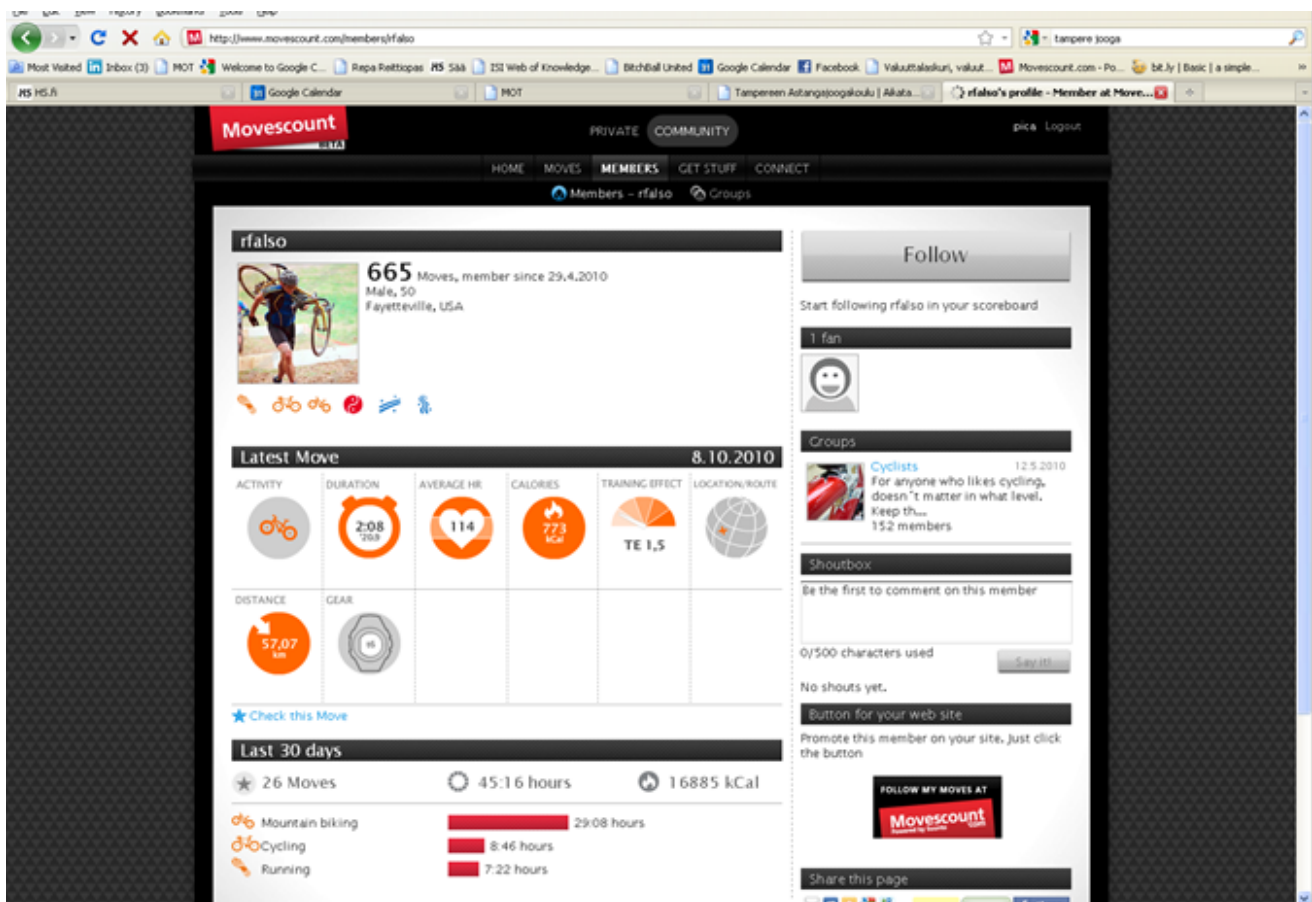
The aim of Study 2 from Suunto’s UX research point of view was to investigate how people use Movescount, how they feel about it and how the usage of the system changes and evolves over 3 months. The online UX survey was executed in the maintenance phase of product development process. The aim related to our online UX survey research was to look at how online UX survey with diary works in a cross-cultural study with many nationalities and English as a language of the study.

Diary-study was selected as a method in Study 2, because the aim was to gather qualitative data about the UX from a longer period of time to understand the usage patterns of the service. As mentioned previously, two main approaches exist for diary studies: psychological and anthropological (Gillham, 2006). In the psychological approach, study subjects record the frequency of predefined events of their

daily life, whereas in the anthropological setting, subjects record any information about their day-to-day activities or environment, which they feel is important to them. In our study, a psychological approach was used as the respondents reported the usage of the online sports diary use and not their day-to-day life events in general.



Picture 2: Screenshot of the Main Web Page of Suunto Movescount



Picture 3: Screenshot of an Individual User of Suunto Movescount Sports Diary

Study 2 lasted 3 months. During those 3 months, there were two 2-week periods when a short online diary was filled in: Diary 1 was in the beginning of the study and Diary 2 at the end of the 3-month period. The link to the online study was sent by e-mail to 17 Movescount users who had volunteered to participate in the study by replying to an invitation survey. 4 dropped out during Diary 1, and one was removed from the results. 2 more participants dropped out during Diary 2. In the end, there were 10 participants left in the study: 1 Belge, 3 Dutch, 1 Suisse, 3 Germans and 2 Americans. All participants were active runners (or triathlons) doing also other sports like cycling, mountain biking, weight training and alpine skiing. Most of the participants exercised 5 or more times a week. They were also users, who had access to Internet and good knowledge of using Internet. They could also read and write in English. The language of the service was English and that is why the survey was also implemented in English and participants were answering in English. The results of UX evaluation of the Movescount service in Study 2 with a diary study were analysed by content analysis by two researchers.

3.7.3 Case Study 3: The Effect of Language in Answering Qualitative Questions in UX Evaluation with Online Surveys

Case Study 3 included two different online UX evaluations of two different products. Our industrial partner in Case Study 3 was a Finnish company Suunto. As mentioned earlier, Suunto products have a global customer base, and therefore Suunto was interested to understand, how online surveys could be designed and used efficiently in collecting cross-cultural UX feedback and the effect of language in eliciting qualitative feedback. The research questions regarding this dissertation in Case Study 3 were 1, 2a and 3 (See Table 2). Case Study 3 is documented and the results reported in a conference article P4. In the following we will shortly describe the methods used in the two studies executed in Case Study 3. We will first present Study 1 and then Study 2.

In Study 1 of Case Study 3 we evaluated the UX of a premium sports watch Suunto Elementum Terra (See picture 4) equipped with an altimeter, barometer and 3D compass. The product was in a maintenance phase of product development process when we executed the online UX survey. The user interface of the product was only in English whereas the user guides were localised.



Picture 4: Product Models of the Suunto Elementum Terra

A total of 149 native Italian speakers and native English speakers were invited to answer the survey in Study 1. The respondents were Suunto Terra owners who had bought the product and volunteered to become product testers when registering at the Suunto web page (www.suunto.com). As an incentive to participate, the participants were included in a raffle of three Suunto outdoor devices (RRP 549 € each).

To study the effect of language, the Italian respondents were divided into two groups: the native Italian group, who received the survey in the Italian language and the native Italian group, who received the survey in English. The response rate in total within all respondents, all Italians and Native English speakers, was 48 % (N=72). For the Italian respondents, the response rate was 52 % overall. For this group the response rate was 64% if answering in Italian, which was significantly higher than if answering in English, which only had a response rate of 38% (chi square = 6.76, df = 1, $p < 0.01$). For the native English respondents the response rate was 43 %, which was significantly lower than the response rate of the Italians answering in their native language (chi-square = 4.45, df = 1, $p < 0.05$).

With the native English-speaking respondents it is important to note that there was an unexpected two-hour maintenance break in the online survey tool immediately after the first invitations were sent which prevented the English-speaking respondents from answering immediately after receiving the invitation. This might have had an effect to the response rate for this group as in both of the other groups; most responses were received on the first day after the invitation, whereas for the native English-speaking group most of the responses were received after a reminder.

The online survey Study 1 was implemented in Webropol-online survey tool (<http://www.webropol.com/>). It consisted of background questions, statements and sentence completion tasks about UX dimensions: Functionality, features and usability; Look and feel; Identification; and Overall judgment. In addition, respondents were able to give open-ended feedback after each UX dimension section. Furthermore, for the Italian respondents answering in English, an additional section of questions about answering in English was added at the end of the survey. The survey was developed in English and translated into Italian for the Italian-language group by a translation bureau. The answers received in Italian were translated into English and were then analysed in English (See Figure 5).

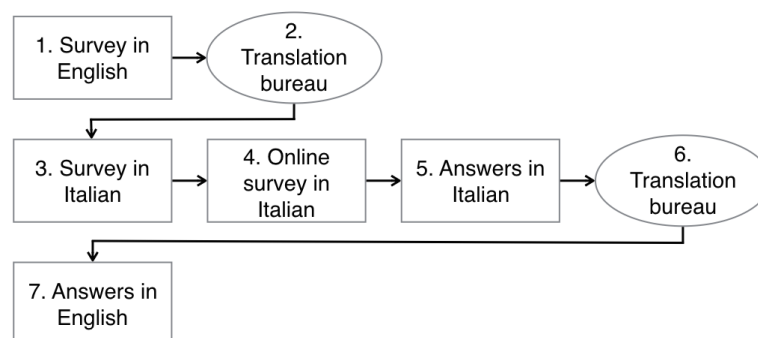


Figure 5: Translation Process of the Italian UX Survey

In Study 1 we used an affinity diagram method in the analysis of qualitative data (Holtzblatt et al., 2005). The analysis was done by two researchers. The response rates were calculated for each sentence completion task. The survey included 13 sentence completion tasks of which a total of 69% of tasks were completed (75% Italians answering in Italian, 51% Italians of answering in English and 81% English answering in English). The quality of the open-ended answers was analysed between the native English-speakers' group and the Italians answering in English-language group. The quality of the content of answers for the sentence completion tasks and open-ended feedback were evaluated by the researchers by analysing what kind of feedback was given: how it was written, what kind of words were

used, how descriptive and understandable it was, how much it related to the product etc. The length of the answers (the number of words for each answer) was also calculated.

In Study 2 of Case Study 3 the aim was to collect feedback on long-term user experience by six repeated online surveys during six months of sports watch use (the Suunto Ambit see Picture 5) while at the same time investigating the effect of language in answering the qualitative questions in the survey. The product was in a maintenance phase in product development process.



Picture 5: Product Models of Suunto Ambit Sports Watch

In Study 2 the survey was in English for all respondents, and therefore we aimed at getting a user sample consisting approximately half native English speakers and half non-native English speakers (to allow comparison in their answering regarding style and quality of answers). Questions about respondents' language skills and language education were included in the first and the last survey. The respondents for Study 2 were selected among the customers who responded positively to an e-mail invitation to take part in the study by answering a short survey with basic demographic, product purchase and usage questions. The invitation was sent to 521 registered owners of the product of whom 190 (36%) expressed an interest to take part. 121 were chosen to take part based on three criteria: 1. Short usage time of the product; 2. Nationality; and 3. First come, first served: if there were too many respondents for certain groups, the order of the enrolment mattered. During the study, 13 respondents dropped out and a further four were excluded from the analysis due to missing data. The final response rate was thus 20% (104 registered owners of the product). As an incentive to take part, we raffled among the respondents five products of Suunto worth up to 269 USD if they completed each of the six surveys.

3.7.4 Case Study 4: Internationalisation of Visual Material in a Cross-Cultural Online Storyboard Survey

In Case Study 4 we researched a remote online survey with storyboards. Our aim was to understand how storyboards fit into cross-cultural online survey and also, how to internationalise visual material in them. Case study 4 was conducted with our industrial partner Nokia. The research questions regarding this dissertation in Case Study 4 were 1, 2b and 3 (See Table 2). Case Study 4 is documented and the

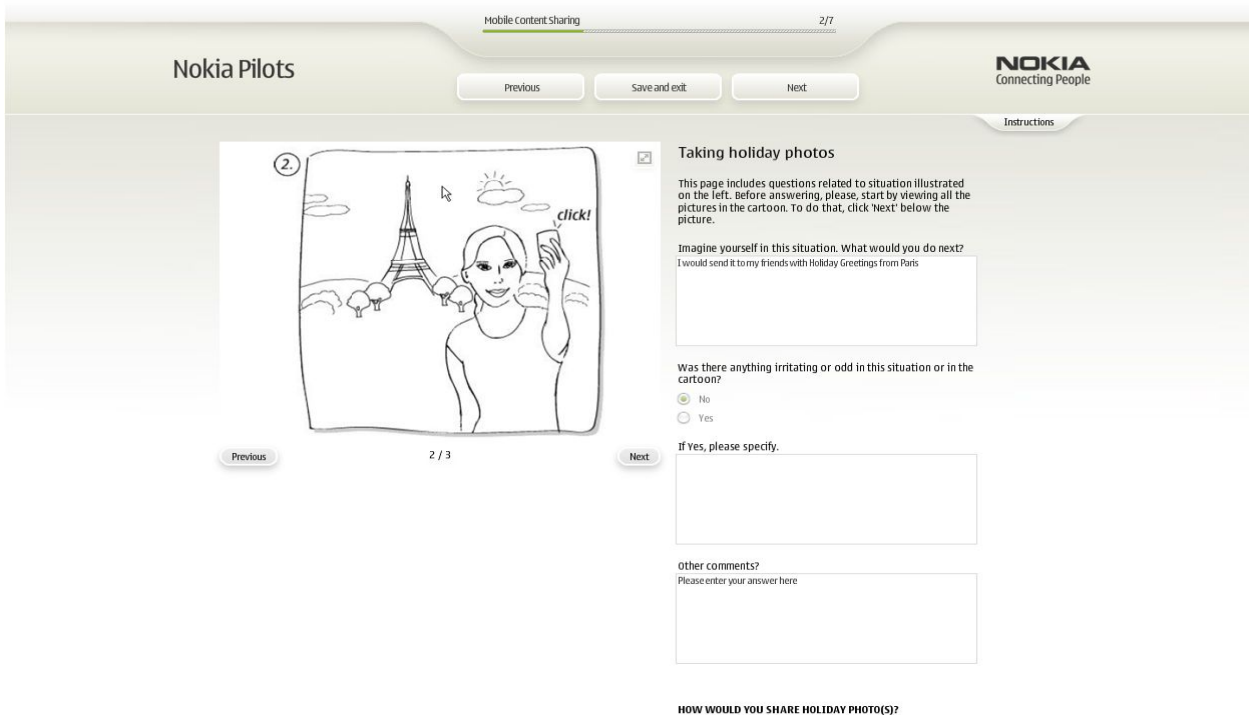
results are reported in a conference article P5. In the following we will shortly describe the methods used in Case Study 4.

Case Study 4 was conducted with our industrial partner Nokia, whose interest was to develop remote and low-cost user experience research methods with short lead-time, enabling cross-cultural UX feedback collection in an early requirement gathering phase in product development process. Case Study 4 involved developing an internationalised remote online storyboard survey charting user needs, motivations and current practices related to sharing of experiences with mobile handsets – via textual stories, different types of media objects and associated information. The aim of employing storyboards was to prime respondents to think about different media objects and usage contexts in which they might share content with their mobile handsets. This was hypothesised to support the respondents in answering questions about mobile content sharing. In order to ensure cost efficiency and short lead time, only one version of the visual stimulus – the internationalised storyboards – was created and English was used as the survey language in all the target countries: USA, Brazil, Finland, India and Italy.

The challenge of using the storyboarding method with cross-cultural respondents is to understand how the images are perceived in different cultural contexts. Our industrial partner needed one single survey version instead of many localised versions to cover all market areas in the study. To address culturally sensitive issues in the visual material, we were internationalising the storyboards. As defined earlier, internationalisation of visual material means finding elements that are familiar to users from all target cultures and avoiding culturally sensitive elements in the material (Aykin et al., 2005; Horton, 2005). We used Horton's approach in internationalisation of visual materials by a studying of target cultures, using images representing globally common experiences, generalising images and eliminating culture-specific symbols. The storyboard survey was tested with 13 under and postgraduate students representing six nationalities: 5 Indians, 4 Spanish, 1 American, 1 British, 1 Finn and 1 Russian. A short preliminary survey via email was executed to ensure that all respondents had experience of using mobile phones. During the storyboard design process, the target countries changed so that Spain and Russian were left out and instead Italy was added.

The online storyboard survey (See Picture 6) consisted of the following parts: background questions, four storyboards presented with two sets of questions: first set was designed to collect feedback about the storyboarding methodology and the second set was designed to collect feedback to inform mobile content sharing concept development and finally, summary questions at the end of the survey. The

survey was open approximately three weeks and aimed to collect minimum of 30 respondents per each of the five countries (minimum altogether 150 respondents).



Picture 6: Screenshot of the Storyboard Survey about the Sharing Information via SNS with a Smartphone in Nokia's Online UX Survey Tool

252 users from 5 countries responded to the online survey: 70 Indians, 66 Finns, 43 Brazilians, 41 Italians and 32 Americans. 93% of the respondents were male and 7 % female. The amount of respondents by age was: 15-20: 5%, 20-30: 43%, 30-40: 38%, 40-50: 12%, 50-65: 4%. Respondents were recruited from an online consumer panel maintained by Nokia. This panel consisted of pre-screened, English speaking people from across target locales and target consumer segments. Even though involving only English speaking respondents in cross-cultural research might bias the results to some extent, utilising an online user database has several benefits. The significant decrease in time required for research and reduced cost when employing non-localised stimulus material and surveys enable agile cross-cultural user involvement in fast-paced product development environment. For the purpose of studying the current behavioural patterns related to sharing media content from mobile devices, Smartphone users with active experience on using at least one social networking service and media sharing on their Smartphones were selected from the panel.

The resulting qualitative data underwent content analysis (Holzblatt et al., 2005) by categorisation of the answers into thematic groups. Categorisation was carried out by two researchers, both working independently first on all the data and then comparing, discussing and combining the results. Also, the analysis of the results was performed by the same two researchers after which the results were shared and discussed with Nokia's UX design team.

3.7.5 Case Study 5: Designing Mobile Technologies for Different Cultures: Issues of Assessing User Experience with Visual Materials in Online Surveys

In Case Study 5 our main objective was to study the use of visual materials in cross-cultural online UX surveys. In Case Study 5 we were interested to gain an understanding of how to localise visual materials for storyboards (including both photos and sketches) in an online survey. To do this we created a survey to collect information about user needs from respondents in Nigeria and Anglo-Celtic cultures, on sharing experiences using Smartphones. There were altogether 92 respondents from 5 countries: Nigeria, UK, Australia, Canada and Ireland. The survey language was English. The supporting research questions regarding this dissertation study were 1, 2b and 3 (See Table 1). The results and details of the study are reported in a conference paper P6. In the following we will briefly describe the methods used in Case Study 5.

In Case Study 5 92 people who responded to an online survey met the inclusion criteria and produced enough data for analysis. 50 were Nigerian and 42 were British or from other Anglo-Celtic countries (Australia, Canada, and Ireland).

A four way mixed design was used. The three between-respondents independent variables were the type of material (Photos or Storyboards), the Culture depicted in the Material (Nigerian or AC) and the Culture of the respondents (Nigerian or AC). The one within-respondent independent variable was the three different scenarios of use presented. The dependent variables were the Likert scale ratings and responses to open-ended questions given about each scenario. In addition there were questions, which asked respondents to reflect on all three scenarios.

Three scenarios were created, with both photo and storyboard versions, starting from the internationalised storyboards developed by Walsh et al. (2011). The first task was to critique these materials from a Nigerian perspective. A critique group of 7 Nigerians were recruited, comprising 4 women and 3 men, mean age 31.3 years (SD = 12.2, range 20 – 51 years). Each member of this group had at least one mobile phone and used at least one social networking site regularly.

Members were given the four Walsh et al. (2011) storyboards and asked to work through them and note all the things that would seem out of place in a Nigerian setting, those things that would make it difficult for them to identify with the characters depicted in the storyboards and the activities being shown. This critique was done in participants' own time and then all the results were collected and cross-tabulated. The group produced 16 points on which the storyboards would not be appropriate for a Nigerian context. The original internationalised storyboards by Walsh et al. (2011) were designed to fit into USA, Brazil, Finland, India and Italy and therefore critique from Nigerian participants were expected. The critique ranged from the fact that there were not enough people on the bus (scenario 2 in Walsh et al., 2011) (a bus in Nigeria would likely be very crowded and it would be impossible to browse the Internet while on a bus journey) to the fact that a Nigerian man would not sit with his legs crossed in the manner depicted in scenario 4, this would be considered inappropriately effeminate.

Using these critiques as a basis, three of the Walsh et al. scenarios (2011) were localised for the Nigerian culture, each with a photo and a storyboard version. For example, scenario 1 from Walsh et al. (2011) was about taking a photo on holiday, the main sketch showing a woman taking a photo of herself in front of the Eiffel Tower. The critique revealed that Paris is not a popular holiday destination with Nigerians, so the scene was changed to Dubai (with the Burj Al Arab in the background). In addition, the critique revealed that Nigerians would be unlikely to take a photo of themselves, "selfies", so the scenario was changed to a woman posing for a photo being taken by someone else. The four images used for this scenario in the current study are shown in Picture 7.



Picture 7: Photos and Sketch Storyboards for "Taking a Holiday Photo"- Scenario.

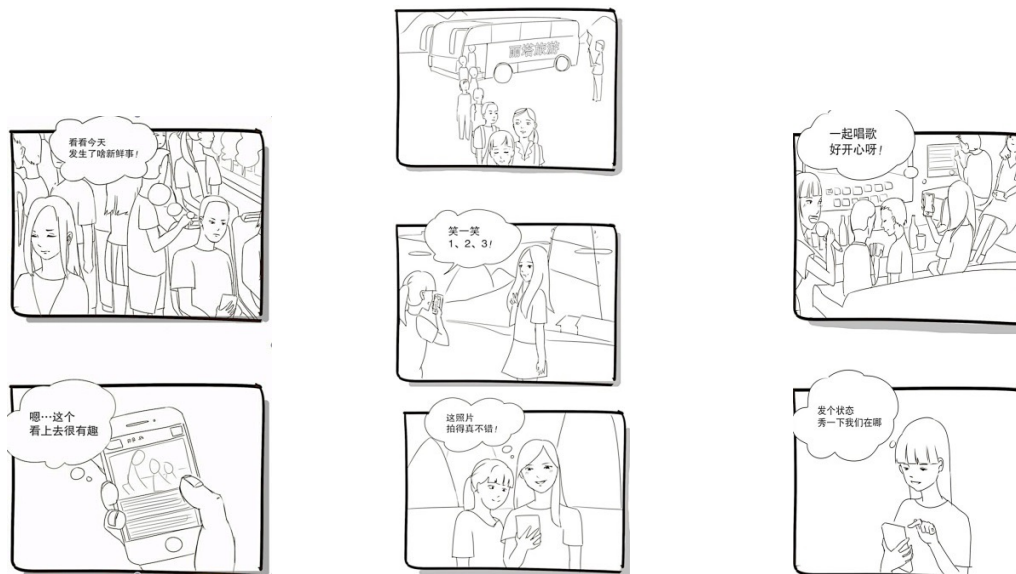
The other two scenarios were checking and sharing information on the internet while travelling (on a bus or in a car) and having a casual social get together with friends and sending photos to other friends. The survey was created in the Survey Monkey online survey software. The survey presented the three scenarios, each with a short textual introduction. All respondents were entered into a prize draw for one of four prizes of gadgets worth £15 (approximately USD 24, 18 euros).

3.7.6 Case Study 6: Localisation of Storyboards for Cross-Cultural User Studies

In Case Study 6 we continued to study how to localise visual material in an online UX survey with storyboards. The research questions regarding this dissertation in Case Study 6 were 1, 2b and 3 (See Table 2). Case Study 6 is documented and the results reported in a conference article P7. In the following we will briefly present the methods used in Case Study 6.

Our aim was to present a process for localising storyboards in an online UX survey for use in cross-cultural user studies, be they for user requirements or evaluation work and to show that this process is both relatively easy and effective. We tested this process by taking a set of storyboards that had been created for Case Study 4 (Walsh et al., 2011) and created localised versions for Chinese respondents based on them. Our aim was firstly to develop and evaluate a process for localising storyboards using focus groups of users from the target culture. Secondly, we studied how the localised storyboards illustrating use scenarios were interpreted and perceived by Chinese respondents in an online survey, where the localised storyboards were implemented.

The purpose of the survey was to gather feedback on user needs and requirements related to sharing via mobile devices. The localisation process consisted of taking the internationalised storyboards and discussing them with focus groups of Chinese users. The storyboards consisted of three scenarios: 1) sharing web links on the go (from the bus), 2) sharing photos when on holiday, and 3) sharing information about leisure activities (See Picture 8).



Picture 8: Three Localised Chinese Storyboards

Focus group 1 was conducted with participants in China using a Chinese online talk application, WeChat. 5 people participated, their ages ranged from 18 to 30 years old, with a mean age of 23, four women and one man.

Participants were given the internationalised storyboards and they were asked them critique them from a Chinese perspective. The focus group was conducted in Chinese in order to allow the Chinese-speaking participants to understand clearly and communicate comfortably in their native language. The three sets of storyboards were introduced one by one. Participants were asked to discuss the following questions: *Was there anything irritating or odd in this situation or in these pictures? What would be more appropriate? What do you think these pictures should be if they were in a typical Chinese context? Are there any recommendations or comments to change these pictures?* After going through all the three storyboard set, participants' answers and comments were summarised back to them so they could confirm them. The focus group lasted for approximately one hour.

Focus group 2 was conducted face-to-face with Chinese participants who were studying in the UK. 6 people participated, their ages ranged from 18 to 30 years old, with a mean age of 23, four women and two men. They were all Chinese students at X who had not lived in the UK for more than a year. All of the participants had at least one mobile phone and tablet device such as iPad. They all had a laptop or a computer. They used their mobile phone every day and some of them say they were even addicted to some smartphone Apps. Participants discussed the same three sets of storyboards as focus group 1. The

procedure for this focus group was conducted exactly the same as that used for focus group 1 and it also lasted about one hour.

The online survey was written in English and then translated from English to Chinese by a native speaker of Chinese. To check the accuracy of the translation, the survey was translated back into English by a second native Chinese speaker and the two versions compared and the text adjusted as needed. By utilizing an online survey, the data from geographically dispersed respondents concerning sharing different kinds of media such as web links, photos that using mobile devices could be collected. The localized Chinese storyboards were designed according to the results of the focus groups (See Picture 8).

Respondents for the online survey were recruited via the personal networks of the Chinese researcher and Chinese students at University of York. 41 Chinese respondents took part in the study and produced sufficient data for analysis and 33 respondents completely finished the survey. Respondents who completed the survey were entered into a draw for 5 Amazon gift vouchers worth 100 Yuan (approximately £10, USD16). The online survey was written in English and then translated into Chinese by a native speaker. To check the accuracy of the translation, the survey was translated back into English by a second native Chinese speaker and the two versions compared and adjusted as needed.

3.8 Summary

In chapter 4 we presented our research setting. Our research consists of literature reviews and six cross-cultural online UX survey case studies in which altogether 1369 responded. Respondents were from 27 different countries. In our case studies we aimed at answering RQ1, RQ2, RQ2a, SQ2b and RQ3 (See Table 2). To analyse the data we used descriptive statistical methods for the quantitative data and content analysis for the qualitative data. Cultural theories (e.g. Hofstede, 2001, 2005) were used in the analysis of the collected data.

4. Results

Table 2 presents how the research questions and publications related to the six case studies of this research.

Case Study	RQ1: How can an online survey fit into cross-cultural user experience (UX) study in collecting qualitative data?	RQ2: What are the central issues of online surveys in collecting qualitative user experience (UX) feedback from cross-cultural user groups?	RQ2a: What kind of cross-cultural issues need to be considered when using textual material in the online user experience (UX) survey?	RQ2b: What kind of cross-cultural issues need to be considered when using visual material in the online user experience (UX) survey?	RQ3: What are the cross-cultural implications to be taken into account in an online user experience (UX) survey process?	Publication
1	x	x	x		x	P1 and P2
2	x	x	x		x	P3
3	x	x	x		x	P4
4	x	x		x	x	P5
5	x	x		x	x	P6
6	x	x		x	x	P7

Table 2: Case Studies, Research Questions Related to Them and Publications.

In our Case Studies 1, 2 and 3 we designed online UX surveys which included sentence completion tasks and diary to collect qualitative cross-cultural UX feedback. These methods bring written feedback from participants and therefore the research was focused around cross-cultural issues in textual material in online UX surveys. In Case Studies 4, 5 and 6 we designed online UX surveys which included visual material in storyboards. Therefore the research was focused around cross-cultural issues in visual materials in online UX surveys. We will first present the results from each of the case study, and then finally summarise our findings regarding the research questions.

4.1 Case Study 1

In P1 and P2 we report the detailed results of Case Study 1. The results of Case Study 1 were to give answers to RQ1, RQ2a and RQ3 (See Table 2). In Case Study 1 we collected a vast amount of cross-cultural, qualitative feedback with a sentence completion method in an online survey of Smartphone UX in late testing phase in a product development process. The respondents completed 1234 sentences

(90.9%), forming 171 answer categories of the resulting answer categories. According to our industrial partner Nokia, during previous product evaluations similar kinds of user groups had not been keen on giving answers to open questions bringing qualitative feedback on UX. Therefore, Nokia was surprised how sentence completion tasks were successful in eliciting such a large amount of free-text answers bringing cross-cultural, qualitative feedback for the design team. The large number of completed answers indicates that an online UX survey with sentence completion method inspired respondents to communicate their product experiences as reported feedback and as a result we were able to get information about respondents' personal feelings and thoughts from different UX dimensions. This feedback helped designers to understand and explain the reasons what areas of product UX were important, both in negative and positive sense, and why this was the case.

We found that an online UX survey with sentence completion method was easy to implement after the sentence completion tasks had been designed and tested. The online sentence completion survey was relatively fast way of gaining knowledge of diverse users of the overall product UX and its strength lies in the rich qualitative data. We found that online feedback is convenient and practical because there is no guessing in individual handwriting and answers can be managed with computer programs. All these aspects would indicate that online UX survey with sentence completion method fits well in cross-cultural UX studies. However, the challenge with sentence completion method is how to quickly analyse, categorise and report the results in late phase of product development. We found also that analysing sentence completion answers may require some interpretation, especially with ambiguous or incomplete English in the answers.

We found that respondents from different countries experienced the product differently depending of their cultural background. For example, Chinese respondents liked the style and size of the evaluated Smartphone a lot. Indians and Americans felt proud and privileged using the product and they also liked the looks of the product. Indians regarded the product high quality, valuable and consistently comparing it to other product and regarding the tested device being "better". The Americans wanted more consistent and inspiring UI with fewer steps to do things and better touch usability (single/double click, scrolling). British respondents also answered in a varied positive way about the look and feel of the product "sleek and elegant". Danish respondents also liked the device and despite the varied negative answers they also gave strong positive answers especially when talking about their everyday needs and that "it felt good in hand". Danish and American respondents' answers were related to the usefulness of it and how they are able to use it in their everyday life and communicating and keeping in touch.

Apart from cultural differences related to the UX of the product, we also found that there were cultural differences in how respondents reacted to the actual remote online UX survey method, especially in the answering style. We found Hofstede's cultural dimensions (2001, 2005) helpful in analysing the results.

Respondents from all countries gave UX feedback reasonably equal amount. However, there was a clear difference in the way respondents from different countries were giving negative or positive answers. For example, the results showed that Indian respondents were the most cautious in giving any negative feedback and a reasonable amount of Indian respondents even avoided answering at all with a sentence that was leading towards negative answers. Chinese respondents seemed also careful about giving negative feedback. Both China and India have a high Power Distance Index (PDI) (Hofstede, 2001, 2005), which indicates that society expects respect for authority and could therefore be seen also in avoidance of giving negative feedback. China also has a low Individualism vs. Collectivism Index (IDV) (Hofstede, 2001, 2005), which indicates that confrontations need to be avoided. Danish respondents, on the contrary, gave varied negative answers with every sentence completion task. Denmark has a low Uncertainty Avoidance Index (UAI) (Hofstede, 2001, 2005) which means that the society accepts more change and risks and therefore could make Danish respondents more prone to freely express both positive and negative feelings. Denmark has also low-PDI 18, which indicates that society prefers equality and accepts criticism from all. This could also explain why Danes were able to best of all nationalities in this study to express their whole scale of emotions. Also USA and UK have a fairly low-PDI, which could explain also their ability to express both negative and positive feelings and ideas. Americans gave varied negative feedback, but also very positive answers. British respondents gave both negative and positive answers, but their answers were more subtle and scattered into many different answer categories more so than American respondents' answers. British, American and Danish respondents were able to express feelings of frustration and stress.

Respondents in India and even stronger in China would not talk directly about oneself, but tell about others around them. By doing so, they would reflect the self through other people. American, British and Danish respondents' answers were related to identification of the product to everyday use describing it being part of their everyday life and clearly identifying it with their own everyday usage. The Individualism Index could explain why Chinese would not talk directly about themselves. The Individualism vs. Collectivism Index (IDV) for Chinese is low 20 and then on the contrary, Americans,

British and Danish users would highlight themselves as respondents in their answers as their IDV scores are high.

The results indicate that some cultures are more expressive in communicating their emotions in a UX study than others. It could be explained partly by cultural differences in the way respondents are expressing emotions, but also, in this study, partly because respondents may not have been able to express their feelings in English language as they would do in their own language. Our respondents were all part of the same international company and in spite that they were fluent in “English for business”, they might not have been fluent enough to express their feelings in other than their own native language. This type of survey, where respondents need to write answers with their own words and not to just select readymade answers language plays a significant role: Native English speakers’ from UK and USA quite naturally had much stronger rhetoric and much more varied language in their answers than non-native speakers. They were able to express themselves clearly the best in English as it would be their native language. The cultural background of respondents as well as their ability to express their feelings in a foreign language needs to be taken into account when analysing and reporting the results of a qualitative, emotionally laden data.

4.2 Case Study 2

In P3 we report the detailed results of Case Study 2. The results of Case Study 2 were to give answers to RQ1, RQ2a and RQ3 (See Table 2). Case Study 2 consisted of two different cross-cultural UX studies with online surveys. In Study 1 we used sentence completion method and in Study 2 we used diary method to collect qualitative feedback with an online UX survey. In Case Study 2 similarly to Case Study 1, we found that online UX surveys were fast to implement, they didn’t require much resources and they were very suitable for cross-cultural user samples that have access to Internet and knowledge to use it. We found that large cross-cultural user samples can be reached. Also, the analysis is faster as the data is accessible in electronic format. These advantages make online surveys attractive for cross-cultural UX research.

As the aim of our research was to find out how an online survey fit into cross-cultural UX study, especially in collecting qualitative data, we needed to look at the whole process trying to find key issues affecting the cross-cultural online UX study. As mentioned earlier, Fan and Yan (2010) have developed a conceptual model of online survey process. It is not specific for the cross-cultural online UX surveys process, but nevertheless, it was a good framework to use in our study. According to their model there are four main stages in online survey process: 1) Survey Development, 2) Survey Delivery, 3) Survey

Completion and 4) Survey Return. We used their model to help us to analyse the online UX survey process in both cases. We added also three more phases in the analysis: Understanding Requirements for Online UX Survey phase in the very beginning, Analysis and Feedback for Design in the end. We also combined the Survey Delivery, Survey Completion and Survey Return into UX data collection phase (See Figure 6).

During the two studies in Case Study 2 we recognised some phases and central issues in cross-cultural online UX survey process. In the first phase of our studies, before the actual survey development started, the research questions regarding the budget, schedule, UX dimension and target market areas were clarified. We called this Understanding Requirements for Online UX Survey phase. This is important so that any country/culture specific requirements can be addressed as early as possible. Issues such as localisation of the texts and other material e.g. symbols or pictures in the survey or choosing a survey-tool that supports the target respondents' languages so that the survey can be implemented and respondents can write their answers.

The respondents in our Case Study 2 were all from Western countries with access to Internet and knowledge of using computers. In Study 1 with online gaming site the online UX survey was localised. In Study 2 with online sports diary, the survey was not localised and respondents were expected to answer in English and not in their own language. We recognised that it is good to reserve time and resources for localisation of texts and other material e.g. pictures. It is also important to choose a survey-tool that supports the target respondents' languages so that the localised survey can be implemented.

The second phase in the process was the Survey development (Fan and Yan, 2010) in which it was important to know what kind of data is wanted (qualitative and/or quantitative), what methods should be used to elicit the feedback and should any cultural issues be taken into account in choosing the method. Similarly to Case Study 1, in Case Study 2 we wanted to gain qualitative data and therefore we chose sentence completion tasks and diary methods. As UX research is concentrating on experiential aspects of use, both diary and sentence completion methods were suitable for our purposes as they give respondents the freedom to express them with their own words. Sentence completion tasks and diary were both easy and quick to implement into our online survey tool and the answers were clear and practical to analyse when written in electronic format if compared to traditional paper and pen. Sentence completion tasks elicited lot of data from respondents and it was found successful method in gaining UX feedback.

The third phase in the online UX survey process was the Data collection phase including Survey delivery, Survey completion and Survey return (Fan and Yan, 2010). We reached our respondents from the existing customer databases and therefore we did not need local help in recruiting the respondents. Direct access to respondents allowed a fast delivery of the survey to respondents in both studies. If there would not had been any customer database available, it would have been good to reserve time in the schedule for recruiting respondents. Both sentence completion and diary methods were easy to implement into the online survey and the results in electronic format were ready for the analysis immediately after they had arrived in Study 2 and in Study 1 after the answers had been translated.

One of the findings we had in our Case Study 2 concentrated on the response rates. Although the potential sample size in study 1 was big (11 238), the actual response rate was low being only 6%: 632 people responded the survey and 120 were selected to be analysed. The reasons for non-response in study 1 may be diverse: We do not know if the non-response was due for instance to getting the invitation too late to respond, benign neglect (i.e. failure to follow through the intentions to respond), intentional noncompliance (dropping out in the middle of the survey) or non-sufficiently attractive prizes that were not motivating enough. In Study 1, we were not able to reliably record the dropout rates while answering the surveys due to the lack of that kind of feature in the survey platform used. However, that would have given extra insight to the survey itself, perhaps revealing too difficult questions, too long answering time or the like. The less specialised populations and more abstract survey topic may at least partly explain the low response rate in the Study 1.

In Study 2, 38% of the volunteered respondents dropped out of the study. It was known already in the beginning that diary-studies require more long-term commitment from respondents than a one-off survey. Therefore, respondents in diary-studies are in a risk of dropping out of the study and they would need to be motivated to continue until the end. The answer rate was better than in Study 1, which could be explained by more specialised user group and good prizes: 3 respondents were raffled to win a brand new Suunto heart rate monitor (value 169euros).

The fourth phase in the cross-cultural online UX survey process was the Analysis phase. In Study 1 we needed to translate the answers and reserve time for it. The possibility for respondents to write the answers by computer helps in the analysis of the data as there is no guessing on handwriting and no need for extra data transfers manually from paper to electronic format. This is useful especially when dealing with foreign languages and the translation process as well as categorisation of qualitative data. We found in the Study 1 Hofstede's cultural dimensions (2001, 2005) helpful in analysing the results. The results

from Study 1 helped designers to address the online gaming site localisation, to recognise areas that were culturally sensitive and to design culture specific web site concepts.

The fifth in the cross-cultural online UX survey process was Feedback for design. In Study 1 the results of the survey were reported directly to the UX design team at Paf.com in a workshop. It helped designers to understand the needs of the monetary gaming site localisation needs for Spanish and Swedish users. The results and the workshop enabled designers and researchers to analyse the results together in the design context, make guidelines together and designers to address culturally sensitive areas leading to more culture specific web page concepts. The results of study 2 were also reported directly to Suunto UX team.

4.3 Case Study 3

In P4 we report the results of Case Study 3. The results were to give answers to research questions 1, 2a and 3 (See Table 2). With these questions we aimed to understand how an online UX survey as a method fits into cross-cultural UX study in collecting qualitative feedback. Furthermore, we aimed to understand what kind of cross-cultural issues need to be considered when using textual material in the UX survey. And, finally to gain knowledge of cross-cultural implications that would need to be taken into account in an online UX survey process. In Case Study 3 we investigated how the language of an online survey effects answering by respondents and furthermore to gain information about the importance of survey localisation in UX evaluation. We collected data on the language effect on UX evaluation in two studies concentrating in especially in sentence completion tasks.

We found that language of the survey had an effect on response rate. The Italian respondents, who had to answer the survey in English, had 26% lower answer rate in the survey than the Italian group, who answered in Italian. Italians answering in English did not consider it hard, but it is possible that those who felt more confident in answering in English responded in the first place and those who did not, just did not answer at all. That could also explain the lower response rates among Italians answering in English-group.

When planning an online UX survey only in English with cross-cultural user sample it is good to be prepared for lower response rates and therefore send the invitation to a larger sample reserving more time for recruiting respondents to the study. In our study the respondents who were invited to answer had all volunteered for the study and they were well educated with English language skills, but still, not all of them answered. Our studies would indicate that translating the survey into respondents' native language might increase the response rate, especially if the sample needs to include more varied

respondents. However, if translation is not possible, our results show that statements with fixed-responses are easier for non-natives to answer in comparison to writing answers to open-ended questions, but as mentioned previously, in UX evaluations, qualitative data is also needed to assess the different experiential aspects.

The majority of respondents in both studies answered that they did not have difficulties in answering the survey in English. In Study 2 most of the respondents had been studying English at school for over 5 years. Some of them were using English daily at work or had been studying their degrees in English. The respondents did, however, point out that they could express themselves better if the survey was in their own language: It would be easier to give more details and examples of experiences. Some respondents reported to have used a dictionary or online translators to help completing in the survey. They also commented that it would be quicker to write answers in their own native language without having to look up words and spelling from the dictionaries.

We compared the length of the answers in open-ended questions and sentence completion tasks between answering in native language (the native English group in Study 1) and answering in foreign language (the Italians answering in English in Study 1). We found that the answers given in the native language were longer: 75% longer in open-ended questions and 13% in sentence completion. We also found in Study 1 that the answers were more descriptive and richer in describing the UX when using native language. Thus, if more descriptive qualitative data is needed from participants, our studies indicate that respondents are able to answer with richer language in their own native language.

4.4 Case Study 4

In P5 we report the results of Case Study 4. Case Study 4 aims to answer to research questions 1, 2b and 3. With these questions we aimed to understand how an online survey as a method fits into cross-cultural UX study in collecting qualitative feedback. Furthermore, we aimed to understand what kind of cross-cultural issues need to be considered when using visual material in the UX survey. And, finally to gain knowledge of cross-cultural implications that would need to be taken into account in an online UX survey process.

In Case Study 4 we developed an internationalised online UX survey with storyboards that could be used to collect user feedback on concept ideas from five different target market areas: Brazil, Finland, India, USA and Italy. The online survey was aimed to collect information about user needs and requirements related to sharing experiences, via different types of content, from mobile handsets.

Storyboards were chosen as a tool because visual presentation of ideas helps respondents to identify themselves with the use situation, and enhance imagination.

In designing the visual material for the survey, we needed to investigate what kind of situations and details would be understandable for all target areas. Planning of universal settings for the situations in the storyboards was challenging, as was finding the right kind of visual images with the right level of detail to suit all five different cultures. We found Horton's (2005) instructions for internationalising user interface graphics very useful. The survey questions about the storyboards and mobile content sharing were developed simultaneously with the storyboards, because they needed to support each other. The survey development was iterative: To ensure that the designed storyboard survey was well internationalised and the questions would match with the storyboards before launching it to a larger user group, we needed respondents' input and the survey was tested in a pilot study.

In the survey the first question asked about each of the storyboard was: *“Imagine yourself in this situation. What would you do next? (Free text)”*. The purpose of the question was to collect spontaneous reactions to the illustrated situation to determine whether the respondents associated the storyboard with mobile content sharing domain and, consequently, whether the priming to the sharing questions was successful. Moreover, the question enabled exploring sharing needs and requirements, which may not have been discovered if the predetermined questions with multiple choice answer options were used as the sole data collection method. The results show that in all scenarios, the majority of respondents were able to imagine the situation and offer a reasonable continuation related to that situation.

We found that the online survey with storyboards enhanced respondents' understanding of difficult concept ideas and facilitated them to imagine themselves in different use situations. An online storyboard survey proved to be useful in eliciting UX feedback even though, respondents had never seen the intended product, and yet, were able to give feedback and ideas for design in early phase of product development. A third of the respondents found it easier to answer the questions with the storyboards and more than half the respondents gave general positive feedback on storyboards. With this online storyboard survey we were able to gain insights into how people currently share photos and other media and how that could work in the future.

According to our results, the storyboards were understood mostly in a very similar way with respondents with different cultural backgrounds. Respondents seemed to pay attention to very small details concerning the device and the context was expected to be realistic although the simple and “rough” drawing style was accepted in general. The pictures got more positive feedback than negative

and a third of respondents spontaneously stated that they helped them to imagine the situation and answer the questions about mobile content sharing patterns. Furthermore, the pictures were considered nice and comfortable in a long survey.

4.5 Case Study 5

In P6 we report the results of Case Study 5. The results aim to answer research questions 1, 2b and 3 (see Table 2). With these questions we aimed to understand how an online survey as a method fits into cross-cultural UX study in collecting qualitative feedback. Furthermore, we aimed to understand what kind of cross-cultural issues need to be considered when using visual material in the UX survey. And, finally to gain knowledge of cross-cultural implications that would need to be taken into account in an online UX survey process. Our main aim in Case Study 5 was to study further the use of visual materials in cross-cultural online UX surveys. We were interested to gain an understanding of how to localise visual materials for storyboards (including both photos and sketches) in online UX surveys. To do this we created a survey to collect information about user needs from respondents in Nigeria and “Anglo-Celtic” (AC) cultures, on sharing experiences using smartphones.

