

# User eXperience: Tools for Developers

Anssi Jääskeläinen

Supervisor: Jari Porras

Advisor: Kari Heikkinen

Lappeenranta University of Technology, Department of Information Technology,  
Skinnarilankatu. 34, 53850 Lappeenranta, Finland  
{jaaskela, Jari.Porras, Kari.Heikkinen}@lut.fi

**Abstract:** This dissertation aims to narrow the user experience gap between the design and test phases in software development by offering UX tools for the developers.

**Keywords:** User experience, UX, software development, query tool, database

**Research area:** Tools for Design, Modeling, Evaluation

## 1 Introduction

User experience (UX) has been an important topic in e.g. travel business for a long time [1] and currently UX is gaining interest in the field of software development as well [2], [3], [4]. UX related requirements are raised up in the design phases and in the test and marketing phases, but there is still a huge gap between those. Programmers might see the UX requirements created by the designers but since the programming language or used tool does not support the designed features they are overlooked and passed by or replaced by similar functionality created by the programmer itself. The problem is that programmer seldom possesses enough awareness about UX to be able to make acceptable compromises [5]. This means that a lot of money might be wasted on programming that needs to be redone due to programmers' wrong decisions that has not been verified with the designers.

A simple solution would be to approve every change and replacement from the designers, but often e.g. in many projects the deadlines and deliverables have been pre-set and there simply is no time to approve every single change. My personal experience in multiple projects at university has revealed this same fact; deadlines are usually set to real tight due to financial and funding aspects.

Intention of my dissertation is to shrink the gap between the design and test phases by offering UX tools for developers. A resulting tool set can help developers to solve simple UX vs. reality problems without consulting UX designers and to reduce fatal

mistakes in UX caused by bad decisions. By all means, this tool is not and will not be a replacement for the designers! It only tries to increase the likelihood that the whole development process is completed in time and with better results, thus every decisions does not have to go through the designers. My claim is based on this chapter and is. *“By offering UX tools for developers the likelihood of successful software development process is increased.”*

## 1.1 Related work

Multiple studies about the effect of usability in UX have been conducted. E.g. According to [6] usability is a key issue when designing DVD menus that improve the overall UX. On the other hand, in [2] authors have studied the possibility to use existing usability reports as tools to increase the influence of UX on the strategically important levels in the company. Although, these and many other studies, have proven that usability forms a great amount of UX it is certainly not the only affecting matter. Scholars have studied that, in addition to usability, the following factors have impact for UX.

- Emotional reactions: heart rate, galvanic skin response and heart rate variability[7]
- Fundamental needs, wishes, necessities of the user / target [8]

## 2 Current status

Foundations to my dissertation were experiences and the work carried out in two projects called Ampers<sup>1</sup> and Virtahepo<sup>2</sup>. This dissertation continues the path built by those projects by combining four different sections presented in Figure 1. The first section is experience economy, where the research aim is to raise personal understanding of UX in economy point of view and to understand why it is considered so important in business. This section is completed. Two papers were written and published [9, 10] and several reference applications, were built. These papers and applications contributed to guidelines for multiple aspects of actual UX among different population groups and offered a path to integrate ISO 9126 software quality standard for measuring UX.

The second section is software metrics and the idea is to test how well the existing software metrics suits for measuring the UX level. This section is completed. Two different multiplayer games for youths were implemented by using MUPE (Multi-User Publishing Environment) platform<sup>3</sup>; Greenhouse and Detector. Greenhouse worked as a primary reference when the first set of high level UX metrics were rationalized from the ISO 9126 software quality standard while utilizing the learning from experience economy section [11]. Detector was used in a publication which

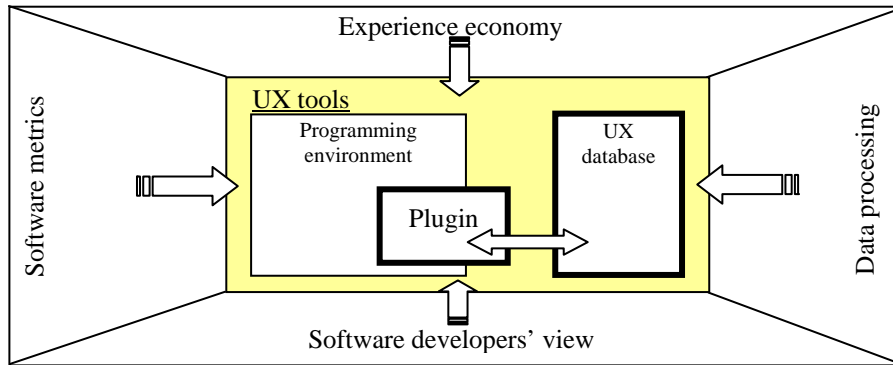
---

<sup>1</sup> <http://www.tbrc.fi/eng/projects/?PCID=32&PID=33>

<sup>2</sup> <http://virtual.vtt.fi/virtual/virtahepo/>

<sup>3</sup> <http://www.mupe.net/>

introduces context-aware service development under MUPE, and analyzes differences between professional and amateur developers [12].



