

# Questionnaires in User Experience Evaluation

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## ABSTRACT

User experience evaluation is currently discussed widely both in the academia and industry. In this paper we discuss the use of questionnaires in user experience evaluation from the point of view of both academic research and practical system and service development in industry. We describe the current challenges and future needs we have identified in questionnaire usage, such as the need for agreed metrics for user experience evaluation, mobile questionnaires, modular questionnaires and creating questionnaire toolboxes for researchers and practitioners.

## Keywords

User experience, evaluation, questionnaire

## INTRODUCTION

Questionnaires are widely used for collecting data from respondents, and there are various kinds of questionnaires to be used in user experience evaluation. Questionnaires can be used for collecting both quantitative and qualitative data. They can be used to collect summative data to score the designs, as well as formative data to inform design and development about problems, requirements or needs [9]. Respondents can be asked to write open-ended answers to questions, or just to select one or more of the given options. Both paper based and digitally distributed questionnaires can be used.

Evaluation of user experience (UX) with questionnaires is of interest to both researchers doing academic research [e.g. 4, 7, 9, 10] and user experience practitioners working on the development of new systems and services in the industry [6, 13]. Gaming experience is one of the areas where questionnaires have been used extensively as part of the experience evaluation [1, 2, 11, 12, 14].

Academia and industry often have very different needs for user experience evaluation. In academia, researchers try to find the methods that provide valid, reliable and comprehensive data on user experience. In industry, user experience evaluations are used for improving products in the different phases of human-centred product development process. During the fast-paced process, it is often hard to find the needed resources for the user studies. This is why user experience professionals try to find lightweight user experience evaluation methods that could provide guidance for design even when they have just one day for setting up, executing, and reporting the evaluation. Questionnaires

have the potential to serve the needs both in academia and industry.

Online questionnaires are one of the few methods that can be used to collect user data even within a few hours. If the questionnaire can be distributed to people's mobile phones, it is likely that the survey facilitator receives most of the responses within one hour after posting the questionnaire. It is easy to target the questionnaire to a specific user group, even internationally, if you have a database of representatives from the target user group. The data can be analyzed quickly, especially if it is quantitative.

Setting up the infrastructure for executing online surveys is not an easy task. Having up-to-date contact details to a wide set of respondents from each target user group is challenging. Building the questionnaire is perhaps the most laborious task, since it is often hard to find a comprehensible, context-sensitive, and unbiased way to address the wanted aspects related to user experience. That is why we hope a set of readily validated user experience questionnaires would be available for user experience evaluators, as is the case with usability and many other evaluations.

## VIEWPOINTS OF ACADEMIA AND INDUSTRY

The goal of science is to create new knowledge. Therefore, with a phenomenon like user experience, which is still neither well-defined nor well-understood, much of the current academic research concentrates on understanding and exploring the phenomenon and building theory around it based on the research results. This includes, for example, understanding the subjective, temporal, and contextual aspects of user experience, as well as the interrelationships between the factors contributing to it.

The academic research on user experience aims to cover a wide range of questions related to what, who, how, why, where and when. Research varies from controlled experiments in lab environment to field studies of real-life usage of shorter or longer duration. Also future scenarios, concepts and non-functional prototypes are evaluated. Questionnaires can be used as part of all types of studies and therefore one of the important research targets is to develop reliable and valid tools for studying and evaluating user experience. However, when using questionnaires, it is important to consider whether a questionnaire can be used to respond to the research question, what is the overall

research design and the role of questionnaires in it. In best case the developed questionnaires by the academia are not aimed only for research purposes and understanding the phenomenon itself for theory building. Rather they are also applicable or aimed at practitioners working on user experience in design, development and evaluation in industry.

In industry, the eventual goal is to provide successful products and get return on investments. One needs to manage the product development process to optimize the efforts in building successful products. Investments in user experience are calculated against the business value that they will provide, and user experience methods that do not fit the fast-paced development cycle are rarely used. Longitudinal field studies and large scale experiments are hard to justify. When conducting larger user studies in industry, the goal is to increase the return on investments by maximizing the usefulness of the data for many stakeholders, such as several product development teams, researchers, quality department, and the customer care. [8].