Our research objective was to study how localised visual materials (storyboards and photos) were perceived and understood by respondents from two cultures in a remote online UX survey. We found that Nigerian respondents are more positive in their ratings than AC respondents, irrespective of content, and were less likely to be critical. The culture of the respondents and the culture in the visual materials of the scenarios does matter, but the way it matters is not straightforward, and there were complex interactions: By this we mean that we expected that our results would show a strong identification with one’s own cultural group, but this turns out to be only one aspect of a scenario that may affect respondents. Therefore care needs to be taken in localising visual materials and in interpreting the results from different cultural groups.

4.6 Case Study 6

In P7 we report the results of Case Study 6. Results aim to give answers to research questions 1, 2b and 3 (see Table 2). In Case Study 6 we found in the focus groups that there are two main issues in localising the storyboards: First you need to be able to localise the situation which means where it all happens and what is the cultural context for using the interactive system. For example, when discussing about where would Chinese people typically go on a holiday, they would not say Paris by the Eiffel Tower, which was depicted in the internationalised storyboard. Chinese people would be much more

likely to travel within China itself to big cities or natural scenic places to relax. Also in the third scenario about sharing information about leisure activities, focus group results showed that a typical place for Chinese to spend time with friends would be in a karaoke bar.

When the situation has been localised, the localisation of the drawing details can start. In our focus group discussions about the situation in the bus, it was very clear that the bus would be much more crowded in China and not as empty as in the internationalised version. Also, Chinese people prefer to sit in the window seat in case someone else gets on the bus: then it will be easy for them to take a seat without disturbing each other. Also, we found that Chinese people do not like to take selfies, because they feel embarrassed and shy about it. They would prefer to let other people take a photo of them.

Based on our online survey results, the storyboards were well understood and therefore we can argue that the localisation of the storyboards was successful: In the online survey we had three sets of storyboards and SNS questions. The results of the question *“Imagine yourself in this situation. What would you do next?”* gave us information about how well the respondents were able to imagine the use of the system concept in the particular situation depicted in the storyboards. We got valuable knowledge of how the respondents would use the mobile device in that situation. Answers also revealed if the situation and the system concept were unfamiliar to the respondents. The online survey was useful and fit for eliciting cross-cultural feedback.

The most useful questions in validating the storyboards were the questions asking, if the scenario could happen in one’s own country and if the pictures felt familiar to one’s own culture. However, these questions do not necessarily tell us if the scenario was understood in the way it was anticipated and, hence, it is also important to ask the respondent to describe what is happening in the storyboard. We achieved this by asking respondents to say what they would do next. Future research might investigate this more directly by asking the respondents to describe the scenario as they see it.

Cultural background affects how respondents tend to answer the questions and how freely they can express their opinions. When conducting cross-cultural UX research, we suggest encouraging the respondents to answer freely their own opinions, for example, by using instructions such as *“Please, feel free to write your opinion and remember that there are no wrong or right answers.”*

We had a direct question about the pictures and situations presented in the storyboards: *“Was there anything irritating or odd in this situation or in these pictures?”* This question gave us some information about respondents’ normal behaviour and habits related to situations in the storyboards such as that Chinese people are reserved, shy or embarrassed to take selfies publicly and especially men

would not take selfies and that the buses are always crowded and therefore it would be odd to have an empty bus in Chinese storyboards.

The focus groups gave us information of how to alter the internationalised storyboards to Chinese context especially choosing the situation. In the online UX survey those few comments given by respondents about the pictures were mostly about drawing details that did not hinder the understanding of the scenario. At the end of the survey 92% of respondents answered that they felt familiar with all three scenarios, and that they have the idea that people in the pictures can represent themselves.

We have presented the results from each of the case study, and will now summarise our findings regarding the research questions.

4.7 Fit of Online Surveys into Cross-Cultural UX Study in Collecting Qualitative Data

We found, in our six case studies that online surveys as an instrument and method fit well into cross-cultural UX research in collecting qualitative feedback for product development purposes. In our case studies, we were able to gather a significant amount of cross-cultural, qualitative UX feedback with online UX surveys with sentence completion method, diary method and storyboards. Based on our research, all three research methods were effective in eliciting user feedback and easily incorporated into a cross-cultural online UX surveys. Online UX surveys were fast to implement, they didn't require many resources, and they were very suitable for cross-cultural user samples that have access to the Internet and the knowledge to use it. We found that a large number of cross-cultural user samples could be reached. Also, the analysis of the feedback of the online survey results is faster than the analysis of paper survey results because the feedback is accessible in an electronic format. This is useful especially with the translation process and the categorisation and analysis of qualitative data. These advantages make online surveys attractive for cross-cultural UX research.

The use of storyboards allowed the collection of cross-cultural UX feedback even though respondents had never used or seen the intended product. Respondents were able to give feedback and ideas for design in the early phase of the product development process, in the Requirement gathering phase, related to the sharing of personal experiences with mobile handsets—via textual stories, different types of media objects and associated information (Case Study 4: P5, Case Study 5: P6, Case Study 6: P7) .

In our studies the online UX survey with sentence completion tasks quickly elicited rich qualitative UX feedback regarding the different dimensions of UX with cross-cultural respondents for product development purposes in the Testing and Maintenance phases of the Product Development Process (Case Study 1: P1, Case Study 2: P3 and Case Study 3: P4). The use of the sentence completion method

in an online UX survey is a relatively fast and easy way to collect a large amount of qualitative feedback. However, the challenge with the sentence completion method is how to quickly analyse, categorise and report the results.

4.8 Central Issues of Online Surveys in Collecting Qualitative UX Feedback from Cross-Cultural User Groups

Research question 2 addressed the question of what are the central issues of online surveys in collecting cross-cultural, qualitative UX feedback. The research question was supported by questions 2a and 2b, which are related to textual and visual materials in a cross-cultural online UX survey. Although, these questions were supportive, they were vital, because when conducting cross-cultural UX research, it is important that the material used in the online UX survey, for example, survey questions and visual stimulus material fit into the cultures respondents represent.

In the following we will summarise our findings related to these questions, and furthermore summarise the practical cross-cultural implications for an online UX survey by anchoring them into a theoretical concept of an online UX survey process adapted from Fan and Yan (2010) related to research question 3. While presenting the results, the case studies and publications that support the findings are referred to as Case Study 1 -Case Study 6 and P1–P7.

4.8.1 Cross-Cultural Issues of Textual Material in Online UX Surveys

Research question 2a was: What kinds of cross-cultural issues need to be considered when using textual material in the online UX survey? To study the cross-cultural issues of textual materials in an online UX survey, we developed online UX surveys in Case Studies 1 (P1 and P2), 2 (P3) and 3 (P4). We will present the main findings regarding the cross-cultural issues of textual materials in online UX survey in the following.

1. **There are cultural differences in the way people from different cultures respond to an online UX survey and share their experiences of using the interactive system** (Case Study 1: P2). Although respondents from all different countries in Case Study 1 gave reasonably equal amount of qualitative UX feedback, the way in which, and the number of respondents who expressed either positive or negative experiences, depended on their culture. For example, the results showed that Indian respondents were the most cautious in giving any negative feedback, and a reasonable amount of Indian respondents even avoided answering at all the sentence completion task that was aimed to elicit negative answers. Danish respondents, on the contrary,

gave varied negative answers in every sentence. The Danes were the only respondents who did not have any “No replies” regarding the sentence completion task that was aimed to elicit negative answers. Danes were best able, in this study, to express their whole scale of emotions, both positive and negative. Americans gave varied negative feedback, but also very positive answers. British respondents gave both negative and positive answers, but their answers were more subtle and scattered into many different answer categories, more so than the American respondents’ answers. In addition, British, American and Danish respondents were able to express feelings of frustration and stress.

2. **The language that was used in an online UX survey and in answering the questions affected the quality of answers** (Case Study 1: P2, Case Study 3: P4). Language had an effect on the way respondents were able to express themselves and to describe their experiences such as emotions, feelings, and ideas. When respondents were writing descriptive qualitative responses the quality of feedback depended on whether the respondent was answering in his/her native language or not (Case Study 1: P2, Case Study 3: P4).
3. **The use of non-native language in an online UX survey can negatively affect the response rates** (Case Study 3: P4).

4.8.2 Cross-Cultural Issues of Visual Materials in Online UX Surveys

Research Question 2b was: What kinds of cross-cultural issues need to be considered when using visual material in the online UX survey? To study the cross-cultural issues of visual material in online UX surveys, we developed online surveys with visual material presented on storyboards in Case Studies 4 (P5), 5 (P6) and 6 (P7). In Case Study 4 the visual material on the storyboards was internationalised and in Case Studies 5 and 6 it was localised. The main findings regarding visual material on storyboards in cross-cultural online UX surveys are:

1. **Internationalisation of visual material is a good option for designing storyboards for online UX surveys.** In our research, the internationalised storyboards supported a similar interpretation by respondents from different cultural backgrounds (Case Study 4: P5).
2. **We found Horton’s (2005) instructions for internationalising the visual material helpful in the storyboard internationalisation** (Case Study 4: P5).
3. **The use of internationalised** (Case Study 4: P5, Case Study 5: P6) **and localised** (Case Study 5: P6, Case Study 6: P7) **storyboards assisted respondents in providing rich answers to a**

long UX survey because of a sound understanding of the intended situations and ease of imagining themselves in different usage situations (Case Study 4: P5).

4. In localisation of visual materials we found that the culture of the respondents and culture of the visual materials in the scenarios do matter in terms of the respondents' reactions, but the way in which it matters is not straightforward, and there are complex interactions. We expected that our results (Case Study 5: P6) would show respondents' strong identification with localised visual material, but in some cases respondents identified more with material that was designed for a different cultural context. Therefore, care needs to be taken in localising visual materials and in interpreting the results from different cultural groups (Case Study 5: P6).

5. The main issues in designing localised storyboards are localisation of situations to accommodate the local context of use and localisation of details in the actual drawing (Case Study 6: P7).

6. Involving local people in the design of localised storyboards, for example, focus groups with local people, is a good way of collecting information about the local context. Also, we recommend using a local person or graphic designer to sketch and to achieve a local "look and feel" in the visual materials (Case Study 6: P7).

4.9 Cross-Cultural Implications to the Online UX Survey Process

We present the practical implications of the results in a theoretical concept of a cross-cultural online UX survey process based on Fan and Yan's online survey process (2010), see also Figure 3 (p. 30). By anchoring the implications to the online survey process, we aim to make our research findings more practical to take into use in UX research. The theoretical concept of cross-cultural online UX process in collecting qualitative feedback with sentence completion, diaries and storyboards differs from Fan and Yan's (2010) online survey process in that it highlights the UX and cross-cultural issues in the process. (Figure 6). To this end, the third research question (RQ3) is: What are the cross-cultural implications to be taken into account in an online UX survey process? In the following, we describe the cross-cultural implications for an online UX survey process based on our six case studies. In Figure 6 we describe the main phases of cross-cultural online UX survey process. The survey design implications are presented in these phases.

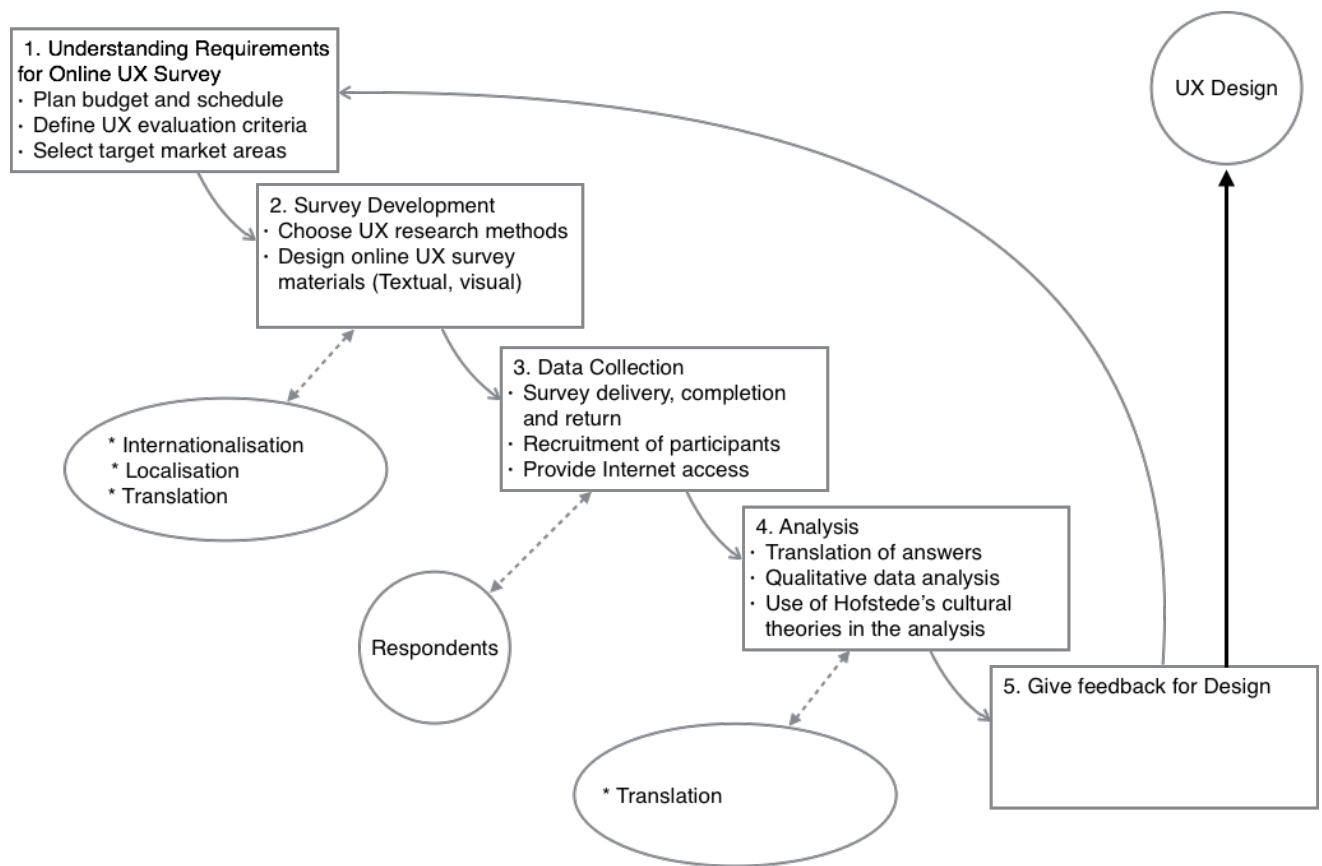


Figure 6: Theoretical Concept of Cross-Cultural Online UX Survey Process (An adapted version of Fan and Yan’s online survey process, 2010).

1. Understanding Requirements for Online UX Survey

The first phase in the cross-cultural online UX survey process is *Understanding Requirements for Online UX Survey*. Before a cross-cultural online UX survey can be developed, the following needs to be considered:

Plan budget and schedule. Define how much cross-cultural UX research can be done.

Define UX evaluation criteria (product/service, brand, UX dimensions). The research questions regarding the UX of a product or a service need to be defined so that the online UX survey can be developed.

Select target market areas (internationalisation and localisation requirements). Before the actual online UX survey development starts, the target market areas of a product or a service need to be selected, so that any country/culture specific requirements can be addressed for internationalisation and localisation.

2. Survey Development

The second phase in the cross-cultural online UX survey process is *Survey Development*. Fan and Yan (2010) listed Survey Development as the first phase in an online survey process, whereas we see it as the second phase of a cross-cultural online UX survey process. From a cross-cultural point of view, the central issues in the Survey Development phase were related to *UX research methods and online UX survey materials*.

Choose UX research methods. It is important to know what kind of data is required to be achieved in UX research, whether it is qualitative and/or quantitative, in order to choose which research methods should be used to acquire the feedback and whether any cultural issues should be taken into account in choosing the research methods. As UX research concentrates on experiential aspects of use, sentence completion and diary methods were suitable for our studies as they elicit qualitative feedback, which gives respondents freedom to express their subjective experience with their own words. Sentence completion tasks and diaries were both easy and quick to implement into our online UX surveys. Sentence completion tasks elicited a vast amount of meaningful data from respondents. Sentence completion method was found to be a successful research method in collecting UX feedback. Storyboards were chosen to elicit better feedback on concept ideas, as visual material can help the user to understand and to better identify with the use scenario.

Design online UX survey materials (both textual and visual). To help and enable respondents to give valid feedback, the need for internationalisation and localisation of online UX survey materials, both textual and visual, need to be investigated.

Textual material. When designing an online UX sentence completion survey or a diary study, it is essential to consider what language is used in the survey. Two practical issues to consider are, firstly, the effects of the online UX survey language, for example, the given sentence completion tasks or diary questions. Secondly the effect of the input language which is the language that respondent is answering in must be considered. Translating the online UX survey and letting respondents answer in their own native language assists respondents in expressing their feelings and emotions, which are important in collecting qualitative UX feedback.

Visual material. The main issues in designing localised storyboards are the following: Firstly, localisation of the situations to accommodate the local context of use into visual material and secondly, localisation of details in the actual drawing. Involving local people in the design of localised storyboards, for example in focus groups using local people, is a good way of gathering information

about the local context of use and drawing details. A local person or graphic designer can help to create a local “look and feel” for the visual materials.

Creating internationalised storyboards requires that both the use situations and storyboard pictures based on them are familiar to people from target cultures. It can be challenging to choose situations or experiences that are common for all cultures as storyboards may become too abstract or bland if one wants to avoid all culturally significant elements. We found Horton’s (2005) instructions for internationalising visual material useful.

3. Data Collection: Survey Delivery, Completion and Return

The third phase in the cross-cultural online UX survey process is the Data Collection phase (Fan and Yan, 2010), which includes Survey Delivery, Survey Completion and Survey Return. We found the following implications of cross-cultural issues in an online UX survey process for this phase:

Recruitment of respondents. We reached the respondents in our case studies mostly from existing customer databases, user panels and mailing lists of local users, and, therefore, we did not need local help in recruiting them. Direct access to respondents allowed fast delivery of the survey. If there had not been any customer databases or mailing lists available, it would have been appropriate to reserve time in the schedule for recruiting the respondents.

Provide Internet Access. Issues to consider with online UX surveys with cross-cultural respondents are their access to the Internet.

4. Analysis

The fourth phase in the cross-cultural online UX survey process is the Analysis. This was not part of the online survey process presented by Fan and Yan (2010), but we see it as an important part of the cross-cultural online UX survey process. We found the following implications of cross-cultural issues in an online UX survey process for the Analysis phase:

Translation of answers. Before the data analysis, we needed to translate the answers in Case Studies 2 and 3 and allow time for this. The possibility for respondents to write the answers on the computer helped the analysis as there was no guessing of handwriting and no need for extra data transfers manually from paper to electronic format. This is especially useful when dealing with foreign languages and the translation process, as well as in a categorisation and analysis of qualitative data.

Qualitative data analysis. The challenge with sentence completion method is how to quickly categorise, analyse and report the results in the late phase of product development. Online feedback is convenient and practical as there is no guessing of individual handwriting and answers can be managed

with computer programmes. The sentence completion method enabled collection of detailed and thorough feedback for product UX analysis and ideas for design. However, categorising the sentence completion items from raw qualitative data is manual and time-consuming. For example in Case Study 1, fourteen sentence completion tasks could not be rapidly analysed: it took one week for three researchers to form paper affinity diagrams, and then two weeks for two researchers to transfer the diagrams to Excel and analyse and report the results. We also found that analysing sentence completion answers may require some interpretation, especially with ambiguous or incomplete English in the answers. As a result of a thorough analysis, we were able to determine which sentences provided more focused and more rapidly analysable insights.

Use of Hofstede's cultural theories in the analysis. The cultural background of respondents, as well as their ability to express their feelings in a foreign language, needs to be taken into account when analysing and reporting the results of qualitative, emotionally laden feedback. The use of Hofstede's cultural dimensions (2001, 2005) in the analysis of the feedback gives a better understanding of the impact of specific cultures on the results. Hofstede's cultural dimensions were used in the analysis of Case Studies 1 (P2) and 5 (P6). The main findings regarding Hofstede's cultural dimensions in the analysis of the results of cross-cultural online UX survey are:

- 1) There are cultural differences in giving positive/negative feedback between countries with a high Power Distance index (PDI) and low Power Distance index (PDI) countries (CS1: P2, CS5: PV7). The respondents from high PDI countries were more positive in their evaluations than the respondents from low PDI countries.
- 2) There are cultural differences in how people talk about themselves in the feedback between countries with a high Individualism index (IDV) and a low Individualism index (PDI) (Case Study 1: P2). The respondents from low IDV countries would portray themselves through other people in their answers more than the participants from high IDV countries.

5. Give feedback for design

The fifth phase to study in the theoretical framework of cross-cultural online UX survey process is two folded: Firstly, there is the UX feedback collected by the survey for the design of the product that is being developed. Secondly, there is also feedback for the design of the online UX survey itself, for example, how to improve it for the next UX study. In the real industrial Case Studies 1, 2, 3 and 4 the results of the online UX surveys were reported directly by our UX research team at University to the collaborating companies' UX design teams in workshops. For example in Case Study 1 the online UX

feedback yielded data for product UX analysis and ideas for design. For example the summary of the Smartphone UX (See P1 and P2) was presented to and discussed with the UX designers. In Case Study 2 the UX feedback helped designers to understand the UX of the existing service and the needs of the monetary gaming site localisation for Spanish and Swedish users. The results and the workshop enabled designers and researchers to analyse the qualitative results together in the design context, to come up with guidelines together and for designers to address culturally sensitive areas leading to more culture-specific web page concepts.

5. Discussion

The motivation for our research comes from the fact that there is a growing demand to understand the cultural perspective in the design of positive UX of interactive systems. Therefore, also collecting cross-cultural UX feedback has become essential (e.g. Väänänen-Vainio-Mattila et al., 2008). As discussed in the literature (e.g. Monahan, 2008; Väänänen-Vainio-Mattila et al., 2008), online methods are considered attractive for collecting cross-cultural UX feedback in rapid product development, because they are considered fast, easy-to-use and cost-efficient, compared to traditional on-site user-centered research methods. Although previous research (e.g. Monahan et al., 2008) has shown that online surveys are suitable for cross-cultural UX research, the area has not yet been studied in detail and there are not yet many methods for cross-cultural online UX research. Despite there being a large body of work in survey research in areas such as marketing, sociology, economic, policy making, and health sciences, the online UX surveys have not been researched to a great extent. Consequently, our research goal was to understand firstly, how an online survey can fit into a cross-cultural UX study in collecting qualitative feedback. Secondly, the research gap was what kind of surveys, practices, and methods are needed to collect cross-cultural UX feedback.

In this chapter, we discuss our findings and reflect the relationship of our research to related work. The thesis covered several areas of research: firstly, we discuss the development of online UX surveys and how online surveys fit into the cross-cultural UX research as an instrument. Secondly, we discuss the qualitative research methods in an online UX survey, using mainly sentence completion and storyboards and how they worked in collecting cross-cultural UX feedback. Thirdly, we discuss cross-cultural issues in an online UX survey. Furthermore, we discuss the limitations of our research.

5.1 Development of Online UX Surveys

To gain knowledge and to develop the online UX research methods, the main aim of this research was to investigate how online surveys as an instrument and a method fit into cross-cultural UX study in collecting qualitative feedback. A multiple-case research design strategy was adopted in our research (Yin, 2003; Dube and Pare, 2003). Multiple-case studies were performed to understand the influence of variability in context and to gain more generic research results (Yin, 2003). This strengthened the validity of our results.

In our six case studies, we were able to collect a significant amount of cross-cultural, meaningful qualitative UX feedback with online surveys in different stages of the product development process of different kinds of products and services. The online UX feedback was collected in requirement

gathering, testing and maintenance phases in our case studies. The feedback gave input to the product development and our collaborating companies reported that it was useful for them.

We had 1369 participants from 27 different countries—a large cross-cultural sample from a wide variety of countries representing different cultural values (Hofstede, 2001, 2005). This broad sample strengthened the validity of our research. The respondents were selected from respective collaborating companies' customer panels or from samples of university students and employee volunteers. Our respondents were affluent, literate and educated with a desire to use sophisticated devices and services. Also, all the respondents in our case studies had access to the Internet and knowledge of using computers or mobile devices. In some of our case studies, the respondents were also expected and able to answer in English and not in their own language. The use of online UX surveys with such respondents can thus be considered successful.

It is important to understand that if we had had respondents for example from less developed areas of the world where the respondents can be illiterate, poorly educated, have limited incomes, have no equipment, have no access and knowledge of how to use the Internet, the online survey might not work as a UX research method. Therefore, using online UX surveys in less developed countries is not yet self-evident, because all potential respondents cannot answer online UX surveys. Nevertheless, there is huge potential to reach even wider user samples using Internet coverage because the spread of mobile devices and IT knowledge is increasing. If people in less developed countries are the target respondents for an online UX survey, internationalisation and/or localisation of textual material, visual presentation material, including pictures and symbols, and voice needs to be done carefully and also the literacy rates need to be investigated.

The case studies demonstrated that a good representative set of respondents can be easily reached online. Although on-site field studies and usability tests provide rich and high-quality data, in practice only a limited number of people can participate, and they may not be willing to discuss sensitive issues face-to-face. In product development, it is useful to collect cost-efficient cross-cultural UX feedback since it is not often possible to travel to many locations. Therefore online methods are necessary to complement basic UX research methods (Luedemann and Muller, 2010). We argue by answering RQ1 that **online surveys fit well in collecting cross-cultural qualitative UX feedback. Online UX surveys collect important cross-cultural, qualitative UX feedback from local users and help designers to understand local context of use of technology. This helps to design better UX.**

5.2 Qualitative Research Methods in an Online UX Survey

As discussed in the literature and found in our research, online UX survey as a tool is practical, easy-to-use and can involve large numbers of respondents worldwide for UX research. However, which research methods to use in an online UX survey to collect feedback that is meaningful for the UX development then becomes an important further question.

The concept of UX and UX research methods are actively being developed in the HCI community. As Law et al. (2014) conclude user experience (UX) is a recently established research area and therefore still haunted by the challenges of defining the scope of UX in general and operationalising experiential qualities in particular. According to Law et al. (2014) there have been recent efforts to deepen the understanding of UX in three areas: in the theoretical roots of UX (e.g. Obrist et al., 2011), in UX evaluation methods (e.g. Vermeeren et al., 2010) and in the operationalisation work for UX measurement (e.g. van Schaik, Hassenzahl and Ling 2012). Our work aimed at increasing the understanding of UX evaluation methods and specifically, the cross-cultural, qualitative online UX surveys. It has been found that in UX research, the qualitative approach is seen as one of the best ways to understand experiences that are constituted around themes such as aesthetics and affect (Bargas-Avila and Hornbaek, 2011). The focus then is on the meaning of using technology and what kind of implications it has for the user (Bargas-Avila and Hornbaek, 2011). Qualitative methods emphasise the details and richness of description (Bargas-Avila and Hornbaek, 2011).

The emphasis on qualitative research in UX has also made progress in developing UX measures to be slow (Bargas-Avila and Hornbaek, 2011). Traditionally, usability tests tend to focus on task performance, which can be measured with quantitative methods. However, UX is more subjective (Law et al., 2009) and therefore, objective usability measures, such as task execution time or number of clicks, are not sufficient measures for UX (Law et al., 2009) where feelings, motivations and expectations have an important role. UX evaluation focuses on lived experiences (Law et al., 2009). So, in our research too, we were interested in using qualitative research methods, which are designed to expose personal experiences and allow the respondents to express themselves in writing. Qualitative research looks at users' actual behaviours and expectations in order to gain an in-depth understanding of how and why users behave as they do, and what kind of experiences and expectations they have.

However, UX research is challenging as participants in UX studies may find it difficult to express their experiences if directly asked to. Projective techniques have been used in psychology to bypass or circumvent the conscious defences of participants to gain unconscious information from them

(Lilienfeld et al., 2000). Also, in consumer research projective techniques have been successfully used to yield a wide range of responses providing an understanding of a consumer's thoughts and feelings, experiences and motivations (Doherty and Nelson, 2010). In addition, projective techniques are often inspiring to participants as using them is fun and engaging for both participants and researchers alike (Doherty and Nelson, 2010, Will et al., 1996). The experiences of projective techniques in consumer research are positive and thus, it seemed likely that the same techniques could be applied to UX research, although they are relatively unknown in HCI and UX research.

Since UX is multidimensional and the relevance of the dimensions can vary from one product to another, it is difficult to design good scales for measuring UX. Therefore, in some situations, it may be more useful to gather inspirational data, stimulate discussion and obtain a deeper understanding about what is important to users and how they interpret their experiences with products. Projective techniques such as the sentence completion method (e.g. Soley and Smith, 2008), and diaries allowing free text feedback (e.g. Alaszewski, 2006, Lazar et al., 2010, Gillham, 2006) would appear suitable for collecting qualitative UX feedback. These methods give information of how users themselves describe their behaviours and reactions.

In addition, we also wanted to gain an understanding of how visual material could enhance the quality of the survey and help to elicit more feedback, which is already in the requirement gathering phase. To this end, we used storyboards (e.g. Van den Hende et al., 2007). Based on our research, **all three qualitative research methods, sentence completion, diary, and storyboards, were effective in collecting cross-cultural qualitative UX feedback and were easily incorporated into cross-cultural online UX surveys.**

In our studies, the sentence completion tasks quickly elicited rich, meaningful, qualitative, cross-cultural UX feedback regarding the different dimensions of UX for product development purposes, in the Testing and Maintenance phases of the Product Development Process (Case Study 1, Case Study 2, and Case Study 3). Interestingly in Case Study 1, according to our industrial partner, some answer categories found in the sentence completion data were new to them and yielded new points of view about the product's user experience. **From a product development point of view, feedback and problems related to technical issues, utility and usability can often be found quite quickly with a smaller testing team, whereas an intangible user experience is more challenging to evaluate. For example, the answers to sentence completion tasks that related to visual/haptic/acoustic aesthetics, identification, and socio-pleasure gave new insight.** For instance, these sentence completion answers

provided information on how and in which ways the device was meaningful for the users and supported their daily life. The responses also revealed how the product reflected the feeling of professionalism and how it made them feel confident. This new information was important in product development itself and can also be used when designing future user experience evaluation surveys.

The use of storyboards allowed the collection of cross-cultural UX feedback even though respondents had never used or seen the intended product. The respondents were able to give feedback and ideas for design in the early phase of the product development process in the Requirement gathering phase related to the sharing of personal experiences with mobile handsets—via textual stories, different types of media objects and associated information (Case study 4, Case Study 5, Case Study 6).

5.3 Cross-Cultural Issues in an Online UX Survey

A cross-cultural online UX survey should be able to collect meaningful feedback for product development purposes in different phases of the product development process and take cultural issues into consideration too. People in different countries have different values (Hofstede 2001, 2005) and these values have an effect on how people experience technology. Cockton (2006) replaced the term value with worth and discussed bringing worth to the design as something that people value and in which they are thus motivated to invest money, time, energy and commitment. According to Cockton (2006), worth depends on the users, situation and context; there is no “product quality” insofar as this refers to intrinsic, universal value in technology. Harper et al. (2008) also emphasise that people value different things in different contexts. Values and worth should play a major role in cross-cultural design, too. As we found through literature and with our industrial collaborators in our case studies, the demand for understanding cross-cultural issues in the design of technology has grown because of globalisation and the demand for positive UX. **Cross-cultural online UX surveys enable the collection of feedback that will bring an understanding of the different cultural values people have in different countries and, therefore, create worth for the UX. Therefore, it is vital to consider the effect of culture on the UX feedback. From the respondents’ point of view, to give meaningful and valuable feedback, respondents should be able to express their experiences and thoughts so that the feedback is valid and expressed in the best possible way. One of the main issues we found in our studies is that there are cultural differences in the way people from different cultures respond to an online UX survey and share their experiences of using an interactive system.**

The pivotal issue when looking at cross-cultural issues in an online UX survey is to understand cultural differences in how respondents are answering and responding to the survey. There may be cultural differences also in how respondents experience the product or service. Ouygi et al. (2008) summarise that cross-cultural issues not only have an effect on the product UX but also on the UX research methods (Ouygi et al., 2008). We found in the literature that cultures differentiate from one another by the use and understanding of objects, patterns of behaviour, values, thinking and communication (e.g. Hofstede (2001, 2005), Hall (1976), Hofst (1995), Stewart and Bennett (1991), and Trompenaars and Hampden-Turner (1991)).

Consequently, there is a need for UX research methods that can be effectively used in cross-cultural contexts where cultural differences exist. Snitker (2010) argues that the influence of culture on UX research has received attention without much in the way of theory to support it. According to Snitker (2010), UX designers often have few models and concepts of culture per se, and even fewer understand the implications of culture on their particular research project. We found in the literature that tools for cross-cultural UX research in the development of interactive systems are inadequate (e.g. Snitker, 2010).

One reason for the inadequate tools and methods in cross-cultural UX research is that the concept of UX is not only complex but also the concept of culture itself is complex. Therefore, it is not straightforward to study cultural issues in the context of technology UX design. The dominant approach for understanding cultural differences in HCI has long been to use existing information about different cultures. Cultural theories, mainly Hofstede (2001, 2005), have been found to be useful in many ways (E.g. Marcus, 2005 and 2006), but cultural theories alone do not help designers to create a delightful UX for various local contexts. De Angeli et al. (2004) argue that cultural dimensions like those proposed by Hofstede are too high-level to be used to directly inform the design of technology.

We found that Hofstede's theory is helpful in the analysis of UX survey data but it would not help significantly for example in the actual design of an online UX survey. Although approaching culture in HCI by using existing cultural theories as a basis for UX design has been found to be useful, especially in the design of websites (e.g. Marcus, 2005) and in the analysis of data (Schumacher, 2010), it does not allow local users in local contexts to participate and give feedback in the actual UX design process.

Kamppuri (2011) argues that one approach is to see culture as a resource. With this approach culture is used as a means of better understanding users, as a kind of perspective from which to understand how users may interact with technology, encouraging the design process to be informed by culture and not

controlled by it. We argue this that approach proposed by Kamppuri (2011) and used by us in our research is in line with the human-centered design approach. Ideally, cross-cultural UX research would be done on-site involving local users, but it is not always possible as it can be expensive, time-consuming and hard to organise in fast-phased projects. We argue that remote online UX research methods involve users as well, and they are considered less expensive, faster and reaching wider user groups than on-site UX research. **Using culture as a resource for UX design fits well in the main idea of the HCD process where the needs, wants and limitations of users of a product, service or process are given extensive attention at each stage of the product development process (ISO 9241-210:2010).** The biggest difference from other product design philosophies is that HCD tries to optimise the products around how users can, want, or need to use it rather than forcing the users to change their behaviour to accommodate the product (E.G. Bayer and Holzblatt, 1998; ISO 9241-210:2010; Jordan, 2002). **Involving varying target users from different countries with different cultural values when collecting UX feedback enables these users to express their needs, wants, and limitations of a product or service.**

We studied what the central issues are when designing and implementing online surveys for collecting cross-cultural qualitative UX feedback. In Case Studies 1, 2 and 3 we focused on cross-cultural issues that need to be considered when using textual material in an online UX survey. In Case Studies 4, 5 and 6 we focused on cross-cultural issues that need to be considered when using visual material in a UX survey. We aimed to reflect the practical implications of the results of an online UX survey process to present our findings. To this end, we present the cross-cultural implications to be taken into account in an online UX survey process.

It is important to understand that respondents from different cultural backgrounds express positive and negative experiences in different ways. In our studies, we found that the amount of positive and negative answers varied depending on the culture of the respondents. We found Hofstede's cultural dimensions (2001, 2005) useful in the analysis and for understanding the reasons for these cultural differences. There are cultural differences in giving positive/negative feedback between respondents from countries with high Power Distance index (PDI) and respondents from countries with low Power Distance index (PDI). The respondents from high PDI countries were more positive in their evaluations than the respondents from low PDI countries. Also, in the feedback between countries with high Individualism index (IDV) and low Individualism index (IDV) countries, we found that there are cultural differences in how people talk about themselves in their responses to the qualitative questions.

The respondents from low IDV countries would portray themselves through other people in their answers more than the participants from high IDV countries. This suggests that respondents from low IDV countries can find it hard to talk directly about their personal experiences. To conclude, we argue that **there are cultural differences in how users understand, interpret, and respond in an online UX survey.**

Another important issue we found in our studies was that the language that was used in an online UX survey and in answering the questions affected the quality of answers. **Language had an effect on the way users were able to express themselves and to describe their personal experiences such as emotions, feelings and ideas.** When the respondents were writing descriptive qualitative responses, the quality of UX feedback depended on whether the respondent was answering in his/her native language or not. This suggests that it is worthwhile considering translating an online UX survey so that respondents can give more precise, meaningful and personal answers.

Our research question 2b, regarding the visual material in an online UX survey, approached the design of the survey material by internationalising it in Case Studies 4 and 5 and localising it in Case Studies 5 and 6. **Both approaches, internationalisation and localisation, can be used where UX is considered in product design, depending on the needs of the project.**

We found that both types of storyboards, the internationalised and the localised ones, assisted respondents in providing rich answers to a long survey because of a sound understanding of the intended situations and ease of imagining themselves in different usage situations. The use of storyboards allowed us to elicit UX information even though respondents had never used or seen the intended product. Respondents were able to give feedback and ideas for design in the early phase of requirement gathering related to the sharing of personal experiences with mobile handsets—via textual stories, different types of media objects, and associated information.

In localisation of the visual materials, we found that the culture of the respondents and culture of the visual materials of the scenarios does matter in respondents' reactions. Therefore, care needs to be taken in localising visual materials and in interpreting the results from different cultural groups. This could indicate that respondents had already adapted to the use of technology in a similar way other than within the different culture, which could not have been predicted.

By involving local users in the design of localised storyboards, for example, focus groups with local people are a good way of gathering information about the local context. Also, we recommend using a local person or graphic designer to sketch the design to achieve a local “look and feel” for the visual

materials. The main issues in designing localised storyboards are localisation of situations to accommodate the local context of use and localisation of details in the actual drawing.

Finally, we identified and presented practical cross-cultural implications for the theoretical concept of a cross-cultural online UX survey process based on Fan and Yan's (2010) online survey process. By anchoring the cross-cultural implications to the online survey process (Fan and Yan, 2010), we aimed to make our research findings more generalisable and also practical in order to use them in UX research. The theoretical concept of cross-cultural online UX process in collecting qualitative feedback with sentence completion, diaries and storyboards extends the process of Fan and Yan's (2010) in that our concept highlights the UX and cross-cultural issues in the process. For example, at the very beginning of the process UX evaluation criteria and target market areas for any internationalisation and localisation requirements need to be clarified.

5.4 Limitations of the Research

One of the limitations of our work was that we had to leave the analysis of the actual UX results out of the scope of this study. The results from the case studies are presented in the included publications, but the present dissertation focuses on the online UX survey method development. One reason for leaving the UX results out of the scope was that UX feedback collected in the case studies was partly company confidential. Another significant reason was that the amount of work included in covering the UX results would be too extensive for one doctoral dissertation.

Another limitation was that we had no possibility of interviewing our respondents about the online UX survey. In order to gain a deeper knowledge of how respondents experienced the answering of a remote online UX survey, we would need to do another, similar kind of study with an interview session at the end of the UX research, where we could gain information on how respondents felt about answering the survey.

Furthermore, one of the limitations of our study was that we did not have a comparison of an on-site UX research of the same subject. That would have helped us to gain an insight into whether the UX research results would have differed from an online UX survey.

One of the limitations of our research is that the resulted theoretical concept of cross-cultural online UX survey process that was used to demonstrate the cross-cultural implications for the process has not been validated empirically. We utilised the building theories from the case studies approach, and thus this is strongly based on our empirical findings. The theoretical concept itself would need to be evaluated further in additional case studies.

One of the challenges in the study of UX is its interdisciplinary dialogue on the relationship between theory and practice when talking about user experience (Obrist et al., 2013). Our research was done in close collaboration with technology companies, which was good in a sense that it offered the possibility to use both current theories and real industrial practices in UX research. As Obrist et al. (2013) discuss, theoreticians and practitioners tend to live in separate spheres with different professional goals and incentives. According to Obrist et al. (2013), academic theories tend to be abstract and hard to understand without a careful study of the philosophy behind the theory. This makes it onerous for practitioners to parse and apply theory given the constraints of business environments. In our research, the dialogue between the researchers in academia and practitioners was open and research questions and goals were formulated and set together at the very beginning of the research projects. Multiple-case research design strategy allowed us to study the phenomena in different contexts and strengthen the validity of our results. The challenge we found during our research project was the control of the case studies as schedules often change in industry. Nevertheless, carefully planned initial research questions helped to overcome some of the issues. For collaborating companies the cooperation brought both practical UX research results and also theoretical knowledge specifically found in the case studies for their own interactive products and services.

6. Conclusions

This chapter revisits the original research questions and summarises the key results. Furthermore, it highlights the key contributions and suggests future work that could validate and expand upon the present findings.

6.1 Key Findings

RQ1. How can an online survey fit into a cross-cultural UX study in collecting qualitative data?

In our research, we found that online surveys are well suited to cross-cultural UX studies in collecting qualitative data. In our case studies, we collected a significant amount of cross-cultural, qualitative UX feedback with online surveys using the sentence completion method, diary method and storyboards. All methods were practical to implement in an online UX survey. In our studies, the online survey with sentence completion tasks relatively quickly elicited meaningful and rich qualitative cross-cultural UX feedback about the different dimensions of UX for product development purposes, in the Testing and Maintenance phases in the Product Development Process.

We found in our six case studies that online surveys as an instrument and method fit well into cross-cultural UX studies in collecting qualitative data for product development purposes. In our case studies, we were able to gather a significant amount of qualitative cross-cultural user feedback for online UX surveys with sentence completion methods, diary methods and storyboards. Based on our research, all three research methods were effective in eliciting user feedback and were easily incorporated into cross-cultural online UX surveys. Online UX surveys are quick to implement, they do not require many resources and they are suitable for cross-cultural user samples that have access to the Internet and the knowledge to use it. We found that a large number of cross-cultural user samples can be reached. Also, the analysis is faster as the data is accessible in an electronic format. This is useful especially with the translation process and the categorisation of qualitative data. These advantages make online surveys attractive for cross-cultural UX research.

RQ2: What are the central issues of online surveys in collecting qualitative UX feedback from cross-cultural user groups? What kinds of cross-cultural issues need to be considered when using textual (RQ2a) and visual (RQ2b) material in the UX survey?

We found the central cross-cultural issues that have implications for online UX surveys concerned textual and visual materials. These issues have implications for the cross-cultural online UX survey process. With regards to the textual material in collecting qualitative UX feedback, we found that there

are cultural differences in how respondents understand, interpret, and share their experiences in an online UX survey. For example, culture has an effect on language and communication style, and these have an effect on the answering process. Therefore, it is important to recognise cross-cultural implications when designing a cross-cultural online UX survey, collecting the cross-cultural UX feedback online, and analysing the results.

In our studies the online survey with sentence completion tasks quickly elicited rich qualitative user feedback regarding the different dimensions of UX with cross-cultural users for product development purposes in the Testing and Maintenance phases of the Product Development Process. The use of the sentence completion method in an online survey is a relatively fast and easy way to collect a large amount of qualitative user data. However, the challenge with the sentence completion method is how to quickly analyse, categorise and report the results.

When, in a cross-cultural online UX survey, the written language is the only way of presenting the UX questions and also the only way for users to give qualitative feedback, the ability and way of expressing oneself becomes an important part of UX evaluation, where thoughts, feelings and emotions are being measured. We argue that it is important to design an online UX survey in a way that allows all users to understand the UX survey and to express their thoughts about the UX in the best possible way. This supports human-centered design principles, which see culture as a resource involving local users in the design process. We found that the use of Hofstede's cultural dimensions, mainly Power Distance and Individualism (2001, 2005), in the analysis of the data gives a better understanding of the impact of specific culture on results.

Concerning the visual material, we found that storyboards assisted respondents in providing rich answers to a long survey because of a sound understanding of the intended situations and ease of imagining themselves in different usage situations. The use of localised and internationalised storyboards allowed us to elicit UX information even though users had never used or seen the intended product. They were able to give feedback and ideas for design in the early phase of product development, in Requirement gathering related to the sharing of personal experiences with mobile handsets—via textual stories, different types of media objects, and associated information. Using culture as a resource for design involving local users in the design process supports human-centered design principles.

RQ3: What are the cross-cultural implications to be taken into account in an online UX survey process?

The case studies demonstrated how to gather cross-cultural, qualitative UX feedback with online surveys. They can be used as guidelines and help to understand and design future online UX surveys with cross-cultural respondents. We reflected on the practical implications of the results in a theoretical concept of cross-cultural online UX survey process to present our findings. Using Yan and Fan's (2010) process of online surveys as an initial framework was useful in creating a theoretical concept of a process specifically for cross-cultural online UX survey. This will help expand academic researchers' as well as UX practitioners' in the industry's knowledge of how to approach cross-cultural UX research with online surveys, especially taking into account the localisation and internationalisation issues of the process.

6.2 Contributions

This dissertation has explored with a multiple-case research design strategy how an online survey can fit into cross-cultural UX research in collecting qualitative data, specifically with sentence completion, diary, and storyboarding methods. This work addressed the gap in UX research knowledge into how to best do remote online cross-cultural UX research to collect qualitative feedback, which is vital for developing positive UX of technology products and services.

Involving varying target users from different countries with different cultural values when collecting UX feedback enables these users to express their needs, wants, and limitations of a product or service. Using culture as a resource for UX design fits well in the main idea of the HCD process where the needs, wants and limitations of users of a product, service or process are given extensive attention at each stage of the product development process (ISO 9241-210:2010). Cross-cultural online UX surveys enable the collection of feedback that will bring an understanding of the different cultural values people have in different countries, and, therefore create worth for the UX.

The thesis overview and the seven publications can be used by other researchers and UX practitioners as guidelines and help them to understand the following issues of how to collect cross-cultural, qualitative feedback with online UX surveys:

Firstly, the related work will give an overview of culture in HCI and how to approach cross-cultural issues in UX research in general.