**Fig. 1.** Sections of UX tools

Currently sections 3 (software developers' view) and 4 (data processing) are under way. Combined goal from these sections is to widen my personal aspects with the experience gained from other software developers and to gain sufficient amount of data to achieve statistical reliability. So far the work in these sections has been conducted by creating UX surveys for programmers in different programming related courses. Surveys intends to find out what causes the feeling of experience while developing and using some software. Secondary goal is to study the effects of UX in learning and programming.

A second iteration of surveys is currently being done in equivalent programming courses to collect enough data to achieve statistical reliability. This collected data is then being analyzed and transferred into a database. Preliminary results and evaluations indicate some promising points that should be further studied, e.g. a story behind a programming assignment could make it more pleasant and therefore more experiencing. Results from these surveys will be published in suitable journals or conferences.

## 2.1 Future work

Currently the stub of database contains only one table with about hundred data rows, but after adequate amount of reliable data has been collected, the database structure will be enhanced. Of course, before this enhancing process can begin, the collected data must be validated. A great helping hand is given by one M.Sc. student, whose topic is testing and validating collected data. I really look forward to see the results, thus they can really help me in final sections of my dissertation. Target of this last phase is to enhance the database so that it can match the specific needs of the tool for the developers. Intended deadline for final database structure is the end of this year, but of course the data collecting will continue further on to create larger and more thorough database.

After the database structure is near to finish it will probably be released to test use in our university to collect real usage statistics from the programmers. This valuable usage data can help to further develop the structure and efficiency of the database. Later on a plug-in for programming environment (e.g. Eclipse or Visual Studio) is developed with the ability to make highly specified queries to UX database with a simple mouse clicks. With this possibility, it is easy for the programmer to check the current project or functionality under development against the information held by the database. In addition to easy queries, this plug-in will also contain the formulas to count and predict the UX rate of the defined user type. Plug-in will present the data with the format specified by the developer. Possible formats are going to be plain numbers, different types of charts and statistical views.

## 2.2 Expected contributions

- Shrink the “UX free” gab between the design and test phases
- Functional UX database
- UX tools for developers (plugin connected to UX database)

## References

1. Lapland Centre of Expertise for the Experience Industry (LEO), Articles on Experiences, <http://tinyurl.com/dm49dp>
2. Rönkkö. K, Winter. J, Hellman. M. Reporting user experience through usability within the telecommunications industry. Proc. international workshop on Cooperative and human aspects of software engineering 2008. 89-92
3. Ashley. J, Desmond. K, Success with user-centered design management. Interactions, Volume 12, Issue 3. 2005. 27-32.
4. Najafi. M., Toyoshiba. L. Two Case Studies of User Experience Design and Agile Development. Proc. AGILE 2008, 531-536
5. Buxton. B, Sketching User Experiences: Getting the Design Right and the Right Design, Morgan Kaufmann Publishers, 2007
6. Költringer. T, Tomitsch. M, Kappel. K, Kalbeck. D, Grechenig. T. Implications for designing the user experience of DVD menus. *ext. abstracts on Human factors in computing systems CHI 2005*, 1565-1568
7. Lottridge. D. Emotional Response as a Measure of Human Performance. *ext. abstracts on Human factors in computing systems CHI 2008*, 2617-2620
8. Keinonen. T. User-centered design and fundamental need. Proceedings of the 5th Nordic conference on Human-computer interaction: building bridges, 2008. 211-219
9. Jääskeläinen. A, Heikkinen. K. Designing and implementing www-based multi-user virtual environment: Case youth work, IADIS e-Society 2006, 261-265
10. Jääskeläinen. A., Heikkinen. K. Designing, Implementing and Testing Experiential Multi-User Virtual Community with MS-Patients. IADIS Int. Jour. WWW/Internet, 2007, 147-164
11. Jääskeläinen. A, Heikkinen. K. Utilisation of GQM method to map ISO 9126 for experience measurements. SOFTCOM 2008.
12. Jääskeläinen. A., Lautamäki. J. Analysing Context-Aware Service Development under MUPE Platform, ASWN 2008.