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# *Engineering for User Experience: An Interactive TV Case Study*

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**Abstract**. *This paper provides an experience report and position paper describing some subjective and personal insights we gained during the design and development of an interactive television application that had the enhancement of the overall user experience as the main target. Goal of this position paper is to point out practical experience that - as simple lessons learned - can help avoid that a project fails due to simple communication errors or role-specific different expectations.*

## *1 Introduction*

The claim to focus on the User Experience (UX) is widespread in the field of interactive television (iTV) [1]. Vendors in almost all European countries use to claim that their next generation of interactive TV or Internet Protocol TV will provide more content and a better experience when interacting with the TV. In the majority of cases, the claim for a better experience is closely linked to the introduction of a new interaction technique. For example, France, one of the most vivid IPTV markets, saw the introduction of (1) the usage of pointing (point-and-click) to support Web browser navigation on the TV [3], (2) the usage of gesture to perform basic control tasks like volume or channel change [9] and announcements for touch to be included in the next generation [10].

Applying a user and UX centered design and engineering process is one of the most important pillars that modern product development is based on. The development process for interactive TV products and applications should be based on a thorough analysis of the targeted users, their tasks, as well as the environment and context that the iTV or IPTV product or application will be used in [4]. Goal is to gather and analyse requirements, to develop alternative designs based on the gathered data, and to support iterative development and the evaluation of various prototypes with different qualities [7], [13]. Prototypes can

range from paper prototypes, sketching the basic idea of the application, to final or nearly final products, used in summative evaluations [2]. Benefits of an iterative design and development approach are at hand; apart from the goal of developing excellent products that exactly fit the users' needs, the well-known saying "fail early, fail often" is a good synopsis of the fact that the cost of failure in an iterative design process increases as the project advances over time, while the risk of undiscovered issues declines the more iterations in the design and evaluation circle are carried out [8].

Unfortunately, the scientific vision of the ideal iterative development to support UX is rarely fully applied in industrial settings [11], [12]. On a general basis, UX is often mentioned as being important, but (in our daily practical work) already at the requirements phase details on how this "user experience" is to be built, supported or evaluated are already missing [5]. In the following we describe some of these insights from our daily work, to show shortcomings in the industrial practice when following iterative design and development phases.

# 2 An Experience Report from a Case Study from the field of IPTV

The main goal of the project used in this case study was to develop a user interface that supports UX in terms of positive emotions due to its seamless animations and quick feedback, that achieves high (user) ratings in terms of aesthetics and that users describe as stimulating and a system they would identify with. The goal was to develop a (set-top box) browser-compatible version of a user interface. Our intention was to deploy an iterative design and development approach including a set of evaluations. We describe in the following our experiences on why and how we failed to follow this approach.

## 2.1 Requirements Phase

What we learned during the project set-up phase and early requirement phase is that for supporting UX a simple textual description of requirements is not enough. We thus delivered a fully functional (flash-based) user interface prototype showing about 70% of the functionality, together with a requirements document of several hundred pages including task descriptions supported by user interface screenshots, detailed functional requirements as well as design specifications (colour codes etc.). The vision we had is the more details we provide, the better. Our project partners responsible for the implementation were simply overwhelmed, and given that they had a functional prototype, preferred to

use the prototype as reference (and simply did not follow the documentation in the beginning).

## 2.2 Design and Development Phase

Given that the design was already fully defined, we assumed that there was no further design phase necessary and went directly to the development phase. What became clear during the implementation phase with a partner company from Asia is that providing a full specification is overwhelming, while a slow development of the design and a simultaneous development might have helped to make our vision clearer.

### 2.2.1 Outsourcing

Outsourcing for the development sounds like a good idea, and sometimes it might even result in perfectly managed and performed projects, but there are also risks of spending more resources than expected. Various problems might come up if a project or parts of a project are outsourced.