Secondly, the research presents what kinds of surveys, practices, tools and methods to deploy in different stages of the technology product development process to collect cross-cultural, qualitative UX feedback. For example, we demonstrated in our research how rich cross-cultural, qualitative UX

feedback regarding different dimensions of UX can be collected with a sentence completion method, and reach a large number of respondents in different parts of the world. We also demonstrated how the use of storyboards allows collection of cross-cultural, qualitative UX feedback even when respondents had never used or seen the intended product. Respondents were able to give feedback and ideas for design in an early phase of the product development process, which could otherwise be challenging.

Thirdly, other researchers and UX practitioners can benefit from the results in understanding how the cross-cultural UX surveys should be localised or internationalised so that the textual and visual material fit into the cultures the respondents represent.

Fourthly, we found that the use of Hofstede's cultural dimensions (2001, 2005) in the analysis of the feedback gives a better understanding of the impact of specific culture on results.

Fifthly, we reflected on the practical implications of the results in a theoretical concept of a cross-cultural online UX survey process. This will help to expand the knowledge of academic researchers as well as UX practitioners on how to approach cross-cultural UX evaluation with online surveys as a process, especially taking into account the localisation and internationalisation issues in the process.

6.3 Future Work

It would be valuable to continue the study of qualitative methods in measuring UX in a cross-cultural context. One research direction could be to study, create and validate a cross-cultural online UX survey that could be easily be used in UX evaluation in different local contexts.

We believe that interesting further analyses can also be made out of the actual cross-cultural UX evaluation results found in our research, to understand even better the influence on cultural values in how people perceive UX. Further studies of UX of other novel products could also be conducted

Finally, the developed cross-cultural online UX survey process could be tested as a theoretical framework in several further case studies. The process could be developed into a validated theoretical framework and bring insights into the larger body of work in cross-cultural survey research.

References

- Adams, A., Lunt, P. and Cairns, P. (2008) A qualitative approach to HCI research. In Cairns, P. and Cox, A. (Eds.), *Research Methods for Human-Computer Interaction*, pp. 138-157. Cambridge University Press, Cambridge, UK.
- Aikio, K.-P., Jounila, I. and Jokela, T. (2005) Developing Techniques for Visualising Scenarios. *Proceedings of HCII 2005, Las Vegas*.
- Aykin, N. (Ed.) (2005) *Usability and Internationalisation of Information Technology*. Lawrence Erlbaum, New Jersey, US.
- Aykin, N. (2005) Overview: Where to Start and What to Consider. In Aykin, N. (Ed.), *Usability and Internationalization of Information Technology*, pp. 3-20. Lawrence Erlbaum, New Jersey, US.
- Alaszewski, A. (2006) *Using Diaries for Social Research*. Sage Publications, London, UK.
- Bargas-Avila, J.A. and Hornbaek, K. (2011) Old wine in new bottles or novel challenges: a critical analysis of empirical studies of user experience. *Proceedings of CHI2011*, pp. 2689-2698. ACM Press, New York.
- Battarbee, K. (2003) Defining Co-experience. In Hannington, P. and Forlizzi, J. (Eds.) *Proceedings of 2003 International Conference of Designing Pleasurable Products and Interfaces*, Pittsburgh, PA, USA, pp. 109-113. ACM Press, New York.
- Benedek, M. and Miner, T. (2002) Measuring Desirability: New methods for evaluating desirability in a usability lab setting. *Proceedings of UPA 2002, Orlando*.
- Benfield, J. and Szlemko, W. (2006) Internet-Based Data collection: Promises and Realities. *Journal of Research Practice* 2, 2, Article D1.
- Beyer, H. and Holtzblatt, K. (1998) *Contextual Design*. Kaufmann.
- Boddy, C. R. (2007) Projective techniques in Taiwan and Asia-Pacific market research. *Qualitative Market Research: An International Journal*, 10 (1), 48-62.
- Bruun, A., Gull, P., Hofmeister, L., and Stage, J. (2009) Let your users do the testing: a comparison of three remote asynchronous usability testing methods. *Proceedings of CHI2009*, pp. 1619-1628. ACM Press, New York.
- Chavan, A., L., Gorney, D., Prabhu, B. and Arora, S. (2009) The Washing Machine That Ate My Sari—Mistakes in Cross-Cultural Design. *Interactions*, Jan/Feb 2009, 26-31.
- Choi, B., Lee, I., Kim, J. and Jeon, Y. A. (2005) Qualitative Cross-National Study of Cultural Influences on Mobile Data Service Design. *Proceedings of CHI 2005*, pp. 661-670. ACM Press, New York.
- Clemmensen, T. and Roesse, K. (2010) An Overview of a Decade of Journal Publications about Culture and Human-Computer Interaction (HCI). In Katre, D. et al. (Eds.) *HWID 2009, IFIP AICT 316, 2010*.
- Clemmensen, T., Hertzum, M., Hornbæk, K., Shi, Q. and Yammiyavar, P. (2009) Cultural cognition in usability evaluation. *Interacting with Computers*, vol. 21, no. 3, 212–220.
- Cockton, G., (2004) Value-centred HCI. *Proceedings of the Nordic Conference on Human-Computer Interaction (NordiCHI)*, pp.149–160. ACM Press, New York.
- Cockton, G., (2006) Designing worth is worth designing. *Proceedings of the Nordic Conference on Human-Computer Interaction (NordiCHI)*. pp. 166–174. ACM Press, New York.
- Cockton, G., Kujala, S., Nurkka, P. and Hölttä, T. (2009) Supporting Worth Mapping with Sentence Completion. *Proceedings of INTERACT 2009*, pp. 566-581. Springer-Verlag, Berlin, Heidelberg.
- Corbin, J., and Strauss, A. (2008) *Basics of qualitative research*. 3rd ed. Sage.
- Couper, M., Conrad, F and Tourangeau, R. (2007) Visual Context Effects in Web-Surveys. *Public Opinion Quarterly*, Vol. 71, No. 4, 623-634.

- Creswell, J.W. and Plano Clark, V.L (2007) *Designing and Conducting Mixed Methods Research*. Sage Publications, USA.
- Creswell, J.W. (2009) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications, USA.
- Czerniawska-Joerges, B. (1992) *Exploring Complex Organizations. A Cultural Perspective*. Sage Publications, Newbury Park.
- De Angeli, A., Athavankar, U., Joshi, A., Coventry, L. and Johnson, G. (2004) Introducing ATMs in India: a contextual inquiry. *Interacting with Computers*, vol. 16, no.1, 29-44.
- Del Galdo, E. (1996) Culture and Design. In Del Galdo, E. and Nielsen J. (Eds.), *International User Interfaces*, pp. 74-87. John Wiley & Sons, New York, USA.
- Denzin, N. K. (2010) Moments, Mixed Methods, and Paradigm Dialogs. *Qualitative inquiry*, 16(6), 419-427.
- Doherty, S. and Nelson, R. (2010) Using projective techniques to tap into consumers' feelings, perceptions and attitudes... getting an honest opinion. *International Journal of Consumer Studies*, 34, 400-404.
- Dray and Siegel (2005) "Sunday in Shanghai, Monday in Madrid?!": Key Issues and Decisions in Planning International User Studies. In Aykin, N. (Ed.), *Usability and Internationalization of Information Technology*, pp. 189-212. Lawrence Erlbaum, New Jersey, US.
- Dubé, L. and Paré, G. (2003) Rigor in information systems positivist case research: current practices, trends, and recommendations. *MIS Quarterly*, 27, 597-636.
- E-communications Household Survey Report (2010) Special Eurobarometer 335. European Commission.
- Eisenhardt, K. M. (1989) Building theories from case study research. *Academy of management review*, 14(4), 532-550.
- Ekman, L. and Litton, J-E. (2007) New times, new trends; e-epidemiology. *European Journal of Epidemiology*, 22, 285-292.
- European Social Survey (ESS) (2013) Retrieved December 28, 2015, from <http://www.europeansocialsurvey.org>
- Evans, J. and Mathur, A. (2010) The value of online surveys. *Internet Research*, Vol. 15, No 2, 195-219.
- Fan, W. and Yan, Z. (2010) Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior*, 26, 132-139.
- Flick, U. (2014) *An Introduction to Qualitative Research Methods*. Sage.
- Forlizzi, J. and Battarbee, K. (2004) Understanding Experience in Interactive Systems. *Proceedings of Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques*, Cambridge, MA, USA, pp. 261-268. ACM Press, New York.
- Fricker, R.D. and Schonlau, M. (2005) Advantages and Disadvantages of Internet Research Surveys: Evidence from Literature. *Field Methods*, 14, 4, 347-367.
- Friedman, B., (1996) Value-sensitive design. *Interactions* 3 (6), 16-23.
- Gillham, R. (2006) Diary Studies as a Tool for Effective Cross-Cultural Design. *Proceedings of IWIPS 2006*, Amsterdam.
- Glover, D. and Bush, T. (2005) The online or e-survey: a research approach for the ICT age. *International Journal of Research & Method in Education*, 28, 2, 135-146.
- Greenbaum, J. M., and Kyng, M. (Eds.) (1991) *Design at work: Cooperative design of computer systems*. Routledge.
- Hall, E. T. (1976) *Beyond Culture*. Anchor Press/Double Day, New York, US.

- Harkness, J., Braun, M., Edwards, B., Johnson, T., Lyberg, L., Mohler, P., Pennell, B.-E. and Smith, T. (Eds.) (2010) *Survey Methods in Multinational, Multiregional, and Multicultural Contexts*. John Wiley & Sons, New Jersey, USA.
- Harper, R., Rodden, T., Rogers, Y., Sellen, A. (Eds.) (2008) *Being Human: Human-Computer Interaction in the Year 2020*. Microsoft Research.
- Hart, J. (1998) *The Art of the Storyboard: Storyboarding for Film, TV, and Animation*. Focal Press.
- Hartson, H., Castillo, J., Kelso, J. and Neale, W. (1996) Remote evaluation: the network as extension of the usability laboratory. *Proceedings of CHI 1996*, pp. 228-235. ACM Press, New York.
- Hassenzahl, M. (2003) The thing and I: understanding the relationship between user and product. In Blythe, M., Overbeeke, K., Monk, A. and Wright, P. (Eds.), *Funology, From Usability to Enjoyment*, pp. 31-42. Kluwer Academic Publishers.
- Hassenzahl, M. (2004) The interplay of beauty, goodness, and usability in interactive products. *Human-Computer Interaction* 19, 4, 319–349.
- Hassenzahl, M. and Tractinsky, N. (2006) User experience - a research agenda. *Behaviour & Information Technology*, 25, 91-97.
- Hofstede, G. (2001) *Culture's Consequences: Comparing values, behaviours and organisations across nations*. Sage Publications Inc.
- Hofstede, G. (2005). *Cultures and Organizations: Software of the Mind*. McGraw-Hill, New York.
- Hoft, N. (1996) Developing a Cultural Model. In Del Galdo, E. and Nielsen J. (Eds.), *Intercultural User Interfaces*, pp. 41-73. John Wiley & Sons, New York, US.
- Holland, A.C. and Kensinger, E.A. (2010) Emotion and autobiographical memory. *Phys. Life Rev.*, 7, 88-131.
- Holzblatt, K., Wendell, J. and Wood, S. (2005) *Rapid Contextual Design. A How To Guide to Key Techniques for User Centered Design*. Elsevier, San Francisco, USA.
- Honold, P. (1999) Learning How to Use a Cellular Phone: Comparison between German and Chinese Users. *Technical Communication*, 46(2), 196-205.
- Horton, W. (2005) Graphics: The Not Quite Universal Language. In Aykin, N. (Ed.), *Usability and Internationalization of Information Technology*, pp. 157-187. Lawrence Erlbaum, New Jersey, US.
- Iivari, N. (2004) Enculturation of User Involvement in Software Development Organizations - An Interpretive Case Study in the Product Development Context. *Proceedings of NordiCHI 2004*, pp. 287-296. ACM Press, New York.
- Internet Usage Statistics (2010) *Internet Usage Statistics*. Miniwatts Marketing Group.
- ISO CD 9241-210 (2010) *Ergonomics of human-system interaction. Part 210: Human-centered design for interactive systems*.
- Isomursu, M., Tahti, M., Vainamo, S. and Kuutti, K. (2007) Experimental evaluation of five methods for collecting emotions in field settings with mobile applications. *Int. J. Hum.-Comput. Stud.*, 65, 404-418.
- Ito, M. and Nakakoji, K. (1996) Impact of Culture on User Interface Design. In Del Galdo, E. and Nielsen J. (Eds.), *International User Interfaces*, pp. 105-126. John Wiley & Sons, New York, USA.
- Jones, M. and Alony, I. (2007) The cultural Impact of Information Systems- Through the Eyes of Hofstede- A Critical Journey. *Issues in Information Science and Information Science and Information Technology*, Vol. 4.
- Jordan P.W. (2000) *Designing Pleasurable Products. An Introduction to the New Human Factors*. Taylor & Francis, London, UK.
- Jowell, R. (2008) How comparative is comparative research? *American Behavioral Scientist*, 42(2), 168-177.

- Kalton, G., Lyberg, L. E., and Rempp, J. M. (1998) Review of Methodology. In S. Murray, I. Kirsch, and L. Jenkins (Eds.), *Adult literacy in OECD countries: Technical report on the first international adult literacy survey* (Report NCES 98-053). Department of Education, Washington, DC, US.
- Kamppuri, M. (2011) *Theoretical and methodological challenges of cross-cultural interaction design*. University of Eastern Finland.
- Karat, J., Karat, C-M., and Vergo, J. (2004) Experiences People Value: The New Frontier of Task Analysis. In Stanton N. and Diaper, D. (Eds.), *The Handbook of Task Analysis for Human Computer Interaction*, pp. 585-603. Lawrence Erlbaum Associates, Mahwah, NJ, USA.
- Keesing, R. and Strathern, A. (1998) *Cultural Anthropology: A Contemporary Perspective*. Forth Worth; Harcourt Brace College.
- Kohn, M.L. (1987) Cross-national research as an analytical strategy. *American Sociological Review*, 52, 713-731.
- Kolli, R. (1993) Using video scenarios to present consumer product interfaces. *Proceedings of INTERACT '93 and CHI '93*, pp. 61-62. ACM Press, New York.
- Krippendorff, K. (2004) *Content analysis: an introduction to its methodology*. Sage, US.
- Kujala, S. and Nurkka, P. (2009a) Identifying User Values for an Activating Game for Children. *Proceedings of MindTrek 2009*, pp. 98-105. ACM Press, New York.
- Kujala, S. and Nurkka, P. (2009b) Product Symbolism in Designing for User Experience. *Proceedings of DPPI 2009*, pp. 176-186. Springer.
- Kujala, S., Walsh, T. , Nurkka, P. and Crisan, M. (2013) Sentence Completion for Understanding Users and Evaluating User Experience. *Interacting with Computers, Oxford Journals*, 26(3), 1-18.
- Law, E., Roto, V., Hassenzahl, M., Vermeeren, A. and Kort, J. (2009) Understanding, Scoping and Defining User Experience: A Survey Approach. *Proceedings of CHI 2009*, pp. 719-728. ACM Press, New York.
- Law, E., van Schaik, P. and Roto, V. (2014) Attitudes towards User Experience (UX) Measurement. *International Journal on Human-Computer Studies* 72(6) June 2014, 526–541.
- Lazar, J., Feng, J.H. and Hochheiser, H. (2010) *Research Methods in Human-Computer Interaction*. Wiley.
- Lee, J., Jones, P., Mineyama, Y. and Zhang, X. (2002) Cultural Differences in Responses to a Likert Scale. *Research in Nursing and Health*, 25, 295-306.
- Lelie, C. van der. (2006) The value of storyboards in the product design process. *Personal and Ubiquitous Computing*, 10(2–3), 159–162.
- Lilienfeld, S.O., Wood, J.M. and Garb, H.N., (2000) The scientific status of projective techniques. *Psychological Science in the Public Interest*, 1, 27-66.
- LISA (Localisation Industry Standards Association) *The Globalization Industry Primer*. Retrieved February 2011 from <http://www.lisa.org/Globalization-indust.468.0.html>.
- Lozar Manfreda, K., Batagelj, Z. and Vehovar, V. (2002) Design of Web Survey Questionnaires: Three Basic Experiments. *Journal of Computer-Mediated Communication* 7, 2002.
- Luedemann, I. and Muller, T. (2010). Online Surveys. In Schumacher, R. (Ed.), *The Handbook of Global User Research*, pp. 190-195. Morgan Kaufmann, Burlington, USA.
- Lynn, P., Japac, L., and Lyberg, L. (2006) What's so special about cross-national surveys? In Darkness, J.A. (Ed.) *Conducting Cross-National and Cross-Cultural Surveys*, pp. 7-20. ZUMA-Nachrichten Special, 12, Mannheim: ZUMA.
- Madden, T., Hewett, K. and Roth, M. (2000) Managing Images in Different Cultures: Cross-National Study on Color Meanings and Preferences. *Journal of International Marketing*, Vol. 8 No. 4, 90-107.
- Mahlke, S., (2005) Understanding Users' Experience of Interaction. *Proceedings of 2005 Annual Conference on European Association of Cognitive Ergonomics*, pp. 251-254. Chania, Crete, Greece.

- Marcus, A. (2005) User Interface Design and Culture. In Aykin, N. (Ed.) Usability and Internationalization of Information Technology. pp. 51-78. Lawrence Erlbaum, New Jersey, USA.
- Marcus, A. (2006) Cross-Cultural User Experience Design. In Barker-Plummer, O. et al. (Eds.), *Diagrams 2006*, LNAI 4045, pp. 16-24. Springer Verlag, Berlin Heidelberg.
- Marzano, S. (2009) *New Values for the Millennium: Phillips Corporate Design*.
- McCarthy, J. and Wright, P. (2004) *Technology as Experience*. MIT Press, Cambridge, MA, USA.
- McSweeney, B. (2002). Hofstede's Model of National Cultural Differences and Consequences: A Triumph of Faith- a Failure of Analysis. *Human Relations*, 55, 1, 89-118.
- Miles, M. B., and Huberman, A. M. (1994) *Qualitative data analysis: An expanded sourcebook*. Sage.
- Monahan, K., Lähteenmäki, M., McDonald, S. and Cockton, G. (2008). An investigation into the use of field methods in the design and evaluation of interactive systems. *Proceedings of British HCI 2008: People and Computers XXII: Culture, Creativity, Interaction - Volume 1*, pp. 99-108.
- Nie, N.H. and Erbring, L. (2000) *Internet and Society: Preliminary Report*. Stanford Institute of Quantitative Study of Society. Palo Alto, CA.
- Nielsen, J. (1990). Paper versus computer implementation as mockup scenarios for heuristic evaluation. *Proceedings of IFIP INTERACT 1990*, pp. 315-320.
- Obrist, M., Law, E.L-C., Väänänen-Vainio-Mattila, K., Roto, V., Vermeeren, A., and Kuutti, K. (2011) UX research- which theoretical roots do we build on – if any. In *Extended Abstract CHI 2011*. ACM Press, New York.
- Obrist, M., Wright, P.C., Kuutti, K., Rogers, Y., Hook, K., Pyla, P.S. and Frechin, J.L. (2013) Theory and Practice in UX Research: Uneasy Bedfellows? In *Extended Abstract CHI 2013*, April 27- May 2, 2013, Paris, France. ACM Press, New York.
- Oyugi C., Dunckley L. and Smith A. (2008) Evaluation methods and cultural differences: studies across three continents. *Proceedings of NordiCHI 2008*, pp. 318-325. ACM Press, New York.
- Putnam, C., Rose, E., Johnson, E.J. and Kolko, B. (2009) Adapting User-Centered Methods to Design for Diverse Populations. *Information Technologies and International Development*, 5 (4), 51-73.
- Rokkan, S. (1969) Cross-national survey research: Historical, analytical and substantive contexts, in Rokkan, S., Verba, S., Viet, J. and Almsy, E. (Eds.), *Comparative Survey Analysis*, pp. 3-55. Mouton, The Hague.
- Rosnow, R. and Rosenthal, R. (1997) *People Studying People*. W.H. Freeman and Company, New York.
- Roto, V., Rantavuo, H. and Väänänen-Vainio-Mattila, K. (2009) Evaluating User Experience of Early Product Concepts. *Proceedings of DPPI 2009*, pp.199-208.
- Runeson, P., Höst, M., Rainer, A. and Regnell, B. (2012) *Case Study Research in Software Engineering: Guidelines and Examples*. John Wiley & Sons, Inc., Hoboken, NJ, USA.
- Sanders, E.B-N. and Dandavate, U. (1999) Design for Experiencing: New Tools. In Overbeeke, C.J. and Hekkert, P. (Eds.), *Proceedings of the 1st International Conference on Design and Emotion*, TU, Delft, Netherlands, pp. 87-92.
- Schumacher, R. Ed. (2010) *The Handbook of Global User Research*. Morgan Kaufmann, Burlington, USA.
- Shi, Q. (2008) A Field Study of the Relationship and Communication between Chinese Evaluators and Users in Thinking Aloud Usability Tests. *Proceedings of NordiCHI 2008*, pp. 344-352. ACM Press, New York.
- Shih, T.-H. and Fan, X. (2008) Comparing Response Rates from Web and Mail Surveys: A Meta-Analysis. *Field Methods* 20, 3, 249-271.
- Singh, A., Taneja, A. and Mangalaraj, G. (2009) Creating Online Surveys: Some Wisdom from the Trenches Tutorial. *IEEE Transactions on Professional Communication* 52, 2, 197-212.

- Smith, A., Gulliksen, J., and Bannon, L. (2005) Building usability in India: Reflections from the Indo European Systems Usability Partnership. *Proceedings of HCI 2005*, pp. 397-405. Springer.
- Smircich, L. (1983) Concepts of Culture and Organizational Analysis. *Administrative Science Quarterly* (28)3, 339-358.
- Snitker, T. (2010) The impact of culture on user research. In Schumacher, R. (Ed.) *The Handbook of Global User Research*, pp. 257-277. Morgan Kaufmann, Burlington, USA.
- Soley, L. C., and Smith, A.L. (2008) *Projective Methods for Social Science and Business Research*. The Southshore Press, Milwaukee, USA.
- Stewart, E. and Bennett, M. (1991) *American Cultural Patterns: A Cross-Cultural Perspective*. Intercultural Press.
- Sun, H. (2012) *Cross-Cultural Technology Design. Crafting Culture Sensitive Technology for Local Users*. Oxford University Press.
- Survey Research Center (2010) *Guidelines for Best Practice in Cross-Cultural Surveys*. Ann Arbor, MI: Survey Research Center, Institute for Social Research, University of Michigan. Retrieved 12, 26, 2015, from <http://www.ccsr.isr.umich.edu/>
- Swallow, D., Blythe, M. and Wright, P. (2005) Grounding Experience: Relating Theory and Method to Evaluate the User Experience the User Experience of Smartphones. *Proceedings of 2005 Annual Conference on European Association of Cognitive Ergonomics*, Chania, Crete, Greece, pp.91-98. ACM Press, New York.
- Swanborn, P. (2010) *Case Study Research. What, Why and How?* SAGE Publications Ltd.
- Trompenaars, F. and Hampden-Turner, C. (1997) *Riding the Waves of Culture. Understanding Diversity in Global Business*. McGraw-Hill, New York.
- Van den Hende, E., Schoormans, J., Morel, K., Lashina, T., van Loenen, E. and de Boevere, E. (2007). Using early concept narratives to collect valid customer input about breakthrough technologies: The effect of application visualization on transportation. *Technological Forecasting and Social Change*, 1773-1787.
- Van Schaik, P., Hassenzahl, M., and Ling, J. (2012) User experience from an inference perspective. *Transaction on Human-Computer Interaction*, 19(2), Article 11.
- Vatrapu, R. and Pérez-Quiñones, M.A. (2006) Culture and Usability Evaluation: The Effects of Culture in Structured Interviews. *Journal of Usability Studies*, 1(4), 156-170.
- Vermeeren, A., Law. E., Roto, V., Obrist, M., Hoonhout, J. and Väänänen-Vainio-Mattila, K. (2010) User experience evaluation methods: current state and development needs. *Proceedings of NordiCHI 2010*, pp. 521-530. ACM Press, New York.
- Vyas, D. and van der Veer, G.C. (2006) Rich Evaluations of Entertainment Experience: Bridging the Interpretational Gap. *Proceedings of 13th European Conference on Cognitive Ergonomics: Trust and Control in Complex Socio-Technical Systems*, Zurich, Switzerland, pp. 137-144. ACM Press, New York.
- Väänänen-Vainio-Mattila, K., Roto, V. and Hassenzahl, M. (2008). Now Let's Do It in Practice: User Experience Evaluation Methods in Product Development. *Proceedings of CHI 2008*, pp. 3961- 3964. ACM Press, New York.
- Walsh, J., Kiesler, S., Sproull, L. and Hesse, B. (1992). Self-selected and randomly selected respondents in a computer network survey. *Public Opinion Quarterly* 56, 241-244.
- Walsh, T. and Helkiö, L. (2009) What is Cross-Cultural Design? Presentation in Cross-Cultural UX Design Seminar, Tampere University of Technology, Finland 15.9.2009.
- Walsh, T., Nurkka, P. and Walsh, R. (2010) Cultural Differences in Smartphone User Experience Evaluation. *Proceedings of MUM2010*, Article 24. ACM Press, New York.
- Walsh, T., Nurkka, P., Koponen, T., Varsaluoma, J., Kujala, S. and Belt, S. (2011) Collecting Cross-Cultural User Data with Internationalized Storyboard Survey. *Proceedings of OzCHI 2011*, pp. 301-310. ACM Press, New York.

- Walsh, T., and Nurkka, P. (2012) Approaches to Cross-Cultural Design: Two Case Studies with UX Web-Surveys. Proceedings of OzCHI 2012, pp. 633-642. ACM Press, New York.
- Walsh, T., Nurkka, P., Petrie, H. and Olsson, J. (2013) The Effect of Language in Answering Qualitative Questions in User Experience Evaluation Web-Surveys. Proceedings of OzCHI 2013, pp. 73-82. ACM Press, New York.
- Walsh, T., Petrie, H. and Odutola, F. (2014) Designing Mobile Technologies for Different Cultures: Issues of Assessing User Experience with Visual Materials. Proceedings of Ozchi 2014, pp. 470-479. ACM Press, New York.
- Walsh, T., Petrie, H. and Zhang, A. (2015) Localization of Storyboards for Cross-Cultural User Studies. Proceedings of Mobile and Ubiquitous Multimedia 2015, MUM 2015, pp. 200-209. ACM Press, New York.
- Weber, R. P. (1990) Basic Content Analysis. Sage Publications.
- Wenger, E. (1998) Communities of Practice. Learning, Meaning, and Identity. Cambridge University Press, Cambridge.
- Yin, R. K., (2003) Case Study Research: Design and Methods. (3rd ed.) SAGE Publications
- Yin, R. K., (2013). Case Study Research- Design and Methods. Sage Publications.
- Young, P. A. (2008) Integrating culture in the design of ICTs. British Journal of Educational Technology, vol. 39, no. 1, 6-17.

Original Publications

Publication 1

Kujala, S., Walsh, T., Nurkka, P. and Crisan, M. (2013). Sentence Completion for Understanding Users and Evaluating User Experience. *Interacting with Computers, Oxford Journals*, 26(3), 1-18.

Reproduced from Sari Kujala et al. Sentence Completion for Understanding Users and Evaluating User Experience. *Interacting with Computers* (2014) 26 (3): 238-255. By permission of Oxford University Press on behalf of The British Computer Society.

Publication 2

Walsh, T., Nurkka, P., and Walsh, R.. (2010). Cultural Differences in Smartphone User Experience Evaluation. *Proceedings of Mobile and Ubiquitous Multimedia (MUM 2010)*, ACM, Article 24.

Reprinted by permission.

Cultural Differences in Smartphone User Experience Evaluation

Tanja Walsh
Tampere University of Technology
P.O. Box 589
FIN-33101 Tampere, Finland
+358 40 849 0627
tanja.walsh@tut.fi

Piia Nurkka
Tampere University of Technology
P.O. Box 589
FIN-33101 Tampere, Finland
+358 40 849 0728
piia.nurkka@tut.fi

Rod Walsh
Nokia Research Center
Visiokatu 1
33720 Tampere, Finland
+358 50 483 5632
rod.walsh@nokia.com

ABSTRACT

Through globalization it has become increasingly important to understand how culture affects the user experience (UX) of mobile devices and services. Despite the importance of cultural factors in product design, not much research has been done to study them. Our aim was to discover cultural differences in the UX of a Smartphone with remote online sentence completion method. This paper presents the results of a remote online UX evaluation survey of a Smartphone with altogether 72 respondents from India, China, USA, UK and Denmark. The results indicate that there are cultural differences in how people experience the product and also in the way people respond to UX evaluation survey and share their experiences with the product. The results show that a remote online sentence completion survey is a relatively fast and easy way of gathering international user data, although the analysis can be challenging. The use of Hofstede's cultural dimensions in the analysis of the data gave us better understanding of the impact of specific culture on the results.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces – *Evaluation/methodology, User-centered design.*

General Terms

Design, Experimentation, Human Factors, Languages.

Keywords

Remote user study, cross-cultural design, sentence completion technique, user experience, mobile device.

1. INTRODUCTION

As the world has become truly a global marketplace, technology products and services are being sold worldwide in different cultures [e.g. 1, 7]. Ubiquitous products afford multi-user

applications and people, who interact with ubiquitous systems, such as public displays or smart phones, come from different cultural backgrounds and value systems. Consequently, in designing for global and local users there are an unlimited number of ways to get it wrong [4]. Therefore, cross-cultural issues are increasingly important in designing mobile devices and services. However, although cultural aspects seem to be a fairly new area in the ICT industry, companies have quickly realized the importance of making products international by not only localizing the product texts, but also looking into design issues with the goals of making products suitable, usable, and preferred by the users in the target market areas. Thus, making products and services international is not only a language issue, but should cover all sides of the design. The success of any product, service or system in international markets requires a good knowledge of customer needs in the planned variant market areas and appropriate localization of the product to fit the local needs and culture [1].

In addition to globalization of products and services, there has been a shift from usability to user experience. The customers globally expect more from their products and services than mere utility and usability: they are looking for experiences. In usability the focus has been on how the user interacts with the product or whether the user finds a product useful in task completion. With ubiquitous technology the uses of computing technology have reached far beyond productive tools to support work to other aspects of human life [18], and technology has become a means for human experiences [23]. In addition to the pragmatic dimension of UX that focuses on fulfilling users' functional needs, UX comprises also of the hedonic dimension that focuses on fulfilling users' stimulation and identity needs [8].

The aim of this study was to understand cross-cultural factors in how people from different countries experience the use of a Smartphone. In this paper we describe our findings to the following research questions: 1) Can we find cultural differences in UX evaluation with a remote online sentence completion method? 2) Can we find any affect from culture in the way users respond to a remote online sentence completion method? 3) Can Hofstede's cultural dimensions help in explaining cultural differences in the way people answer to sentence completion?

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

MUM '10, December 1-3, 2010, Limassol, Cyprus

Copyright © 2010 ACM 978-1-4503-0424-5/10/12 \$10.00

2. BACKGROUND

UX design should take into account users' socio-cultural context, because in designing UX there is greater focus on content, brand and emotions than in designing mere usability [22]. Therefore understanding the concept of culture and how it impacts the product UX, becomes an essential part of study and design of UX. Cross-cultural design aims to ensure that products are easy to use and that they provide good user experiences across cultural boundaries. Much of cognitive reasoning depends on social norms and background culture [15], and this cultural diversity makes it unrealistic for designers to rely only on intuition or personal experience when designing for good user experience in cross-cultural contexts [29]. However, there is no simple agreement on a specific definition of culture. According to Keesing and Strathern [19] most anthropologists seem to agree that culture is a learned behaviour consisting of thoughts, feelings and actions and is transferred in social interaction. Some anthropologists would like to limit the concept of culture to national and ethnic cultures, but most anthropologists seem to agree that social interaction, which in a globalized world is not tied in a place or time, is the most important prerequisite to produce and maintain a culture, and even special interests, such as Star Trek enthusiasts, can create a culture [7]. Hofstede [11] defines culture as "the collective programming of the mind which distinguishes the members of one group of people from another". This means that culture cannot be understood by studying only one individual, but rather that culture can only be read clearly as a set of shared characteristics within a group of people that affects the behaviours of individual members by providing norms for that group.

In order to create a basis for localization of product design, the key factors differentiating cultures from one another need to be clearly identified [14]. Two broad types of issues inherent to cross-cultural design related to culture are identified in relevant literature: There are objective issues, such as language and format conventions of time of day, dates and number, text directionality in writing systems etc. Then there are subjective issues such as value systems, behavioural and intellectual systems of one or more cultural groupings of users or the ways in which people in different cultures interact with computers and websites [10, 29]. Culture influences human-product interaction [10] and therefore it is vital to develop understanding of the cultural factors also in product design. For instance, designers need to be aware of users' nationality, language, history, and level of technical development [7]. Despite the importance of cultural factors in product design, little research has been performed to study them [5]. Although technology researchers and practitioners have long been aware of the challenges of global markets, there are still many unsolved problems concerning the extent to which culture may affect the development of the artefacts produced [29]. In relation to the product of development, cultural differences in signs, meanings, actions, conventions, norms and values raise challenging issues in the design of usable localized artefacts. In relation to the process of development, cultural differences potentially affect the manner which users are able to participate in design and act as subjects in evaluation studies [26].

2.1 International UX Research

Cross-cultural design requires studying existing theories of the target market cultures as well as performing international user research on-site or remotely. However, application of the common UX research methods in product design for global markets is not always viable for many reasons: budgets are limited, the ability to perform firsthand on-site research can be challenging without extensive local knowledge, and product time frames can limit the feasibility of field research [27]. Thus, international UX research is often time-consuming and expensive. Therefore, according to Väänänen-Vainio-Mattila, et al. [31] the main requirement for international UX evaluation methods is that they must be lightweight (not utilizing many resources). In addition, they must be fast to apply, and relatively easy to use [31]. These criteria can be at least partly met by applying remote methods for user experience research. However, no common practice exists on how UX can be studied remotely in international contexts, although a need for these kinds of methods has been previously identified [25].

2.2 Projective Sentence Completion Method

In our study we were interested to explore how applicable a remote online survey, with a projective technique called sentence completion, would be in gathering qualitative international user feedback. Projective techniques, such as bubble drawings, collage, personification, word association or sentence completion, are a collection of practical research methods which, when used skilfully, can help the researcher gain a deeper understanding from the respondents than would be possible with more direct questioning [2]. In sentence completion, the respondents are provided with beginnings of sentences that they then complete in ways that are meaningful to them [30]. By providing only the beginning of the sentence, a researcher does not decide what exactly is going to be asked, but the respondent has the freedom to choose. Thus, the results from sentence completion will be more representative of the participant's point of view and attitudes than those of the researcher. The sentence completion tool was chosen for this study because it has been successfully used in assessing motivations and attitudes [30] and identifying user values and meanings [6, 20]. It also appears to be more useful across cultures than positivist-type measures, such as bipolar scales, which are more likely to be culturally biased [30].

2.3 Hofstede's Cultural Dimensions

Hofstede's cultural dimensions have been found useful in cross-cultural design as a tool to understand cultural differences [21]. Applying Hofstede's dimensions to user research allows to learn and achieve more when planning and executing studies in multiple cultures and also gives a better understanding of the impact of specific culture on the results [28]. In this study, we were interested to use Hofstede's cultural theories and dimensions in order to understand the cultural differences reflected in the content of the answers and in the answering style. We were also interested to gain knowledge on whether Hofstede's dimensions could be utilized in the analysis, without making cultural generalizations.

The development of cultural dimensions is based on Hofstede’s studies on what values IBM workers had in various countries [11, 12]. The idea was to compare cross-cultural differences. Based on the data and additional data from the Chinese Value Survey, five cultural dimensions in which cultures differentiate were found for 75 countries and regions. Each country was given a ranking on how ‘high’ or ‘low’ they score on these values. The dimensions are measured on a scale from 0 to 125. In our study we were interested to use the dimensions to help analyze the cultural differences found in UX evaluation, despite the fact that Hofstede’s work has been criticized for instance for the fact that his study assumes that national populations are homogenous wholes, but most nations are ethnic units. Or that nations are not proper units of analysis as cultures are not necessarily bounded by borders. Critics have also argued that Hofstede’s study was performed among IBM workers and there are no evidence-based reasons for assuming that the average IBM worker’s response would reflect the national culture. [e.g. 16, 24]. Considering the limitations of Hofstede’s work and that culture is hard to capture absolutely through a series of dimensions, we still wanted to use his dimensions in order to gain understanding how cultures may differ and if his work was helpful in analyzing the responses.

The first Hofstede’s cultural dimension is *power distance*. It is the extent to which less powerful people in a society expect and accept that power is distributed unequally. E.g. Malaysia has high power distance index (PDI) 104 and Netherlands has low PDI 38. The second dimension of national culture is *uncertainty avoidance*. It is the extent to which people tolerate ambiguity and risk or feel threatened by change. E.g. Greece has high uncertainty avoidance index (UAI) 112 and Denmark low UAI 23. The third dimension is *individualism*, as opposed to *collectivism*. It is the extent to which people are integrated into tight social networks and act on the basis of their own needs or the needs of their social groups. E.g. USA is an individualistic society scoring 91 on the individualism index (IDV) and Colombia is collectivistic with IDV 13. The fourth dimension along which national cultures differ systematically is *masculinity*, with its opposite pole *femininity*. According to Hofstede, the duality of sexes is a fundamental fact with which different societies cope in different ways. The main issue is the implications the biological differences between the sexes should have for the emotional and social roles of genders. The dominant values in a masculine society are achievement and success and the dominant values in a feminine society are caring for others and quality of life. E.g. Japan has a high masculinity index value (MAS) 95 and Sweden a low MAS 5. The fifth concept that Hofstede found later is *long vs. short-term time orientation*, which focuses on the degree the society embraces, or does not embrace, long-term devotion to traditional values. E.g. China has high long-term time orientation index (LTO) 118: long-term rewards expected as a result of today’s hard work and thus rewards are not expected immediately and e.g. Canada has low LTO 23. Table 1 presents the index values for the countries involved in this study.

	PDI	UAI	IDV	MAS	LTO
USA	40	46	91	62	29
India	77	40	48	56	61
China	80	30	20	66	118
UK	35	35	89	66	25
Denmark	18	23	74	16	-

Table 1: Index values of Hofstede’s five cultural dimensions (power distance, uncertainty avoidance, individualism, masculinity and long-term time orientation) for USA, India, China, UK and Denmark.

3. METHODOLOGY

In our study we gathered the cross-cultural data to evaluate the overall UX of a Smartphone, which was in a late phase in product development. Initially all together 130 respondents from 10 countries were invited to answer and the response rate was 75%. Countries, where respondents came from, were India, Japan, China, Finland, Denmark, Germany, UK, USA, Singapore and United Arab Emirates. Most respondents came from USA (26%) and from China (17%). Respondents were mainly engineers, developers and business people of the same international company. They had all been using the same version of the Smartphone in testing already for 5 months before they answered our survey. The results of how the remote online sentence completion method worked in the UX evaluation and the results of the evaluation were reported in [32]. In this paper, the focus is to further investigate whether any cultural differences in product UX can be found, and whether answers to remote online sentence completion differ from one culture to another.

3.1 Online Survey

The survey was a relatively short asynchronous online questionnaire. A remote asynchronous questionnaire is characterized by both a spatial and temporal separation of users and evaluators [3]. The language of the survey was English and the respondents were expected to answer in English. We knew beforehand that the respondents were fluent in English, as their official daily business language was English. The reason why the survey was not translated into different languages was that our industrial collaborator’s interest was to keep the cost of the survey low and avoid translation processes. The survey was implemented in our industrial collaborator’s own web-tool, which our respondents were already familiar with. They knew how to use the tool and how to answer the questionnaire. Our survey included 14 sentence completion tasks, in which the respondents were provided with beginnings of sentences and they were asked to complete them in the following way: ”Please, complete sentences so that they describe how you feel. Respond rather quickly without thinking too long. You can leave a sentence without an answer if you feel it is not suitable for your situation.” Sentences were designed to gather data widely from different UX dimensions presented in relevant literature (e.g. 9, 17): Usability, utility, context, meaning, aesthetics (visual/haptic/acoustic), identification, socio- & ideo-pleasure, brand & image and culture. The first set of 14 sentences was tested with two pilot testers, a Finn and a Briton, in order to

verify that the sentences were correctly understood. Some changes were made to the final set according to their comments and answers. A more thorough pilot testing was not possible, due to a very tight survey implementation schedule.

3.2 Analysis

We used the affinity diagram method to analyze the data from completed sentences [13]. Our aim with this method was to find the most common answer categories from the raw qualitative data for each sentence, and to find out how users experienced different areas of the product. We let the users' data suggest labels for emerging themes, rather than starting with predefined categories. Groups were then labelled using the words of the respondent saying what they do and how they think. Three researchers categorised the answers based on arising topics using post-it notes on a paper sheet. The categories were discussed and evaluated between the three researchers. The answer categories for each sentence were then transferred from the paper sheets into excel. A graph for each 14 sentence completion task was created. An example of a graph is presented in Figure 1.

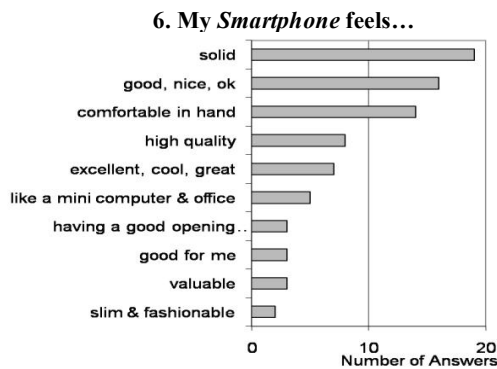


Figure 1: An example of categories formed from sentence completion results. *Smartphone* refers here to the name of the Smartphone in evaluation.

After finding the most common answer categories for each sentence, we continued by selecting 5 countries from the biggest user groups. The countries selected were USA (24 users), China (16 users), UK (11 users), Denmark (12 users) and India (9 users). Our aim then was to cluster the data according to the countries and to see if there were cultural differences in experiencing the product. Furthermore, we organized the data so that the distribution of responses was correlated pair-wise between each country. Each correlation figure between +1 and -1 represents the level of similarity of variance in responses to a particular question. Where a value of 0 represents no similarity between the value of responses of 2 nations. +1 represents an identical pattern of variance of responses and -1 represents a perfect opposite correlation of responses. Generally, countries showed some level of positive correlation to one another, whether great or small. However, one specific question revealed very country-specific views: “When I use my *Smartphone*, I feel...”. Figure 2 illustrates the country-wise correlations for this question, and figure 3 shows responses categories to this

question from different countries. By comparing the differences in clusters of answer categories and differences in answers between countries we were able to analyze the data further. For analyzing the cultural differences and the reasons for them we used Hofstede’s cultural dimensions and index values of cultural differences for each country.

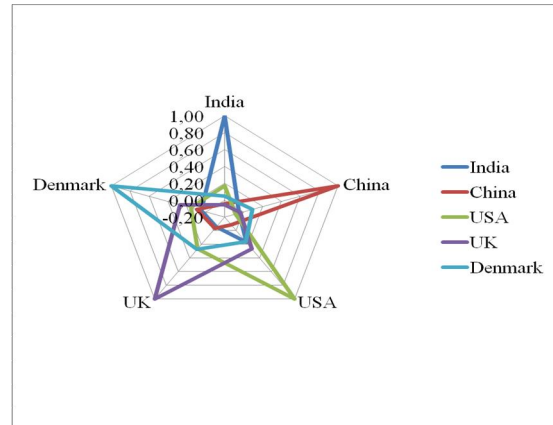


Figure 2: Example of differences in answers between countries in sentence 7: When I use my *Smartphone*, I feel...

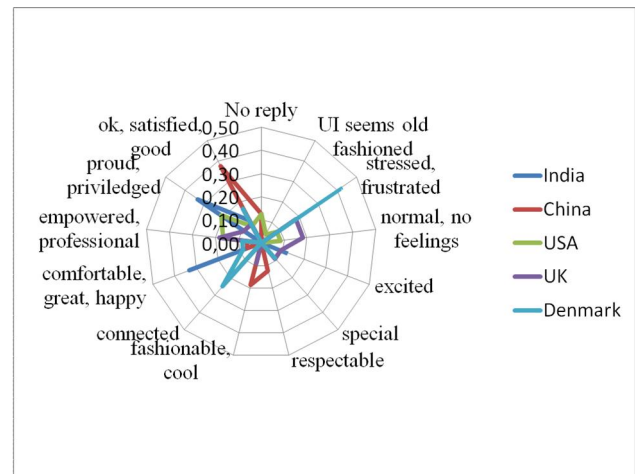


Figure 3: Example radar of clusters of answer categories by country in sentence 7: When I use my *Smartphone*, I feel....

4. RESULTS

Our sentence completion answers showed considerable nuance and variation for UX categories: 1393 items from 14 questions formed 171 distinct categories. These results of the overall UX evaluation of a Smartphone created a base for clustering the answer categories by countries [32] for finding cultural differences and are summarised in Table 2. The number of UX dimensions identified is also shown.

Sentences	Items	No reply	Cat egor ies	UX Dimen- sions
1. Using my <i>Smartphone</i> is...	93	4	10	4
2. The functions of my <i>Smartphone</i> are...	99	3	13	4
3. My <i>Smartphone</i> is best for...	192	4	13	2
4. My <i>Smartphone</i> is not suitable for...	85	13	12	3
5. I think the appearance of <i>Smartphone</i> is...	91	6	7	2
6. My <i>Smartphone</i> feels...	97	10	14	6
7. When I use my <i>Smartphone</i> , I feel...	96	6	12	4
8. I'm happy with my <i>Smartphone</i> , because...	93	4	14	5
9. The problem with my <i>Smartphone</i> is...	95	8	15	5
10. It is irritating that my <i>Smartphone</i> ...	93	10	15	2
11. If other people have paid attention to my <i>Smartphone</i> , they...	99	9	13	6
12. The owner of <i>Smartphone</i> is typically...	98	19	11	3
13. In my own culture, <i>Smartphone</i> ...	75	22	14	6
14. Compared to other smart phones, <i>Smartphone</i> is...	91	6	8	6
Total:	1393	124	171	

Table 2: Summary of sentence completion results. *Smartphone* refers here to the name of the Smartphone in evaluation.