User experience evaluations are conducted in many phases during the product development process and the goal of evaluation differs accordingly. In the very early phase, the company has several, often tens of potential ideas for development. These concept ideas should be evaluated not only against their profitability and technical feasibility, but also against user experience, i.e. whether users would find the idea attractive and/or useful in their lives. At this point of the process, we should find ways to evaluate user experience of tens of raw ideas. After the best ideas have been selected for development, companies want to minimize the risk of usability failures and maximize the likelihood of positive user experiences in the concepts being developed. At this point, user interface designers often have several alternative designs and it is beneficial to run user experience evaluations to identify the best design. Designers need the answer soon, so the user experience evaluation needs to provide results even in less than a day. UX evaluation during the product development is often about testing a small piece of the whole system, which is far from a holistic product experience. Once the product is out, we can investigate the full scale user experience with actual customers, which will help designing the next product version.

#### **CURRENT CHALLENGES IN USING QUESTIONNAIRES**

There are several issues that we find as challenges in using questionnaires in user experience evaluation today.

First, although the standardization process is ongoing, a widely agreed definition of user experience is still missing. For example, the relationship between usability and user experience is under debate, since many HCI people argue that satisfaction as defined in usability covers user experience. This means that many user experience questionnaires deal primarily with usability and do not take into account experiential aspects such as fun, pleasure or

affect. As long as the terminology is not clear, the discussion on user experience evaluation and questionnaire usage remains on a shaky ground.

Second, questionnaires developed in academia are typically based on theoretical frameworks to ensure validity and reliability. The developed questionnaires are used to study a specific viewpoint of user experience. Alternatively, questionnaires can be based on hypotheses from the findings of interviews or field studies to validate the results of the study. Questionnaires may therefore be developed for a specific purpose, application area or context under study – at extreme a specific system to be used in a specific context. This poses questions on applying the developed questionnaires further in other areas. Furthermore, when applying questionnaires developed by others it is important to understand the theoretical background behind them and what is actually being measured. On the other hand, the variety of questionnaires available enables to apply and combine a wanted set of questionnaires in the study to cover viewpoints of interest like in [10].

Third, in the user experience literature, there exist a vast amount of factors that have been mentioned to affect user experience related to user, system and context, and a varying set of experiential aspects such as fun, trust, pleasure, stimulation, flow and immersion. It is a challenge to identify and understand the effect of or relationship between these factors when using questionnaires for user experience evaluation. In a single study of academic research, the selected factors and their effect can be studied in detail, but in a fast-pace, iterative evaluation in industry, the questionnaires cannot be too extensive. We need to understand what is relevant to be measured to gain reliable, meaningful and useful results for each evaluation case. A collection of modular, readily tested questionnaires would help identifying the relevant aspects in each case. In fact, when a holistic viewpoint to user experience is taken and when the interest is in the development of systems, a combination of both summative and formative methods and questionnaires may be the most beneficial for a successful outcome.

Fourth, user experience is context dependent but questionnaires are often designed for stationary situations: paper or online. Questionnaires designed specifically for mobile phones would be helpful, since mobile phones are carried along at all times and thus have the potential to reach users in the right context at the right time. Context-awareness of the mobile phones could be utilized for prompting users to respond to a questionnaire when the wanted context related criteria are met. For example, in experience sampling the context related information is already being used for collecting user's experiences in mobile context.

Fifth, there is a lack of agreed universal metrics for user experience. There is a need to discuss and agree on how and what to measure in a consistent and reliable way [9].

The current lack of agreed metrics means that each researcher or practitioner often reinvents or redefines the metrics for their questionnaires. It is time-consuming to develop high quality and valid questionnaires [see e.g. 3] and therefore using questionnaires developed by others, which have been tested for validity would be beneficial.

