Chapter 13
Usability and User Experience Evaluation Methods

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ABSTRACT
Usability and user experience are two important factors in the development of mass-customizable personalized products. A broad range of evaluation methods is available to improve products during an user-centered development process. This chapter gives an overview on these methods and how to apply them to achieve easy-to-use, efficient and effective personalized products that are additionally fun to use. A case study on the development of a new interaction technique for interactive TV helps to understand how to set up a mix of evaluation methods to cope with some of the limitations of current usability and user experience evaluation methods. The chapter concludes with some guidelines of how to change organizations to focus on usability and user experience.

INTRODUCTION
Mass customization has become a buzz word relating to the ability to provide customized products or services through flexible processes in high volumes at reasonable costs (Da Silveira, Borenstein and Fogliatto, 2001). Customization can be found in almost all areas of daily life ranging from T-shirts with personalized messages, shoes with personalized color concepts to the personalization of IT and ICT products, like cell phones with new forms of ring-tones, to new forms of entertainment like interactive TV, allowing users to personalize and individualize their content (Riemer and Totz, 2001). Following these examples we use the term mass customization describing “a system that uses information technology, flexible process, and organizational structures to deliver a wide range of products and services that meet specific needs of individual customers” (Da Silveira et al., 2001, p. 2).

Mass customization can exist on varying levels and several factors contribute to the success of a mass customization system. From the organizational and market-related perspective the customer...
demand for variety and customization must exist, market conditions must be appropriate, the value chain should be ready, the technology must be available, the products should be customizable and the knowledge about the process must be shared (Da Silveira et al., 2001). Usability and user experience evaluation method contribute to these success factors, taking additionally into account that the final product or service should be usable and have a positive user experience. When developing a product that can be mass customized, a user-centered development perspective (UCD) helps to understand who is using when, what, how often, in what kind of context and how to improve usability and user experience (Kramer, Noronha & Vergo, 2000).

Usability evaluation methods have been developed in the field of human-computer interaction (HCI) during the last 25 years, offering a wide range of applicable methods for all stages in the development cycle. User experience (UX) in contrast is a relatively new focus point in HCI. There is a still on-going development of methods and approaches to understand, investigate, and evaluate UX.

This chapter is going to present an overview on usability and UX evaluation methods. Goal of this chapter is to explain from the perspective of human-computer interaction the importance of usability and UX evaluation within the development cycle of mass-customizable personalized products. Describing some of the most commonly used evaluation methods we show how these methods can be applied within a user-centered development process, and when application of standard usability evaluation methods is limited. Additionally methods are presented that are not typical for the industrial context, but which can help to understand how to make mass-customizable personalized products and services usable and how to develop products that have a positive user experience.

Using a case study we describe how to set up a methodological mix, to (in our opinion) successfully support the development of a mass-customizable personalized product. The chapter concludes giving practical implications for managers on how to take usability and UX into account from an organizational perspective.

**USABILITY EVALUATION METHODS**

Usability evaluation is a set of methods used in the area of human-computer interaction to increase the efficiency, effectiveness and user satisfaction when interacting with any form of computer or more general any form of information and communication technologies. The document ISO 9241-11 18 Guidance on Usability (ISO, 2008) specifies usability as: “The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.” A major issue for products and services being mass customized is the overall utility of such systems or products. The area of usability evaluation today can be summarized as all forms of methods that can help to understand how to improve the usability of a system, to investigate usability problems in all kinds of usage contexts, or even to understand the long-term usage of a product in the field to inform new generations of the product.

From the perspective of human-computer interaction the development of a usable product can only be achieved following an iterative development process. Goal of a user-centered design process (ISO 13407) is to develop a usable product typically in various iterative phases. A typical product development could start with investigating new ideas for a product in the field, followed by a user and task analysis and a simple paper prototype. Usability evaluation is conducted continuously during the whole development to understand how to improve the product or service in terms of usability. At each stage during the development different methods can be used to improve usability aspects of the product. Usability