In the following we will describe the findings of cultural differences from each of the sentences, which all addressed certain UX dimensions. We found clusters of answers by country for each answer categories. The results are summarized under the UX dimensions, which were: 1) Usability, utility, context and meaning 2) Aesthetic aspects 3) Subjective feelings 4) Identification, socio & idea-pleasure, brand image and culture. In the sentences the Smartphone in evaluation is referred with *Smartphone*.

4.1 Usability, Utility, Context and Meaning

The first four sentences were designed to probe the areas of usability, utility, context and meaning of a product. The analysis showed that the sentence 1 "Using my *Smartphone* is..." and sentence 2 "The functions of my *Smartphone* are..." did not elicit negative feedback from Indian and Chinese users: Indian users gave answers such as "pleasure", "comfortable", "proud", "amazing & great", "better than previous models". Chinese gave answers like "ok & good", "amazing & great", "style statement". Americans gave mostly positive feedback such as "amazing & great & cool", "exciting", "OK & good", "easy", "handy & useful". The biggest answer groups for Americans and Brits with sentence 1 were the same: "amazing & great & exciting". British users gave both positive and negative answers and used the most varied language. Danes had most answers in the "easy & handy & useful"-category, which is referring to the utilitarian aspects of the product. Danes also had varied positive answers with sentences 1 and 2 such as "fun", "rich & diverse", "supporting

my daily life". The Brits and Danes gave more negative answers than others e.g. about usability of the UI and small SW related problems. Especially Danes had several answers categories in a negative feedback.

The biggest answer categories for all but Americans with the sentence number 3 "My *Smartphone* is best for ..." was a list of applications or features such as connectivity, browsing, widgets, multimedia. Chinese also answered "young people... business people... the youth who purchase fashion", which all fell into category of "certain types of people". Indians also gave answers of "certain types of people". Furthermore Danes and Americans gave answers that went into category "supporting my needs": The biggest answer category for Americans with sentence 3 was in the category of "communicating and keeping in touch". As one American wrote: "Keeping in contact with my life". Also texting, messaging and browsing were popular answers for Americans.

Even though sentence 4 "My *Smartphone* is not suitable for..." was leading towards a negative answer, the biggest answer category for Indians was "Is suitable for everything". All in all Indians gave answers to 5/12 categories, which is not as varied as with other countries. Chinese were also careful with negative answers and they had a peak in the category of "certain groups of people". Danes gave very pragmatic answers with sentence 4 such as "using in the car" or "long battery life". Their answers had a peak in "quick and rough everyday use".

4.2 Aesthetic Aspects

The sentences 5 and 6 were designed to probe the areas of aesthetic aspects such as visual, haptic, and acoustic. With sentence 5 "I think the appearance of *Smartphone* is..." Indians gave only positive feedback. Users from India, China and Denmark had most answers in the category of "Nice, good". Americans gave most answers in the categories of "Very nice & cool & great & attractive. Brits had again clearly most varied positive answers such as "sleek" "elegant, subtle, charming" "solid". Danes gave again most varied negative feedback such as "dull & ordinary" and "too big".

With sentence number 6 "My *Smartphone* feels..." Indians gave very positive feedback. Their biggest answer categories were "excellent & cool & great". Other answers included "good & nice & ok", "comfortable in hand", "high quality", "like mini computer and office", "valuable". Chinese also liked that it was "comfortable in hand" and "slim & fashionable". British users didn't have any negative comments. They had most answers in "solid" and other answers were "valuable", "high quality", "excellent, cool, great". Americans answered most in the same category as British users "solid". Other positive categories were "good for me", "comfortable in hand". Negative answers included "big & bulky" and "complicated". Danes gave varied negative answers as well as positive: "solid, "comfortable in hand" "good & nice & ok".

4.3 Subjective Feelings

The sentences 7, 8, 9 and 10 were aimed to collect our users' subjective feelings about the product. With the sentence 7 "When I use my *Smartphone*, I feel..." Chinese gave mainly positive answers. Their biggest answer category was "ok & satisfied &

good” and also “respectable”. Also Indians gave very positive feedback. Their two biggest answer categories were “proud & privileged” and “comfortable & great & happy”. Both Chinese and Indian users felt “fashionable and cool” using the product. Danish users gave again varied negative feedback as well as positive. Their biggest answer group as well as British users’ biggest was “stressed & frustrated & problematic”. Danish users’ biggest positive answer category was “connected & in touch”. Whereas British users’ felt “empowered & professional & confident” when using the product. Americans felt “proud and privileged”.

With sentence number 8 “I am happy with my *Smartphone*, because...” both Americans and Danes answered the most in the category of “it fills my needs”. Where as the biggest answer group for Chinese was “it is attractive”. Brits had two biggest answer categories: “it is attractive” and “it works”. Indians gave equal amount of answers in two biggest categories: “of its touch & keypad” and “it fills my needs”.

With sentence 9 “The problem with my *Smartphone* is...” majority of answer categories were about the functionality of the phone. Users from China, USA, UK and Denmark had the most answers in “slow software & UI” and it was the third biggest category for Indians.

Sentence 10 “It is irritating that my *Smartphone*...” was clearly aimed at leading for negative feedback, Denmark was the only country which didn’t have any “No replies”. Danes complained most about “has complicated UI” and “is slow” and “touch is not responding”. Indian respondents had the highest response rate in the “No reply”-category. Chinese user group was the only group answering “Nothing irritates” and had also some “no replies”. All countries gave responses in some functional categories.

4.4 Identification, Socio & Ideo-Pleasure, Brand & Image & Culture

Answers from sentences 11, 12, 13 and 14 aimed to probe about identification, socio & ideo-pleasure, brand image and culture issues relating to the product. Sentence 11 “If other people have paid attention to my *Smartphone*, they...” Indian users gave only positive feedback such as “like the looks” and “are interested to buy”. Also both Indian and Chinese respondents answered into a category “are certain kind of people”. Chinese users gave positive feedback such as “are curious, interested”, “feel good, like it” and “like the looks”.

Sentence 12 “The owner of *Smartphone* is typically...” Both Danish and American users answered “wants to be connected, on the go”, “business person, professional” and “early gadget adaptor”. Indians and Chinese answered “young” and “stylish”. Chinese also gave answers to whom the phone is not suitable for. Indian users also answered “proud” and “well off with money”. British users had a high amount of “No reply” and their biggest answer group was “heavy user”.

Sentence 13 “In my own culture, *Smartphone* ...” had a higher than average “No reply”-rate with other than Chinese users. “Fits well” was the biggest answer group for both India and China. Indians also mentioned “better than device X” and “is getting part of my life”. Chinese answered also “is attractive”. Apart

from No replies, American answered “supercool”, “valuable, luxury” and “competitive”. Both British and Danish users found negative issues under “needs improvement” but for different reasons: One British users found it “cool and beautiful, but (functionality of the software) needs to be improved.” Danish users would say “it is too late”. British and Danish users also answered “supercool”.

Sentence 14 “Compared to other Smartphones, *Smartphone* is...” brought Danish users to answer mostly negatively “good, but not enough” and “having problems”. The biggest answer categories for British and American users were “good, but not enough” and “the best”. Chinese users gave no negative feedback. Their answers included categories: “right size” and “better”, which were the biggest answer categories and “rich in functions & good for business”. Indians thought it was “the best”, “good, but not enough”, “the best” and “good looking”.

5. DISCUSSION

The results from the clustering of countries and answers brought up some emerging themes relating to cultural differences found in answers. The emerging themes are discussed below.

5.1 Positive and Negative Answers

The high amount of received completed sentence items indicated that the sentence completion in an online questionnaire works well. There were no scaling or pre-defined answers and therefore respondents were inclined to write what they think about the product. Respondents from all countries seemed to give feedback reasonably equal amount. However, there was a clear difference in the way users from different countries were giving negative or positive answers. The results show that Indian users were the most cautious in giving any negative feedback and a reasonable amount of Indian users even avoided answering at all with a sentence that is leading towards negative answers (sentence number 10). Chinese users seemed also careful about giving negative feedback and it was the only country with users answering “Nothing irritates” with sentence 10. Both China and India have a high-PDI, which indicate that society expects respect for authority and could therefore be seen also in avoidance of negative feedback. China also has a low-IDV, which indicates that confrontations need to be avoided. Danish users, on the contrary, gave varied negative answers with every sentence and Danes were the only users who did not have any “No replies” with sentence 10. Denmark has a low uncertainty avoidance index (UAI) which means that the society accepts more change and risks and therefore could make Danish users more prone to freely express both positive and negative feelings. Denmark has also low-PDI 18, which indicates that society prefers equality and accepts criticism from all. This could also explain why Danes were able to best of all nationalities in this study to express their whole scale of emotions. Also USA and UK have a fairly low-PDI, which could explain also their ability to express both negative and positive feelings and ideas. Americans gave varied negative feedback, but also very positive answers. British users gave both negative and positive answers, but their answers were more subtle and scattered into many different answer categories more so than American users’ answers. British, American and Danish users were able to

express feelings of frustration and stress. With sentence 9 “The problem with my *Smartphone* is...” gave answers from all five countries to software related functional problems. The results indicate that some nationalities are more expressive in communicating their emotions than others. It could be explained partly by cultural differences in expressing emotions, but also, in this study, partly because users may not have been able to express their feelings in English language as required. Our users were all part of the same international company and in spite that they were fluent in “English for business”, they might not have been fluent enough to express their feelings in other than their own language. The cultural background of users as well as their ability to express their feelings in a foreign language needs to be taken into account when analyzing and reporting the results of a qualitative, emotionally laden data. It is also important to consider, how comparable the results from different countries are, if others strongly express themselves in all scale of emotion and others are not as expressive.

5.2 Language

The UI language of the survey was English, because the survey tool and processes developed for the system, were not aimed to have multi-lingual support. As the users responded in English, there was no need to translate their answers. To not to translate made the survey implementation and data analysis process faster and lower cost. Prerequisite for not translating it, was that the users would be able to understand and write English fluently. The difference in the use of language was one clear finding. This type of survey, where users need to write answers with their own words and not to just select ready made answers language plays a significant role: Native English speakers’ from UK and USA quite naturally had much stronger rhetoric and much more varied language in their answers than non-native speakers. They were able to express themselves clearly the best in English as it would be their native language. Although British and American users had differences in the overall answering, they had 10 out of 14 biggest answer categories the same. This could suggest that native language speakers understand the sentences similarly and also think about the continuation of the sentences in a similar way. Non-native English Speakers e.g. Chinese respondents gave short and sometimes unclear answers. I’m happy with my *Smartphone*, because...” “good body size and touch window”. “If other people have paid attention to my *Smartphone*, they...” “become big eyes”. In analyzing and reporting the qualitative results, it is needed to consider the effects of the online survey’s UI language (the given sentences) and the input language (the language that respondent is answering in). Our results seem to confirm the limitations in language proficiency by participants from India and China, which in the best case can indicate a cultural characteristic, but in the worst case, the inability to express what they want to express due to poor domain of the English language. Consequently, in analysis and reporting the results one needs to consider the effects of the level of experience and skills with the language, both in the sense of understanding the questions and being able to express their feelings.

5.3 Reflecting Self through Other People

Indian and Chinese users gave answers to some sentences that belonged to a category “certain types of people”. This was rather interesting cultural difference as no users from USA, UK or Denmark would answer similarly with those same sentences. Clearly the users in India and even stronger in China would not talk directly about oneself, but tell about others around them. By doing so, they would reflect the self through other people. Chinese gave information about the context by identifying the device with certain types of people “My *Smartphone* is best for...” “the youth who purchase fashion...” “business people”. Chinese users mostly related the product with young and stylish people or as a “style statement”. Whereas Americans, expressed in their answers the importance of their own texting, messaging and browsing, socializing and how it supports their lifestyle well: “My *Smartphone* is best for...” “everyday usage in every aspect”... “my daily needs”.... “keeping in contact with my life”... “Facebook monitoring...”. American, British and Danish users’ answers were related to identification of the product to everyday use describing it being part of their everyday life and clearly identifying it with their own everyday usage. Users from all countries would relate the product to professional use. The individualism index could explain why Chinese would not talk directly about themselves. The IDV-score for Chinese is low 20 and then on the contrary, Americans, British and Danish users would high-light themselves as users in their answers as their IDV scores are high.

5.4 Different Experiences of the Same Product

In the results we noticed that the looks of the product came up in the answers of Chinese users more than with other countries and they liked the style and size of the evaluated Smartphone a lot. It was repeated in Chinese users’ answers how stylish it was. Indians and Americans felt proud and privileged using the product and they also liked the looks of the product. Indians regarded the product high quality, valuable and consistently comparing it to other product and regarding the tested device “better”. Americans wanted more consistent and inspiring UI with fewer steps to do things and better touch usability (single/double click, scrolling). British respondents also answered in a varied positive way about the look and feel of the product “sleek and elegant”. Danish users also liked the device and despite the varied negative answers they also gave strong positive answers especially when talking about their everyday needs and that “it felt good in hand”. Danish users’ answers indicated also the importance of utilitarian aspects. All respondents were interested about the functionalities of the product and valued the rich and diverse functions of it. Danish and American users’ answers were related to the usefulness of it and how they are able to use it in their everyday life and communicating and keeping in touch.

6. CONCLUSIONS

The aim of this study was to find out any cultural differences in the UX evaluation with remote online sentence completion. We collected a vast amount of qualitative data with a remote online sentence completion method, categorized the data into meaningful answer categories and furthermore clustered the

found answer categories by 5 different countries and then correlated the answers. By comparing the clusters of answer categories, we found out that users from different countries answered in a different way: Not only the style, but also the content of the answers were different. We found cultural differences in the following themes: Firstly, the users from different countries were giving different amount and expression of negative/positive answers. Hofstede's Power Distance and Uncertainty Avoidance dimensions seemed to correlate with the way people from different countries gave negative or positive feedback or any feedback at all. Secondly, we found differences in answering style due to the fact that the survey was in English and users from different countries were expected to answer in English. Thirdly, there were differences in how users were describing the product either through other people or directly through own use. Hofstede's Individualism vs. Collectivism dimension seemed to correlate and explain well the reasons why people described the product and how they related to it. Furthermore, there were differences in experiencing the look and feel and utility of the product. The survey gave knowledge of what issues about the product came up in the answers and that there were cultural differences in answers. By understanding what these differences meant from the product UX point of view, we were able to give improvement ideas for product development.

Although, in cross-cultural design it is necessary to understand the cultural differences of the actual product UX, it is also important to understand that users will respond in the questionnaires in different ways. The way users tell their stories of experiences differ partly because of their cultural background. In order to gain deeper knowledge of how users experienced the answering to a remote online sentence completion survey, we would need to do another, similar kind of study with an interview session in the end, where we could gain information how did users feel about answering and find out if they had understood the sentences the same way. An additional verification mechanism such as the previously mentioned interview as well as a much deeper analysis of the correlation between the observations and the Hofstede's dimensions would help to gain even more knowledge of the sentence completion method and cultural differences.

This study demonstrated that a remote online sentence completion survey is a relatively fast and easy way of gathering international user data providing the users have access to the Internet, have the needed equipment and are able to understand and write in English, if the survey is not going to be translated. Translating the survey and answers would facilitate users' ways of expressing their feelings and emotions. For future study it might be useful to investigate how a translated survey differs from a non-translated survey. Although gathering the data was fast and easy, the analysis of the qualitative data was rather laborious. Therefore, another useful area for future study would be methodology to attain the same quality of results as the affinity diagram approach, but in a more rapid, efficient and versatile manner. Another interesting direction for further research would focus on accounting for differences in answering styles between countries and making the answers directly comparable. It would also be important to investigate the best

and new practices for incorporating the gained cross-cultural knowledge into actual product UX design process. Based on our case study, a remote sentence completion method was a useful and relatively fast way of gaining knowledge of diverse users of the overall product UX and its strength lies in the rich qualitative data, although the analysis of the data poses challenges.

7. ACKNOWLEDGMENTS

We thank Liinu Helkiö for her assistance, Professor Sari Kujala and Tiina Koponen for their valuable comments and Heli Rantavuo from Nokia for providing us the possibility of conducting this case study. This research was part of the project "SUXES - User Experience Evaluation for Supporting International Competitiveness", mainly funded by Tekes, the Finnish Funding Agency for Technology and Innovation (decision number 40079/09).

8. REFERENCES

- [1] Aykin, N. 2005. Overview: Where to Start and What to Consider? In *Usability and Internationalization of Information Technology*, N. Aykin, Ed. Lawrence Erlbaum, New Jersey, 3-20.
- [2] Boddy, C. R. 2007. Projective techniques in Taiwan and Asia-Pacific market research. *Qualitative Market Research: An International Journal*, 10, 1, 48-62.
- [3] Bruun, A., Gull, P., Hofmeister, L., and Stage, J. 2009. Let your users do the testing: a comparison of three remote asynchronous usability testing methods. In *Proceedings of the 27th international Conference on Human Factors in Computing Systems* (Boston, USA, April 04-09, 2009). CHI'09. ACM, New York, 1619-1628.
- [4] Chavan, A.L, Gorney, D., Prabhu, B. and Arora, S. 2009. The Washing Machine That Ate My Sari – Mistakes in Cross-Cultural Design. *Interactions* (Jan/Feb 2009), 26-31.
- [5] Choi, B., Lee, I., Kim, J. and Jeon, Y. A Qualitative Cross-National Study of Cultural Influences on Mobile Data Service Design. 2005. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (Portland, Oregon, USA, April 02 - 07, 2005). CHI '05. ACM, New York, NY, 661-670.
- [6] Cockton, G., Kujala, S., Nurkka, P. and Hölttä, T. 2009. Supporting worth mapping with sentence completion. In *Proceedings of the 12th IFIP TC 13 international Conference on Human-Computer interaction: Part II* (Uppsala, Sweden, August 24 – 28, 2009). T. Gross, J. Gulliksen, P. Kotzé, L. Oestreicher, P. Palanque, R. O. Prates, and M. Winckler, Eds. Lecture Notes In Computer Science. Springer-Verlag, Berlin, Heidelberg, 566-581.
- [7] Del Galdo, E. Culture and Design. 1996. In *International User Interfaces*, E. Del Galdo and J. Nielsen, Eds. John Wiley & Sons, New York, USA, 74-87.
- [8] Hassenzahl, M. 2003. The thing and I: understanding the relationship between user and product. In *Funology, From Usability to Enjoyment*, M. Blythe, K. Overbeeke, A. Monk,

- and P. Wright, Eds. Kluwer Academic Publishers, Norwell, MA, USA, 31–42.
- [9] Hassenzahl, M. and Tractinsky. 2006. User Experience- A Research Agenda. *Behaviour and Information Technology*, 25, 2, 91-97.
- [10] Hofst, N. Developing a Cultural Model. 1996. In *International User Interfaces*, E. Del Galdo and J. Nielsen, Eds. John Wiley & Sons, New York, USA, 41-73.
- [11] Hofstede, G. 2001. *Culture's Consequences: Comparing Values, Behaviours and Organizations Across Nations*. Sage Publications Inc, USA.
- [12] Hofstede, G. 2005. *Cultures and Organizations: Software of the Mind*. McGraw-Hill, New York, USA.
- [13] Holtzblatt, K., Burns Wendell, J. and Wood, S. 2005. *Rapid Contextual Design. A How-To Guide to Key Techniques for User-Centered Design*. Elsevier, San Francisco, USA, 159-179.
- [14] Honold, P. 1999. Learning How to Use a Cellular Phone: Comparison Between German and Chinese Users. *Technical Communication*, 46, 2, 196-205.
- [15] Ito, M. and Nakakoji, K. 1996. Impact of Culture on User Interface Design. In *International User Interfaces*, E. Del Galdo and J. Nielsen, Eds. John Wiley & Sons, New York, USA, 105-126.
- [16] Jones, M. and Alony, I. 2007. The Cultural Impact of Information Systems – Through the Eyes of Hofstede – A Critical Journey. *Issues in Information Science and Information Technology*, Vol. 4, 2007.
- [17] Jordan, P.W. 2000. *Designing Pleasurable Products. An Introduction to the new human factors*. Taylor & Francis, London, UK.
- [18] Karat, J., Karat, C-M., and Vergo, J. 2004. Experiences People Value: The New Frontier of Task Analysis. In *The Handbook of Task Analysis for Human-Computer Interaction*, N. A. Stanton and D. Diaper, Eds. Lawrence Erlbaum Associates, Mahwah, NJ, USA, 585-603.
- [19] Keesing, R. and Strathern, A. 1998. *Cultural Anthropology: A Contemporary Perspective*. Forth Worth, TX, Harcourt Brace College.
- [20] Kujala, S. and Nurkka, P. 2009. Product Symbolism in Designing for User Experience. In *Proceedings of the 4th International Conference on Designing Pleasurable Products and Interfaces* (Compiègne, France, 13-16 October, 2009), DPPI'09, 176-186.
- [21] Marcus, A. User Interface Design and Culture. 2005. In *Usability and Internationalization of Information Technology*, N. Aykin, Ed. Lawrence Erlbaum, New Jersey, 51- 78.
- [22] Marcus, A. 2006. Cross-Cultural User Experience Design. *Diagrammatic Representation and Inference, Lecture Notes in Computer Science*, 4045/2006, 16-24.
- [23] Marzano, S. 2000. *New Values for the Millennium: Philips Corporate Design*. V+K Publishing, Eindhoven, Netherlands.
- [24] McSweeney, B. 2002. Hofstede's Model of National Cultural Differences and Consequences: A Triumph of Faith- a Failure of Analysis. *Human Relations*, 55, 1, 89-118.
- [25] Monahan, K., Lähteenmäki, M., McDonald, S. and Cockton, G. 2008. An Investigation into the Use of Field Methods in the Design and Evaluation of Interactive Systems. In *Proceedings of the 22nd British HCI Group Annual Conference on People and Computers: Culture, Creativity, interaction - Volume 1* (Liverpool, United Kingdom, September 01 – 05, 2008). British Computer Society Conference on Human-Computer Interaction. British Computer Society, Swinton, UK, 99-108.
- [26] Oyugi, C., Dunckley L. and Smith A. 2008. Evaluation methods and cultural differences: studies across three continents. In *Proceedings of the 5th Nordic Conference on Human-Computer interaction: Building Bridges* (Lund, Sweden, October 20 – 22, 2008). NordiCHI '08, vol. 358. ACM, New York, NY, 318-325.
- [27] Putnam, C., Rose, E., Johnson, E.J. and Kolko, B. 2009. Adapting User-Centered Methods to Design for Diverse Populations. *Information Technologies and International Development*, 5, 4, 51-73.
- [28] Schumacher, R, Ed. 2010. *The Handbook of Global User Research*. Morgan Kaufmann, Burlington, USA.
- [29] Smith, A., Gulliksen, J., and Bannon, L. 2005. Building usability in India: Reflections from the Indo European Systems Usability Partnership. In *People and Computers XIX- The Bigger Picture: Proceedings of HCI 2005*, T. McEwan, J. Gulliksen, and D. Benyon, Eds. Springer, 219-232.
- [30] Soley, L. C. and Smith, A. L. 2008. *Projective Methods for Social Science and Business Research*. The Southshore Press, Milwaukee.
- [31] Väänänen-Vainio-Mattila, K., Roto, V., and Hassenzahl, M. 2008. Now Let's Do It in Practice: User Experience Evaluation Methods in Product Development. In *CHI '08 Extended Abstracts on Human Factors in Computing Systems* (Florence, Italy, April 05 – 10, 2008). CHI '08. ACM, New York, NY, 3961-3964.
- [32] Walsh, T., Nurkka, P., and Kujala, S. 2010. Exploring Cross-Cultural UX Evaluation with the Remote Online Sentence Completion Method. In *Proceedings of the Ninth International Workshop on Internationalization of Products and Systems* (London, UK, 7-10 July, 2010), IWIPS2010, 11-22.

Publication 3

Walsh, T. and Nurkka, P. (2012). Approaches to Cross-Cultural Design: Two Case Studies with UX Web-Surveys. *Proceedings of OzCHI 2012*, ACM, 633-642.

Reprinted by permission.

Approaches to Cross-Cultural Design: Two Case Studies with UX Web-Surveys

Tanja Walsh

Tampere University of Technology
33101 Tampere, Finland
tanja.walsh@tut.fi

Piia Nurkka

Tampere University of Technology
33101 Tampere, Finland
piia.nurkka@tut.fi

ABSTRACT

Cross-cultural design has become an area in HCI that needs more research in order to be able to respond to the demands of globalization and emerging markets. Agile ways of gathering local user data are needed to help designers to create better products and services and minimize the risk of failing in the target market areas. The aim of this paper is to introduce approaches related to cross-cultural design focusing on the advantages and challenges of web-surveys in international UX evaluation. Web-surveys allow quickly reaching remotely a vast amount of users in different corners of the world. We looked at two case studies where web-surveys were used to collect UX data about online services in different countries. We found that UX web-surveys were fast to implement and very suitable for a cross-cultural user sample that has access to Internet. We argue that UX web-surveys have potential to gather user data even from larger areas than now, as ubiquitous technology products and services are getting accessible for wider user groups.

Author Keywords

Cross-Cultural Design, User Experience Evaluation Methods, Web-Surveys

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Globalization and the rise of emerging markets have fundamentally altered the global marketplace creating a global network of manufacturers, programmers, and designers who can be based anywhere. On the other hand, users are always embedded in a local context (Chavan et al., 2009). The success of any product or service in international markets requires a good knowledge of customer needs in the planned market areas and appropriate localization of product variants to fit the local needs and culture (Aykin, 2005).

The task of designing for global markets is challenging: According to Oyugi et al. (2008), cultural differences affecting a product can be found in signs, meanings, actions, conventions, norms and values. In relation to the development process, cultural differences potentially affect the manner in which users are able to participate in

design and act as subjects in evaluation studies (Oyugi et al., 2008). This means that designers should understand local user needs, and employ methods to gather this information in the best possible way. When designing for good user experience (UX) in cross-cultural contexts, cultural diversity makes it unrealistic for designers to rely only on intuition or personal experience (Smith et al., 2005) and therefore collecting local user feedback has become vital.

Fast and reliable user data collection enables designers to understand users from different locations and contexts. This makes remote methods, especially web-surveys, attractive for global user data collection as they are practical, cost-effective and wide scale (Väänänen-Vainio-Mattila et al., 2008). Monahan et al. (2008) reported that no common practice currently exists on how UX can be studied remotely in international contexts and therefore the development of suitable remote methods is needed.

Traditionally, usability tests tend to focus on task performance. Usability can be measured with quantitative methods, whereas user experience is subjective (Law et al., 2009). Therefore objective usability measures, such as task execution time or a number of clicks, are not sufficient measures for UX (Law et al., 2009), where feelings, motivations and expectations have an important role. UX evaluation focuses on lived experiences (Law et al., 2009), and so we were interested in using qualitative methods, more specifically diary and sentence completion method as they are suited to remote user evaluation. These methods are designed to expose personal experiences, as they allow users to express themselves in writing.

Our research addresses the question *how does a web-survey fit into cross-cultural UX studies?* We look at the advantages and disadvantages of web-surveys and present two case studies, where web-surveys were used to evaluate UX of a service with cross-cultural users. The results of this study will give academic researchers and designers knowledge in how to approach cross-cultural UX evaluation. The area has not yet been studied much and practices and methods to do it are needed.

BACKGROUND

Cross-cultural design is designing technology for different cultures, languages, and economic standings ensuring good usability and UX across cultural boundaries (e.g. Aykin, 2005). Globalization strategy and process support cross-cultural design; and technical processes of internationalization and localization support globalization. Internationalization is designing and

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

©ZCHI'12, November 26–30, 2012, Melbourne, Victoria, Australia.
Copyright 2012 ACM 978-1-4503-1438-1/12/11...\$10.00.

engineering a technology product so it can be easily adopted for various target market areas without requiring subsequent changes to the core application (Aykin, 2005). Localization is a process of adapting a product or service to specific cultures and languages making products and services usable in and therefore acceptable by, target cultures (Aykin, 2005). In order to create a basis for localization of product design, the key factors differentiating cultures from one another need to be clearly identified (Honold, 1999).

How to understand what to internationalize and to what extent to localize? And what methods could be used and are available? Although technology researchers and practitioners have long been aware of the challenges of the global markets, there are still many unsolved problems concerning the extent to which culture may affect the product design and how to evaluate and analyze it (e.g. Smith et al., 2005, Schumacher, 2010).

Many UX researchers see that ensuring good UX for products is done by understanding users (ethnographic user research before deciding on the concept), having skilled designers work closely together with real users, and collecting user feedback in field studies (e.g. Aykin, 2005, Schumacher, 2010). Utility, usability and UX are issues that need to be tackled in product development of any system, but especially when designing for global markets as much of cognitive reasoning depends on social norms and background culture (Ito & Nakakoji, 1996).

Using Existing Theories of Cultures in HCI

How then to bring the cultural understanding to design work? A good starting point mentioned in literature (e.g. del Galdo, 1996) is to understand what is meant by 'Culture'. There is no simple agreement on a specific definition for the concept of culture (e.g. Hoft, 1996).

According to Keesing and Strathern (1998) most anthropologists seem to agree that culture is a learned behavior consisting of thoughts, feelings and actions and is transferred in social interaction. One way of looking at the concept of culture is to try model it somehow: Of what it consists of and in what levels. Many researchers in the field of anthropology have studied objects, patterns of behavior and thinking differentiating one culture from another. Some of them have compiled these into cultural meta-models.

There are several different cultural meta-models: For example Stewart and Bennett (1991) present a meta-model of culture called The Objective Culture and Subjective Culture, Hoft's Iceberg Model (1996) and Hofstede's Pyramid Model of Culture (2005). They all aim to explain what culture consists of and are one way of understanding the different levels of culture in which localization is needed guiding designers to know what to look for. Designers can also build a cultural model of the target area. A cultural model can be used to identify global information for internationalization, cultural bias or cultural metaphors, to assess the degree of necessary localization or to avoid making offending or misleading cultural mistakes. It can be also used to evaluate the

effectiveness of an international user interface (Hoft, 1996).

Hofstede's Cultural Dimensions

Another way of bringing cultural understanding through existing theories to design work in HCI is to use Hofstede's cultural dimensions (Hofstede, 2001, 2005). These dimensions are based on studies of the values IBM workers have in various countries (Hofstede 2001, 2005).

The idea was to get data which can be used to compare cross-cultural differences among people coming from different countries. In total 74 countries were studied in the original study and later replication studies. Based on the data and additional data from Chinese Value Survey, five cultural dimensions were found in which cultures differentiate. Each country got a ranking on how 'high' or 'low' they score on these values. With help of the following dimensions a designer can compare different cultures in Power Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, Uncertainty avoidance and Long vs. short term time orientation.

Cultural dimensions can be used in cross-cultural design as a tool to understand the cultural differences. Applying Hofstede's dimensions to user research allows to learn and achieve more when planning and executing studies in multiple cultures and also gives a better understanding of the impact of a specific culture on the results in the analysis (Schumacher, 2010). Marcus (2005) combined the scheme of Hofstede's five cultural dimensions and the scheme of five UI design components (metaphors, mental models, navigation, interaction and appearance) to create a five-by-five matrix that allows for 25 fields of interest to help designer to make better decisions about usability, aesthetics and emotional experience (Marcus, 2005).

Hofstede's work has been criticized (e.g. McSweeney, 2002, Jones et al., 2007) because his study assumes that national population is a homogenous whole, whereas most nations contain ethnic units. Or that nations are not proper units of analysis as cultures are not necessarily bounded by borders. Critics have also argued that Hofstede's study was performed with only among IBM workers and there are no evidence-based reasons for assuming that the average IBM worker's response would reflect the national culture. Considering both the limitations of Hofstede's work and that culture is hard to capture absolutely through a series of dimensions, nevertheless, his dimensions can be useful in order to gain understanding how cultures may differ.

In addition to use existing cultural theories in HCI, user-centered research on-site or remotely is another way of acquiring information about cross-cultural users. We will discuss about them in the next chapter.

User-Centered Research On-Site or Remotely

Clemmensen and Roese (2009) reviewed how cultural issues in HCI have been studied in practice. Firstly, they found that Hofstede's cultural dimensions (Hofstede 2001, 2005) had been the dominating model of culture in HCI. Secondly, that in HCI research the participants had been chosen usually because they could speak English. Thirdly, that most studies had been large scale

quantitative studies. These three findings suggest that more user-centered research methods, especially qualitative methods, are needed to balance the current practice. These methods should also enable non-English user samples to participate to better respond to the challenges of globalization and to get wider range of users in the studies. Also, if developing countries are involved illiterate users have to be considered as well and methods suitable for them.

User-centered design approach supports the cross-cultural product development process with user-centered activities (e.g. Aykin, 2005). Cross-cultural user research on-site or remotely is user-centered research and will help to understand what needs to be internationalized and localized. The user-centered design on-site, provides the most reliable information as users are researched in their own context, but is also expensive and time-demanding. Remote user-centered design methods such as questionnaires, diary studies and remote usability tests are more cost-efficient, but not many methods exist yet (e.g. Monahan et al., 2008). For optimizing the cost and effort, all these processes and approaches can be used simultaneously depending on the product's design, project's resources and timeframes.

We argue that cross-cultural design can be approached by studying existing cultural theories such as Hofstede (2001, 2005) and/or by using user-centered research methods to find out more customer insights for each specific country/culture either on-site and/or remotely (e.g. Aykin, 2005, del Galdo, 1996, Väänänen-Vainio-Mattila et al. 2008). We have created a framework of this (See table 1). The focus of this paper is on remote web-surveys. Therefore in the next chapter we will explore the advantages and challenges of web-surveys.

Understanding Cultural Differences			
User Centered Design		Using Theories of Cultures	Existing of
On-Site	Remote		
<ul style="list-style-type: none"> - Reliable - Expensive - Time-consuming - Reaches all kinds of users everywhere in the world 	<ul style="list-style-type: none"> - Cost- and time efficient - No common practice yet - Methods needed - Requires Internet literacy and access 	<ul style="list-style-type: none"> - Cost Efficient - Quick - Reinforce stereotypes - Cultures are changing 	

Table 1. Approaches to Cross-Cultural Design

Web-Surveys

Internet is a promising alternative to collect data replacing traditional paper and pencil and face-to-face methods for scientific and market research utilizing surveys (Singh et al. 2009). Following the increased use of online surveys in social research (Glover & Bush 2005), in usability and user experience research too, online methods have become desirable given the lightweight nature, speed and relative ease of use (Väänänen-Vainio-Mattila et al. 2008). Web-survey is

also versatile in that it can be used at any stage of the design process; e.g. for investigating people's characteristics (early concepting) or people's attitudes to prototypes or finished products. A study on UX evaluation methods by Vermeeren et al. (2010) reveals that around half of the UX methods surveyed could be used remotely. Web-surveys are typically used as a supplementary method alongside other user research methods and not as the only research method (Luedemann & Muller, 2010).

A large variety of tools are available for creating, administering, and analyzing web-surveys (Luedemann & Muller, 2010). There are two categories of web-questions – fixed-response and open-ended. With fixed-response questions, people are either presented with a number of alternative responses to a question and choose the most appropriate, or to register the strength with which they hold an opinion on a scale (typically a 5- or 7-point Likert-scale) (Jordan, 2000).

Benedek and Miner (2002) note that one problem with Likert-scale is that the topics of the questions or anchors on the scales are assigned by the practitioner (and influenced by his cultural background) and often do not mean as much to a participant. In addition, cultural differences have been found in responses to Likert-scales. For example Lee et al. (2002) found Japanese and Chinese respondents to select more the midpoint frequently on the items that involved admitting to a positive emotion than did the Americans, who were more likely to indicate a positive emotion.

Open-ended questions allow users to answer more freely what they think than in fixed-response questions (Gillham, 2006, Soley & Smith, 2008). Therefore they are considered more culturally sensitive than Likert-type of questions. They are useful in eliciting qualitative data about personal experiences.

Fan & Yan (2010) developed a conceptual model of web-survey process. According to their model there are four main stages in online survey process: 1) Survey development, 2) survey delivery, 3) survey completion and 4) survey return. In our study we are using their model in analyzing the results.

Advantages of Web-Surveys

Web-surveys have many advantages. They are considered to be cost-effective, because data collection is faster and demands less of a work force. In addition, data is ready for analysis immediately after delivery (Fan & Yan, 2010). Furthermore, samples can be bigger: increased sample size does not make much difference to the total cost of the study as it would with traditional methods (Benfield & Szlemko, 2006). Also, it is easier to reach respondents worldwide (Evans & Mathur, 2005). Internet reduces the time and distance between people, and makes communication more efficient (Ekman & Litton, 2007).

Web-surveys may be more convenient to respondent as they can answer when suitable for them. Furthermore, real-time randomization of survey questions can be used, the questions can be tailored according to the respondent demographics or his/her answers to particular questions,

and thus, each respondent gets only the pertinent questions (Evans & Mathur, 2005). Moreover, there are more design and question diversity options than in traditional paper-and-pencil surveys, and the use of multimedia (like video) is possible. It is also possible to control the order of answering to the questions (Evans & Mathur 2005).

Challenges of Web-Surveys

Besides many advantages, web-surveys face some challenges. The quality of the research may be threatened by errors in the coverage: not everybody has access or uses Internet as Internet penetration is not evenly distributed across segments of the population. For example, among the countries of European Union the percentage of Internet access at home varies from 89 % (in the Netherlands) to 31 % (in Romania) of the households (E-Communications Household Survey Report 2010). If comparing worldwide coverage, 57 % of EU households (E-Communications Household Survey Report 2010) in comparison to only 10.9 % of the population of Africa (Internet Usage Statistics, 2010) have Internet access.

Skewed samples by attributes may be a challenge also because there are demographic differences between Internet vs. non-Internet users: Internet users tend to be younger with higher educational levels (Nie & Erbring, 2000) and they tend to live in more urban areas than the general population (E-Communications Household Survey Report 2010). In fact, Fricker & Schonlau (2005) point out that university population often tend to have greater access to the Internet, and refer to Walsh et al. (1992) who found a positive correlation between propensity to respond electronically and amount of network usage. This finding is in line with studies with college populations: web-surveys are found to have higher response rate than mail surveys among them (Shih & Fan, 2008).

However, the problem with the Internet coverage in general is diminishing with time: Internet usage around the world is constantly increasing (Internet Usage Statistics, 2010), and the experience and expertise to use Internet among general populations will escalate. This will offer new opportunities to perform user research with an even wider population providing users have access to the Internet and other needed equipment.

On the other hand, even a 100 % Internet coverage does not mean the respondent will actually be reached: if the invitation is sent by e-mail, the respondent never gets it if the spam filters screen it as spam (Evans & Mathur 2005). Therefore, the invitations must be carefully designed a way that avoids filters.

What is more, technological issues including both the type of Internet connection and the computer of the respondent might cause problems (Evans & Mathur 2005). Slow Internet connection means the survey might take longer time to complete (especially if it takes a long time to download) increasing the possibility of drop-outs. In addition, the use of different browsers or monitor sizes may change the layout of the questionnaire making it

harder for the respondent to fill it out (Evans & Mathur, 2005), and possibly leading to drop-outs.

In any case, web-surveys need to have particularly clear answering instructions as there usually is not, at least not direct, human contact to ask for advice (Evans & Mathur, 2005).

Another challenge to tackle and take into account is the respondent's concern for privacy and security violation that online research may pose (Evans & Mathur, 2005).

One of the main challenges in web-surveys however, is low response rates: in a meta-analysis conducted by Lozar Manfreda et al. (2008) the results show the response rates in web- surveys are on average 11 % lower than of other survey modes. A similar result was found in a meta-analysis by Shih & Fan (2008), who found on average a 10 % higher response rate in mail than in web-surveys.

Fortunately there are examples of the opposite: Glover & Bush (2005) have gained better response rates with web-surveys than traditional postal surveys in a study with head teachers. An implication is that with some populations web-surveys may be preferred over traditional surveys. However, it is reasonable to be aware that the quality of research may be threatened: low response rates may lead to biased results. When studying user experience, non-response should be considered as a possible threat to the validity of the study. For example, if only respondents having positive experiences respond, the understanding of the UX remains one-dimensional.

Next we look at two case studies where web-surveys were used to evaluate UX of a web-service with cross-cultural users.

CASE STUDIES

In this chapter we introduce two of our case studies of how web-surveys were used in gathering global UX data. We will describe the methods used in the two case studies. In the following we will look at the overall goals of the case studies, participants, methods used, analysis and results of the web-survey.

Case Study 1

Case study 1 was conducted in collaboration with Paf.com, which is an online monetary gaming company. The aim was to investigate what would be an ideal online monetary gaming experience for Swedish and Spanish users and whether there were cultural differences between these two countries in gaming habits and attitudes towards online monetary gaming.

The objective was to collect user feedback from the existing customers to find how to better localize the Swedish and Spanish sites. Both sites were already translated and users were using them in their own languages (Swedish and Spanish). Nevertheless, there was a need to localize the content to make the sites more appealing and familiar for users in Sweden and Spain Furthermore Paf.com's aim was to gain insights into how to design for good user experience in new markets in the future. The focus of the evaluation was their existing online monetary gaming site (see screenshot in figure 1).



Figure 1. Screenshot of the Paf.com online monetary gaming site.

Participants

The invitation to participate in the web-survey was sent by e-mail to 11238 registered Paf customers in Spain (5112 users) and Sweden (6126 users). The survey was open for three weeks. After two weeks, a reminder mail was sent. There were in total 444 respondents from Sweden and 188 from Spain. The response rate was 7% in Sweden and 4% in Spain. The average response rate was 6%. The main prize was a gift card worth 200 EUR in a local store (1 in Spain and 1 in Sweden). As a second prize, three black premium backpacks worth 60 EUR, were raffled in both countries.

The participants were segmented into three categories according to the answers they gave in response to the background questions. Consequently, a total of 120 respondents were selected (60 from Sweden and 60 from Spain) for the analysis. In Spain, there were more males than females (see Table 2). The Spanish were younger and slightly better educated than the Swedes. There were clear differences in gaming preferences between the Spanish and Swedish respondents.

		Spain (N=60)	Sweden (N=60)
Age	18-35	40	22
	36-55	18	26
	56-65+	2	12
Education	Elementary school	4	8
	College	24	31
	University	32	21
Gender	Male	52	28
	Female	8	32

Table 2. Demographics: age, education and gender

Sentence Completion Method

Sentence completion was selected as a method in case study 1. Sentence completion method can be used to assess motivations and attitudes (Soley & Smith, 2008), to identify user values (Nurkka et al., 2009), and

meanings (Kujala & Nurkka, 2009b). Sentence completion tasks provide respondents with beginnings of sentences, which they then complete in ways that are meaningful to them (Soley & Smith, 2008). Interestingly, Soley & Smith (2008) point out that the sentence completion tests appear to be more useful across cultures than are positivist-type measures, such as bipolar scales, because they are less likely to be culturally biased. Walsh et al. (2010) found in their study of Smartphone UX evaluation with the sentence completion method that there are cultural differences in how people experience the product and also in the way people respond to a UX evaluation survey and share their experiences with the product.

Web-Survey

In case study 1 the sentence completion tasks were implemented using Wepropol-tool. In total, there were 18 sentence completion tasks to elicit user's habits and attitudes towards online monetary gaming. For example:

- An online monetary gaming site is welcoming, if...
- I immediately quit playing at certain monetary gaming site if...
- In addition to winning, I enjoy...
- The kind of monetary gaming site that I would recommend to my best friend...

Participants were allowed to leave sentences unfilled, if they could not immediately come up with the ending for the sentence. The sentences were translated to Spanish and Swedish, and the respondents answered in their own mother tongue. The reason for translating the survey was the fact that the local sites were translated so the users were using the site in their own language and we couldn't guarantee their ability to participate in English. The answers were then translated to English for analysis. Figure 2 demonstrates the localization process of the survey.

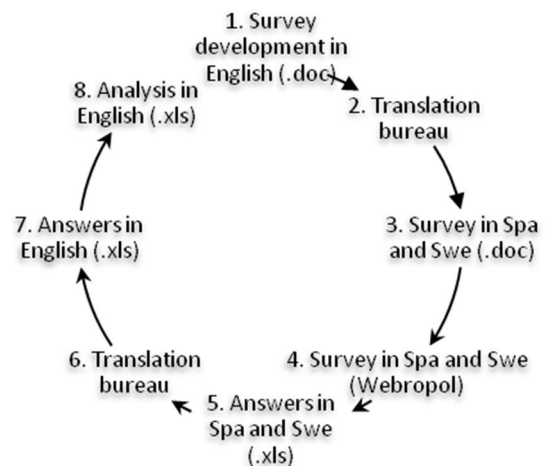


Figure 2. Localization process of the survey in case study 1

The results of the UX evaluation of the online monetary gaming service in case study 1 with sentence completion were analyzed by a content analysis by grouping similar answers together in a spreadsheet by two researchers. They both grouped them first by themselves and then compared the groupings.

Sentence completion method proved useful in eliciting a rich and vast amount of qualitative data from the users about their experiences and opinions on online monetary gaming. The answer rate on average for 18 sentence completion tasks was 80 % (78 % for Swedish users and 82 % for Spanish users). In analyzing the sentence completion tasks with the help of Hofstede's cultural dimensions, we recognized cultural differences in the answers between Spanish and Swedish users.

Case Study 2

In case study 2 we evaluated a service called Movescount, which is an online sports diary, where users can share their sports data and interact with other users. It is developed by a Finnish company Suunto, who was interested to study web-surveys in UX research as it too has a global customer base and a need of collecting user data from all over the world. Movescount is compatible with Suunto products such as heart-rate monitors and sports watches. The aim of case study 2 from the service evaluation point of view was to investigate how participants use Movescount, how they felt about it and how the usage changes and evolves over 3 months. Our aim related to web-survey research was to look at how web-survey works in a cross-cultural study with many nationalities and English as a language of the study.