**Language**

The first one is connected to communication and language problems when working with international teams or partners. While in general all involved persons can speak English as a common language, language skills and mastery vary, and there are chances that project goals (or design goals or rationales) are not understood correctly, or that misunderstandings occur when the responsible persons in the partner company forward information to their (internal) team.

What we found is that the internal communication in the development company was done in a foreign language, and back-translation to English changed the requirements and how they were interpreted.

**Cultural Misunderstandings**

Other issues that might occur are long feedback cycles if working with bigger international companies while one team at the same location might work more efficiently. Cultural differences in working attitudes and commitments might also be taken into account. For example, some cultures would tend to not say ‘no’ directly if something is not possible or feasible, while in other countries there might not be the same cultural understanding that a "no" is acceptable. In our case, we would have wanted the partner to show and communicate possible limitations, so we could change the design, but things that were simply not implementable in the specified time frame were not named, until the very end of the project.

**Acceptance Criteria**

When outsourcing projects, we learned we would have benefited from writing down the criteria for acceptance in detail, as well as the consequences if one part of the acceptance criteria is not met or just partially met. This issue is also directly connected to the question how changing requirements are incorporated into the project and how these can be handled [6].

Overall, "committed" project management and communication on both sides is essential to transport goals and priorities to the respective teams. In terms of UX centred engineering, when outsourcing a project, it is advisable to have the project requirements ready early on (mind balancing over- and under-specification) and to reserve enough time for feedback cycles throughout the project to reduce the risk of misunderstandings and possible slower-than-expected progress, or if a project partner is not sticking to the agreed requirements.

### *2.2.2 Communication problems in multi-language and multi-location teams*

In our modern world, it is not uncommon that the teams involved in a project are spread over various locations and have various mother tongues. Beyond that, sometimes team members also just need a person to 'translate' between their professional worlds, as e.g. the designer might have a different professional vocabulary than the software developer or the project manager, to avoid problems - like we experienced the software developer to wait for a rough framework for the app while the designer is lost in describing details that are at this stage unnecessary for the software developer. Other experiences we all might have made is the cliché of the software developer not focusing on usability ("it's 'perfectly understandable'") or designers making beautiful yet unusable interface designs.

## *2.3 Evaluation Phase*

Constant testing and user feedback throughout the whole product development process is desirable, but proved to be unrealistic. In reality, due to time or confidentiality constraints, UX engineering sometimes is more engineering to the CEO's or client's desires. The sooner the deadline for the final product, the more likely decisions might not be based on user studies and user evaluation, but will follow the decision of the client requesting the product, for example the CEO of the client company deciding that the product will be pre-released at a major fair.

These problems from time constraints (e.g. fair launch dates) lead to a change in planning where iterative development and evaluation are not scheduled accordingly any more, but the goal to "have something running" is more important than the usability or UX of the final system.

Due to the specific way we were involved in this project, it was not possible to have external people see the product (even if they would sign an NDA), so recruiting test participants was difficult and we ended up testing with people employed in the company.

## 3 Summary & Conclusion

This workshop paper gives some insight into our daily work and experiences we made during an IPTV-based software development that had as a main target to provide a new type of UX. The occurrences described where observed directly in the project we participated, which of course, we want to keep confidential in terms of participants involved. Although most of the topics presented in Section 2 are very subjective, we hope to provide some key lessons: (1) whatever the preparation, people need time to understand the scope of the work and to understand the level of quality required in the final product; (2) be aware of misunderstandings and differences in cultures - even if it seems obvious that the people speak the same language. What we learned as a central lesson is "to mind the gap" - between scientific lessons and industrial practice, between people's different roles and their understanding of the project - and also between languages - as sometimes a translation from French to English done by an Austrian, communicated by a Brazilian to an English speaking person from India, transcribing the requirements in a language from India, to be finally read by a French (native speaking) project officer will simply incorporate some surprises. Our very personal UX lesson learned: just smile :-).

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