Sixth, user experience is a multifaceted phenomenon, which can be approached and studied from varying viewpoints. This imposes the important question on what does it mean that user experience is evaluated? The task completion time and the number of errors when completing a task are clear measures, but do they tell about user experience? It is also possible to measure the outcomes, such as judgment or behavioral consequences; the emotional responses; the change in aspects of user experience over time, and so forth. However, it would be important for product development to identify more precisely what factors in the system cause these judgments or outcomes, so that the results would be useful for design and development purposes. The summative approach can indicate possible problem areas, but formative evaluation is needed for identifying precisely what needs to be changed in the design. Therefore, further research is needed to clarify the role and suitability of questionnaires in user experience evaluation.

#### **FUTURE VIEWS**

As the used systems, products and services become more complex including multiple parts, service mash-ups, and multiple features and functionalities, it is far more challenging to develop questionnaires that suit all situations and contexts. One possible solution is to develop modular questionnaires and relevant modules are chosen for specific identified evaluation needs. However, there clearly is a need for a variety of different types of questionnaires varying from very general to very specific. For example, in our mobile news journalism study [15, 16, 17], we experienced that the length of a questionnaire easily grows if we want to cover a holistic view to user experience with a wide range of factors. Furthermore, when simultaneously trying to identify or confirm what system, context or user related factors cause the overall evaluative judgments the burdening of the respondents with exhaustive questionnaire becomes a limiting factor.

As discussed earlier in this paper, questionnaires that users receive and fill in on their mobile phones would be very beneficial for user experience evaluations. Mobile questionnaires should be short enough to be completed in just a few minutes, and preferably, users would not necessarily need to have an internet access to respond to the survey. This challenges the design of the questionnaires. Splitting a larger questionnaire into pieces would mean a decrease in the number of fully answered questionnaires, since participants may skip or forget some prompts for a set of questions. The system would also receive data in pieces, and collecting all the pieces of data into one database

requires new tools. New tools are needed also for executing the survey by text messages (SMS) instead of only via the Internet. If the questionnaire is available in the Internet, only the users with an Internet-capable phone and a flat fee data plan will answer the survey. Future research is needed on how to formulate reliable and user friendly mobile questionnaires and how to ensure the validity of the results.

It would be beneficial not only for the academia, but also for the industry to share the questionnaires used in the studies publically. One good example is the AttrakDiff questionnaire, which is publically available online [5]. The more users a questionnaire has and the more information is gathered about its use, the better it is for the validity, applicability, and the further development of the questionnaire.

A further idea is to collect the different questionnaires into toolboxes, including the questionnaire itself with explanations on what perspective and application area it was originally developed for, what were the underlying assumptions or theories, what it measures, how it has been validated, what other areas it has been applied for, and how to analyze and interpret the results,. The researchers or practitioners who have applied the questionnaire in their own work could add their insights and improvement recommendations of each evaluation case. This would help especially the practitioners to identify and use available questionnaires in their work. In return, questionnaire developers could get feedback about the real-life usage of their questionnaire in industrial setting. These toolboxes could be packaged into services where the analysis results could be delivered quickly and reliably to the customer.

As a conclusion, we present a short summary of discussed topics to be considered by researchers or practitioners when developing and using questionnaires for user experience evaluation:

1. When developing questionnaires for user experience evaluation, consider providing them in the form of a toolbox. Include a description of the theoretical background, how and when to apply the questionnaire and cases where it has been applied. Collect information of its application and feedback on usage. It would be great to have the different UX questionnaires available for a wider audience via the Internet.
2. As evaluated systems and services are getting more complex, consider developing modular questionnaires or using a combination of available validated questionnaires for user experience evaluation.
3. Developing validated questionnaires for mobile user experience measurement needs further studying. This includes studying the challenges related to the limitations of the mobile phones when using mobile measurement.

Let's make the evaluation challenge into a mutual opportunity for both the academia and industry!

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