The study lasted 3 months. During those 3 months, there were two 2-week periods when a short web-diary was filled in: Diary 1 was in the beginning of the study and Diary 2 at the end of the 3-month period.

Participants

The link to the online study was sent by e-mail to 17 Movescount users who had volunteered to participate by replying to an invitation questionnaire. 4 dropped out during Diary 1, and one was removed from the results. 2 more participants dropped out during Diary 2. In the end, there were 10 participants left in the study: 1 Belge, 3 Dutch, 1 Suisse, 3 Germans and 2 Americans. All participants were active runners (or triathlons) doing also other sports like cycling, mountain biking, weight training and alpine skiing. Most of the users exercised 5 or more times a week. They were also users, who had access to Internet and good knowledge of using Internet. They could also read and write in English. See Table 3 for demographics.

		Male (N=9)	Female(N=1)
Age	25-30	2	1
(in years)	31-40	2	-
	41-50	2	-
	50+	3	-

Table 3. Demographics: age and gender

Diary Studies

Diary-study was selected as a method in case study 2, because the aim was to gather data from a longer period of time to understand the usage patterns of the service. Diary studies are a useful design alternative for cross-cultural work because they are promising as a means of

extracting some of the rich information provided by ethnographic methods, but demanding less costs, time and skilled resources. (e.g. Gillham, 2006; Röse, 2001). Diaries can also be implemented as web-surveys.

Two main approaches exist for diary studies: psychological and anthropological (Gillham, 2006). In the psychological approach, participants record the frequency of predefined events of their daily life, whereas in the anthropological setting, subjects record any information about their day-to-day activities or environment which they feel is important to them.

Benefits of diary studies include that they can be used to study real context – which is an important cultural factor (e.g. Gillham, 2006) –; they can reveal unexpected information and challenge designers' assumptions (Gillham, 2006); are relatively cheap; can be used to gather data in parallel – which allows side-by-side comparison and analysis (Gillham, 2006; Dray & Siegel, 2005) –; and can be employed to record any sort of behavior.

In our study, a psychological approach was used as the respondents reported the usage of the online sports diary use and not their day-to-day life events in general.

Web-Survey

The web-survey in case 2 consisted of three parts: 1) Background questionnaire (Demographics, previous Movescount usage etc.) 2) Diary 1 (2 weeks period when users filled a short web survey after each time they had used Movescount). Diary included questions: a) Why did you come to Movescount? (free text) b) What did you do in Movescount? (tick box options) c) How did it feel to use Movescount? (free text) 3) Diary 2 (2 weeks period when users filled a short web survey after each time they had used Movescount). Same questions than in Diary 1. At the moment of the study the language of the service was English and that is why the survey was also implemented in English.

The results of UX evaluation of the Movescount service in case study 2 with a diary study was analyzed by content analysis by two researchers. Most users had used the service more than 3 weeks, before they participated the diary study (only one participant had started to use the service 1-2 weeks before the study).

There were no clear changes in use during the study and it seems the style of use is formed quite early in the usage. Thus, new features need to be actively marketed to help users to find and use them. We also found that the feeling of use- measure is not necessarily related to Movescount use as such but to e.g. how the exercise in general was like. Negative responses were clearly related to Movescount (e.g. technical problems).

With the diary method in case 2 we found that the main motivation to use Movescount service was to follow own training by adding, reviewing and editing own Moves (= own exercise). Secondly, that Movescount is used to interact with peers by joining groups. However, we found that participants had different styles of use: Style 1 user- was quite strictly interested only in his/her own moves: Style 2- user was mainly interested in his/her own moves,

but looked around what else was happening: Style 3- user quite often used just the social features of Movescount without adding/reviewing or editing own moves.

Analysis of the Cross-Cultural Web-Survey Process

The aim of our research was to find out how a web-survey as an instrument and method fit into cross-cultural UX study, especially in eliciting qualitative data. Therefore we needed to look at the whole process trying to find key issues affecting the cross-cultural study. As mentioned earlier, Fan & Yan (2010) have developed a conceptual model of web-survey process. According to their model there are four main stages in online survey process: 1) Survey development, 2) survey delivery, 3) survey completion and 4) survey return. We used their model to help us to analyze how the web-survey process in both cases. We added also 3 other phases in the analysis: The Requirements phase in the very beginning, Analysis and Feedback for Design in the end.

RESULTS

In this chapter we present the results of our research of how web-surveys fit into cross-cultural UX studies. We are looking at the web-survey as an instrument, method and process in cross-cultural context.

Requirements for Web-Survey

During the case studies we were able to recognize some phases and key-issues in cross-cultural UX web-survey process. In the first phase of our study, before the actual survey development started, the research questions and target market areas were clarified, so that any country/culture specific requirements could be addressed.

Localization is important issue to consider in cross-cultural web-survey design so that users are able to give valid feedback. In our case study 1 we localized the survey as the users were already using the web-service in their own language so that we could not assume them to be able to answer in English and therefore the web-survey was localized. Also, the user sample was large in case study 1 and not as specified as in the case study 2, where we didn't localize the survey and the evaluation was in English.

We recognized that it is good to reserve time and resources for localization of texts and other material e.g. pictures. It is also important to choose a survey-tool that supports the target user's languages so that the survey can be implemented.

Survey Development

The second phase to observe and study in the process was the survey development (Fan & Yan) in which it was important to know what kind of data is wanted (qualitative and/or quantitative), what methods should be used and should any cultural issues be taken into account in choosing the method. In our cases we wanted to get qualitative data and therefore chose sentence completion and diary method. They were easy and quick to implement into a web-survey tool.

Data Collection

The third phase to observe and study in the process was the data collection including survey delivery, survey completion and survey return (Fan & Yan).

We reached our users in both case studies from the existing customer databases and therefore we did not need local help in recruiting the users. Direct access to users allowed fast delivery of the survey to users in both case studies. If there would not have been any customer database available, it would have been good to reserve time in the schedule for recruiting the users. Both sentence completion and diary methods were easy to implement into the web-survey and the results in electronic format were ready for the analysis immediately after they had arrived in case 2 and in case 1 after the answers had been translated.

One of the findings we had in our study concentrated on the response rates. Although the potential sample size in case study 1 was big (11 238), the actual response rate was low being only 6%: 632 users answered the survey and 120 were selected to be analyzed.

The reasons for non-response in case 1 may be diverse: We do not know if the non-response was due for instance to getting the invitation too late to participate, benign neglect (i.e. failure to follow through the intentions to participate), intentional noncompliance (dropping out in the middle of the survey) or non-sufficiently attractive prizes that were not motivating enough. In case 1, we were not able to reliably record the dropout rates while answering the surveys due to the lack of that kind of feature in the survey platform used. However, that would have given extra insight to the questionnaire itself, perhaps revealing too difficult questions, too long answering time or the like. The less specialized populations and more abstract survey topic may at least partly explain the low response rate in the case 1.

In case study 2, 38% of the volunteered participants dropped out of the study. It was known already in the beginning that diary-studies require more long-term commitment from users than a one-off questionnaire. Therefore diary users are in a risk of dropping out of the study and they would need to be motivated to continue until the end. The answer rate was better than in case 1, which could be explained by more specialized user group and good prizes: 3 participants were raffled to win a brand new Suunto heart rate monitor (value 169euros).

Analysis

The fourth step to observe and study was the analysis phase in which we needed to translate the answers in case study 1 and reserve time for it. The possibility to write the answers by computer helps the analysis as there is no guessing on handwriting and no need for extra data transfers manually from paper to electronic format. This is useful especially dealing with foreign languages and the translation process as well as categorization of qualitative data.

Feedback for Design

The fifth phase to study in the process was feedback for design. In case study 1 the results of the survey were reported to the design team at Paf.com in a workshop. It helped designers to understand the needs of the monetary gaming site localization for Spanish and Swedish users. The results and the workshop enabled designers and

researchers to analyze the results together in the design context, make guidelines together and designers to address culturally sensitive areas leading to more culture specific web-page concepts. The results of case study 2 were also reported directly to Suunto UX team.

CONCLUSIONS AND DISCUSSION

Our aim in this study was to address the question of how does a web-survey fit into cross-cultural UX study? In order to understand the current practice, we explored through literature cross-cultural design approaches and advantages and challenges of web-surveys. Furthermore, we executed two international UX evaluation case studies with web-surveys.

In the case studies we were able to recognize some phases and key-issues in cross-cultural UX web-survey process. In the first phase, the research questions and target market areas need to be clarified before designing the survey, so that country/culture specific requirements can be addressed such as localization of the texts and other material e.g. pictures in the survey and choosing a survey-tool that supports the target user's languages so that the survey can be implemented.

The users in our case studies were all from western countries with access to Internet and knowledge of using computers. In case 2 users were also expected to answer in English and not in their own language. It is rather obvious that web-surveys in user studies require the equipment and knowledge for using Internet. Therefore using web-surveys in less developed countries is not yet self-evident, but there is a potential as Internet coverage and IT knowledge is increasing as well as fast spread of mobile devices. If users in less developed countries are targets for web-surveys, localization of text, visual presentation material, including pictures and symbols, and voice needs to be done carefully and also the literacy rates need to be investigated.

An interesting issue in doing cross-cultural research is also to consider how culture affects the actual research methods. Lee & Lee (2007) point out, that most of the UX research methods currently in use have been developed in the United States or Western Europe and subjected to people in these areas. It questions if those methods can achieve the expected results when applied to people living in non-western cultures e.g. how users are able to express themselves in the evaluation. However, most research on usability/UX evaluation methods presupposes that evaluation is unaffected by cultural issues (Clemmensen et al., 2009).

Matsumoto (2003) notes that researchers who formulate research questions and hypotheses have their own cultural upbringing and backgrounds, and "these backgrounds produce biases on the part of researchers, regardless of whether these biases are good or bad, right or wrong, conscious or unconscious." Thus researcher's own cultural background inevitably affects the way he or she will formulate questions, observe the user and interpret the data gathered. In addition, methods that work well on one culture may be inappropriate in another.

The second phase was the web-survey design in which it was important to know what kind of data is wanted (qualitative and/or quantitative), what methods should be used and should any cultural issues be taken into account in choosing the method e.g. does the survey need localization, are there any symbols or pictures in the survey that might not be understood by the users, what is the Internet literacy among users, how to address the users etc.

In our cases we wanted to get qualitative data and therefore we chose sentence completion tasks and diary. They were both easy and quick to implement into a web-survey tool and the answers were clear to analyze when written in electronic format if compared to traditional paper and pen. Sentence completion tasks elicited lot of data from users and was found successful method in gaining user data. As user experience research is concentrating on experiential aspects of use, both diary and sentence completion methods were suitable for our purposes as they give users freedom to express them.

The third phase in the process we identified was the data collection including survey delivery, completion and return. We reached our users in both cases from the existing customer bases and therefore we did not need local help in recruiting the users.

One of the main findings we had in our study concentrated on the response rates, which are considered to be one of the main criteria to evaluate the quality of research in online surveys and secondly, as a way to estimate if the findings can be generalized to a larger population (e.g. Lozar Manfreda et al., 2008).. Despite a large potential sample size in case 1, the response rate was very low, only 6 % on average. As stated in the literature, less specified user groups seem to have low response rates as demonstrated in our study. With the selected group in case 1, we got 80% response rate for sentence completion task. The diary case study was challenging for the risk of users dropping out as the original sample pool was small (17 users). We were able to keep small amount of users in the study, but it was enough to give some information from a longer period of time.

The fourth phase was the analysis in which we needed to translate the answers in case study 1 and reserve time for it. We also found in the first case study Hofstede's cultural dimensions (2001, 2005) helpful in analyzing the results as well as in the fifth phase, the feedback for design. In case 1 the study helped designers to address the monetary gaming site localization, to recognize areas that were culturally sensitive and to design culture specific web-page concepts.

The limitations of our study were in that we didn't have a comparison of an on-site research of the same subject. That would have helped us to gain insight whether this kind of study would have been possible on-site and how the results would have differed from a web-survey. There are also some limitations with qualitative data analysis in that the interpretation of users' answers depends on the researcher. Although, we had 2 people analyzing the data

in both cases, it is possible that some answers could have been misunderstood by researchers.

The challenges of UX web-surveys are, as mentioned also in the literature and found in our studies, in getting good user coverage. Also low response rates can be a challenge, especially with surveys like diary studies, where users need to commit to the study for a longer period of time.

We found that UX web-surveys were fast to implement and very suitable for a cross-cultural user sample that has access to Internet and knowledge to use it. The advantage of web-surveys is that they are more cost-effective than traditional on-site research, because the data collection is faster and demands fewer work forces. We found with case study 1 that bigger samples can be reached. Also, the analysis is faster as the data is accessible in electronic format. These advantages make web-surveys attractive for cross-cultural user research.

As the ubiquitous technology is spreading worldwide making products and services accessible to different variety of user groups, we argue that UX web-surveys have potential to gather user data even from larger areas than now. For future studies, it would be interesting to compare multimodal UX-survey material and compare the results with a developed country sample with a non-developed country sample.

ACKNOWLEDGMENTS

We thank Paf.com and Suunto for providing us the possibility of conducting the case studies. This research was part of the project "SUXES - User Experience Evaluation for Supporting International Competitiveness", mainly funded by Tekes, the Finnish Funding Agency for Technology and Innovation (decision number 40079/09).

REFERENCES

Aykin, N. Overview: Where to Start and What to Consider? In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, 2005.

Benedek, M. & Miner, T. Measuring Desirability: New methods for evaluating desirability in a usability lab setting. *Proc. UPA 2002*, (2002).

Benfield, J., A. & Szlemko, W., J. Internet-Based Data Collection: promises and Realities. *Journal of Research Practice* 2, 2, Article D1 (2006).

Chavan, A.L, Gorney, D., Prabhu, B. & Arora, S. The Washing Machine That Ate My Sari – Mistakes in Cross-Cultural Design. *Interactions* (Jan/Feb 2009), 26-31.

Clemmensen, T. & Roesse, K. An Overview of a decade of journal publications about culture and human-computer interaction (HCI). Working paper nr. 3 Copenhagen Business School (2009).

Del Galdo, E. Culture and Design. In Del Galdo, E. & Nielsen, J. (Eds.) *International User Interfaces*. John Wiley & Sons, New York, USA, 1996.

Dray, S. & Siegel, D. "Sunday in Shanghai, Monday in Madrid?!" Key Issues and Decisions in Planning International User Studies. In Aykin, N. (Ed.) *Usability*

and Internationalization of Information Technology. New Jersey, US: Lawrence Erlbaum, 2005.

E-Communications Household Survey Report. 2010. Special Eurobarometer 335. European Commission.

Ekman, L. & Litton, J-E. New times, new trends; e-epidemiology. *Eur. J. Epidemiology* 22 (2007), pp. 285-292.

Evans, J. & Mathur, A. The value of online surveys. *Internet Research* 15, 2 (2005), pp. 195-219.

Fan, W. & Yan, Z. Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior* 26 (2010), pp. 132-139.

Fricker, R., D. & Schonlau, M. Advantages and Disadvantages of Internet Research Surveys: Evidence from the Literature. *Field Methods* 14, 4 (2005), pp. 347-367.

Gillham R. Diary Studies as a Tool for Effective Cross-Cultural Design. *Proc. IWIPS 2006*, (2006).

Glover, D & Bush, T. The online or e-survey: a research approach for the ICT age. *International Journal of Research & Method in Education* 28, 2 (2005), pp. 135-146.

Hofstede, G. *Culture's Consequences: Comparing Values, Behaviours and Organizations Across Nations*. Sage Publications Inc, USA, 2001.

Hofstede, G. *Cultures and Organizations: Software of the Mind*. McGraw-Hill, New York, USA, 2005.

Hoft, N. Developing a Cultural Model. In Del Galdo E. & Nielsen, J. (Eds.) *International User Interfaces*, John Wiley & Sons, New York, USA, 1996.

Honold, P. Learning How to Use a Cellular Phone: Comparison Between German and Chinese Users. *Technical Communication*, 46, 2 (1999), 196-205.

Internet Usage Statistics. 2010. Internet Usage Statistics. Miniwatts Marketing Group.

Ito, M. & Nakakoji, K. Impact of Culture on User Interface Design. In Del Galdo, E. and Nielsen, J. (Eds.) *International User Interfaces*, John Wiley & Sons, New York, USA, 1996.

Jones, M. & Alony, I. The Cultural Impact of Information Systems – Through the Eyes of Hofstede – A Critical Journey. *Issues in Information Science and Information Technology*, Vol. 4 (2007).

Jordan, P.W. *Designing Pleasurable Products. An Introduction to the new human factors*. London, UK: Taylor & Francis, 2000.

Keesing, R. & Strathern, A. *Cultural Anthropology: A Contemporary Perspective*. Forth Worth, TX, Harcourt Brace College, 1998.

Kujala, S. & Nurkka, P. (2009b). Product Symbolism in Designing for User Experience. *Proc. DPPI 2009*, pp. 176-186.

Law, E., Roto, V., Hassenzahl, M. & Kort, J. Understanding, Scoping and Defining User eXperience: A Survey Approach. *Proc. CHI09, ACM* (2009).

Lee, J., Jones, P., Mineyama, Y. & Zhang, X. Cultural Differences in Responses to a Likert Scale. *Research in Nursing & Health*, 2002, 25 (2002), pp. 295-306.

Lee, J.J. & Lee, K.P. Cultural differences and design methods for user experience research: Dutch and Korean participants compared. *Proc. DPPI 2007*, (2007).

- Lozar Manfreda, K., Batagelj, Z., & Vehovar, V. Design of Web Survey Questionnaires: Three Basic Experiments. *Journal of Computer-Mediated Communication* 7, 0 (2002).
- Luedemann, I. & Muller, T. Online Surveys. In Schumacher, R. (Ed.) *The Handbook of Global User Research*. Morgan Kaufmann, Burlington, USA, 2010.
- Marcus, A. User Interface Design and Culture. In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. Lawrence Erlbaum, New Jersey, 2005.
- Matsumoto, D. Cross-Cultural Research. In Davis, S.F. (Ed.) *Handbook of Research Methods in Experimental Psychology*. USA: Blackwell Publishing, 2005.
- McSweeney, B. Hofstede's Model of National Cultural Differences and Consequences: A Triumph of Faith- a Failure of Analysis. *Human Relations*, 55, 1 (2002), 89-118.
- Monahan, K., Lähteenmäki, M., McDonald, S. & Cockton, G. An Investigation into the Use of Field Methods in the Design and Evaluation of Interactive Systems. *Proc. British HCI 2008, ACM (2008)*, 99-108.
- Nie, N., H. & Erbring, L. 2000. *Internet and Society: Preliminary Report*. Palo Alto, CA: Stanford Institute for the Quantitative Study of Society.
- Nurkka, P., Kujala, S. & Kempainen, K. Capturing users' perceptions of valuable experience and meaning. *Journal of Engineering Design*, 20:5 (2009), pp. 449-465.
- Oyugi, C., Dunckley L. & Smith A. Evaluation methods and cultural differences: studies across three continents. *Proc. NordiCHI 2008, ACM (2008)*, 318-325.
- Röse, K. Intercultural Human-Machine Systems: Empirical Study of User Requirements in Mainland China. In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, 2005.
- Schumacher, R. (Ed.). *The Handbook of Global User Research*. Morgan Kaufmann, Burlington, USA, 2010.
- Shih, T-H & Fan, X. Comparing Response Rates from Web and Mail Surveys: A Meta-Analysis. *Field Methods* 20, 3 (2008), pp. 249-271
- Singh, A., Taneja, A. & Mangalaraj, G. Creating Online Surveys: Some Wisdom from the Trenches Tutorial. *IEEE Transactions on Professional Communication* 52, 2 (2009), pp. 197-212.
- Smith, A., Gulliksen, J. & Bannon, L. Building usability in India: Reflections from the Indo European Systems Usability Partnership. *Proc. HCI 2005, Springer (2005)*, 219-232.
- Soley, L. & Smith, A. *Projective Methods for Social Science and Business Research*. Milwaukee: The Southshore Press, 2008.
- Stewart, E. & Bennett, M. *American Cultural Patterns: A Cross-Cultural Perspective*. Intercultural Press, Maine, USA, 1991.
- Vermeeren, A., Law, E., Roto, V., Obrist, M., Hoonhout, J. & Väänänen-Vainio-Mattila, K. User experience evaluation methods: current state and development needs. *Proc. NordiCHI 2010, ACM (2010)*, 521-530.
- Väänänen-Vainio-Mattila, K., Roto, V. & Hassenzahl, M. Now Let's Do It in Practice: User Experience Evaluation Methods in Product Development. *Proc. CHI 2008, ACM (2008)*, pp. 3961- 3964.
- Walsh, J., Kiesler, S., Sproull, L. & Hesse, B. Self-selected and randomly selected respondents in a computer network survey. *Public Opinion Quarterly* 56 (1992), pp. 241-44.
- Walsh, T., Nurkka, P. & Walsh, R. 2010. Cultural Differences in Smartphone User Experience Evaluation. *Proc. MUM 2010, ACM (2010)*.

Publication 4

Walsh, T., Nurkka, P., Petrie, H. and Olsson, J. (2013). The Effect of Language in Answering Qualitative Questions in User Experience Evaluation Web-Surveys. *Proceedings of OzCHI 2013*, ACM, 73-82.

Reprinted by permission.

The Effect of Language in Answering Qualitative Questions in User Experience Evaluation Web-Surveys

Tanja Walsh

Tampere University of
Technology
33101 Tampere,
Finland
tanja.walsh@tut.fi

Piia Nurkka

Tampere University of
Technology
33101 Tampere,
Finland
piia.nurkka@tut.fi

Helen Petrie

University of York
Heslington, York,
YO10 5DD,
United Kingdom
helen.petrie@york.ac.
uk

Jaana Olsson

Suuntaamo Oy
33101 Tampere,
Finland
jaana@suuntaamo.fi

ABSTRACT

We investigated the effect of language in answering qualitative questions in user experience (UX) evaluation web-surveys. Two cross-cultural case studies of high tech sports watches with altogether 176 participants were carried out. Comparisons in answers were made among 72 native English speakers and 104 non-native English speakers. In the first study native Italian and native English speaking users were compared. Half of the Italians answered in Italian and half of them in English. We found that the response rate for participating to the survey among Italians answering in their native language was 64 % compared to only 38% among Italians answering in English. The results of our case studies indicate that translating a UX web-survey into participants' native language would motivate users to participate in the study, especially if the user sample needs to include more varied users. It is easier to describe more in details and give examples of experiences, express emotions, feelings and ideas in one's own native language. The results suggest that if more descriptive qualitative data is needed from users, they are able to answer better in their own native language.

Author Keywords

User Experience, User Feedback, Qualitative Data, Web-surveys, Language

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Collecting user feedback in a fast and reliable way is necessary to minimize the risk of failed products in target market areas. User feedback gathered with UX evaluations during different stages of the product

development lifecycle is important for the design of technology products and services, especially for internationalization and localization. However, according to Putnam et al. (2009) among others, data collection with global users is challenging for many reasons: for example, it is not easy to reach users in all needed target market areas. In addition, the selection of methods to be used in the actual data collection can be challenging as the application of common on-site user-centered research methods is not always possible. Constraints in using such methods are caused by, for example limited budgets, the challenge and ability to perform first-hand on-site research without extensive local knowledge, and time frames of product development that can limit the feasibility of field research (Putnam et al., 2009). Therefore, low-cost and agile ways of collecting cross-cultural user feedback are needed to complement the toolkit of UX research methods, (e.g. Väänänen-Vainio-Mattila et al. (2008) or Putnam et al. (2009).

Over the past two decades researchers have made use of information and communication technologies, and found new ways to collect and analyze data (Benfield & Szlemko, 2006). The internet has become a promising alternative to collect data replacing traditional paper and pencil and face-to-face methods for scientific and market research utilizing surveys (Singh et al., 2009). Following the increased use of online methods in social research (Glover & Bush, 2005), in UX research too, online methods have become desirable given their lightweight nature, speed and relative ease-of-use (Väänänen-Vainio-Mattila et al., 2008).

A study on UX evaluation methods by Vermeeren et al. (2010) reveals that around half of the UX research methods surveyed could be used remotely. Hence, the potential of remote methods over field methods should be reviewed. Thus, feedback and data can be collected from users for example via web-surveys. While these new online methods for UX research make the data collection faster and reaches more users from different geographical locations and cultural backgrounds, the importance of understanding of cross-cultural issues in data collection becomes evident. According to Oyugi et al. (2008) cross-cultural issues should be addressed in the actual product,

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

OZCHI'13, November 26–30, 2013, Adelaide, Australia.
Copyright 2013 ACM 978-1-4503-1438-1/12/11...\$10.00.

but also in the methods used during the design and evaluation. Therefore cross-cultural issues need to be considered also in the selection of the methods to be used and in the design of a web-survey. The localization needs of the web-survey are important to assess (e.g. language, symbols, pictures) if the aim is for it to be completed by a cross-cultural sample of users.

The main goal in our two case studies was to investigate how the language of a web-survey affects answering by participants and to gain information about the importance of survey localization in UX evaluation. We collected data on the language effect on UX evaluation in two case studies concentrating especially in qualitative question types such as open ended questions and sentence completion tasks. In our two case studies we had altogether 176 participants from different countries with different native language speakers. We evaluated the UX of premium sports watches in case study 1 with 51 native Italian speaking users and 21 native English speaking users. In case study 2 we had a user sample of 61 non-native English speakers from different native language backgrounds and 43 native English speakers.

USER EXPERIENCE

The interest in HCI has moved from usability and functionality to understanding the quality-in-use of interactive products with a wider perspective to emphasize the importance of experiential aspects of interaction such as fun, enjoyment and pleasure. As a consequence, also a need for new approaches for designing and evaluating products and services has emerged. According to Hassenzahl and Tractinsky (2006) the aim of UX design is to create and enable the outstanding of experiences rather than just to prevent usability problems.

Thus, the value of a product does not depend only on the utilitarian aspects of the product but also, for example, on the social, symbolic and aesthetic aspects it provides for its users. Consequently, the success of products and services depends on a large extent of the level to which they promote a high-quality experience for their users (Law & van Schaik, 2010). UX is assumed to become the main success factor during the 'loyalty decade' in which returning customers is the measure of business success (Nielsen, 2008).

However, to benchmark competitive designs, to select appropriate design options or to improve the design, UX needs to be evaluated. A multitude of methods for UX evaluation exists but recent meta-analysis of empirical research on UX show there is still a need for further development (Bargas-Avila & Hornbæk 2011, Vermeeren et al., 2010).

According to Law and van Schaik (2010) one of the challenges is how to select appropriate measures to address the particularities of the evaluation context. The choice of an evaluation method depends on the experience targets, as well as on the purpose of the evaluation and other constraining factors such as time and costs (Vermeeren et al., 2010). Therefore, the primary criterion for an acceptable evaluation is that it is fit for the

purpose: making informed and thoughtful choices about the correct methods for evaluation. In general terms, evaluating any human experience, also including UX, needs to address validity (in other words: are we measuring the right construct in the correct way) and reliability (in other words: can the findings be replicated) issues.

In the following section we will take a look at the characteristics of qualitative self-report UX evaluation methods such as sentence completion that we used in our case studies.

Qualitative Self-Reporting UX Evaluation Methods

Vermeeren et al. (2010) consider a "qualitative" method as a method without predefined measures meaning users can describe their experiences freely in their own words. Many UX researchers are passionate about using qualitative methods as predefined choice of answers might reveal only a fraction of the whole UX (Vermeeren et al., 2010). The qualitative approach with open-ended responses about experience is seen as one of the best ways of understanding experiences that are constituted around themes like aesthetics and affect. The focus is on the meaning of using technology and what kind of implications it has for users. Qualitative methods emphasize the details and richness of description (Bargas-Avila & Hornbæk, 2011).

While traditional qualitative techniques (e.g. interviews, focus groups, observations) are widely used, projective and constructive methods have also gained popularity in UX research (Bargas-Avila & Hornbæk, 2011). In the projective technique, participants are asked to make sense of an ambiguous stimulus – one that does not quite make sense in itself – by having to add to it (e.g. by filling out a picture or a sentence) (Soley & Smith, 2008). Soley and Smith (2008) explain the theory that by completing the missing part, participants project part of themselves into it, and hence information is obtained about the participants.

Projective techniques, such as association, completion and construction, have been used in clinical psychology to assess factors such as personality and motivation, and in marketing to study consumer's attitudes (Soley & Smith, 2008). According to Boddy (2007) projective techniques, such as sentence completion, bubble drawings, collage, personification or word association, are a collection of practical research methods which, when used skilfully, can help researchers gain a deeper understanding from participants than would be possible with more direct questioning (Boddy, 2007).

In sentence completion participants are provided with beginnings of sentences that they then complete in ways that are meaningful to them (Soley & Smith, 2008). In UX research the sentence completion projective technique can be used to assess motivations and attitudes (Soley & Smith, 2008), to identify user values (Nurkka et al., 2009, Kujala & Nurkka, 2009a) and meanings (Kujala & Nurkka, 2009b).

Soley and Smith (2008) point out that the sentence completion tasks appear to be more useful across cultures than are measures, such as bipolar scales, because they are less likely to be culturally biased. Walsh et al. (2010b) found in their study of smartphone UX evaluation with a sentence completion method that there are cultural differences in how people experience the product and also in the way people respond to UX evaluation survey and share their experiences with the product. Walsh et al. (2010a) found that a remote online sentence completion survey is a relatively fast and easy way of gathering qualitative user data in an international context, although the analysis can be challenging.

Web-Surveys in User Experience Evaluation

Hartson et al. (1996) make a categorization of usability methods based on how the evaluators and the users are located relative to one another. In local evaluations they are usually in the same place at the same time. In remote evaluations, however, they are separated in space and/or time. One of the most popular remote methods is a remote web-survey where the data is collected over the internet.

There are many advantages for using web-surveys in collecting user feedback: They enable gathering vast amounts of data as they can reach a large group of people in a very short time compared to on-site user studies providing that participants have access to the internet, the needed equipment and also the ability to understand, read and write in the survey language, e.g. English if the survey is not going to be localized.

Web-surveys are also rather quick to make and there is a large variety of tools available for creating, administering and analyzing them. Web-surveys can also be used in all development phases of a new online product or a service (Luedemann & Muller, 2010). Luedemann & Muller (2010) point out that web-surveys are typically used as a supplementary method alongside other user research methods and not as the only research method.

The disadvantages of web-surveys include, for example, the risk of low response rates (e.g. Lozar Manfreda et al., 2008) or difficulties in addressing and finding the correct participants for the study (e.g. Nie & Erbring, 2000).

Also the quality of the research may be threatened by errors in coverage because not everybody has access or uses the internet as internet penetration is not evenly distributed across segments of the population. Samples skewed by such attributes may be a challenge as well as there being demographic differences between internet vs. non-internet users: internet users tend to be younger with higher educational levels (Nie & Erbring, 2000) and they tend to live in more urban areas than general population (E-Communications Household Survey Report 2010). However, the problem with Internet coverage in general is diminishing with time: Internet usage around the world is constantly increasing (Internet Usage Statistics).

Web-surveys are also a rather restricted way of getting results because they should be simple and relatively brief. Global web-surveys also usually need to be translated and sometimes adjusted for specific local use (Luedemann &

Muller, 2010), which requires resources and localization knowledge and processes. The translation process can be expensive and time-consuming and therefore many companies prefer not to translate surveys. They would rather provide the survey in English and ask participants to answer in English.

Translation of a survey and letting participants to answer in their own language facilitates participants' ways of answering, especially in expressing their feelings and emotions, and therefore it is a recommended process (Luedemann & Muller, 2010). Languages are humankind's principal tools for interacting and expressing ideas, emotions, knowledge, memories and values (Unesco, 2009). According to Unesco (2009) there are other "principle tools" such as pictures and icons, but language is persistent and flexible supporting both spoken and, written media (Unesco, 2009).

Added to this, the cognitive load is much higher if the the participant has to use a second language in answering because the brain must then work to translate the language while simultaneously trying to understand and produce the new information (E.g. Paas & al., 2004).

Thus, support for different language versions in the development and evaluation of technology products and services is almost self-evident with a cross-cultural user samples as only 8% to 10% of the world's population speaks English as their primary language (Aykin, 2005).

Although, it can be self-evident, that it is easier to answer a web-survey in one's own native language, it is not always possible to translate and localize a survey due to tight project schedules or budget limitations. Clemmensen & Roese (2010) found in their study that often participants in HCI studies have been picked because they could speak English. This could lead to a e.g. biased survey results.

Our study aimed to find out to what extend translation is necessary in order to elicit good quality user experience feedback with qualitative methods from global markets.

METHODOLOGY

In this section we will present the methodology of our two case studies. Our industrial partner in both cases was a Finnish company Suunto. Suunto designs technical sports watches, dive computers and other instruments used by active people. The products have a global customer base, and therefore Suunto was interested to understand, how web-surveys could be designed and used efficiently in gathering user data and the effect of language in eliciting qualitative data.

Case Study 1

In our first case study we evaluated the UX of a premium sports watch Suunto Elementum Terra (Figure 1) equipped with an altimeter, barometer and 3D compass. The user interface of the product was only in English whereas the user guides were localized.



Figure 1: Product models of the Suunto Elementum Terra evaluated in Case Study 1

Participants in Case Study 1

A total of 149 native Italian speakers and native English speakers Terra owners who had bought the product and volunteered to become product testers when registering at the Suunto web-page (www.suunto.com) were invited to answer the survey in case study 1 (See Table 1). As an incentive to participate, the participants were included in a raffle of three Suunto outdoor devices (RRP 549 € each)

Table 1: Participant information in Case Study 1

Country	Language	Invitations sent	Responses Received	Response rate
Italy	Italian	50	32	64 %
Italy	English	50	19	38 %
USA	English	49	21	43 %
Total (all)		149	72	48 %
Total (without Italian-English group)	(without English)	99	53	54 %

To study the effect of language, the Italian users were divided into two groups: the native Italian group, who received the survey in the Italian language and the native Italian group, who received the survey in English.

The response rate in total within all users, all Italians and Native English speakers, was 48 % (N=72).

For the Italian users, the response rate was 52 % overall. For this group the response rate was 64% if answering in Italian which was significantly higher than if answering in English which only had a response rate of 38% (chi square = 6.76, df = 1, $p < 0.01$).

For the native English users the response rate was 43 % which was significantly lower than the response rate of the Italians answering in their native language (chi-square = 4.45, df = 1, $p < 0.05$).

The participants were all men with the average age of 43 years. The participants work in many different areas. The three biggest groups were “Professional (legal, medical etc.)” (N=11: 15 %), “Executive / Senior Manager” (N=8: 11%) and “Self-employed / Entrepreneur” (N=8: 11 %). Most of the participants had owned the product for at least 7 months (N=51: 71 %).

Methods in Case Study 1

The web-survey in case study 1 was implemented in Webropol-online survey tool (<http://www.webropol.com/>). It consisted of background questions, statements and sentence completion tasks about UX dimensions: Functionality, features and usability; Look and feel; Identification; and Overall judgment. In addition, participants were able to give open-ended feedback after each UX dimension section. (See the sentence completion tasks in Table 2).

Table 2: Survey questions in Case Study 1

1. Functionality, features & usability:	2. How the product looks and feels?
<i>Sentence completion:</i> This product is best for... This product is not suitable for... The problem with this product is... This product could be improved by... My expectations about this product...	<i>Sentence completion:</i> Using this product... I think the appearance of this product... I am happy with this product, because... I'm disappointed with this product, because...
<i>Please, feel free to comment about the functionality, features and usability of this product.</i>	<i>Please, feel free to comment about the look & feel of this product.</i>
3. How does the product fit you as a person?	4. Overall judgment of the product
<i>Sentence completion:</i> When I use this product... The owner of this product is typically... If other people see me using this product, they...	<i>Sentence completion:</i> Compared to other watches, this product...
<i>Please, feel free to comment about how this product fits you as person.</i>	<i>Please, feel free to give any additional opinions or comments about this product.</i>
5. Language questions for Italian-English group: a) How did you feel about answering this survey in English compared to, if you would have answered in your native language? b) Did answering in English have an effect in the way you answered? How? Please explain. c) Understanding the questions and statements was (scale from 1 (= very easy) to 6 (= very difficult)) d) Writing the answers was (scale from 1 (= very easy) to 6 (= very difficult)).	

Furthermore, for the Italian participants answering in English, an additional section of questions about answering in English was added at the end of the survey.

The survey was developed in English and translated into Italian for the Italian-language group by a translation bureau. The answers received in Italian were translated into English and were then analyzed in English (See Figure 2).

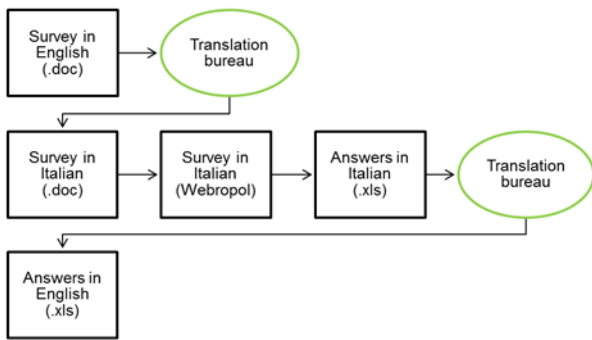


Figure 2: Translation Process of the Italian UX Survey

The survey was open for 10 days for all the participants. An initial invitation was sent by e-mail with a reminder 5 days later. With the native English-speaking participants it is important to note that there was an unexpected 2 hour maintenance break in Webropol- online survey tool right after the first invitation e-mails were sent that prevented the participants from responding immediately after receiving the invitation. This probably had an effect to the response rate for this group. In both of the other groups, most responses were received on the first day, whereas for the native English-speaking group most of the responses were received after the reminder.

The participants were meant to answer the survey in the language they received the survey: native English-speakers had the survey in English, half of the participants from Italy in Italian and half of the participants from Italy in English. Two Italian users, who received the survey in English, contacted researchers via e-mail and asked whether they could get the survey in Italian. One participant in the group of Italians answering in English had to be excluded from the analysis, because the participant had used an online translator in completing the survey and therefore it was not known whether the participant had understood the questions correctly. This participant had translated the questions from English to Italian and then answered in Italian.

Analysis in Case Study 1

In case study 1 for the analysis of qualitative data an affinity diagram method was used (Holtzblatt et al., 2005). The analysis was done by two researchers. The response rates were calculated for each sentence completion task. The quality of the open-ended answers was analyzed between the native English-speakers' group and the Italians answering in English-language group. The quality of the content of answers for the sentence completion tasks and open-ended feedback were evaluated by the researchers by analysing what kind of feedback was given: how it was written, what kind of words were used, how descriptive and understandable it was, how much it related to the product etc. The length of the answers (the number of words for each answer) was also calculated.

Case Study 2

In our second case study the main aim was to collect data on long-term user experience by six repeated web-surveys during six months of sports watch use (the Suunto Ambit

see Figure 3) while at the same time investigating the effect of language in answering the qualitative questions in the survey.



Figure 3: The two variants of Suunto Ambit sports watch

In this study the questionnaire was in English for all users, and therefore we aimed at getting a user sample consisting approximately half native English speakers and half non-native English speakers (to allow comparison in their answering regarding style and quality of answers).

Language related questions were included in the first and the last survey. In the first questionnaire, there were questions about participant's native language and English studies (How long have you studied English at school? 1 = 0-1 years, 2 = 1-4 years, 3 = 5-8 years, 4 = More than 8 years).

Both the first and the last questionnaires included questions on the experience of answering in English as a non-native speaker. The questions were 1-7 Likert-scale type of questions:

Understanding the questions and statements in the questionnaire in English was...

1 (Very difficult) – 7 (Very easy)

- Writing the answers in English in the questionnaire was...

1 (Very difficult) – 7 (Very easy)

- How did you feel about answering this survey in English compared to, if you would have answered in your native language?

1 (I would prefer to answer in my own language)- 7 (I am fine answering in English or in my own language. It doesn't make any difference for me.)

- Why?

The main questionnaire remained the same on every survey, and consisted questions on recent memorable experiences with the product, on UX and satisfaction with the product, and life events, feelings and physical exercise of the participants. The user interface of the product at the time of the study started was English as a default, but could be customized to German, Spanish or French. In addition, five new languages were implemented later during the study (Finnish, Swedish, Italian, Portuguese and Dutch. Unfortunately, it is not known what UI language users were using or if they changed them during the six months of our user experience study.

Participants in Case Study 2

The participants for the study were selected among the customers who responded positively to an e-mail invitation to take part in the study by answering a short questionnaire with basic demographic, product purchase and usage questions.

The invitation was sent to 521 registered owners of the product of whom 190 (36%) expressed an interest to take part. 121 were chosen to take part based on three criteria: 1. Short usage time of the product; 2. Nationality; and 3. First come, first served: if there were too many participants for certain groups, the order of the enrolment mattered. As an incentive to take part, a participant would receive a product of Suunto worth up to 269 USD if he completed each of the six surveys.

During the study, 13 participants dropped out and a further four were excluded from the analysis due to missing data. The final response rate was thus 20% (104 registered owners of the product).

97 participants (93%) are male (See Table 3). 92 (88,5%) bought the device themselves, 10 (10%) received it as a requested gift, and two received it as a surprise gift. The age of the participants varies between 20 and 65 years: the mean age is 41 years old (mode 45 years). There are 15 different nationalities with the biggest nationality group being Americans (15, 14%)

Over half of the participants (58, 56%) are from Europe (15 participants do not live in their home country). Most of the participants have a university degree: Bachelor's degree has 34 (33%) and 28 (27%) participants have a Master's degree.

Table 3: Participant information in the study

Group	Native (n=43)	Non-native (n=61)
Age	Mean 42 years, median 43 years, range 29 to 65 years	Mean 41 years, median 41 years, range 20 to 57 years
Education:		
High School or similar/Other	11%	8%
Few years of college or university studies	28%	16%
University Bachelors degree	41%	26%
University Masters degree	13%	38%
Doctorate degree	9%	9%
Sex	40 (94%) male, 3 female (6%)	57 male (93%), 4 female (7%)

There were 43 (44%) participants who stated they were native English speakers or most comfortable in speaking English: 15 Americans, 10 Australians, 7 Canadians, 7

British, 2 Irish, 2 Malaysian and 2 New Zealanders. The rest, 61 (56%) participants are non-native English speakers who come from Europe (49), Asia (8), Canada (2) and South Africa (2). They report as their native language 12 different languages: Afrikaans, Cantonese, Dutch, Finnish, French, Fukienese, German, Malay, Mandarin, Norwegian, Swedish and Thai.

Figure 4 shows how long participants had studied English at school. The majority of participants had been studying English for over 5 years.

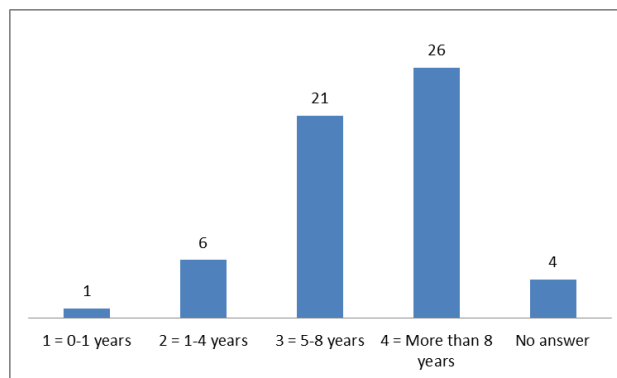


Figure 4: How long have you studied English at school? (N=61)

RESULTS

In this section we will present the results of case study 1 and 2. The results of case study 1 include response rate for the survey, answer times, length and quality of answers, and the questions about answering the survey in English. The results of case study 2 include answer times, and the questions about answering the survey in English.

Response Rates in Case Study 1

One of the main findings of case study 1 concerns the response rates. With the Italian participants the response rate for open ended questions in native language (Italian) was 64 % whereas in foreign language (English) the answer rate was only 38 %, the difference being 26 %. The answer rate of 43 % in the native English-speaking user group is not directly comparable since the maintenance break in Webropol-online survey tool right after the first invitation e-mails were sent.

Parallel readings were found also within the response rates in the sentence completion tasks. With sentence completion tasks, the answer rates varied with the Italian-language group from 53 % up to 91 % (average 75 %) whereas with the Italian-English-language group the answer rates varied from 28 % up to 72 % (average 51 %) the average difference being 24 %. With the native English-speaking group the response rates varied from 57 % up to 90 % (average 81 %).

Answer Times in Case Study 1

In case study 1 there was a difference in the duration time in responding between the Italian-language group answering in Italian and the Italian group answering in English: In the Italian-language group the average answering time was 18:09 (min:sec) whereas in the

Italian group answering in English the average time was 24:05 (23 % longer). In the native English speaking group the average time was 20:00.

Quality of Answers in Case Study 1

When comparing the quality of the answers to open-ended question for different UX dimensions between answering in native language (the native English-speaking group) and answering in foreign language (the Italians answering in English group), the answers in the native language were longer and therefore more descriptive. On average, individual answers in native language had 52 words whereas the answers in foreign language had 13 words, the difference being 75 % (See Figure 5).

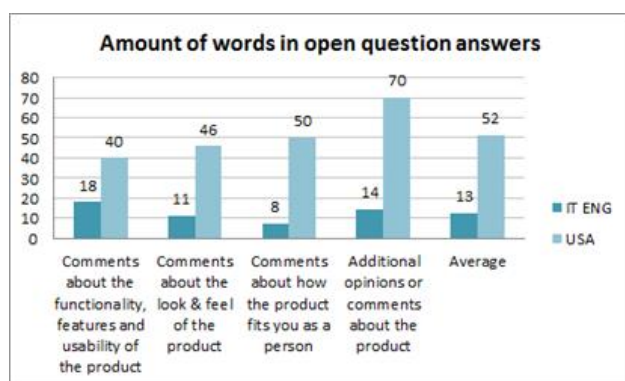


Figure 5: The effect of answering language while compared the amount of words in open question answers.

