

## Chapter 36

# Intermedia and Transmedia User Experience with Multi-Touch Apps

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### ABSTRACT

*In the Web of devices, information and services are designed for multi-device use. As each device has its specific characteristics, inter-device adjustments and adaptations result in inconsistent inter-device (system) models. They are perceived by users on visual and functional experience layers as well as on information architecture and prevent users from building transparent mental models. Evidence from case studies reveals the nature of cognitive information processing in this situation of rich user experience. Consistency design rules seem to be insufficient to overcome the rich user experience problems, as users' exploration of inconsistencies lead to interaction problems. In consequence, a systemic intermedia perspective is needed. This is explored in this chapter.*

### INTRODUCTION

Within the emergent web of devices (W3C), many web-based services (content and functions) are available for multiple interaction devices. In human-computer interaction literature, these systems, platforms or applications are either referred to as multi-device systems, multi-device environments, multiple user interfaces (MUI) (Denis & Karsenty, 2004) or cross-media systems (Segerstahl, 2008).

Calvary et al. (2003) already stated that many multi-device environments allow users utilizing

variable devices (e.g. desktop PC, multi-touch tablet, smart phone etc.) in order to do the same task within variable contexts of use or combine several devices for one task (transmedia processes). Each device has its specific characteristics, e.g. interface conventions (Kurkovsky, 2009), modalities, and variable contexts of use. Therefore, web-based services need to be transferred, configured, and adapted across different devices for multi-device use.

Levin (2014) pointed to multiple-device environments as a design challenge, because their usage is not yet fully understood. The main

design approaches for multi-device environments are consistent design approaches (Levin, 2014). According to Denis and Karsenty (2004), they aim at inter-device consistency, which seems to satisfy claims on ergonomic design principles of consistency (DIN EN ISO 9241-110:2008-09). Therefore, these approaches port the same content and features across devices in a like manner, and attempt to replicate the desktop experience onto the mobile device. Some adjustments or adaptations are made to accommodate specific device characteristics (Levin, 2014).

Responsive web design, as it is understood by Marcotte (2011), is a consistent design approach, which ports content and features across devices (desktop PC, tablet, smart phone) in a like manner with some necessary adjustments to the characteristics of each device (Nielsen & Budiu, 2013). Levin (2014) emphasized that the resulting inconsistencies mainly address form factor, screen size, interaction model (touch, key or voice), and sensor data (GPS etc.). Many adaptations are visually, e.g. screen layouts or grids, but can also involve other experience layers like information architecture or functionality.

In view of the consistency principle, there is an inherent problem for the design of multiple-device environments. Because each device has its specific characteristics, e.g. screen size, interaction models etc., inconsistencies are inevitable and consistent in multi-device environments cannot mean identical. Differences between devices cause adjustments and adaptations to the respective characteristics of each device. Furthermore, Segerståhl (2008) emphasized that sometimes heterogeneity and functionality in the case of cross-media services may even add value for their use.

Available design principles are insufficient. Wäljas, Segerståhl, Väänänen-Vainio-Mattila and Oinas-Kukkonen (2010) claim inter-device consistency with respect to core-functionality and common look and feel (visual language) and Levin (2014) considers consistent information architecture across devices to be important. However, these

recommendations are not precise enough, and to some extent even not realizable, as, sometimes, it is the case for relationships hold between larger displays like the desktop and smaller displays like the smart phone (see case two in the case studies). Anyway, inconsistencies are inevitable, because of specific device characteristics.

However, from the user's point of view, inconsistencies cause insecurity, as they do not support mental model formation during the interaction process. Little is known on rich user experience in multi-device environments. To get evidence, we studied inter-device consistency from the user's point of view. According DIN EN ISO Standards (DIN EN ISO 9241-210:2011-01) the concept of user experience covers the user's perceptions and responses during use of a system or service. This includes all emotions, beliefs, preferences, physical and psychological responses, behaviors and accomplishments to occur before, during and after use. The user perceives the presentation, functionality, system performance, context of use and so on, and these perceptions are central to the user's information processing during interaction. Therefore, the user's cognitive perceptual and information processing during the interaction process was one aspect of user experience, which was studied with news apps on multi-touch tablets in two case studies.

A common psychological model for describing the user's information processing in human-computer interaction is the cognitive concept of mental model, which has a long tradition in cognitive science and engineering psychology (Gentner & Stevens, 1983; Wilson & Rutherford, 1989). The concept of mental model helps to understand the complex user experience with multi-device systems, and, as in our case studies, to understand especially the user experience with inter-device consistency. Schmitt, Cassens, Kindsmüller and Herczeg (2011) described different concepts of the meaning of mental models. The most helpful one seems to be the meaning of a mental model as a kind of working model, which is permanently

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