In the following there are examples of the open ended answers from both native English speakers and Italians answering in English:

“Please, feel free to comment about the functionality, features and usability of this product:”

“The watch looks great and feels great on the wrist. The bracelet would be better if the links were screwed in rather than the push pin system (easier adjustment). It functions well and the screen is gorgeous. The improvements I would suggest are: Weather graph such as on the Core & quote; Snooze" feature on the alarm; ability to scroll back to a previous setting in the menus - right now if you enter the wrong information you must continue through the whole menu before you can get back to enter a correct value.” (Native English speaker, male 45 years, accounting/financing)

“Good and nice watch, good precision in measurement” (Italian answering in English, male 45 years, accounting/financing)

“Please, feel free to comment about how this product fits you as person:”

“I guess that I am pretty a typical as a Suunto user in that I own a LOT of Suunto products. As a teacher, my students are constantly commenting on my watches that I own and keep asking me why I own so many watches. I tell them that I just like this particular brand.”(Native English speaker, male 38 years, education/training)

“I am a strive person who likes sports and adventure.” (Italian answering in English, male 32 years, healthcare)

In sentence completion tasks in case study 1 the difference was smaller both in the quality and in the length of the answers. The answers in the native language had on average 6.1 words whereas the answers in foreign language had 5.3 words, the difference being 13 %.

Questions about Answering the Survey in English in Case Study 1

We asked questions of the Italians answering in English-group about answering the questions in English: **“How did you feel about answering this survey in English compared to, if you would have answered in your native language?”**

Seven participants replied that compared to answering in their native language they did not have any problems in answering in English: For example: *“no problem to answer in English”* (male 75 years, self-employed/entrepreneur)

Three participants answered while it was preferable to answer in their own language, it was OK to answer in English: For example: *“sure it's easier to reply in my language but it's ok also in English”* (male 30 years, airplane pilot).

Three participants replied that they had some problems, for example: *“easy questions resolved some minor difficulties with a translator”* (male 41 years, professional e.g. legal, medical etc.).

Two participants had bigger difficulties with answering, for example *“Italiano”* (male 42 years, executive/senior management).

Three answers were not understood, because of bad English, for example *“not necessary”* (male 44 years, executive/senior management).

We also asked: **“Did answering in English have an effect in the way you answered? How? Please explain.”**

Eleven participants stated that answering in English did not have an effect in the way they answered: For example: *“No. I think I tried to say exactly my thinking”* (male 48 years, professional e.g. legal, medical etc.), *“no it was like in Italian”* (male 43 years, professional e.g. legal, medical etc.).

Three replied that it had some effect. For example: *“a little more difficult, obviously, but I usually don't use English in my work or social life”* (male 50 years, professional e.g. legal, medical etc.).

One participant replied that: *“the answers were shorter and poorer of quality”* (male 50 years, professional e.g. legal, medical etc.).

One replied that *“using English, made the answering significantly harder”* (male 42 years, executive/senior management).

Two answers were not understandable enough to be analyzed.

In addition the participants were asked to evaluate the sentence **‘Writing the answers was...’** on a scale from 1 (1 = very easy) to 6 (= very difficult). Based on their self-assessment, the participants replied with the average of 2.8.

The participants were also asked to evaluate the sentence **‘Understanding the questions and statements was...’** on a scale from 1 (= very easy) to 6 (= very difficult). Based on their self-assessments, the participants found understanding the questions and statements a bit easier than answering as they rated on average 2.0.

Answer time in Case Study 2

In case study 2 the the average answering time for non native English speakers was 16:50 (min:sec). In the native English speaking group the average time was 15:43.

Questions about Answering the Survey in English in Case Study 2

In case study 2 we asked language related questions of the non-native English speakers.

The first language related question was to evaluate the sentence **‘Understanding the questions and statements was...’** on a scale from 1 (= Very difficult) to 7 (= Very easy). Based on their self-assessments, the participants found understanding the questions and statements relatively easy, they rated them on average 5.9.

The second language related question was to evaluate the sentence **‘Writing the answers was...’** on a scale from 1 (1 = Very difficult) to 7 (= Very easy). Based on their self-assessments, the participants found writing the answers relatively easy, as they rated them on average of 5.7.

The third language related question we asked from non-native English speakers in case study 2 was:

How did you feel about answering this survey in English compared to, if you would have answered in your native language? 1 (I would prefer to answer in my own language) - 7 (I am fine answering in English or in my own language. It doesn't make any difference for me.) Figure 6 gives the summary of the results for this question. The participants replied with the average of 5.2.

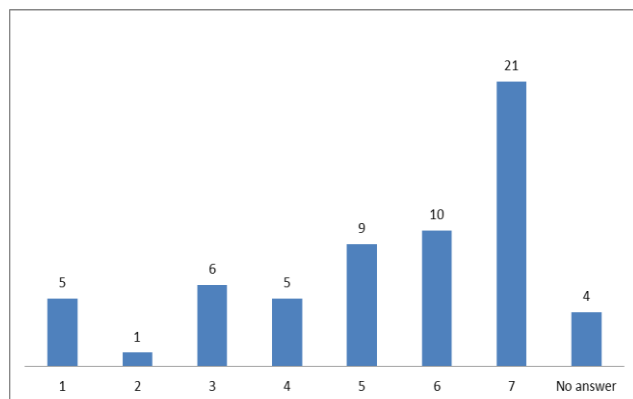


Figure 6: Results by each scaling value (N=61) , Scale: 1 (I would prefer to answer in my own language) - 7 (I am fine

answering in English or in my own language. It doesn't make any difference for me

Users were also invited to explain why they had given a particular rating for the previous scaling question.

Five participants rated 1 (I would prefer to answer in my own language) - 7 (I am fine answering in English or in my own language. It doesn't make any difference for me.) and gave the reason for their rating as e.g. can express myself better, can give more detailed answers, can express myself faster/easier, can express feelings and emotions. Below there are some examples of the answers

“I can express myself better” (Romanian)

“Easier to give more details and examples and describe emotional stuff” (French)

“Works fine with a little help of google translate :) but it would have been easier if it had been in my home language” (Swedish)

One user rated 2 and gave the reason for rating as:

“English is OK for me, but I would be able to write more about my experience, with more details, in my native language.”(French)

Six users rated 3 and gave the reason for their rating as:

“Sometimes it is not easy to describe in English how I feel about things, and sometimes I have to lookup words in google to see if they are spelled right, this takes a lot of time for me” (Dutch)

“Describing in the native language would give the opportunity to add more details when describing thoughts or feelings.” (Dutch)

“Words were not of my daily use” (Finnish)

Five users rated 4 and gave the reason for rating as:

“You cannot express yourself as quickly as in your mother tongue.” (German)

“It's always more easy to answer in your native language. You don't have to think about the words you want to use. I don't use the English language very often. Considering my age, you can imagine that I sometimes have to search for words and that I don't know some of the words that are used.”(Dutch)

Nine users rated 5 and gave the reason for their rating as:

“I prefer answering in my own language (especially for the orthography), but it's not a big problem to answer in English.”(French)

“I'd like to speak and write more and better in English.”(French)

“I can manage with my English, but it would be easier to describe all my feelings and ideas with Finnish. I'm sure that I would write more to answers if I would write Finnish.” (Finnish)

“Often my spelling fail.”(Swedish)

10 users rated 6 and gave reasons for their rating as:

"Sometimes I did not understand some words." (Norwegian)

"I feel quite comfortable while communicating in the English language" (Dutch)

"The adjective comparison was difficult (sometimes subtle)"(French)

"I could understand the questions well. My grammar isn't very good, but I think you can understand all my writings" (German)

"I use English daily also at my work and thus it is quite natural to use it also now." (Finnish)

21 users rated 7 and gave reasons for their rating as:

"I like speaking English. So even more attractive for me." (French)

"No problems for me. If necessary I can use a dictionary and I hope you can understand my English answers :-)" (Swedish)

"I come from a multilingual family and grew up in many countries from different regions of the world. Although Thai is my main language, my first spoken language is Spanish and attended International schools (US English) through out my school years. I am more verse in English and Spanish. I can speak fluent Thai, but below average in reading and writing." (Thai)

"In addition to studying English in school I have spent one year as an exchange student in the USA, worked abroad with English as working language and still today big part of my work is documented in English." (Finnish)

"I work in international company and talk 50% in English and most of the documents I create are in English. So it's just normal to apply English but some adjectives are not part of my vocabulary. Those I have to check first before I can give an answer." (German)

"Reading and understanding English is usually not a problem. Daily in my work I need to be able to read, understand and explain myself in English." (Dutch)

"Expressing myself in English is not that difficult for me. Please excuse my mistakes with grammar or spelling."(Dutch)

"English is the language taught in our schools and is considered the international language of learning, commerce and trade." (Chinese)

"I have finished part of my schooling in Canada and worked all my life in Canada. I work in English and German, using Croatian very seldom. I feel more comfortable with English."(Croatian)

"I only need English nowadays when watching movies, reading magazines etc. So, it's nice to use it." (Finnish)

"It is actually more straightforward to write in English than in French." (French)

"I have been living in the US" (German)

"Because I am most comfortable with writing in English formally compared to my native language." (Malay)

"I've done both my undergraduate and graduate studies abroad and in english language."(Finnish)

"I like speaking English. So even more attractive" (French)

DISCUSSION AND CONCLUSIONS

In our two case studies with real users of highly technical sports watches, we investigated how the language used in the UX evaluation web-survey affected the elicitation of qualitative user experience feedback. Furthermore, we investigated how the users would be able to answer if they could not to use their native language in reading and answering the survey.

Response Rate in Case Study 1

We found that language of the survey had an effect on response rate. In case study 1 the Italian users, who had to answer the survey in English, had 26% lower answer rate in the survey than the Italian group, who answered in Italian. Italians answering in English did not consider it hard, but it is possible that those who felt more confident in answering in English responded in the first place and those who did not, just did not answer at all. That could also explain the lower response rates among Italians answering in English-group.

When planning a survey only in English with cross-cultural user sample it is good to be prepared for lower response rates and therefore send the invitation perhaps to a larger sample and reserve more time for recruiting users to the study. In our studies the users who were invited to participate had all volunteered for the study and they were well educated with English skills, but still, not all of them answered. Our studies would indicate that translating the survey into users' native language might increase the response rate, especially if the sample needs to include more varied users. However, if translation is not possible, our results show that statements with tick box are easier for non-natives to answer in comparison to writing answers to open-ended questions, but as mentioned previously, in UX evaluations, qualitative data is also needed to assess the different experiential aspects.

How easy was it to answer in English?

The majority of participants in both studies answered that they did not have difficulties in answering the survey in English. Most of them gave positive feedback on answering in English. The users were educated and in case study 2 most of the users had been studying English at school for over 5 years. Some of them were using English daily at work or had been studying their degrees in English. They did, however, point out that they could express themselves better if the survey was in their own language: It would be easier to give more details and examples of experiences. Furthermore, using own native language is better for expressing emotions and describing feelings and ideas.

Some users reported to have used a dictionary or online translators to help completing in the survey. They also

commented that it would be quicker to write answers in their own native language without having to look up words and spelling from the dictionaries.

Length of the Answers

We compared the length of the answers in open-ended questions and sentence completion tasks between answering in native language (the native English group in case study 1) and answering in foreign language (the Italians answering in English in case study 1). We found that the answers given in the native language were longer: 75% longer in open ended questions and 13% in sentence completion.

Quality of Answers

We also found in case study 1 that the answers were more descriptive and richer in describing the UX when using native language. Thus, if more descriptive qualitative data is needed from users, our studies indicate that users are able to answer with richer language in their own native language.

ACKNOWLEDGEMENTS

We thank Tiina Taskinen and Christian Nordström from Suunto for co-operation during the studies. This research was supported by the Finnish Doctoral Program in User-Centered Information Technology (UCIT) and the Finnish Funding Agency for Technology and Innovation (Tekes) through the project SUXES.

REFERENCES

Aykin, N. (2005). Overview: Where to Start and What to Consider? In: Aykin, N. (Ed.) Usability and Internationalization of Information Technology. New Jersey, US: Lawrence Erlbaum.

Bargas-Avila, J., A. & Hornbæk, K.. Old wine in new bottles or novel challenges: a critical analysis of empirical studies of user experience. In Proc. CHI 2011. ACM Press (2011), 2689-2698.

Benfield, J., A. and Szlemko, W., J. 2006. Internet-Based Data Collection: promises and Realities. Journal of Research Practice 2, 2, Article D1

Boddy, C. (2007). Projective techniques in Taiwan and Asia-Pacific market research. Qualitative Market Research: An International Journal, 10 (1), 48-62.

Clemmensen, T. & Roese, K. An Overview of a Decade of Journal Publications about Culture and Human-Computer Interaction (HCI). In D. Katre et al. (Eds.): HWID 2009, IFIP AICT 316, pp. 98–112, 2010. E-Communications Household Survey Report. 2010. Special Eurobarometer 335. European Commission.

Glover, D & Bush, T. 2005. The online or e-survey: a research approach for the ICT age. International Journal of Research & Method in Education 28, 2, pp. 135–146.

Hartson, H., Castillo, J., Kelso, J. & Neale, W. Remote evaluation: network as an extension of the usability laboratory. Proc. SIGCHI 1996, ACM (1996), 228-235.

Hassenzahl, M. & Tractinsky, N. User Experience - a research agenda. Behavior & Information Technology 25, 2 (2006), 91-97.

Holtzblatt, K., Burns Wendell, J. & Wood, S. (2005). Rapid Contextual Design. A How-To Guide to Key Techniques for User-Centered Design. Elsevier, San Francisco, USA.

Internet Usage Statistics. 2010. Internet Usage Statistics. Miniwatts Marketing Group.

Kujala, S. & Nurkka, P. (2009a). Identifying User Values for an Activating Game for Children. Proc. MindTrek 2009, ACM (2009).

Kujala, S. & Nurkka, P. (2009b). Product Symbolism in Designing for User Experience. Proc. DPPI 2009, pp. 176-186.

Law, E. and van Schaik, P. Modelling user experience - an agenda for research and practice. Interacting with Computers, 22, 5 (2010), 313-322.

Lozar Manfreda, K., Batagelj, Z., & Vehovar, V. 2002. Design of Web Survey Questionnaires: Three Basic Experiments. Journal of Computer-Mediated Communication 7, 0.

Luedemann, I. & Muller, T. (2010) Online Surveys. In Schumacher, R. (Ed.) The Handbook of Global User Research. Morgan Kaufmann, Burlington, USA.

Nie, N., H. & Erbring, L. 2000. Internet and Society: Preliminary Report. Palo Alto, CA : Stanford Institute for the Quantitative Study of Society.

Nielsen, J. Alertbox, January 22, 2008. Acc.20.2.2011. <http://www.useit.com/alertbox/roi.html>

Nurkka, P., Kujala, S. & Kempainen, K. 2009. Capturing users' perceptions of valuable experience and meaning. Journal of Engineering Design, 20:5, pp. 449-465.

Oyugi, C., Dunckley L. & Smith A. Evaluation methods and cultural differences: studies across three continents. Proc. NordiCHI 2008, ACM (2008), 318-325.

Paas, F., Renkel, A., & Sweller, J. 2004. Cognitive Load Theory: Instructional Implications of the Interaction between Information Structures and Cognitive Architecture. Instructional Science 32: 1–8

Putnam, C., Rose, E., Johnson, E. & Kolko, B. (2009). Adapting User-Centered Methods to Design for Diverse Populations. Information Technologies and International Development, 5 (4), 51-73.

Singh, A., Taneja, A. & Mangalaraj, G. 2009. Creating Online Surveys: Some Wisdom from the Trenches Tutorial. IEEE Transactions on Professional Communication 52, 2, pp. 197-212.

Soley, L. C., and Smith, A.L. (2008). Projective Methods for Social Science and Business Research. Milwaukee: The Southshore Press.

Vermeeren, A., Law, E., Roto, V., Obrist, M., Hoonhout, J. & Väänänen-Vainio-Mattila, K. User experience evaluation methods: current state and development needs. Proc. NordiCHI 2010, ACM (2010), 521-530

Publication 5

Walsh, T., Nurkka, P., Koponen, T., Varsaluoma, J., Kujala, S. and Belt, S. (2011). Collecting Cross-Cultural User Data with Internationalized Storyboard Survey. *Proceedings of OzCHI 2011*, ACM, 301-210.

Reprinted by permission.

Collecting Cross-Cultural User Data with Internationalized Storyboard Survey

Tanja Walsh¹, Piia Nurkka¹, Tiina Koponen¹,
Jari Varsaluoma¹, Sari Kujala¹

¹Tampere University of Technology
33101 Tampere
firstname.lastname@tut.fi

Sara Belt²

²Nokia Oyj
00045 Nokia Group, Finland
sara.belt@nokia.com

ABSTRACT

Globalization and the search for experiential aspects of technology products and services have increased the demand for cross-cultural user feedback. Remote methods would suit agile global data collection, but only few common practices yet exist. Thus, the goal of the present study was to determine ways in which common visual stimulus material (internationalized storyboards) are perceived similarly and differently by cross-cultural respondents. An internationalized remote online storyboard survey was designed to collect cross-cultural user data of 252 respondents, from the USA, Brazil, India, Italy and Finland – around the topic of mobile content sharing concepts. It was found that, for the majority of situations and details, storyboards supported a similar interpretation by users from different cultural backgrounds; and internationalized pictures assisted respondents in providing rich answers to a long survey because of a sound understanding of the intended situations and ease of imagining themselves in different usage situations.

Author Keywords

Cross-Cultural, User Experience, Remote Online Surveys, Internationalization, Storyboards

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design, Experimentation, Human Factors

INTRODUCTION

Companies have recently realized the importance of making products international by not only localizing the product texts, but also looking into design issues with the goals of making products suitable, usable, and desirable by the users in the target market areas (Aykin, 2005, LISA, 2011). Making products and services international is not only a language issue, but should cover different aspects of

product design and experience more broadly. Moreover, as the use of technology has reached far beyond productivity tools to support work to other aspects of human life (Karat et al., 2004) and technology has become a means for human experiences (Marzano, 2000), the collection of cross-cultural user feedback has become pivotal.

Cross-cultural user experience (UX) design is needed in order to ensure that the products are easy to use and that they provide good user experience across cultural boundaries. However, cross-cultural UX design can be challenging and expensive. To succeed in international markets, it is important to cover all target market areas with users from different cultural backgrounds and value systems (Aykin, 2005). Visiting and studying users in all the target markets is often not possible for many reasons: budgets are limited, the ability to perform firsthand on-site research can be challenging without extensive local knowledge, and product timeframes can limit the feasibility of field research (Putnam et al., 2009). As international UX studies, especially on-site, are time-consuming and expensive in practice, a need for remote methods has been identified (Monahan et al., 2008). Development of remote methods would enable wide collection of cross-cultural feedback informing product design to create better products for global markets. However, no common practices exist yet on how user experience can be studied remotely in international contexts (Monahan et al., 2008).

The objective of this case study was to develop a remote online storyboard survey that could be used to collect user feedback on concept ideas from several target market areas. The survey was aimed to collect information about user needs and requirements related to sharing experiences, via different types of content, from mobile handsets. Storyboards were chosen as a tool because visual presentation of ideas helps respondents to identify themselves with the use situation, and enhance imagination. The aim was to internationalize the visual material in the storyboards, so that one single version of the survey could be used in all countries involved. The main research objective was to study how the internationalized storyboards illustrating use scenarios are interpreted and perceived by cross-cultural respondents in remote setting and to evaluate the suitability of internationalized storyboards in remote UX research for product concepts.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

OZCHI '11, Nov 28 – Dec 2, 2011, Canberra, Australia
Copyright © 2011 ACM 978-1-4503-1090-1/11/11... \$10.00

BACKGROUND

UX design should take into account users' socio-cultural context because, in designing UX, there is a greater focus on content, brand and emotions than in designing mere usability (Marcus, 2006). Therefore understanding the concept of culture and how it impacts the product UX, becomes an essential part of study and design of UX. Much of cognitive reasoning depends on social norms and background culture (Ito et al., 1996) and this cultural diversity makes it unrealistic for designers to rely only on intuition or personal experience of interface design when designing for good user experience in cross-cultural contexts (Smith et al., 2005).

However, there is no simple agreement on a specific definition of culture. According to Keesing et al. (1998) most anthropologists seem to agree that culture is a learned behaviour consisting of thoughts, feelings and actions, and is transferred in social interaction. Some anthropologists would like to limit the concept of culture to national and ethnic cultures, but most anthropologists seem to agree, that social interaction, which in a globalized world is not tied in a place or time, is the most important prerequisite to produce and maintain a culture, and even special interests, such as Star Trek enthusiasm, can create a culture (Del Galdo, 1996).

Globalization strategy and process support cross-cultural research and design as well as the technical processes of internationalization and localization. Internationalization process (often abbreviated as i18N) is a process of designing and engineering a technology product so it can be easily adopted for various target languages and cultures without requiring subsequent changes to the core application (Aykin, 2005). According to Aykin et al. (2005) the needs for internationalization vary a lot from very abstract issues involving conceptualizations of culture and their implications for user's reactions to products and services. Others are more pragmatic and concrete for instance visible variables such as icons (Aykin et al., 2005).

Localization is the process of adapting a product or service to a specific culture and language by adding *locale*-specific components and translating the texts used in and with the product. Localization makes products or services usable in and therefore acceptable by, target cultures. (LISA, 2011). In order to create a basis for localization of product design, the key factors differentiating cultures from one another need to be clearly identified (Honold, 1999). Two broad types of issues inherent to cross-cultural design related to culture are identified in relevant literature: There are objective issues, such as language and format conventions of time of day, dates and number, text directionality in writing systems etc. Then there are subjective issues such as value systems, behavioural and intellectual systems of one or more cultural groupings of users or the ways in which people in different cultures interact with computers and websites (Smith et al., 2005).

Despite the importance of cultural factors in product design, little research has been performed to study them (Choi et al., 2005). During recent years the interest in the relationship between cultural aspects and Human-Computer Interaction (HCI) has grown significantly (Clemmensen et al., 2009). Although technology researchers and practitioners have long been aware of the challenges of global markets, there are still many unsolved problems concerning the extent to which culture may affect the development of the artefacts produced (Smith et al., 2005). Ouygi et al. (2008) suggest that in relation to the product of development, cultural differences in signs, meanings, actions, conventions, norms and values raise challenging issues in the design of usable localized artefacts (Ouygi et al., 2008). And that in relation to the process of development, cultural differences potentially affect the manner which users are able to participate in design and act as subjects in evaluation studies (Ouygi et al., 2008). Thus, cross-cultural issues affect the UX of a product and also the UX research methods. Therefore, cultural factors should be considered not only in the actual product itself, but also in the methods that are used during the design. Cross-cultural user research requires studying existing theories of the target market cultures as well as performing international user research on-site or remotely.

Remote Methods

In the development of technology (e.g. new interactive products or services) gathering user feedback is necessary to minimize the risk of failed products in the market. Where and how to collect data from users are relevant questions in cross-cultural users design, and next we will look into these questions.

Hartson et al. (1996) make a categorization on usability methods based on how the evaluator and the user are located relative to one another. In local evaluation they are usually in the same place at the same time. In remote evaluation, however, they are separated in space and/or time. One of the most popular remote methods is a remote questionnaire/survey where the data is collected over the Internet. There are many advantages of web-based surveys, such as the low cost of data collection and analysis; it is a fast way of acquiring information as respondents can answer in a time convenient for them; there can be a variety of different question types; and, the use of multimedia (like sound or video clips) is possible (Evans et al., 2005). In addition, there is a possibility to reach large samples of participants worldwide. Thus, the main requirements for international user experience evaluation methods (not utilizing many resources, fast to apply, relatively easy to use and data collection in many locations) (Väänänen-Vainio-Mattila et al., 2007) would be met by remote survey. However, known internationalized survey methods rely on the use of question item language translations, and it is hard to identify contextual issues with them.

UX is context dependent and measures are thus sensitive to situational factors. Hence, it might seem that on-site or local methods are more likely to elicit realistic experiential responses (Madden et al., 2000). However, realistic experiential responses or direct observation of those are not possible when there is no concrete product at the very beginning of the development process. Vermeeren et al. (2010) suggest, that in early concept phases, where there are no functional systems that participants could interact with but they need to use imagination to be able to evaluate the concept, immersion is the only known method, and that more methods would be needed that help imagining and evaluating future experiences. (In immersion, the respondent is supposed to keep the concept in mind in her/his daily life and make notes on the applicability of the concept in different situations.)

Storyboards

Storyboarding is a method for presenting ideas visually to users to helping them to understand the use cases and to identify themselves with the situations within the stories (Van den Hende et al., 2007). Storyboards are sequences of pictures resembling comic strips. The origins of storyboards lie in the film and animation industry where storyboards are used in visualizing scenes and working as a guide for production (Hart, 1998). In HCI, storyboards are mostly used to present user interfaces and contexts of use, and to illustrate interaction between the system and the user (Holzblatt et al. 2005, Nielsen, 1990). Storyboards can be rough hand drawn sketches, stylish detailed illustrations made by design tools, or anything in between. Usually storyboards are closer to the former, aiming to support in testing and evaluating work practices and system features without worrying about the details (Roto et al., 2009).

Besides evaluating user interfaces and prototypes, storyboards can also be used in evaluating product concepts as Roto et al. (2009) have shown. In these cases when no user interfaces yet exist, particular attention should be paid to describing the context since user experience depends also on the context of use. Storyboards help the participants to step into the situation and boost imagination (Van den Hende et al., 2007). Storyboards are attractive for cross-cultural design and research, because they can be implemented into remote online surveys which enable quick and cost-efficient concept evaluation early in different use contexts in different parts of the world (Roto et al., 2009).

According to Couper et al. (2007) images are contextual stimuli and, like prior questions, they can systematically affect responses when their content has relevance to the survey questions. Couper et al. (2007) suggest three categories for the uses of images in Web surveys: Firstly, images may be used to replace words in survey questions, providing the visual stimulus that forms the core of the question. Secondly, images may be used to supplement the survey questions, e.g. by clarifying the meaning. Thirdly,

images may be used to motivate or entertain the respondent, in which case the images are not intended to influence the responses but rather to increase participation or reduce break offs (Couper et al.2007).

The challenge of using the storyboarding method with cross-cultural users is to understand how the images are perceived in different cultural contexts. Localization of the survey, i.e. adapting the survey material to each of the target cultures and making several local versions, is one option, but this is often infeasible due to cost and time constraints. Through internationalization it is possible to use the same visual material with users from different cultures, which can save resources when compared to localizing material for each remotely participating culture, and this has not been demonstrated or proven in prior art.

Internationalization of Visual Material

Internationalizing visual material means finding elements that are familiar to users from all target cultures and avoiding culturally sensitive elements in the material (Aykin et al., 2005, Horton, 2005). Horton (2005) presents instructions for internationalizing user interface graphics. Many of the instructions are applicable also for internationalizing visual material in general. According to Horton, internationalization of visual material includes the following steps:

1. Research target cultures thoroughly.
2. Use images representing globally common experiences.
3. Generalize images.
4. Test visual material with target cultures.
5. Involve persons from target cultures in design.
6. Eliminate culture-specific symbols.

Research of target cultures through literature can provide useful background information for designing internationalized visual material. Also, interviewing cultural experts may provide important insights about the suitability of the visual material. However, involving end users from target cultures in the design and iteration of the visual material is recommended. The required level of internationalization depends on the target cultures and user groups. Culture is not limited to nationality, language, and religion, but also includes age, gender, caste and social class, wealth, and level of education (2005). Therefore the target cultures, possible sub-cultures and user groups should be clearly defined.

Horton (2005) argues that internationalized images should represent globally common experiences and situations. In addition, the used symbols should be commonly known for the target cultures. All characters (human and animal), gestures, text and colors should also be generalized. According to Horton (2005), people can be presented as cartoons, line drawings and stick figures, because realistic images of people may carry cultural and racial identifiers. Furthermore, recognizable hairstyle, clothing and

implications of status and power should be avoided and the indications of skin color should be omitted. Moreover, signs of economic and social class should be minimized and people in the picture should interact in polite and professional way. Hand gestures should not be used and the right hand should be shown performing interaction with objects (Horton, 2005). Animals can have different symbolic meanings and should be used with care in visual material. For example, a piggy bank represents thriftiness in US but for Muslims the pig may be seen as an unclean and unholy animal (Horton, 2005). If images contain text, any jokes and plays-on-words should be avoided (Horton, 2005). Sense of humor is cultural and personal trait related (Jones et al., 1992) and, for instance, English puns may not be familiar even among English speakers. Color also has a varying symbolic meaning for different cultures (Aykin et al. 2005, Horton, 2005, Madden, et al. 2000).

METHODOLOGY

The case study was conducted with our industrial partner, whose interest was to develop remote and low-cost user experience methods with short lead-time, enabling cross-cultural data collection. The case study involved developing an internationalized remote online storyboard survey charting user needs, motivations and current practices related to sharing of experiences with mobile handsets – via textual stories, different types of media objects and associated information. The aim of employing storyboards was to prime users to think about different media objects and usage contexts in which they might share content with their mobile handsets. This was hypothesized to support the respondents in answering questions about mobile content sharing. In order to ensure cost efficiency and short lead time, only one version of the visual stimulus – the internationalized storyboards – was created and English was used as the survey language in all the target countries: USA, Brazil, Finland, India and Italy.

The online storyboard survey consisted of the following parts: background questions, four storyboards presented with two sets of questions (first set designed to collect data about the storyboarding methodology and second set designed to inform mobile content sharing concept development) and finally, summary questions at the end of the survey. The survey was open approximately three weeks and aimed to collect minimum of 30 respondents per each of the five countries (minimum altogether 150 respondents).

Development of the Storyboard Survey

In the beginning of the study the goals of the user experience research were clarified and identified sharing scenarios were described. Five storyboards about five different mobile content sharing situations would be made: 1. Scenario about taking and sharing photos and other content on a holiday. 2. Scenario about using Internet and sharing news and links on the go. 3. Scenario of how people would share photos and other information when they are

spending some free-time. 4. Scenario of how people would share photos and other information after having had a get-together with friends. 5. Scenario about listening and sharing music with a mobile device.

Our industrial partner needed one single survey version instead of many localized versions to cover all market areas in the study. Therefore, we needed to investigate what kind of situations and details would be understandable for all target areas and this is why we needed to learn and study how to internationalize a survey.

Planning universal settings for the situations in the storyboards was challenging, as was finding the right kind of visual images with the right level of detail. The survey questions about the storyboards and mobile content sharing were developed simultaneously with the storyboards. They needed to support each other. To ensure that the designed storyboard survey was well internationalized before launching it to a larger respondent group, we needed users' input and the survey needed to be tested. Thus, a pilot study was planned to find out how users would interpret the storyboards and how they could be improved.

The pilot survey was implemented into the Survey Monkey web-tool and the pilot tests with users from the target countries begin with 12 under- and post-graduate students representing 5 nationalities (5 Indians, 4 Spanish, 1 American, 1 Brazilian and 1 Russian). The target market areas of pilot tests included Spanish and Russian users, but in the final survey these were replaced by Italian and Finnish users due to a change in requirements. The data from the pilot study was analyzed and the main results were used to improve the survey storyboards and questions.

Final Version of the Survey

In the beginning of the final survey the respondents were instructed in the following way: *“The purpose of this survey is to understand how you currently share photos and other media and to gain insight on how that could work in the future. In order to help us learn about your sharing habits, we have constructed a survey on different situations in which you may find yourself.”* The background questions included questions such as age, nationality, native language, English language skills, brand and model of mobile handset(s) in use, mobile device experience, usage patterns of social networking services (e.g. Which social networking services do you use regularly (visit at least weekly)? How often do you share web links to social networking service(s)? etc.

The four storyboard scenarios and associated questions were presented on separate survey pages. The respondents were asked the same questions about all four storyboards. In the beginning of every web page there was an instruction: *“This page includes questions related to situation illustrated on the left. Before answering the questions, please, start viewing all the pictures in the cartoon. To do that, click the “Next” below the picture.”*

The first question asked about each of the four storyboard was: “Imagine yourself in this situation. What would you do next? (Free text)”. The purpose of the question was to collect spontaneous reactions to the illustrated situation to determine whether participants associated the storyboard with mobile content sharing domain and, consequently, whether the priming to the sharing questions was successful. Moreover, the question enabled exploring sharing needs and requirements, which may not have been discovered if the predetermined questions with multiple choice answer options were used as the sole data collection method.

The second question, asked about each of the four storyboard scenarios, was: “Was there anything irritating or odd in this situation or in the cartoon? (Yes/No) Any comments? (Free text).” The aim of this question was to determine whether there was something unfamiliar for the respondent in the pictures. The answers could tell, if there was something that should have been better internationalized and therefore it was odd or irritating. Following these two questions, users were presented with product design questions specific to our industrial partner – that are outside the scope of this work.

On the last page of the survey we asked the respondents to have a look at all the storyboards again and then answer the following questions: Firstly, “What do you think about the style and the look of these pictures? (Free text)”. Secondly, “Could these situations happen in your own country? (Free text)” Thirdly, “How did these pictures affect your responses?”

Participants

252 respondents from 5 countries participated in the online survey: 70 Indians, 66 Finns, 43 Brazilians, 41 Italians and 32 Americans. 93% of the respondents were male and 7 % female. The amount of respondents by age was: 15-20: 5%, 20-30: 43%, 30-40: 38%, 40-50: 12%, 50-65: 4%. Respondents were recruited from the online consumer panel maintained by the industrial partner. This panel consists of pre-screened, English speaking respondents from across target locales and target consumer segments. Even though involving only English speaking participants in cross-cultural research might bias the results to some extent, utilizing an online user database has several benefits. The significant decrease in time required for research and reduced cost when employing non-localized stimulus material and surveys enable agile cross-cultural end-user involvement in fast-paced product development environment. For the purpose of studying the current behavioural patterns related to sharing media content from mobile devices, Smartphone users with active experience on using at least one social networking service and media sharing on their Smartphones were selected from the panel.

Analysis

The resulting qualitative data underwent content analysis by categorization of the answers into thematic groups.

Categorization was carried out by two researchers, both working independently first on all the data and then comparing, discussing and combining the results. Also, the analysis of the results was performed by the same two researchers after which the results were also discussed with our industrial partner.

RESULTS

The first scenario described a situation of taking a photo on holiday. The idea was to collect user’s reactions to sharing holiday photo object(s) of oneself. The storyboard for scenario 1 is presented in Figure 1. After the users had looked at the cartoon they were asked: “Imagine yourself in this situation: What would you do next?” The response distribution between answer categories, by country, in scenario 1 is presented in Figure 2. “Send” means sending the picture (not mentioning SNSes), “Picture Management” means taking more photos, saving, editing or file transfer of the photo either on the phone, PC or laptop, but not mentioning sharing or sending it immediately in the illustrated context. Answers in the category of “Not related to concept” include answers that didn’t mention anything about doing something to or with the picture.

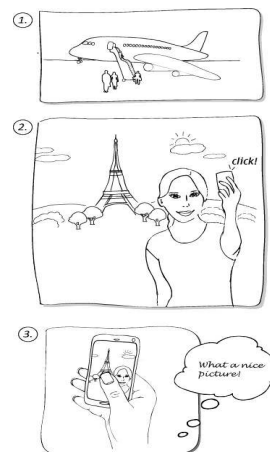


Figure 1. Storyboard for scenario 1 - taking photos on holiday

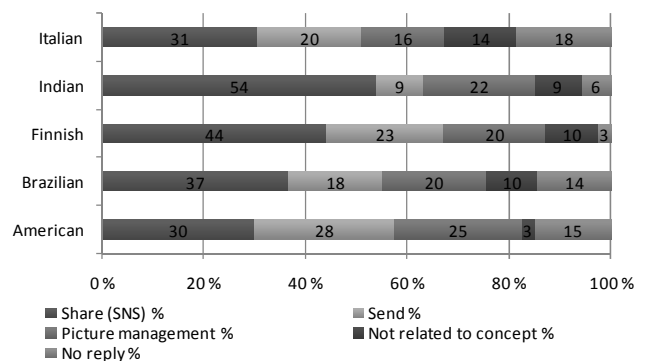


Figure 2. Response distribution between answer categories, by country, to question 1 in scenario 1 “What would you do next?”

The second scenario described the situation of browsing the Internet on the go and the idea was to collect spontaneous perceptions about sharing interesting content found when browsing online. The storyboard for scenario 2 is presented in Figure 3. After users had looked at the cartoon they were asked to imagine themselves in the situation and describe what they would do next - similarly to the first scenario. The response distribution between answer categories, by country, in scenario 2 is presented in Figure 4.

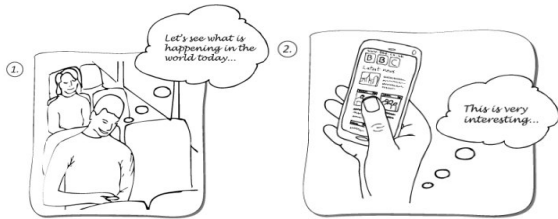


Figure 3. Storyboard for scenario 2- browsing the Internet on the go

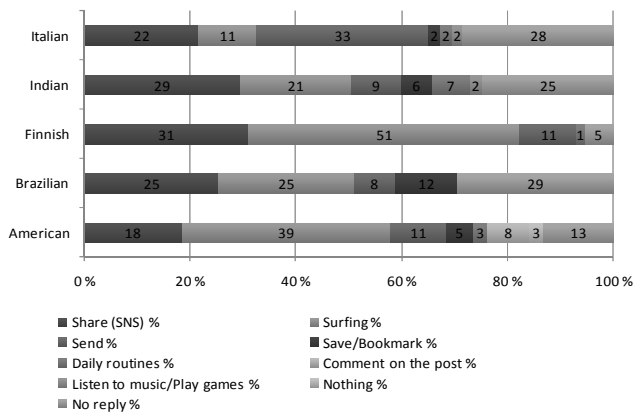


Figure 4. Response distribution between answer categories, by country, to question 1 in scenario 2 “What would you do next?”

The third scenario described a casual get-together and the idea was to chart user reactions related to sharing information, e.g. photos, location related information, textual message or update, about a free-time activity with a group of friends. The storyboard for scenario 3 is presented in Figure 5. After the users had looked at the cartoon, they were asked to imagine themselves in the situation and describe what they would do next. The response distribution between answer categories, by country, in scenario 3 is presented in Figure 6.



Figure 5. Storyboard for scenario 3- casual get-together

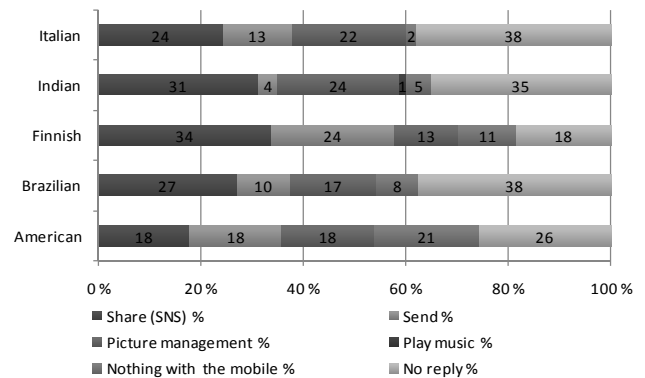


Figure 6. Response distribution between answer categories, by country, to question 1 in scenario 3 “What would you do next?”

The fourth scenario was about listening to music while on the go and the idea was to find out if and how users would share music related information in that situation with a mobile device. The storyboard for scenario 4 is presented in Figure 7. After users had looked at the cartoon, again, they were asked to imagine themselves in the situation and describe what they would do next. The response distribution between answer categories, by country, in scenario 4 is presented in Figure 8. Many said that they would share/send a link, but didn't say how they would do it. Compared to other media objects, respondents stated being clearly less inclined to share the content instantly in the context and, in general, use digital means for sharing music.

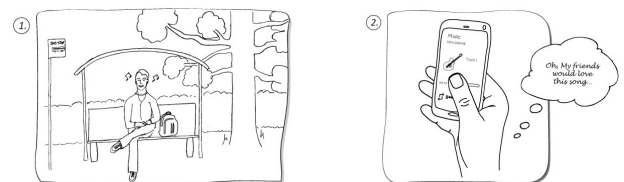


Figure 7. Storyboard for scenario 4- listening music on the go

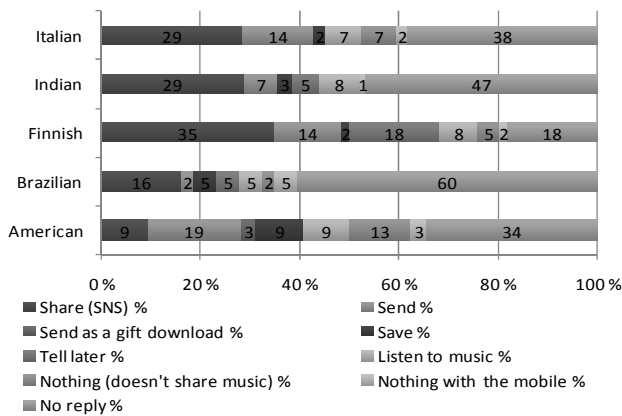


Figure 8. Response distribution between answer categories, by country, to question 1 in scenario 4 “What would you do next?”

The second question in each of the four scenarios was: “Was there anything irritating or odd in this situation or in the cartoon?” Figure 9 shows the distribution of replies (Yes, No, and No reply) in all scenarios per country for question 2. Figure 10 shows the distribution of replies (No, Yes and No reply) of all users’ responses to all scenarios (1, 2, 3 and 4) for question 2.

The answer categories formed with question 2 in scenario one consisted of a rather small amount of answers such as “Using the front camera of the phone” (7 answers), “Thumb covering the picture” (4 answers), “Light coming straight to the camera” (2 answers), and “Nearly impossible to take a photo like that” (2 answers). These were categories about details. Categories related to the situation were “Data costs” (6 answers), “Doesn’t take pictures of himself” (5 answers), “Would use real camera on a holiday” (3 answers), “Where are all the people in Paris?” (3 answers).

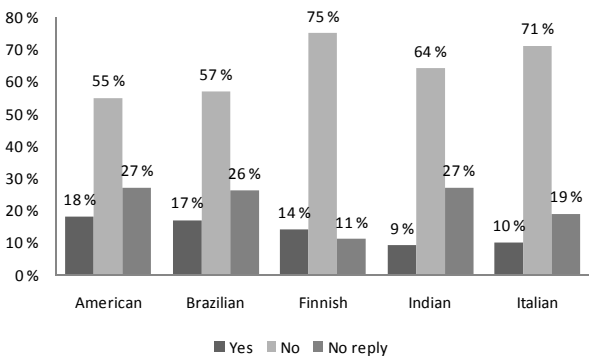


Figure 9: Distribution of replies (Yes, No, and No reply) in all scenarios per country for question 2 “Was there anything odd or irritating in the situation or in cartoon?”

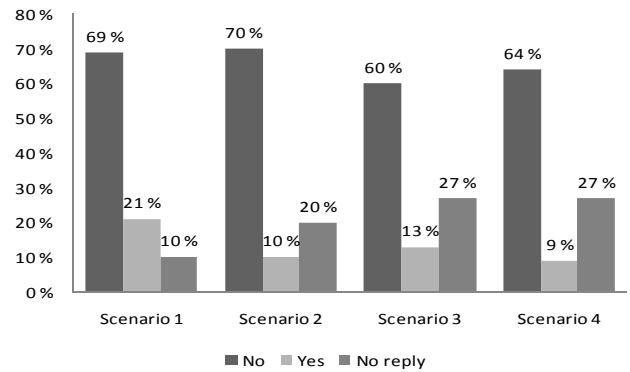


Figure 10: Distribution of replies (No, Yes and No reply) of all users’ responses to all scenarios (1, 2, 3 and 4) for question 2 “Was there anything odd or irritating in the situation or in cartoon?”

In the results of the second scenario there were only few answer categories for irritation such as “Small screen” (3 answers), “Using a cell phone onboard a flight” (4 answers). In the results of the third scenario there were answer categories such as “Tree on a beach” (4 answers), “Doesn’t want to share location with others” (privacy issue) (7 answers), “No need to share information being on a beach” (6 answers), “wouldn’t use a phone in a situation like this (would like to relax) (4 answers), “Not sure about the security” (2 answers). In the results of the fourth scenario there were answer categories such as “No interest in sharing with others what I am listening to” (4), “Doesn’t listen to music with mobile” (3), “Doesn’t listen to music outside” (2), “Wouldn’t use the bus” (2).

On the last page of the survey the users were asked to look at all the pictures again and then answer to “What do you think about the style and look of these pictures?” Figure 11 shows the amount of positive and negative answers and No replies by country. On average 56% of the answers in all countries were positive: the three biggest positive answer categories were: “Nice/Good/Trendy”, “Informative/Descriptive” and “Simple and clear”. On average, 16% of the answers in all countries were negative: Drawing style was not liked (“amateurish, sketch like, cartoonish, childish, poor quality, rough”) and “Lack of details”. Finnish users liked the storyboards the most (66% of the answers were positive). Some American users found them too “Eurocentric” (people and situations). Many users told that the situations depicted could happen in their own countries.

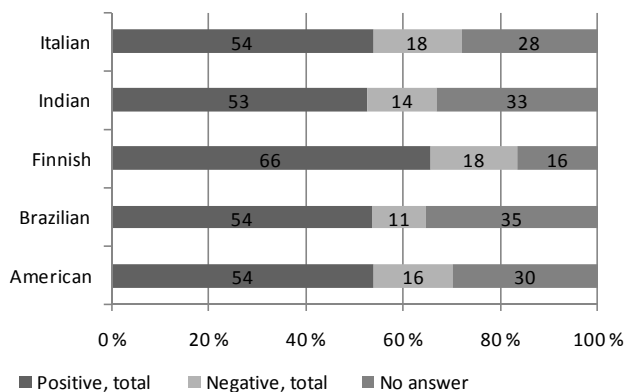


Figure 9. The amount of positive and negative responses and No replies in percentages by country for question: “What do you think about the style and look of these pictures?”

The second question on the last page of the survey was: “Could these situations happen in your own country?” 67,6% answered Yes, 0,4% answered No and 32% of No replies.

The third question was “How did these pictures affect on your responses?” Figure 12 shows users’ responses in percentages by country.

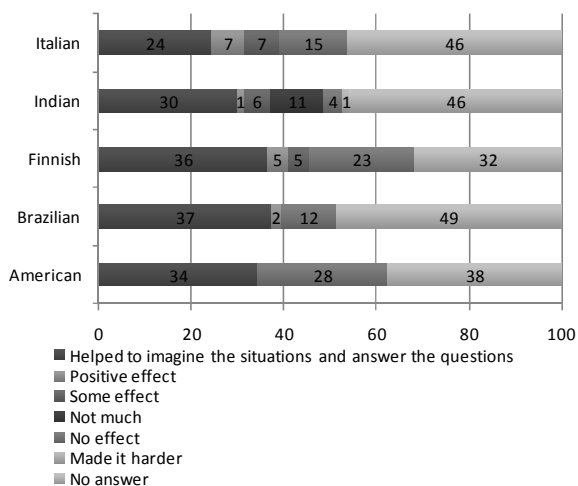


Figure 10: Users’ responses in percentages, by country, for question “How did these pictures affect on your responses?”

A third of the answers said that the storyboards helped to imagine the situations and answer the questions. Some examples of the answers: “It gave me the situation clearly”, “Reminded me of my own experiences using my phone camera”, “They helped to set the stage for thinking about the situations”, “They gave me ore realism during the reply”, “Easier to visualize”, “Just remind me situation that I have in my life”, “Stimulating them”.

The mean No reply rate for all of the questions was 34%. Figure 14 shows the No reply-rate for all countries for questions 1 and 2 in each of the 4 scenarios. The No reply rate grew towards the end of the survey with questions 1 and 2.

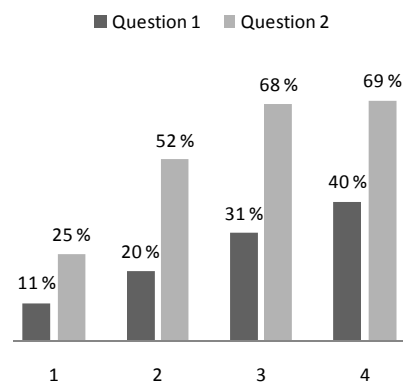


Figure 14: No reply rate for questions 1 (dark grey) and 2 (light grey) in each of the 4 scenarios (1, 2, 3 and 4 in the figure)

DISCUSSION

The situation in the first scenario was interpreted in a similar way by users from different cultural backgrounds. Sharing and sending the picture were the biggest answer categories. Only 5-10% of answers were not related to the mobile content sharing and also the holiday situation was understood. Several participants misinterpreted the intended photo capture use case as receiving a photo, for instance, via multimedia message (though there was no cultural pattern in this). Male respondents might have had difficulties in identifying themselves with a woman character in the scenario, which was evident based on the responses. Brazilian and Finnish users were concerned about the roaming cost and therefore many would send the picture after having found a free Internet connection. Taking prints of the photos and sharing them physically was, interestingly, only suggested in the Indian sample. Some Americans did not think that the scenario was in Paris but they thought she was in Las Vegas in front of the Mini Eiffel Tower. Using a airplane does not necessary indicate that the person in the picture would go abroad, to Paris as Americans use airplane to travel domestic. Adding a picture of a passport might have helped to understand them better. We found out that although internationalization guidelines instruct us to use images representing globally common experiences, such as transportation, it is good to keep in mind that transportation is done differently in different countries, for instance, in India buses are more crowded than in Finland and Americans use airplanes travelling domestically. Thus, we should avoid the use of buses in favor of cars, and also avoid the use of airplanes where the domestic-international understanding would be different between the cultures engaged. The No reply rate was between 3-18%.

Users from different cultural backgrounds interpreted the situation in the second scenario in a similar way. Many mentioned that they would share/send a link, but didn't specify how they would do it. For all nationalities, it seemed to be important that the news had to be considered interesting enough to share with others. They also seemed

to think more carefully to whom they would send the link to (who might be interested). Compared to the first scenario, sharing news differs from sharing pictures: Respondents indicated that determining the audience for sharing photos is easier than in the case of links. It seems that in sharing links the audience is considered and selected much more carefully than in sharing holiday photos, which people would like to show for a larger group of people and less selectively. The Finns and the Americans seemed to relate to the situation the best as the No reply rate was lower than with other nationalities and they reported higher amounts of web-surfing with mobiles. Most participants in the US sample stated that they would also comment on the post. The location of the situation itself (in a bus) did not fit for Americans. They thought they were on the plane and couldn't understand how they could be online on a plane. The Brazilians commented that they are used to limited Internet connectivity while moving

Users from different cultural backgrounds also interpreted the third scenario in a similar way. No reply rate was clearly higher than in the previous two scenarios, which may be due to decreasing answering activeness towards the end of the survey. Alternatively, this might be interpreted as a sign of perceived neutrality of the storyboards. Many said that they would share/send the information, but did not specify how. The Finnish users said that they had no need to share immediately. The Indian users would not all share with all friends, just with few specific people.

In the fourth scenario there were differences in answers between countries. Apart from Finns, all the cultures had a higher than 50% No reply rate, which could indicate that it is not very common to share music with mobile devices. Or that at this point in the survey, the respondents were already too tired to answer. Only 9% of the American answers were about sharing music in SNS. Many said that they would share/send a link, but did not say how they would do it. It seems that the scenario 4 was not as familiar to the respondents in our sample as the scenarios 1, 2 and 3. For some of our respondents sharing music seemed to be something that does not have to happen immediately and is something some people prefer to do face-to-face (if at all).

On average 32% of all respondents said that the pictures helped to imagine the situations and answer the questions. The positive comments on the pictures with the previous question about the look and style also support this finding, especially the answer category "Informative/descriptive" ("Described the situation well and helped to answer the mobile content sharing use pattern questions"). Only one respondent said the pictures made it harder to answer. On average, the No reply rate for all the questions was 34%. In general the No reply rates did get higher towards the end of the survey. 28% of the American answers said that storyboards didn't have an effect, whereas the percentage was much lower among Italians (15%), Indians (4%), and Brazilians (12%). It is possible that the pictures had more

effect on the answering of the non-native English speakers. 5% of Finns would have preferred text.

According to our results the storyboards were understood in a very similar way with users with several different cultural backgrounds. Users seemed to pay attention to very small details concerning the device and the context was expected to be realistic although the simple and "rough" drawing style was accepted in general. The results show that in all scenarios, the majority of respondents were able to imagine the situation and offer a reasonable continuation related to that situation. The most unfamiliar situation was sharing music. The pictures got more positive feedback than negative and a third of respondents spontaneously stated that they helped them to imagine the situation and answer the questions about mobile content sharing patterns. Furthermore, the pictures were considered nice and comfortable in a long survey.

CONCLUSION

The customer base for technology companies has expanded to cover the whole globe and the majority of technology products and services are designed for global markets. Therefore, new, low-cost and agile ways of collecting cross-cultural user feedback are needed. Remote surveys could provide one solution as they are rather fast way in gathering information compared to on-site user studies providing that respondents have access to the Internet, the needed equipment and also the ability to understand, read and write in the survey language, e.g. English. With visual material, contextual information can be brought into the survey to support and motivate users' answering, but that can also raise challenges as people from different cultural backgrounds can interpret visual material differently. If there are inadequate resources for localizing the survey, internationalization could be applied.

Our main research objective was to study how the internationalized storyboards were perceived and understood by cross-cultural respondents in a remote online survey. We found out that users from several different cultural backgrounds interpreted our storyboards in a similar way. Careful internationalization of the visual material and pilot tests helped in the design of storyboards. We found that the storyboards enhanced respondents' understanding of difficult concept ideas and facilitated them to imagine themselves in different use situations. As a consequence, a third of the respondents found it easier to answer the questions and more than half the sample gave general positive feedback on storyboards. With this storyboard survey we were able to gain insights into how users currently share photos and other media and how that could work in the future. It would be useful to repeat this study with two different version of the survey: the one with and the one without the storyboards in order to see the effect of pictures on answering more precisely. Also, it would be interesting and useful to study more in detail whether non-native speakers of English would find the

storyboards more important and helpful than the native English speakers (UI language of the survey being English).

REFERENCES

- Aykin, N.: Overview: Where to Start and What to Consider? In: Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, 2005.
- Aykin, N. & Milewski, A. E. Practical issues and Guidelines for International Information Displays. In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, 2005.
- Choi, B., Lee, I., Kim, J. and Jeon, Y. A Qualitative Cross-National Study of Cultural Influences on Mobile Data Service Design. Proc. CHI 2005, ACM (2005), 661-670.
- Clemmensen, T. & Roese, K. An overview of a decade of journal publications about Culture and Human-Computer Interaction (HCI). Workingpaper nr.3 Copenhagen Business School (2009).
- Couper, M., Conrad, F. & Tourangeau, R. Visual Context Effects in Web Surveys. *Public Opinion Quarterly*, Vol.71, No. 4 (2007), 623-634.
- Del Galdo, E. (1996) Culture and Design. In Del Galdo, E. & Nielsen J. (Eds.), *International User Interfaces*. New York, USA: John Wiley & Sons.
- Evans, J.R. & Mathur, A. The value of online surveys. *Internet Research*, Vol. 15 No. 2 (2005), 195-219.
- Hart, J. *The Art of the Storyboard: Storyboarding for Film, TV, and Animation*. Focal Press, 1998.
- Hartson, H., R. Castillo, J.,C., Kelso, J. & Neale, W.,C. Remote evaluation: the network as an extension of the usability laboratory. Proc. CHI 1996, ACM (1996), 228-235.
- Holzblatt, K. Wendell, J. & Wood, S. *Rapid Contextual Design. A How to Guide to Key Techniques for User-Centered Design*. San Francisco, USA: Elsevier, 2005.
- Honold, P. Learning How to Use a Cellular Phone: Comparison Between German and Chinese Users. *Technical Communication*, 46(2) (1999). 196-205.
- Horton, W. Graphics: The Not Quite Universal Language. In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, 2005.
- Ito, M. & Nakakoji, K. (1996) Impact of Culture on User Interface Design. In: Del Galdo, E. & Nielsen J. (Eds.) *International User Interfaces*. New York, USA: John Wiley & Sons.
- Jones, S., Kenelly, C., Mueller, C., Sweezy, M., Thomas, B., & Velez, L. *Developing International User Information*. Bedford, MA: Digital Press, 1992.
- Karat, J., Karat, C-M., & Vergo, J. Experiences People Value: The New Frontier of Task Analysis. In: Stanton, A. & Diaper, D. (Eds.) *The Handbook of Task Analysis for Human-Computer Interaction*, pp. 585-603. Lawrence Erlbaum Associates, Mahwah, USA, 2004.
- Keesing, R. M. & Strathern, A. J. (1998) *Cultural Anthropology: A Contemporary Perspective*. Forth Worth; Harcourt Brace College.
- LISA (Localisation Industry Standards Association). *The Globalization Industry Primer*. Retrieved February 2011 from <http://www.lisa.org/Globalization-indust.468.0.html>
- Madden, T.J., Hewett, K. & Roth, M.S. Managing Images in Different Cultures: Cross-National Study on Color Meanings and Preferences. *Journal of International Marketing*, Vol. 8. No. 4. (2000), 90-107.
- Marcus, A. (2006) Cross-Cultural User Experience Design. In: (Barker-Plummer, O. et al. Eds.) *Diagrams 2006*, LNAI 4045. Berlin Heidelberg: Springer Verlag, pp. 16-24.
- Marzano, S. *New Values for New Millenium*. Philips Corporate Design. V+K Publishing, Eindhoven, Netherlands, 2000.
- Monahan, K., Lähteenmäki, M., McDonald, S. & Cockton, G. An Investigation into the Use of Field Methods in the Design and Evaluation of Interactive Systems. Proc. British HCI 2008, ACM (2008), 99-108.
- Nielsen, J. Paper versus computer implementations as mockup scenarios for heuristic evaluation. Proc. IFIP INTERACT 1990, 315-320.
- Oyugi, C., Dunckley L. & Smith A. Evaluation methods and cultural differences: studies across three continents. Proc. NordiCHI 2008, ACM (2008), 318-325.
- Putnam, C, Rode, E, Johnson, E.J. & Kolko, B.: *Adapting User-Centered Methods to Design for Diverse Populations*. *Information Technologies and International Development* (2009), 51-73.
- Roto, V., Rantavuo, H. & Väänänen-Vainio-Mattila, K. Evaluating User Experience of Early Product Concepts. Proc. DPPI 2009, (2009), 199-208.
- Smith, A., Gulliksen, J., and Bannon, L. 2005. Building usability in India: Reflections from the Indo European Systems Usability Partnership. Proc. HCI 2005, Springer, 219-232.
- Van den Hende, E., Schoormans, J., Morel, K., Lashina, T., van Loenen, E. & de Boevere, E. Using early concept narratives to collect valid customer input about breakthrough technologies: The effect of application visualization on transportation. *Technological Forecasting and Social Change* 74-9 (2007), 1773-1787.
- Vermeeren, A., Law, E., Roto, V., Obrist, M., Hoonhout, J. & Väänänen-Vainio-Mattila, K. User experience evaluation methods: current state and development needs. Proc. NordiCHI 2010, ACM (2010), 521-530.
- Väänänen-Vainio-Mattila, K., Roto, V., & Hassenzahl, M.: *Now Let's Do It in Practice: User Experience Evaluation Methods in Product Development*. Ext. Abstracts CHI 2008, ACM (2008), 3961-39.

Publication 6

Walsh, T., Petrie, H. and Odutola, F. (2014). Developing Mobile Technologies for Different Cultures: Issues of Assessing User Experience with Visual Materials. *Proceedings of OzCHI 2014*, ACM, 470-479.

Reprinted by permission.

Developing Interactive Systems for Different Cultures: Issues of Assessing User Experience with Visual Materials

Tanja Walsh
Tampere University of
Technology
33101 Tampere, Finland
tanja.walsh@tut.fi

Helen Petrie
University of York
Heslington, York, YO10 5DD
United Kingdom
helen.petrie@york.ac.uk

Olufunmilayo Odutola
SimpleUsability Ltd.
Leeds
United Kingdom
funmi.odutola@gmail.com

ABSTRACT

Evaluation of user experience (UX) in cross-cultural settings is vital for the development of interactive systems due to the globalization of markets and the search for good user experience in interactive systems. Although interactive systems are distributed globally, users are always local and this should be taken into consideration in methods and materials used in the cross-cultural UX research. A localized web-survey was designed and data collected from 92 respondents in two cultures, Nigeria and Anglo-Celtic (AC) countries (Australia, Canada, Ireland, and the UK). We found that Nigerian respondents are more positive in their ratings than AC respondents, irrespective of content, and are less likely to criticize in their feedback. The culture of the respondents and culture of the visual materials of the scenarios does matter in respondents' reactions, but the way it matters is not straightforward, and there are complex interactions. We expected that our results would show a strong identification with one's own cultural group, but this turns out to be only one aspect of a scenario that may affect respondents' reactions. Therefore care needs to be taken in localizing visual materials and in interpreting the results from different cultural groups.

Author Keywords

Cross-Cultural User Research Methods, Online Surveys, Localization, Visual Materials, UX

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

OZCHI '14, Dec 2-5, 2014, Sydney, Australia
Copyright © 2014 ACM 978-1-4503-0653-9... \$15.00
<http://dx.doi.org/10.1145/2686612.2686687>

General Terms

Design, Experimentation, Human Factors

INTRODUCTION

Understanding how cross-cultural issues may affect the design of interactive systems and the methods and materials used in cross-cultural user research to design such interactive systems has become vital. One reason is that systems are aimed at different target market areas with people from a range of different cultural backgrounds. As noted by Chavan et al. (2009), it is clear that a single version of a system may not be received in the same manner by users from varying cultural backgrounds. It has also been shown that a lack of consideration for cultural differences can lead to system design catastrophes (Chavan et al., 2009). To succeed in markets in different cultures, it is important to study all target market segments with users from the appropriate cultural backgrounds and value systems (Aykin, 2005). Therefore, gathering user feedback from target market countries to help design better interactive systems is important. In addition, cross-cultural issues need to be addressed not only with respect to interactive systems themselves, but also in the methods used for user research, both during design and evaluation, as users from different cultures may also react differently to different user research techniques (e.g. Oyugi et. al., 2008).

On-site user research in all target markets is not always possible due to limited budgets, resources and time and also limited local knowledge of the designers (Putnam et al., 2009). Therefore, the need for remote user research methods has been identified (Monahan et al., 2008). However, no common practices or guidelines yet exist on how user research can be undertaken remotely in cross-cultural contexts (Monahan et al., 2008).

The online survey is a remote method that can reach large samples of participants across many geographic locations. Online surveys are also low cost and relatively quick for designers to undertake and analyse, and for respondents to

complete, making them an attractive method for both research and industry (Evans and Mathur, 2005, Väänänen-Vainio-Mattila et al., 2008). In addition, there can be a variety of different question types and the use of multimedia is now possible in online surveys (Evans and Mathur, 2005). However, online surveys may need to be localized to fit in to the needs of the local context and users, if they are to be used cross-culturally.

Our main aim in this research was to study the use of visual materials in cross-cultural online surveys. We were interested to gain an understanding of how to localize visual materials for storyboards (including both photos and sketches) in online surveys. To do this we created a survey to collect information about user needs from participants in Nigeria and “Anglo-Celtic” cultures, on sharing experiences using smartphones. Our study is a contribution to the body of work aimed at better understanding the effect of cultural differences in the methods used in user-centred design.

BACKGROUND

The interest in the relationship between culture and people’s use of interactive systems has grown significantly during recent years (Clemmensen and Roesse, 2010) mostly due to the globalization of interactive products and services, creating a need for understanding users in different local contexts (Aykin, 2005). In addition, customers globally expect more from their interactive systems than mere utility and usability: they are looking for positive user experiences (Karat et al., 2004). Consequently, user experience (UX) design needs to take into account users’ cultural contexts as, in designing UX, there is a greater focus on content, brand and emotions than in designing only for functionality and usability (Marcus, 2006). Therefore understanding the concept of culture and how it impacts the UX of an interactive system becomes an essential part of the design of the system. As Ito and Nakakoji (1996) note, much of cognitive reasoning depends on social norms and background culture. This cultural diversity makes it unrealistic for developers to rely only on intuition or personal experience of the design of interactive systems when designing for good UX in cross-cultural contexts (Smith et al., 2005). Oyugi et al. (2008) suggest that cultural differences in signs, meanings, actions, conventions, norms and values raise challenging issues in the design of usable localized interactive systems.

Internationalization and Localization

Two major strategies are adopted in the attempt to meet the demands of globalization: internationalization and localization (Aykin, 2005). Internationalization is the designing of systems in such a way that they do not need to undergo changes to their core form and functionality in order to be adopted for various target markets (e.g. Aykin, 2005, Young, 2008). Conversely, localization means that interactive systems are adapted to suit the specific cultures and languages of target markets thereby making the systems

usable and acceptable by members of the target cultures (e.g. Aykin, 2005, Young, 2008).

To create a basis for localization of interactive systems, the key factors differentiating cultures from one another need to be clearly identified (Honold, 1999). Two broad types of issues related to cross-cultural design have been identified. Firstly, there are objective issues, such as language and format conventions of time of day, dates and number, text directionality in writing systems etc. (Smith et al., 2005). Secondly, there are subjective issues such as value systems, behavioural and intellectual systems of one or more cultural groups or the ways in which people in different cultures interact with interactive systems (Smith et al., 2005). Young (2008) argues that localization requires authentication of the design through methods such as ethnographic research to make sure that the design specifications are truly representative of the target cultures. Chavan et al. (2009) also support the idea of authenticating localization to ensure that designs are not biased to the designers’ own culture.

Furthermore, as Oyugi et al. (2008) discuss, cultural aspects need to be considered also in the selection of the methods to be used in UX research. Consequently, in relation to the process of design and implementation, cultural differences potentially affect the manner which users are able to participate in user requirements studies, design exercises and evaluation studies (Oyugi et al., 2008). A majority of the methods used to conduct user research or to involve users in the design process have originated in the “western” world (Oyugi et al., 2008). These “western” methods may not always be appropriate for research with users from other parts of the world such as Asia or Africa (Oyugi et al., 2008).

Kamppuri (2011) argues that there is a failure by researchers to see the methodology itself as a product of culture. Cultural differences may affect the way users participate in user research studies. Therefore, it is imperative not only that designers and researchers use methods appropriate for the target cultures but that they employ them in appropriate manners as well. Oyugi et al.’s findings (2008) support the conclusion made by Vatrappu and Pérez-Quñones (2006) that it is not enough to consider the cultural differences between researchers and participants, one must also look at the cultural influences of the methods. Consequently, when planning user research, one needs to consider if the methods are suitable for the target countries and whether there are any localization needs for the actual materials, for example in an online survey and its materials.

Hofstede’s Cultural Dimensions

The most well known and one of the first large scale cross-cultural studies conducted was by Geert Hofstede (2001). Hofstede’s study had over 116,000 participants from over 50 countries. It was later discovered that all the participants were employees of IBM, this discovery along with other

observations opened the floodgates of criticism of Hofstede's work. Critics believed that IBM may have a culture of its own that might have influenced Hofstede's findings in ways that his dimensions do not apply to people outside the IBM world (Soendergaard, 1994). Another prominent criticism is the fact that Hofstede refers to culture in the national sense (McSweeney, 2002). His study did not seem to take into account the fact that a country could have several distinct cultures within it. Despite these criticisms, Hofstede's findings have served as a useful foundation on which to conduct cross-cultural studies. Hofstede's five cultural dimensions (Hofstede, 2001) provide a way to understand the influence of cultural differences on human-computer interaction. Therefore, these cultural dimensions have been one of the ways used to characterize the target cultures investigated in the current study. Hofstede's cultural dimensions are as follows and examples are mostly from Nigeria and the UK, as an example of the "Anglo-Celtic" cultures used in this study.

1. Power Distance: this is the degree to which the less powerful members of a society accept that power is unequally distributed. Hofstede's results found that Nigeria has a relatively high Power Distance while the UK has a relatively low Power Distance.

2. Individualism versus Collectivism: the high end of this dimension represents cultures in which individuals are more concerned with their individual needs. The low end represents cultures where the community acts as a whole and the collective needs of its members are more important than the needs of any one individual. Hofstede's results found that the UK has relatively high Individualism when compared to Nigeria.

3. Masculinity versus Femininity: this dimension is perhaps the most controversial of Hofstede's, it is concerned with the expected social and emotional roles of women and men in a culture. The higher end of this dimension represents a masculine culture where there is a preference for heroism, assertiveness, achievement and material reward for success. The low end represents a feminine culture where there is a preference for modesty, caring for the weak, cooperation and quality of life. The UK and Nigeria have similar values on Masculinity-Femininity according to Hofstede's findings.

4. Uncertainty Avoidance: this dimension is concerned with the degree to which a culture tries to deal with the unpredictability of the future. The high end of this dimension represents cultures that are intolerant of unorthodox ways and use strict laws and rules of conduct to maintain some kind of predictability. The low end represents those cultures that are more flexible and welcoming of change. According to Hofstede's findings, Nigeria has higher uncertainty avoidance of 55 than the UK.

5. Long-term versus Short-term Orientation: this dimension is representative of the degree to which a culture considers the future in its present actions. The high end of this dimension represents cultures with long-term orientations, they are more interested in the long run outcome of present situations and individuals in these cultures are more likely to save and invest. The low end represents cultures that have short-term orientation, they have great respect for tradition and have little consideration for long-term outcomes and individuals in these cultures do not have a strong habit of saving and investing and are more likely to buckle under social pressure to maintain an appearance of high social standing. According to Hofstede's findings, the UK has a higher long term orientation than Nigeria.

Remote Online Surveys

A common remote user research method is the online survey. Evans and Mathur (2005) and Väänänen-Vainio-Mattila et al. (2008) argue that there are many advantages of online surveys: the low cost of data collection and analysis; the speed of sending the survey and acquiring information as respondents can answer in a time convenient for them; the variety of different question types that can be used; and, the possibility of using multimedia (e.g. sound or video clips, storyboards). In addition, there is a possibility to reach large samples of participants worldwide.

However, online surveys also have limitations (e.g. Manfreda et al., 2002). Questions in online surveys need to be simple, as respondents will not spend much time on a survey, so complex user responses are unlikely to be elicited. For this reason, closed format questions work better than open-ended formats, as they are quicker and easily to respond to. The number of questions also needs to be relatively brief. All these factors mean that online surveys are more appropriate for eliciting broad but not deep information. There are risks in obtaining appropriate samples from the relevant population of users. This is particularly important if not everyone in the relevant population has access to or uses the Internet. However, the problem with Internet access and usage is diminishing worldwide. Finally response rates may be very low, so considerable effort may be needed in recruiting respondents which may negate the advantages of the method.

Visual Material in Online Surveys

In user research, we often want to elicit information from users about a particular concept or scenario involving an interactive system. Vermeeren et al. (2010) suggest that in early phases of design, when there are no actual systems that participants can interact with, participants must use their imagination to be able to evaluate future interactive systems. However, there are methods to help participants imagine and evaluate possible future systems. For example, visual representations such as photographs and storyboards can be when designers need to convey a particular concept or scenario to users.

To provide visualizations of interactive system concepts or scenarios, designers have used different kinds of visual materials including videos, photographs and storyboards (e.g. Kolli, 1993, Lelie, 2006). Aikio et al. (2005) note that photos and storyboards are easier to create or obtain than videos, and that it is easier to modify photos and storyboards than videos, although the modification of photos can only go so far. This makes storyboards the most versatile visual representation and therefore an ideal method to use in user research that requires localization of visual material. Van Der Lelie (2006) argues that storyboards provide a means of conveying a message in a common visual language that can be understood by people from different backgrounds. One could then argue that storyboards are ideal for cross-cultural studies.

Couper et al. (2007) suggest three categories for the use of images in online surveys: Firstly, images may be used to replace words in survey questions, providing the visual stimulus that forms the core of a question. Secondly, images may be used to supplement a survey question, by clarifying the meaning. Thirdly, images may be used to motivate or entertain the respondent, in which case the images are not intended to influence the responses but rather to prevent respondents in failing to complete the survey.

Storyboards originated in the field of cinematography as a means of communicating continuity to cinematographers (Hart, 1998). They have since become a tool used by HCI designers and researchers to convey a scenario or concept to potential users of interactive systems. In design studies (Holtzblatt, 2005), storyboards are used to illustrate the use or potential use of all or part of an interactive system. They may also be used to assist users in envisioning themselves in various scenarios through a process called transportation (Van den Hende, 2007). Storyboards usually consist of a sequence of drawn pictures reminiscent of the frames of traditional animations. These pictures may have color or be monochrome, may be hand-drawn or done with the aid of design tools. They may also vary in detail; some storyboards have matchstick men while others have more detailed drawings of people. Truong et al. (Truong et al., 2006) warn that too much detail may be distracting.

The challenge of using storyboards in cross-cultural situations is to understand how the images are interpreted in different cultural contexts. Localization of a survey, that is adapting the survey material to each of the target cultures and making several local versions, is one option. Our research is an investigation of a web-survey localization of two different types of visual materials (photos and single drawing storyboards) and evaluation of concepts in two very different cultures, Nigerian and Anglo-Celtic.

In this research we chose to contrast Nigerian culture with the Anglo-Celtic (AC) culture of the UK and its ex-colonies that are populated largely by immigrants from the UK and Ireland: Australia, Canada and New Zealand. All these

countries share a dominant culture with similar values, as reflected in similar profiles on all five of Hofstede's cultural dimensions. Obviously both Nigeria and the AC countries also have a variety of other cultures, but the AC culture is still the dominant one.

METHOD

Participants

92 people who responded to an online survey met the inclusion criteria and produced enough data for analysis. 50 were Nigerian and 42 were British or from other Anglo-Celtic countries (Australia, Canada, and Ireland). Respondents were recruited from professional and personal circles known to the researchers. Thus they are not representative of the entire cultures, but for both Nigerian and AC groups are drawn from university educated, affluent, technologically aware sectors of society. Thus they are reasonably comparable.

The Nigerian respondents comprised 25 women and 23 men. Ages ranged from 18 to over 60, with a median age group of 21 – 30 years. Respondents were from all over Nigeria with native languages including Epira, Fulani, Hausa, Igbo, Tiv and Yoruba. Respondents rated their proficiency in English (on a scale from 1 = beginner to 5 = native speaker level) and gave a mean rating of 4.43 (SD = 0.93). They were also asked to rate whether they would prefer to answer the survey in their native language or English (1 = prefer my native language to 5 = prefer English) and gave a mean response of 4.46 (SD = 0.93). 48 (96.0%) reported having at least one mobile phone (two respondents did not answer this question, so we cannot say whether they had a mobile or not) and 32 (64.0%) reported having at least one tablet computer.

The AC respondents comprised 24 women and 18 men. This group included 36 respondents from the UK, three from Canada, two from Australia and one from Ireland. Ages ranged from 18 to over 60, with a median age group of 31 – 40 years. All AC respondents reported having at least one mobile phone and 31 (73.8%) reported having at least one tablet computer.

Design

A four way mixed design was used. The three between-respondents independent variables were the type of material (Photos or Storyboards), the Culture depicted in the Material (Nigerian or AC) and the Culture of the respondents (Nigerian or AC). The one within-respondents independent variable was the three different scenarios of use presented. The dependent variables were the Likert scale ratings and responses to open-ended questions given about each scenario. In addition there were questions which asked respondents to reflect on all three scenarios.

Materials

Three scenarios were created, with both photo and storyboard versions, starting from the internationalized storyboards developed by Walsh et al. (2011). The first

task was to critique these materials from a Nigerian perspective. A critique group of 7 Nigerians was recruited, comprising 4 women and 3 men, mean age 31.3 years (SD = 12.2, range 20 – 51 years). Each member of this group had at least one mobile phone and used at least one social networking site regularly.

Members were given the four Walsh et al. (2011) storyboards and asked to work through them and note all the things that would seem out of place in a Nigerian setting, those things that would make it difficult for them to identify with the characters depicted in the storyboards and the activities being shown. This critique was done in participants' own time and then all the results were collected and cross-tabulated. The group produced 16 points on which the storyboards would not be appropriate for a Nigerian context, even though they were attempting to be international. These ranged from the fact that there were not enough people on the bus (scenario 2 in Walsh et al., 2011) (a bus in Nigeria would likely be very crowded and it would be impossible to browse the Internet while on a bus journey) to the fact that a Nigerian man would not sit with his legs crossed in the manner depicted in scenario 4, this would be considered inappropriately effeminate.

Using these critiques as a basis, three of the Walsh et al. scenarios (2011) were localized for the Nigerian cultural context, each with a photo and a storyboard version. For example, scenario 1 from Walsh et al. (2011) was about taking a photo on holiday, the main sketch showing a woman taking a photo of herself in front of the Eiffel Tower. The critique revealed that Paris is not a popular holiday destination with Nigerians, so the scene was changed to Dubai (with the Burj Al Arab in the background). In addition, the critique revealed that Nigerians would be unlikely to take a photo of themselves, "selfies", so the scenario was changed to a woman posing for a photo being taken by someone else. The four images used for this scenario in the current study are shown in Figure 1.



Figure 1. Photos and storyboards for Holiday Photo scenario.

The other two scenarios were checking information on the internet while travelling (on a bus or in a car) and having a casual social get together with friends and sending photos to other friends.

The survey was created in the SurveyMonkey online survey software. The survey presented the three scenarios, each with a short textual introduction. For example, the introduction for the Nigerian version of the holiday photo scenario was "Imagine that you have just had a nice photo of you taken while on holiday. What would you do next?" Respondents were asked to look at the image and then rate a series of 5 point Likert items: *How easy or difficult was it to relate to the situation? How appropriate or inappropriate was the situation to you personally? How easy or difficult was it to identify with the situation?* Each Likert item was accompanied by an open-ended question asking the respondents to explain their rating.

After the questions about the three scenarios, respondents were shown all the visual materials again and asked to rate the following 5 point Likert items: *Did you feel that the photos/storyboards helped or hindered you in answering the questions about the situations? Were the photos appropriate to the kind of person you are?*

In addition, there were a number of open-ended questions: *What was appropriate about the photos/storyboards for the kind of person you are? What was not appropriate about the photos/storyboards for the kind of person you are? What do you think helped/hindered you about the photos/storyboards? Do you think the fact that the people were Nigerian/European helped/hindered you?*

The questionnaire also included a number of questions to collect demographic data and information about mobile phone use.

Procedure

An introduction webpage was created to introduce the study and brief participants. An additional advantage of this

procedure was that we could swap the version of the questionnaire made available (photos or storyboards, Nigerian or AC visual materials) depending on which condition we were currently recruiting respondents for.

The study was publicized widely amongst professional and personal contacts of the authors in the AC countries and Nigeria, via personal emails and messages to online discussion groups. The survey took 20 – 30 minutes to complete. All respondents were entered into a prize draw for one of four prizes of gadgets worth £15 (approximately USD 24, 18 euros). It was decided to offer a prize draw for gadgets as it was felt that in Nigerian culture offering cash or gift vouchers would seem rude. It was decided that it was ethical to offer the same value to both groups (although the amount is worth more in real terms in Nigeria), and a type of compensation that would seem appropriate to both groups.

RESULTS

To analyse the Likert scale rating items, we first investigated the relationship between the three scenario specific questions. On all three scenarios, there were highly significant correlations between the responses on the three questions (all $p < 0.001$), so we created a Reaction score for each scenario, being the mean of the three questions for each respondent for that scenario. This has the advantage of being a more robust measure than the response to a single Likert item (Kline, 2000). We also investigated the two Likert scale questions that asked respondents to reflect on all three scenarios they had seen. These also correlated significantly ($p < 0.001$), so we created an Overall Reaction score, being the mean response for each respondent on these two questions.

Univariate analyses of variance (ANOVA) were conducted on the Reaction scores. For each of the three scenarios and for the Overall Reaction, a three way ANOVA was conducted, with Respondent Culture (Nigerian vs AC), Visual Material Type (Photos vs Storyboards), and Visual Material Culture (Nigerian vs AC) as the independent variables and the Reaction score as the dependent variable.

Scenario 1: Internet on the Go

A three way ANOVA on the Reaction scores for Scenario 1 found no significant effects for Respondent Culture, Visual Material Type or Visual Material Culture. The overall mean rating for Scenario 1 was 3.81 (Standard Deviation = 1.05).

Scenario 2: Taking a holiday photo

A three way ANOVA on the Reaction scores for Scenario 2 found a significant main effect for Respondent Culture ($F = 16.88$, $df = 1$, 84 , $p < 0.001$). Nigerian respondents answered significantly more positively, with a mean score of 4.41 (SD: 0.70) compared to a mean score of 3.52 (SD: 1.28) for the AC respondents. There was also a significant main effect of Visual Material Culture ($F = 3.95$, $df = 1$, 84 , $p < 0.05$) with Nigerian Visual Materials (mean: 4.20, SD:

0.94) scoring more positively than AC Visual Materials (mean: 3.82, SD: 1.21). Finally, there was a significant interaction between Visual Materials Culture and Respondent Culture ($F = 4.33$, $df = 1$, 84 , $p < 0.05$). Figure 2 shows that Nigerian respondents were equally positive about the Nigerian Visual Materials, while AC respondents were more positive about Nigerian materials than about AC materials.

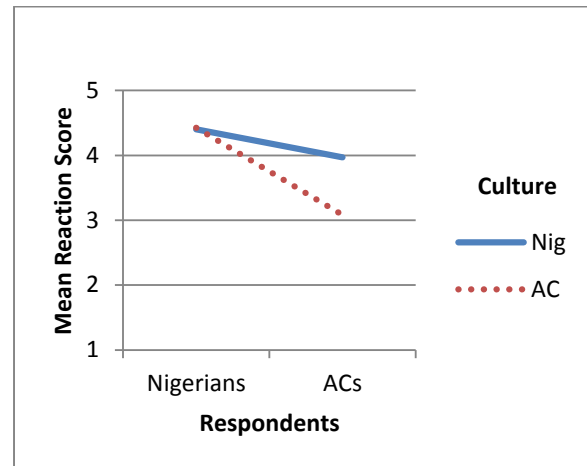


Figure 2. Reaction Scores for Scenario 2, by Respondent Culture and Visual Material Culture.

Scenario 3: A casual social get together

A three way ANOVA on the Reaction scores for Scenario 3 found a significant main effect for Respondent Culture ($F = 16.06$, $df = 1$, 83 , $p < 0.001$). Nigerian respondents answered significantly more positively, with a mean Reaction score of 4.14 (SD: 0.87) compared to a mean score of 3.16 (SD: 1.21) for the AC respondents. There was also a significant three way interaction between Respondent Culture, Visual Materials Type, and Visual Materials Culture ($F = 6.56$, $df = 1$, 83 , $p < 0.05$). Figure 3 shows that for the Photo materials, the Nigerian respondents prefer the Nigerian culture/nationality materials in comparison with the AC materials, whereas the AC respondents prefer AC materials in comparison with the Nigerian materials, so there is matching to culture/nationality, although the effect is far stronger for the Nigerian respondents than for the AC respondents. However, for the Storyboards, the Nigerian respondents prefer the AC materials to the Nigerian ones, whereas the AC respondents do not distinguish between the two.

Reflecting on all three scenarios

A three way ANOVA on the Overall Reaction scores found a significant main effect for Respondent Culture ($F = 17.27$, $df = 1$, 82 , $p < 0.001$). Nigerian respondents answered significantly more positively, with a mean score of 3.80 (SD: 0.82) compared to a mean score of 3.11 (SD: 0.78) for AC respondents. There was also a significant interaction between Visual Materials Culture and Material Type ($F = 3.53$, $df = 1$, 82 , $p < 0.05$). Figure 4 shows that all

respondents (both Nigerian and AC) were equally positive about the Photo materials, whether they depicted Nigerian or AC culture, whereas for the Storyboards, respondents were more positive about AC materials than about Nigerian materials.

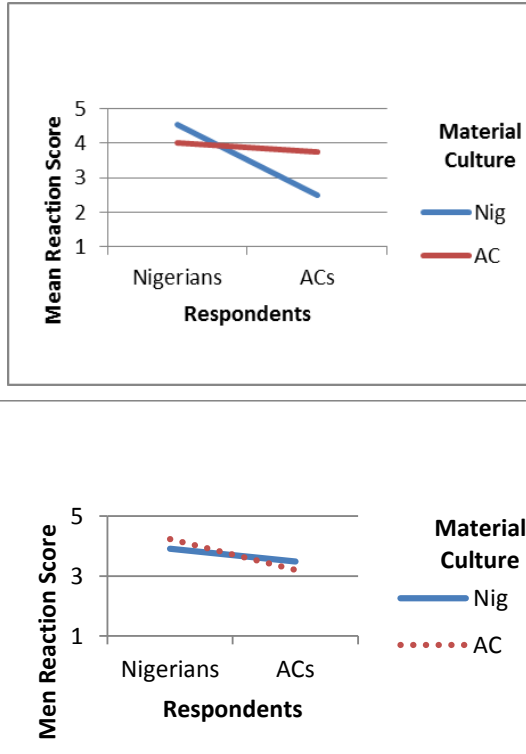


Figure 3. Reactions to Scenario 3, for Photos (top panel) and Storyboards (bottom panel) by Respondent Culture and Visual Materials Culture.

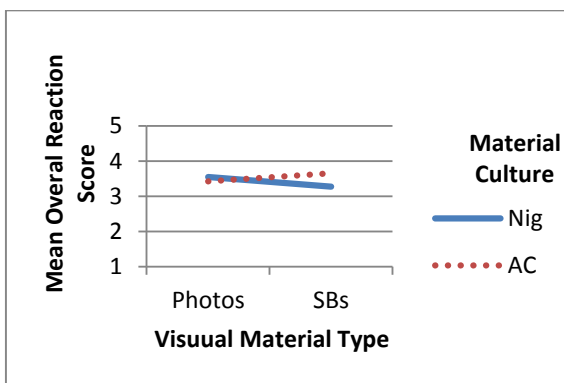


Figure 4. Overall reactions to the materials, for by Material Type and Materials Culture/Nationality.

Open-ended Questions

Answers to the open-ended questions were collated by Respondent Culture and Visual Material Type. Due to space constraints, here we present only the breakdown for Respondent Culture. Tables 1 to 4 present responses based on a content analysis of responses to both Visual Material Types.

Response category	Nigerian	AC	Total
They provide context	27% (10)	35% (12)	31% (22)
Can relate to them	22% (8)	29% (10)	25% (18)
They provide a mental picture	14% (5)	24% (8)	18% (13)
Can relate to the facial expressions	16% (6)	0	8% (6)
Nothing in particular	8% (3)	9% (3)	8% (6)
They made the situations identifiable	3% (1)	12% (4)	7% (5)
Details (words, design etc.)	8% (3)	0	4% (3)
Can relate to the activities/people	5% (2)	0	3% (2)

Table 1. Distribution of responses to “What do you think helped you about the photos/storyboards?”

Response category	Nigerian	AC	Total
Nothing in particular	74% (23)	41% (14)	57% (37)
Too vague	6% (2)	21% (7)	14% (9)
Detail too specific/distracting	3% (1)	15% (5)	10% (6)
Unfamiliar situation	3% (1)	12% (4)	8% (5)
Unfamiliar people	0	9% (3)	5% (3)
Picture details (e.g. drawing style)	6% (2)	0	3% (2)
Unfamiliar activities	3% (1)	0	2% (1)
Restricts imagination	3% (1)	0	2% (1)
Confusing	0	3% (1)	2% (1)

Table 2. Distribution of responses to “What do you think hindered you about the photos/storyboards?”

Response category	Nigerian	AC	Total
Activities	38% (11)	38% (11)	38% (22)
Situation	10% (3)	38% (11)	24% (14)
Use of devices	14% (4)	10% (3)	12% (7)
Emotions shown by the people	17% (5)	3% (1)	10% (6)
People	3% (1)	14% (4)	9% (5)
Everything	17% (5)	0	5% (5)
Locations/places	3% (1)	3% (1)	3% (2)
Nothing in particular	0	7% (2)	3% (2)
The fact that they were a visual representation	7% (2)	7% (2)	3% (2)

Table 3. Response distribution for the question “What was appropriate in the photos/storyboards for the kind of person you are?”

Response category	Nigerian	AC	Total
Nothing in particular	76% (19)	31% (10)	51% (29)

People (e.g. gender, age, dress)	0	37% (12)	21% (12)
Unfamiliar activities	16% (4)	9% (3)	12% (7)
Use of device	0	16% (5)	9% (5)
Posture	4% (1)	3% (1)	4% (2)
Emotions (e.g. people seemed too happy)	0	6% (2)	4% (2)
Too specific	0	3% (1)	2% (1)
Too vague	0	3% (1)	2% (1)
Picture properties	4% (1)	0	2% (1)

Table 4. Distribution of response to “What was Inappropriate about the photos/storyboards for the kind of person you are?”

DISCUSSION

Our research aims to contribute to the development of appropriate methods for conducting cross-cultural user research. We investigated the effect of localized visual materials on responses in a remote online survey by comparing respondents from two cultural groups, Nigerian and AC. The survey was designed to elicit data about experience of mobile technology.

Cultural Differences in Ratings

Overall, the Nigerian respondents gave more positive feedback than the AC respondents. There were significant differences between Nigerian and AC respondents on both Scenarios 2 and 3 and the overall reaction to the scenarios. These results are independent of visual material type and the culture depicted in the visual materials. This means that no matter what visual material type they were looking at or culture depicted in the visual material, Nigerians appeared to be generally more positive than AC respondents of the visual materials.

Nigeria is a high Power Distance culture meaning it promotes reverence for authority and an unwillingness to offend those in authority. This unwillingness to offend may have hindered Nigerian respondents in providing negative feedback. In this study, the researcher who asked Nigerian respondents to participate in the study may have been seen as an authority figure and expert. Nigerians therefore may not have wanted to offend the researcher by providing negative feedback which could be seen as criticism of the researcher’s work.

The AC respondents are from a relative low Power Distance culture. This means that they are more accepting of negative feedback and are less likely to perceive such feedback as an insult to authority. This would suggest that these respondents are more comfortable about giving negative feedback. The mean reaction scores given by the AC respondents to the scenarios were not completely negative, they were in the neutral range. The responses given by AC respondents also had more variation than the Nigerian responses. For example in Scenario 3, AC responses to the individual questions had standard

deviations 1.32, 1.47 and 1.47 of while Nigerian responses had standard deviations of 0.90, 0.90 and 0.88 respectively.

It was also evident in the qualitative data that Nigerians were less likely to give negative feedback than AC respondents. In cases where the questions ask for negative responses (“*What was not appropriate about the photos/storyboards for the kind of person you are?*” and “*What do you think hindered you about the photos/storyboards?*”) far more Nigerians than AC respondents responded with “nothing in particular”.

Although there seems to be a good explanation for why more Nigerians than AC respondents would give positive feedback, Scenario 1 proved to be the exception. In contrast to Scenarios 2 and 3, there was no significant difference between Nigerian and AC respondents in Reaction scores for Scenario 1. This shows that the Nigerian respondents were capable of giving answers in the same way AC respondents did.

Interaction between Respondent Culture and Visual Material Culture

One of the major challenges in designing the visual materials for the storyboards in this online survey was to find scenarios with which all users could identify. After all, the reason for using visual materials in an online survey is to help the respondents to answer the questions. The first scenario seems to have met this criterion, as we did not find significant differences in responses between AC and Nigerian respondents. It could be concluded that the content of scenario 1 overrode any cultural differences.

Interestingly, in scenario 2, the AC respondents were most negative about the AC visual material (see Figure 2, their mean was only 3.08). This scenario involved a person taking a picture of themselves, a “selfie”. This was also reflected in comments such as: “*I tend not to take pictures of myself*”, “*I don’t take photos of myself*”, “*I very rarely take self portraits*”, “*I never take photos of myself*”.

AC respondents were also somewhat negative about sharing information while out on a social gathering with friends, as shown in Scenario 3. Comments included “*I can imagine having a casual get-together with my friends but I can’t imagine I’d want to tell others*” (British respondent), “*I consider my meeting with other people a private, personal thing. I would not have any desire to share info about what was happening to others*” (Australian respondent). The Nigerian respondents were much more positive in their answers about sharing information in this situation. Comments included “*I have many get together a with incomplete groups so it’s nice to keep others absent in the loop through photos*”.

In scenario 3 respondents preferred photos when looking at culturally appropriate visual material and preferred storyboards when looking at visual material localized for a different culture. In the qualitative data, respondents mentioned that the storyboards were too vague. These two

results could be interpreted as a dislike of details that do not agree with one's culture. This is a topic that we will investigate further.

In their overall reaction on the scenarios, both Nigerian and AC respondents frequently mentioned that a helpful thing about the visual materials was that they provided context and helped to form a mental picture to use while answering questions. This supports the use of visual material in future studies of this kind.

It is interesting that when asked "What do you think helped you about the photos/storyboards?" 16% of the Nigerian respondents mentioned the facial expressions of people depicted in the visual material. No AC respondents mentioned this. In addition, most of the Nigerians who gave this response were looking at photos. When asked "What was appropriate in the photos/storyboards for the kind of person you are?" several Nigerians gave answers categorized as "Emotions shown by the people". One AC respondent also gave an answer in this category. The split of categories between visual material types for AC respondents was relatively even, this is not surprising as emotions are more general than facial expressions and perceivable even in relatively vague visual materials. A few Nigerians mentioned details of the visual materials such as drawing style and color, whereas no AC respondents made such remarks.

In cross-cultural studies such as this, overly vague visual materials may prevent respondents from noticing cultural details in the visual materials. On the other hand, just as Truong et al. (2006) warn, overly specific visual material could distract respondents while they try to imagine scenarios. One could also conclude that sensitivity to detail may not be the same across cultures. Further studies need to be conducted in order to determine what amount of detail is optimal for visual materials intended for use in cross-cultural studies and if this amount is also dependent on the target cultures.

Cultural Self-Awareness

Towards the end of the questionnaire it was revealed to respondents that the people depicted in the visual material they had seen were either all Nigerian or all AC. When asked if this helped or hindered them in responding, 89% of the respondents said it did not help or hinder them. However, the quantitative results obtained in this study indicate that this may not be the case. This goes to show that it is not enough to ask simple or direct questions about complex topics such as culture. Stewart and Bennett (1991) state that culture is internalized and that it is very difficult for a person to be self-aware of their culture. This means that cross-cultural studies must not rely on the ability of respondents to be self-aware of how their culture affects their behavior and beliefs.

The study has a number of limitations, such as the fact that the respondent groups were not well matched by age which

is a factor that could affect responses. The relatively small number of scenarios does not allow for an in-depth analysis of the effect of scenario type on responses. In analyzing the results, we realized that there were a number of very small differences between the visual materials in spite of the fact we had attempted to match them exactly, which may have affected the results. One of these was that in scenario 3, all the participants were female in the Nigerian scenario, but of mixed gender in the AC scenario. This and other effects of gender will be investigated further in subsequent analyses of the data.

CONCLUSIONS

The user audience for companies developing interactive systems has expanded to cover the whole globe and the majority of interactive systems are now designed for global markets. Therefore, new, low-cost and robust ways of collecting cross-cultural user experience data are needed. Remote online surveys can provide one solution as they are a fast way in gathering data compared to on-site user studies, providing respondents have access to the Internet, and the equipment needed. With visual materials, contextual information can be brought into the survey to support and motivate respondents to participate, but that can also raise challenges as people from different cultural backgrounds can interpret visual materials differently. Therefore, localization of survey material is strongly recommended.

Our main research objective was to study how localized visual materials (storyboards and photos) were perceived and understood by respondents from two cultures in a remote web-survey. We found that Nigerian respondents are more positive in their ratings than AC respondents, irrespective of content, and were less likely to be critical. The culture of the respondents and the culture in the visual materials of the scenarios does matter, but the way it matters is not straightforward, and there were complex interactions. We expected that our results would show a strong identification with one's own cultural group, but this turns out to be only one aspect of a scenario that may affect respondents. Therefore care needs to be taken in localizing visual materials and in interpreting the results from different cultural groups.

REFERENCES

- Aikio, K.-P., Jounila, I. & Jokela, T. Developing Techniques for Visualising Scenarios. *Proc. HCII 2005*, Las Vegas, (2005).
- Aykin, N.: Overview: Where to Start and What to Consider? In: Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, 2005.
- Chavan, A., L., Gorney, D., Prabhu, B. & Arora, S. The Washing Machine That Ate My Sari—Mistakes in Cross-Cultural Design. *Interactions*, Jan/Feb 2009.

- Clemmensen, T. & Roese, K. An Overview of a Decade of Journal Publications about Culture and Human-Computer Interaction (HCI). *Proc. HWID 2009*, Pune, India, (2010), pp.98-112.
- Couper, M., Conrad, F. & Tourangeau, R. Visual Context Effects in Web Surveys. *Public Opinion Quarterly*, Vol.71, No. 4 (2007), 623-634.
- Evans, J.R. & Mathur, A. The value of online surveys. *Internet Research*, Vol. 15 No. 2 (2005), 195-219.
- Hart, J. *The Art of the Storyboard: Storyboarding for Film, TV, and Animation*. Focal Press, 1998.
- Hofstede, G. H. *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage, 2001.
- Holtzblatt, K. Customer-centered design for mobile applications, *Personal and Ubiquitous Computing*, vol. 9(4), 227-237, 2005.
- Honold, P. Learning How to Use a Cellular Phone: Comparison Between German and Chinese Users. *Technical Communication*, 46(2), (1999), 196-205.
- Ito, M. & Nakakoji, K. 1996. Impact of culture on user interface design. In: E. M. del Galdo & J. Nielsen (Eds.). *International users interfaces*, John Wiley & Sons, Inc., New York.
- Kamppuri, M. Theoretical and methodological challenges of cross-cultural interaction design. *Publications of the University of Eastern Finland. Dissertations in Forestry and Natural Sciences*, no 29. 2011.
- Karat, J., Karat, C.-M., & Vergo, J. Experiences People Value: The New Frontier of Task Analysis. In: Stanton, A. & Diaper, D. (Eds.) *The Handbook of Task Analysis for Human-Computer Interaction*, LEA, Mahwah, USA, 2004.
- Kline, P. 2000. *The new psychometrics: science, psychology and measurement*. London: Routledge.
- Kolli, R. Using video scenarios to present consumer product interfaces. *Proc. INTERACT '93 and CHI '93 ACM*, (1993), 61-62.
- Lelie, C. van der. The value of storyboards in the product design process. *Personal and Ubiquitous Computing*, 10(2-3), (2006), 159-162.
- Manfreda, K.L., Batagelj, Z., & Vehovar, V. Design of Web Survey Questionnaires: Three Basic Experiments. *Journal of Computer-Mediated Communication*, 7, (2002).
- Marcus, A. (2006) Cross-Cultural User Experience Design. In: Barker-Plummer, O. et al. (Eds.) *Diagrams 2006, LNAI 4045*. Berlin Heidelberg: Springer Verlag.
- McSweeney, B. Hofstede's Model of National Cultural Differences and their Consequences: A Triumph of Faith - a Failure of Analysis. *Human Relations*, 55(1), 89-118, 2002.
- Monahan, K., Lähteenmäki, M., McDonald, S. & Cockton, G. An Investigation into the Use of Field Methods in the Design and Evaluation of Interactive Systems. *Proc. British HCI 2008*, (2008), 99-108.
- Oyugi, C., Dunckley L. & Smith A. Evaluation methods and cultural differences: studies across three continents. *Proc. NordiCHI 2008*, (2008), 318-325.
- Putnam, C, Rode, E, Johnson, E.J. & Kolko, B. Adapting User-Centered Methods to Design for Diverse Populations. *Information Technologies and International Development* (2009), 51-73.
- Smith, A., Gulliksen, J., & Bannon, L. 2005. Building usability in India: Reflections from the Indo European Systems Usability Partnership. *Proc. HCI 2005*, Springer, 219-232.
- Stewart E. C. and Bennett, M. J. *American cultural patterns: A cross-cultural perspective*. Intercultural Press. 1991.
- Søndergaard, M. Research note: Hofstede's consequences: a study of reviews, citations and replications. *Organization studies*, 15(3), 447-456, 1994.
- Truong, K., Hayes, G., & Abowd, G. Storyboarding: An Empirical Determination of Best Practices and Effective Guidelines. *Proc. DIS 2006*, (2006).
- Vatrapu, R., & Pérez-Quinones, M. Culture and Usability Evaluation: The Effects of Culture in Structured Interviews. *Journal of Usability Studies*, 1(4), (2006), 156-170.
- Van den Hende, E., Schoormans, J., Morel, K., Lashina, T., van Loenen, E. & de Boevere, E. Using early concept narratives to collect valid customer input about breakthrough technologies. *Technological Forecasting and Social Change* 74-9 (2007), 1773-1787.
- Vermeeren, A., Law, E., Roto, V., Obrist, M., Hoonhout, J. & Väänänen-Vainio-Mattila, K. User experience evaluation methods: current state and development needs. *Proc. NordiCHI 2010*, (2010), 521-530.
- Väänänen-Vainio-Mattila, K., Roto, V., & Hassenzahl, M. Now Let's Do It in Practice: User Experience Evaluation Methods in Product Development. *Ext. Abstracts CHI 2008*, ACM (2008), 3961-39.
- Walsh, T., Nurkka, P., Koponen, T., Varsaluoma, J., Kujala, S. and Belt, S. Collecting Cross-Cultural User Data with Internationalized Storyboard Survey. *Proc. OzCHI2011*, ACM (2011).
- Young, P. A. Integrating culture in the design of ICTs. *British Journal of Educational Technology* 39(1), (2008): 6-17.

Publication 7

Walsh, T., Petrie, H. and Zhang, A. (2015). Localization of Storyboards for Cross-Cultural User Studies. *Proceedings of Mobile and Ubiquitous Multimedia 2015*, MUM 2015, ACM, 200-209.

Reprinted by permission.

Localization of Storyboards for Cross-Cultural User Studies

Tanja Walsh
Tampere University of
Technology
Tampere, Finland
tanja.walsh@tut.fi

Helen Petrie
University of York
York, UK
helen.petrie@york.ac.uk

Anqi Zhang
University of York
York, UK
butterflyribs@126.com

ABSTRACT

Storyboards are useful for presenting ideas visually to users helping them understand possible uses of technology allowing them to identify with use situations, especially when no prototypes are available to demonstrate. Storyboards are good for cross-cultural user studies, because they reduce the amount of text users with different native languages have to read. Storyboards are easy to implement in online surveys, which are convenient in gathering data from geographically dispersed groups of users. However, creating localized storyboards requires considering a number of culture related factors. Little research exists in Human-Computer Interaction about how to create localized storyboards for online UX surveys although the need for gathering global user feedback of technology products and services noticeable. We used two focus groups with Chinese participants to inform the design of localization of storyboards for an online survey. Results showed that localization was successful and some design implications were found of localizing storyboards.

CCS Concepts

• **Human-centered computing**—**Human computer interaction (HCI)**;

Author Keywords

Storyboards; Cross-Cultural User Studies; Localization; Online Surveys

INTRODUCTION

Storyboards have become popular tools for visualising human-technology interaction. According to Stappers and Van der Lelie [20] storyboards can help design teams focus on the user's actions, understanding, and experience, instead of on the system's physical form. They can also be used to highlight the context of place, situation, or social setting, in which the system is used. Storyboards can be rough sketches lacking in detail [9] or they can be detailed

sketches or photographs. However, novice HCI professionals and researchers encounter numerous challenges in the creation of appropriate storyboards [21]. We investigated the challenge posed by cross-cultural variation among the user audience to be addressed.

Ubiquitous and mobile technologies are now common in many cultures, but they are generally designed and developed in a small number of countries, with the assumption that they will be suitable across all cultures. As the majority of technological systems and services are now aimed at international markets, it is not enough to undertake user studies in one country only, they should involve potential users and users in all target markets, which often means worldwide [1]. Storyboards may be a useful tool in such cross-cultural user studies, because they reduce the amount of text that users with different cultural backgrounds and different native languages have to read. Storyboards can also easily be used in online surveys, which are convenient in gathering data from geographically dispersed and cross-cultural groups of users. Some practical guidelines for creating storyboards exist [22], but these guidelines do not address cross-cultural aspects. However, cultural aspects affect both the usability and user experience (UX) of technologies and also the research methods used to elicit information from users in the design and development of technologies [e.g. 16]. Therefore studies are needed to help to understand how to create storyboards for use in cross-cultural online surveys and other user research methods.

The challenge of using storyboards as a tool with users from different cultures is to understand how the visual material in storyboards is perceived by users from different cultural groups and how to make appropriate adjustments to the materials for different cultures, that is how to localize these materials.

Our research question is how to localize storyboards for cross-cultural user studies of mobile and ubiquitous technologies. There is currently no guidance available about how to create parallel storyboards in order to work with users in different cultures, either in terms of what content needs to be adjusted or in terms of what process can be used to decide how to adjust the content. Therefore we conducted a study in which we localized a set of “internationalized” storyboards that had been created for a

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions@acm.org.

MUM '15, November 30–December 02, 2015, Linz, Austria

© 2015 ACM. ISBN 978-1-4503-3605-5/15/11...\$15.00

DOI: <http://dx.doi.org/10.1145/2836041.2836061>

previous project [26] and then tested the effectiveness of those localized storyboards by using them in an online survey with participants from a very different culture from that of the developed of the original storyboards, namely China (the original developers were all Europeans). Thus, our first objective was to develop a process for localizing storyboards using focus groups of users from the target culture. Our second objective was to assess how the localized storyboards were interpreted and perceived by Chinese respondents in an online survey which included the localized storyboards. Our overall objective is to contribute to the development of best practice in research methods for cross-cultural studies with users, for both academic and industrial purposes.

BACKGROUND

The demand and opportunity for cross-cultural design of technology is rapidly rising due to globalization: as companies expand their customer bases across national and cultural boundaries, cross-cultural issues become more important and designers need to carefully consider the cultural elements in their designs [1, 5, and 16]. Consequently designers should understand local users' needs, and employ methods to gather this information in the most effective and efficient way. When designing for usability and UX in cross-cultural markets, cultural diversity makes it unrealistic for designers to rely only on intuition or personal experience [21] and therefore collecting information from local users has become vital.

Remote data collection methods such as online surveys enable designers to understand users from different locations and cultures. They are practical, cost-effective and can reach audiences worldwide. However no common practice currently exists on how usability and UX can be studied remotely in cross-cultural markets [15, 20] and therefore the development of suitable remote methods is needed.

UX is context dependent and measures are thus sensitive to situational factors. Hence, it might seem that on-site or local methods are more likely to elicit realistic experiential responses [13]. However, realistic experiential responses or direct observation of those are not always possible, for example when there is no concrete product, such as at the very beginning of the development process. Vermeeren et al. [25] suggest, that in early concept phases, where there are no functional systems that participants can interact with, but they need to use imagination to be able to evaluate the concept, immersion is the only known method, and that more methods are needed that help imagining and evaluating future experiences. However, storyboards are a way of sparking the imagination, but we need to understand how particular aspects of a storyboard will spark participants from different cultures.

When conducting remote cross-cultural user studies, it is also important that the material used in the study such as survey questions or visual materials are appropriate for the

target culture [3, 10]. For example, a scenario with young people on a beach wearing bikinis or board shorts would not be a good way to visualize free time for users from an Arabic culture, although it would probably work well for Australian teenagers.

One way to solve this problem is to internationalize the materials as much as possible to fit with all the target cultures. In designing materials for user studies this means that all users have the same core material, e.g. texts and pictures. One can attempt to internationalize visual materials, but it seems extremely difficult to create visual materials that do not depict situations which have some cultural implications. In conducting our research, we have been very surprised by how many aspects of our "internationalized" visual materials have jarred with cross-cultural user groups [26].

Another option is to localize the materials for each of the target cultures. Localization usually entails customization related to numeric, date and time formats, use of currency, keyboard usage, collation and sorting symbols, icons and colors, text and graphics containing references to objects, actions or ideas which, in a given culture, may be subject to misinterpretation or viewed as insensitive [1, 10]. However, the localization of visual materials includes considering much more subtle cultural norms and practices, and the value systems of the culture [21].

Chavan et al. [2] argue that a process of authentication of designs is required for localization to ensure that the designs are truly representative for the target cultures and not biased to the designer's own cultural background. Moreover, Oyugi et al. [16] also support the idea that it is necessary to consider cultural aspects when selecting the methods to be applied to user research. The influence of culture on UX research has received some attention but without much in the way of theory to support it [19]. Snitker [19] argues that UX researchers often have few models and concepts of culture per se but even fewer for the implications of culture on their particular research project and the methods used.

Users and participants from different cultural backgrounds have different manners of acting as users and expressing themselves in user requirements studies, design exercises and evaluation studies [11], providing internationalized or localized materials may facilitate their participation. However, even most methods and analysis approaches in user research have originated from western societies. The researchers are also generally western-based and educated and the participants are western. Thus it is not clear that these methods are suitable for use other parts of the world [11]. Vatrapu and Perez-Quinones [24] suggest that researchers consider methods which are suitable for users in different countries where they might need localized visual materials and surveys presented in a manner that is familiar to and acceptable for the users.

In the quest to include considerations of cross-cultural issues in the design process, HCI designers have approached culture in three ways. The first approach to culture according to Kamppuri [12] to see *culture as a list*: this is when culture is thought of as a mere collection of tools, artefacts and other outward physical manifestations that need to be adjusted for in the design process. In this approach only the observable aspects of culture are considered. It is characterized by things like the localization of texts through the provision of language options and there is little consideration of culture as a dynamic mental process. For example, Russo and Boor [18] advise designers to consult a checklist of issues such as texts, images and colours.

A second approach is to see *culture as motivation* where culture is used to directly motivate the design process. The designers depend on the supposed ability of culture to predict how a technological product will be used. This approach assumes that interaction is motivated mainly by culture. Although culture has a significant influence on behaviour and interaction with technology, it is not logical to assume that it is the only determining factor of how people interact with technology. De Angeli et al. [4] would argue that cultural dimensions such as those proposed by Hofstede [7, 8] are too high-level to be used to directly inform the design of technology.

These two above mentioned approaches rely on the use of existing theories of cultures to understand cultural differences affecting the design of technology. The third approach supports human-centered design principles by involving local users in the design of technology, seeing *culture as a resource*: in this approach culture is used as a means of better understanding the users, as a kind of perspective from which to understand how users may interact with technology. This approach encourages the design process to be informed by culture and not be controlled by it. With online surveys, cross-cultural user data can be gathered and generate information from local cultures to help design better technologies. Therefore, careful design of surveys and materials used in them for cross-cultural studies is important.

Storyboards

Storyboards are a tool for presenting ideas visually to users to help them understand the possible uses of a technology and to allow them to identify themselves with the use situations [23]. Storyboards are sequences of pictures resembling comic strips. The origins of storyboards lie in the film and animation industry where storyboards are used in visualizing scenes and work as a guide for production [5]. In HCI, storyboards are generally used to present interactive systems and contexts of use, and to illustrate interaction between the system and the user [9, 15]. According to Stappers et al. [20] storyboards have become a popular tool for visualising human-system interaction not only in design education, but also in design practice. They can help the

design team focus on users' actions, understanding, and experience, instead of the system's physical form; they can be used to highlight the context, that is the place, situation, and social setting in which the system is used. Their form ranges from rough sketches to very detailed representations, depending on whether they are used to explore new ideas, report existing situations, or present design concepts for criticism and discussion. Usually storyboards are closer to rough sketches, aiming to support testing and evaluating practices and overall system features without worrying overly about the details [11].

Besides evaluating interactive systems and prototypes, storyboards can also be used in evaluating system concepts, as Roto et al. [17] have shown. In these cases when no interactive system yet exists, particular attention should be paid to describing the context since UX depends very much on the context of use. Storyboards help users to step into the situation and boost imagination [23].

METHOD

Our aim was to understand how to localize storyboards in an online survey with Chinese users. The purpose of the survey was to gather feedback on user needs and requirements related to use scenarios of sharing different content in social networking services (SNS) via mobile devices. Storyboards were chosen as a tool because visual presentation of ideas enhances imagination and helps respondents to identify themselves with a novel use situation. There were no guidelines on how to localize storyboards of new uses of SNSs particularly as the situation of the use of this mobile technology was novel. Indeed guidelines for localizing storyboards do not exist.

To design localized Chinese storyboards we used internationalized versions as a base for the localization [26] and we also used the same survey questions which included questions of how the storyboards were understood and the actual questions related to sharing experiences with mobile device. The localization process consisted of taking the internationalized storyboards [26] and discussing them with two focus groups of Chinese users. Focus groups seemed fairly good way of sparking ideas. The storyboards consisted of three scenarios: 1) sharing web links on the go (from the bus), 2) sharing photos when on holiday, and 3) sharing information about leisure activities (See Figures 1, 3 and 5).

Focus Group 1

Focus group 1 was conducted with a convenience sample of participants in China using a Chinese online talk application, WeChat. 5 people participated, their ages ranged from 18 to 30 years old, with a mean age of 23, four women and one man. Three of them are working and two are studying. All of the participants have at least one mobile phone and tablet device such as an iPad. They all have a

laptop or a computer. They use their mobile phone every day and use SNSs frequently every day.

Participants were given the internationalized storyboards and they were asked to critique them from a Chinese perspective. The focus group was conducted in Chinese in order to allow the Chinese-speaking participants to understand clearly and communicate comfortably in their native language. The three sets of storyboards were introduced one by one. Participants were asked to discuss the following questions: *Was there anything irritating or odd in this situation or in these pictures? What would be more appropriate? What do you think these pictures should be if they were in a typical Chinese context? Are there any recommendations or comments to change these pictures?* After going through all the three storyboard set, participants' answers and comments were summarized back to them so they could confirm them. The focus group lasted for approximately one hour.

Focus Group 2

Focus group 2 was conducted face-to-face with an opportunistic sample of Chinese participants who were studying in the UK. 6 people participated, their ages ranged from 18 to 30 years old, with a mean age of 23, four women and two men. They were all Chinese students at X who had not lived in the UK for more than a year. All of the participants had at least one mobile phone and tablet device such as iPad. They all had a laptop or a computer. They used their mobile phone every day and some of them say they were even addicted to some smartphone Apps.

Participants discussed the same three sets of storyboards as focus group 1. The procedure for this focus group was conducted exactly the same as that used for focus group 1 and it also lasted about one hour.

Online Survey

Participants for the online survey were recruited via the personal networks of the Chinese researcher and Chinese students at X. 41 Chinese participants took part in the study and produced sufficient data for analysis and 33 participants completely finished the survey. Respondents' ages varied from 20 to 32, with a mean of 24.20 years. 24 respondents were women and 9 were men. The occupations of respondents were diverse, including students, teachers, officers, librarians, financial clerks, designers, engineers, IT freelancers, but 73% were students. All respondents had at least bachelors degree, and most of them had masters degree.

All respondents had at least one mobile device such as smartphone. Most of the respondents used smartphones and the few who use only mobile phones also have a tablet device (this was an inclusion criterion for participation in the survey. Respondents have used their phone for on average 8.15 years. Respondents who completed the survey were entered into a draw for 5 Amazon gift vouchers worth 100 Yuan (approximately £10, USD16). The online survey

was written in English and then translated into Chinese by a native speaker. To check the accuracy of the translation, the survey was translated back into English by a second native Chinese speaker and the two versions compared and adjusted as needed.

The localized Chinese storyboards were designed according to the results of the focus groups (See Figures 2, 4 and 6 and the Results of Focus Groups section).

At the beginning of the survey respondents were instructed similarly as Focus Group 1

The three storyboard scenarios and related questions to each storyboard scenario were presented on separate survey pages. Respondents answered the same questions about all three sets of storyboards. At the beginning of every web page there was the instruction: "Have a look at the pictures below and then answer the questions that follow them."

The first question asked was: *"Imagine yourself in this situation. What would you do next? Remember that there are no wrong or right answers, just give your opinions"*. The purpose of the question was to collect spontaneous reactions to the storyboard to investigate whether the respondents associated the storyboard with mobile content sharing situations. In addition, this question enabled us to explore needs and requirements for content sharing, which may not have been discovered if predetermined questions with multiple choice answers were used as the sole data collection method.

The second question was: *"Was there anything irritating or odd in this situation or in these pictures? (Please explain in the box below)"*. The aim of this question was to find out whether there was to assess whether the localization had been successful.

The third question was: *"Do you have any other comments about these pictures?"* The aim of this question was to gather any other thoughts that respondents had about the scenario. Following these questions, respondents were presented with questions about their content sharing habits specific to the storyboard (these are outside the scope of this paper and will not be reported here).

Respondents were then asked to look at all the storyboards again and answer the following questions: *"Did these pictures feel familiar to you and your cultural background?"* and *"Could these situations happen to someone like you?"*. These questions also investigated whether the localization had been successful.

Finally there were demographic questions. The survey took approximately 30 minutes on average to complete.

RESULTS

Next we will present the main results of the two Chinese focus groups and then the results of the Chinese online UX survey regarding the questions about the localized storyboards.

Results of the Focus Groups

The first use scenario in the study was about sharing web links on the go. In the internationalized storyboard (Figure 1) a man sits on a public transportation browsing news and find an interesting article. The questions of what would happen next would then elicit user data about the sharing habits. When discussing the Internationalized Storyboard 1 (Figure 1), one of the participants mentioned that in China the bus would be very crowded and would not have many empty seats, as it does in the internationalized picture, because of the large population in Chinese cities. All the other participants confirmed this. Another participant noted that the bus would be even more crowded, especially at peak times, and some people would be standing. A third participant also noted that people would keep reserved postures instead of crushing and bothering other people sitting or standing next to them. However, one participant argued that the bus would have empty seats at off-peak times but if the bus is not crowded, then people would prefer to sit on the seat by the window not on the aisle as illustrated. This is regarded as a courtesy so that other people can occupy the empty seat more easily without bothering other people to reach seats.

When discussing Storyboard 1 with the second focus group, all the participants agreed that the bus would always be crowded in China, especially during peak times. A participant from a city where they have one of the most advanced public transport systems in China mentioned that even in her city, there would not be as many empty seats as the internationalized storyboard shows. One participant said he felt embarrassed when touching or disturbing people next to him, so he always keeps a very reserved posture, and is overcautious when the bus is crowded. One participant mentioned that there is a difference between buses in China and the UK, in the latter the entrance point is usually in the front of the bus and the exit point is in the back part of the bus.

The results from the focus groups informed the design of localized storyboard 1 (see Figure 2) to accommodate the situation to correspond Chinese local context of use in a public transportation, in this case the bus. A Chinese graphical designer drew the pictures guided by the researchers, based on the comments from the focus groups. She added more people and made people's gestures and appearance look more Chinese. For example, the people whether sitting or standing, keep reserved postures. People in China would not have the relaxed gestures and body languages as in internationalized pictures. They are more reserved and cautious. Also, the phone in the localized storyboard does not show BBC News as it did in the original. All textual material was translated in Chinese.

The second use scenario in the study was about sharing photos on holiday. In the internationalized storyboard (Figure 3) a female arrives in Paris and takes a selfie in front of the Eiffel Tower and then looks at it. The questions of



Figure 1. Internationalized Storyboard 1 (Sharing web links on the go)



Figure 2. Localized Storyboard 1

what would happen next would then elicit user data about the sharing habits. When discussing about the internationalized storyboard 2 with the first focus group, people had different ideas about where they would want to locate a holiday scene. Their first choice of a holiday scene would not be in Paris by the Eiffel Tower as in the internationalized storyboard; it might not even be outside China because Chinese people travel a lot domestically. One participant would take photos in front of the Shanghai Oriental Pearl, the world's third highest TV tower and Shanghai's most recognized landmark. Another participant mentioned taking photos on the Shanghai Bund which is a famous waterfront and regarded as the symbol of Shanghai. Another participant would have it in Taiwan, as that is a popular holiday destination for Chinese people. A female participant would have it in Shanghai or Hong Kong where Chinese women go shopping and take photos of eating, drinking and shopping. A fifth participant is an art student, and he suggested the Nanluo Old Street or the famous 798 Art district in Beijing. People living in small cities are more

likely to go to big cities in China for holiday. Another important idea, agreed by all participants, was that Chinese people prefer to let other people to take photos of them rather than taking “selfies”.

In discussing Storyboard 2 with the second focus group, the participants came up with quite different ideas compared to the first focus group. One participant argued that Chinese people would not go to big cities like Paris but to natural scenic spots in China like Kanas Lake in Xinjiang. A second participant mentioned about the nine-village valley in Sichuan and a third participant mentioned the Shangri-La in Yunnan. Based on the results of the focus groups, the trend is that Chinese people from big cities are more likely to choose natural scenic spots or old towns where there are few people and better natural environment whereas people from smaller cities are more likely to choose big cities.

All the participants in focus group 2 also agreed that they prefer to have another person taking photos rather than take “selfies”. They do not like to take selfies because it is hard to capture an overview of natural scenes, and because they feel it is a bit embarrassing. If there are other people around, they will feel shy if they taking a selfie. However, this opinion is slightly different among young women: two female participants said that they might take selfies if there are no people around them. The male participants said they would never take selfies because it is looks strange and smug.

Based on the results from the focus groups, we localized Storyboard 2 by radically changing the pictures compared to internationalized version: both the actual situation and its details. In the localized version, the storyboard refers to a trip in China by bus to a natural scenic spot. The environment depicts a typical Chinese landscape. Two female characters travel together and they do not take selfies. Instead, one of them takes a photo of the other and then they look at the photo together.

The third use scenario in the study was about sharing information about leisure activities. In the internationalized storyboard (Figure 5) a group of friends is having a picnic at the beach and they are thinking of sharing their location. The questions of what would happen next would then elicit user data about the sharing habits. In discussing Storyboard 3 (Figure 5) with the first focus group, all participants mentioned using karaoke as the activity a group of friends would undertake together, as it is the a very popular social activity in China. In addition, three participants were working and in a better economic situation than the student participants, who suggested illustrating a drive to a holiday village with colleagues and friends to spend leisure time. The two students within the focus group preferred the idea of karaoke where young people could sing, play cards and chat with each other. When summarizing the replies and asking the questions again, most of the participants agreed that the most common scene in China for this scenario should be a karaoke scene.

The results of Storyboard 3 with the second focus group were similar to those of the first focus group. All the participants would illustrate a karaoke scene. In addition, one participant said that young people might go to the cinema with friends instead of karaoke sometimes. In addition, one female participant would illustrate a shopping mall where there are cafés and the young people would be shopping with friends. Based on the results from the focus groups, we localized Storyboard 3 by changing the social situation from a picnic to a karaoke bar (Figure 6). Thus with only two hours of focus group discussions with participants similar in the target respondents for the online survey, we received many indications of aspects of the storyboards which needed localization.



Figure 3. Internationalized Storyboard 2 (Sharing photos on holiday)



Figure 4. Localized Storyboard 2 (Sharing Photos on Holiday)



Figure 5. Internationalized Storyboard 3 (Sharing about leisure activities)



Figure 6. Localized Storyboard 3

Results of the Online Survey

Storyboard 1 in the survey was about sharing web links on the go. It was designed to gain understanding of how users shared web links found on the Internet or on social media apps while using their mobile devices on the go.

Answers to question 1 (Q1) “*Imagine yourself in the situation, what would you do next?*” are summarized in Table 1. The question was designed to verify that the intended situation was understood by Chinese users. The results indicated that the storyboard 1 was understood in the way it was intended and thus it was adequately localized.

Question 2 (Q2) was “*Was there anything irritating odd in this situation or in these pictures?*”. The question was designed to elicit any information about non-local aspects in storyboard, Only 3 respondents (6%) answered positively. One respondent said the people were unfamiliar, one said it was the picture details and one simply said it was confusing. These results suggest there was not particular problem with the localization.

Table 2 shows the analysis of question 3 (Q3) “Do you have

Table 1. Storyboard 1. Q1: What the respondents would do next.

Category	Number (%) of answers
Share/forward the information	18 (44%)
Read more	13 (32%)
Comment	9 (22)
Like	4 (10)
Save	4 (10)
Investigated, then decide what to do	3 (7)
Express emotion	2 (5)
Investigate comments by others	2 (5)
See related information about the topic	2 (5)

Table 2. Storyboard 1: Q3: Other comments about these pictures.

Category	Number (%) of answers
It is a common/normal situation	3 (7%)
Would do other activities on a bus (listen to music, play games, send messages)	1 (2)
Would not use smartphone on bus (too crowded)	2 (5)
Comments on mobile devices usage	3 (7)
Drawing details (too vague etc)	3 (7)
No answer given	29 (70)

any other comments about these pictures?” 3 participants mentioned details about the drawing that looked odd to them. 2 participants said they would not use smartphones on a bus because of the crowded situation.

Storyboard 2 in the survey was about sharing photos when on holiday. It was designed to gain understanding of how users share their holiday photos.

Answers to Q1 “*Imagine yourself in the situation, what would you do next?*” are summarized in Table 3. Again these results indicate that in general the respondents understood the storyboard in the way it was intended and thus it was adequately localized. One misunderstanding may have been revealed by the fact that two respondents answered “not take selfie”, they may have interpreted the final panel in the storyboard as the two women taking a selfie, rather than looking at the photo one had taken of the other. This reinforces the finding from the focus groups that selfies are not acceptable in Chinese culture.

For Q2 about anything irritating or odd in the situation or in the pictures 7 respondents (16%) answered positively, more than twice as many to Storyboard 1. No responses were provided to explain what people found odd about this storyboard. However, some interesting answers were provided to the final question Q3 about this storyboard “Do

Table 3. Storyboard 2. Q1: What respondents would do next.

Category	Number (%) of answers
Share/Post	21 (51%)
Send	7 (17)
Take more photos	5 (12)
Save	6 (10)
Pick up before sharing	3 (7)
Not take selfie	2 (5)
Consider and decide what to do	2 (5)
Go on with holiday	1 (2)
Nothing or no answer	2 (5)

Table 4. Storyboard 2: Q3: Other comments about the pictures.

Category	Number (%) of answers
Gender difference in behavior	2 (5%)
Confusing	2 (5)
Attitudes to taking holiday photo (selfie)	1 (2)
Attitudes to share photos	1 (2)
Unfamiliar situation	1 (2)
No answer given	34 (83)

Table 5. Storyboard 3. Q1: What the respondents would do next.

Category	Number (%) of answers
Share/Post	18 (44%)
Check the comments received	5 (12)
Take a photo	3 (7)
Go with event	3 (7)
Tell/show	2 (5)
Send	1 (2)
Check if there is WIFI	1 (2)
Nothing or no answer	2 (5)

Table 6: Responses to “Did these pictures feel familiar to you and your cultural background? Could these situations happen to someone like you?”

Category	Number (%) of answers
Storyboard 1 felt familiar	36 (97%)
Storyboard 2 felt familiar	34 (96%)
Storyboard felt familiar	34 (92%)
Answered familiar to all three storyboard	34 (92%)

you have any other comments about these pictures?” which are summarized in Table 4. Two respondents mentioned that different people of different genders might have different

activities and behaviors when taking photos or sharing them, but the storyboard only demonstrated the female side. If the person in the storyboard were male, then the person’s activity as well as other related issues might be different.

Storyboard 3 in the survey was about sharing information about leisure activities. Answers to Q1 “*Imagine yourself in the situation, what would you do next?*” are summarized in Table 5. The results were somewhat general, but did not indicate that the storyboard was misunderstood in any particular way.

For Q2 about anything irritating odd in the situation or in the pictures 5 respondents (13%) answered positively, fewer than for Storyboard 2 but more than Storyboard 1. Three respondents said that the activity was unfamiliar, one respondent said the situation was unfamiliar and one that it was confusing. Again, these replies do not suggest any particular problem with the localization. Similar, the answers to the final question about any other comments did not reveal any problems with the localization, only two respondents made comments.

After answering questions about each storyboard, respondents were asked “*Did these pictures feel familiar to you and your cultural background?*” Table 6 summarizes the answers to these questions. 92% of respondents answered that they felt familiar with all three storyboards. In the first storyboard about sharing web links on the go, only one participant thought that the material shown did not feel familiar to them. In the second storyboard, about sharing photos when on holiday, two participants did not feel familiar with the situation depicted, but they did not give any explanation about why they gave such answers. In the third storyboard, about sharing information about leisure activities, one participant said there are too many people in the karaoke bar and that it looked unfamiliar to them, because in their mind, there would not be so many people in this situation.

DISCUSSION AND CONCLUSIONS

The goal of our study was to understand how to localize storyboards for use in cross-cultural user studies, be they for requirements elicitation or evaluation of interactive systems. Storyboards were chosen as a tool because the visual presentation of ideas helps respondents to identify with the situation of use and because they can be used in numerous types of user study. When using storyboards in cross-cultural studies, it is important though to ensure that the visual materials fit into the local context. If the visual materials contain unfamiliar, odd or irritating situations or details, it may cause misunderstandings, or distract, hinder and even offend respondents. Especially in an online survey where users are usually filling in the survey alone and cannot ask questions to clarify a situation. Even small details such as the seating arrangement in a bus are important because they can be interpreted differently in different cultures. We used two focus groups to gather information for the localization. We had a native Chinese

researcher and native Chinese graphical designer. Having a native Chinese speaker was very important to have both in the focus groups as well as in the online survey design. The Chinese researcher allowed participants to use their own native language. If there is no native speaker of the local language in the research team, it is recommended to use an interpreter and a translator. A native Chinese graphical designer was very important to be able to create the Chinese “look and feel” of the localized storyboards, as features such as people’s gestures and appearance were very natural for her to draw.

Focus groups with members of the target user population in the local is a good way of getting information about how to localize storyboards, because they give firsthand information about the local situation and details. Although there are guidelines how to design e.g. web sites for different cultures [e.g. 14], they are often too generic and don’t help in the design of storyboards for local cultural contexts. Therefore, using human-centered design and involving the local people in the actual design is more informative and helpful. Focus groups encourage people to talk about the situation giving more information about the context than one-to-one interviews would give. If time is short, a researcher can gather information quickly in several focus group sessions of about one hour each, instead of conducting many interviews. We found no differences in conducting the focus group face-to-face or remotely in a sense that both ways gave valuable user data. Thus, we argue that remote focus groups is a good method to get localization information, even if the researchers or practitioners are not physically based in the same place.

We found in the focus groups that there are two main issues in localizing the storyboards: First you need to be able to localize the situation in the local cultural context which means where it all happens and what is the natural context for using the system. When the use situation has been localized, the localization of the details can start. For example, on the first issue, for storyboards 2 and 3, the basic situation depicted in the internationalized storyboards was considered not appropriate for a young Chinese audience. In the holiday photos situation (Storyboard 2), taking photos in front of the Eiffel Tower seems universal in appeal to young western people, but was not the case for Chinese participants. Similarly the picnic on the beach situation (Storyboard 3), was very alien to the young Chinese participants. On the second issue, of the details, our focus group discussions about the situation of sharing information from the bus (Storyboard 1), revealed many interesting small details which jarred for the Chinese participants: the bus would be much more crowded in China, people would not sit on the aisle and leave the window seat empty and would stand differently.

Based on our online survey results, the storyboards were well understood with very few comments about things being

irritating or odd. Therefore we can argue that the localization of the storyboards was successful.

The most useful questions in validating the localization of the storyboards were the questions asking if the scenario could happen in one’s own country and if the pictures felt familiar to one’s own culture. However, these questions do not necessarily tell us if the scenario was understood in the way we anticipated and, hence, it is also important to ask the respondent to relate specifically to what is happening in the storyboard. We achieved this by asking participants to say what they would do next. Future research might investigate this more directly by asking the participants to describe the scenario as they see it.

We had a direct question about the pictures and situations presented in the storyboards: “Was there anything irritating or odd in this situation or in these pictures?” This question gave us some information about users’ normal behavior and habits related to situations in the storyboards such as that Chinese people are reserved, shy or embarrassed to take selfies publicly and especially men would not take selfies and that the buses are always crowded and therefore it would be odd to have an empty bus in Chinese storyboards.

At the end of the survey 92% of respondents answered that they felt familiar with all three sets of storyboards, and that they have the idea that people in the pictures can represent themselves.

In the following we conclude with some main steps when designing localized storyboards. (The first two steps are based on our previous studies [26]):

1. Describe the use scenarios by using as universal situations as possible. We used internationalized storyboards as a basis for localization, however one could start with local storyboards or text scenarios, if this is what is available.
2. Involve local people in the design process by having e.g. focus group discussions on-site and/or remotely. Consider the aspects of rural and urban and even within urban, small and big cities, particularly for very large populous countries like China and India. It helps if the researcher can speak the local language or if not, use an interpreter.
3. Design of the storyboards and survey. First localize the situation: Where and how would it happen and by whom in the local culture? Then localize the details (Localization of both visual and textual material): How would the situation look like? A local graphic designer can bring in the “look and feel” of the local culture.
4. Use verification questions for the survey (Q1, Q2, Q3) which will indicate that the localized storyboards were understood correctly.

In this paper, we presented a localization of storyboards. We validated our process by creating localized storyboards for a Chinese online survey about sharing information with

mobile devices. We conclude that all of the localized storyboards we produced were well understood and we consider the localization as successful. We conclude that focus groups with local users are a good and efficient way of gathering information for the storyboards about the local situation and local details.

REFERENCES

1. Aykin, N. Overview: where to start and what to consider? In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, (2005), 189-212.
2. Chavan, A., Gorney, D., Prabhu, B. and Arora, S. The Washing Machine that Ate My Sari-Mistake in Cross-Cultural Design. *Interactions*, Jan/Feb 2009.
3. Couper, M., Conrad, F. and Tourangeau, R. Visual Context Effects in Web Surveys. *Public Opinion Quarterly*, Vol. 71, No. 4 (2007), 623-634.
4. De Angeli, A., Athavankar, U., Joshi, A., Coventry, L. and Johnson, G. I. "Introducing ATMs in India: a contextual inquiry," *Interacting with Computers*, vol. 16, no. 1, pp. 29-44, Feb. 2004.
5. Dray, S. and Siegel, D. Sunday in Shanghai, Monday in Madrid?! Key issues and Decisions in Planning International User Studies. In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, (2005), 189-212.
6. Hart, J. *The Art of the Storyboard: Storyboarding for Film, TV, and Animation*. Focal Press, (1998).
7. Hofstede, G. (2001) *Culture's Consequences: Comparing values, behaviours and organisations across nations*. Sage Publications Inc.
8. Hofstede, G. (2005) *Cultures and Organizations: Software of the Mind*, McGraw-Hill, New York.
9. Holzblatt, K. Wendell, J., Wood, S. *Rapid Contextual Design. A How to Guide to Key Techniques for User-Centered Design*. San Francisco, USA: Elsevier (2005), 229-243.
10. Horton, W. Graphics: The Not Quite Universal Language. In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, US: Lawrence Erlbaum, (2005), 157-187.
11. Kamppuri, M., Bednarik, R. and Tukiainen, M. The expanding focus of HCI: case culture. In *Proceedings of NordiCHI 2006*, pp.405-408, ACM.
12. Kamppuri, M. *Theoretical and methodological challenges of cross-cultural interaction design*. University of Eastern Finland, 2011.
13. Madden, T., Hewett, K and Roth, M. (2000) *Managing Images in Different Cultures: Cross-National Study on Color Meanings and Preferences*. *Journal of International Marketing*, Vol. 8 No. 4, pp. 90-107.
14. Marcus, A. (2005) *User Interface Design and Culture*. In Aykin, N. (Ed.) *Usability and Internationalization of Information Technology*. New Jersey, USA: Lawrence Erlbaum, pp. 51-78.
15. Nielsen, J. Paper versus computer implementations as mockup scenarios for heuristic evaluation. In *Proceedings of IFIP INTERACT'90*, (1990), 315-320.
16. Oyugi, C., Dunckley L. and Smith A. Evaluation methods and cultural differences: studies across three continents. In *Proceedings of NordiCHI 2008*, ACM Press (2008), 318-325.
17. Roto, V., Rantavuo, H. and Väänänen-Vainio-Mattila, K. Evaluating User Experience of Early Product Concepts. In *Proc. of DPPI 2009*. (2009), 199-208.
18. Russo, P. and Boor, S. How fluent is your interface? Designing for international users. In *Proceedings of INTERACT'93 and CHI'93 conference on human factors in computing systems*, 1993, ACM.
19. Snitker, T. (2010) The impact of culture on user research. In Schumacher, R, (Ed.). *The Handbook of Global User Research*. Morgan Kaufmann, Burlington, USA.
20. Stappers, P.J. and Van der Lelie, C. Storyboarding for designers and design researchers. Halfday course/tutorial at CHI Conference in Vancouver (2011).
21. Smith, A., Gulliksen, J., and Bannon, L. 2005. Building usability in India: Reflections from the Indo-European systems usability partnership. In *Proceedings of HCI 2005*, Springer, 219-232.
22. Truong, K.N., Hayes, G.R. and Abowd, G.D. Storyboarding: An empirical Determination of Best Practices and Effective Guidelines. In *Proceedings of DIS 2006*. ACM Press (2006), 12-21.
23. Van den Hende, E., Schoormans, J., Morel, K., Lashina, T., van Loenen, E. and de Boevere, E. Using early concept narratives to collect valid customer input about breakthrough technologies: The effect of application visualization on transportation. *Technological Forecasting and Social Change* 74-9, (2007), 1773-1787
24. Vatrapu, R., and Pérez-Quñones, M. A., "Culture and International Usability Testing: The Effects of Culture in Structured Interviews." arXiv preprint cs/0405045, 2004.
25. Vermeeren, A., Law, E., Roto, V., Obrist, M., Hoonhout, J. and Väänänen-Vainio-Mattila, K. User experience evaluation methods: current state and development needs. In *Proceedings of NordiCHI 2010*, 2010, ACM.
26. Walsh, T., Nurkka, P., Koponen, T., Varsaluoma, J., Kujala, S. and Belt, S. Collecting cross-cultural user data with internationalized storyboard survey. In *Proc. of OzCHI 2011*. ACM Press (2011), 301-310.

Tampereen teknillinen yliopisto
PL 527
33101 Tampere

Tampere University of Technology
P.O.B. 527
FI-33101 Tampere, Finland

ISBN 978-952-15-3719-6
ISSN 1459-2045