

# Navigating Practical Trade-Offs During Prototype Testing

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## INTRODUCTION

In this study, a usability evaluation laboratory at a mid-western U.S. university was contracted by an insurance company to conduct a usability evaluation of their home page redesigns. A two-phase prototype testing was implemented:

- First, think-aloud user testing was conducted to compare three prototypes, focusing on the layout and key functionalities of the home page.
- Next, an online survey was administered to compare three possible aesthetic designs of the home page.

This article focuses on the methodology details, including the selection of prototypes and usability evaluation methods and the considerations for practical trade-offs. Findings from each phase were also shared. Insights from this study could inform developers of other e-commerce applications.

## BACKGROUND

The success of an online commercial system is contingent upon how consumers react to it. Much has been said about website usability and its role in influencing customers' online purchase and repurchase decisions (Green & Pearson, 2011; Konradt, Held, Christophersen, & Nerdinger, 2012; Zhang, Fang, Wei, Ramsey, McCole, & Chen, 2011). In order to construct a user-friendly website, it is necessary to conduct a usability evaluation by taking into consideration users' inputs from the early stages of website development. Additionally, the time taken for the usability evaluation should not last so long as to slow down the entire development process. Prototype testing constitutes a powerful solution to address the above-mentioned challenges.

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Two types of prototypes are commonly identified in literature (Engelberg & Seffah, 2002; Rudd, Stern, & Isensee, 1996; Virzi, Sokolov, & Karis, 1996):

- A high-fidelity prototype is much like the final product. It is highly functional, with many details, and is usually interactive.
- A low-fidelity prototype only possesses some characteristics of the final product. It is incomplete and with little or no functionality.

Additionally, Engelberg and Seffah (2002) advocated for medium-fidelity prototypes, which fall between low- and high-fidelity ones.

Despite the popularity of prototype testing during the creation of e-commerce applications, there is no consensus on which type of prototype should be used and how to best conduct prototype testing under the specific circumstance (Engelberg & Seffah, 2002; Rudd et al., 1996). Practitioners are unsure of what might constitute the best approach for their individual situations (Wixon, 2003). It is, therefore, necessary to conduct comparisons between different prototypes and among various usability evaluation methods.

For instance, some studies reported that using high- and low- fidelity prototypes led to equivalent findings (e.g. Sauer, Seibel, & Rüttinger, 2010; Sauer & Sonderegger, 2009; Virzi et al., 1996), while other researchers suggested that high-fidelity prototypes, despite being more expensive to develop, were more effective in improving product design (e.g. Nielsen, 1990; Sauer, Franke, Ruettinger, 2008). Additionally, researchers noted that the same prototype could possess different fidelities on various dimensions. Cerejo (2010) proposed visual, content, and functionality as major fidelity dimensions. Rudd et al. (1996) further summarized that the fidelity of a prototype was dependent upon the extent that this prototype represented the target product in terms of appearance and users' interaction experiences. As suggested by Sauer et al. (2008), investigators comparing prototypes of different fidelities needed to adopt a refined categorization.

There has also been a lack of effort in evaluating different methods that could be adopted for usability evaluation of e-commerce application prototypes (Hasan, Morris, & Probets, 2012; Koutsabasis, Spyrou, & Darzentas, 2007). Some researchers attempted to use a quasi-scientific quantitative approach through computing the number of issues identified and the resource usages (Gray & Salzman, 1998; Hasan et al., 2012). In contrast, Wixon (2003) suggested that the determination of best methods was subject to various contextual factors. Therefore, he argued for the value of qualitative case study approach and the accumulation of knowledge based on different researchers' cases studies. Additionally, Wixon pointed out that methodology effectiveness was not only determined by the usefulness of the collected feedback but was also related to the attempts made to incorporate findings into the future website development. Practitioners also often adopted subjective and objective usability measures to best serve their goals (Plantak Vukovac, Kirinic, & Klicek, 2010). It was necessary to include all this information in the methodology discussion.

## MAIN FOCUS OF THE ARTICLE

In this article, details of each phase of evaluation, including the practical trade-offs under time and resource constraints, were elaborated. Insights from this study will provide directions to practitioners who are under time constraints to conduct a full-fledged extensive usability study while at the same time increasing the reliability of their study by employing more than one usability evaluation method. Guided

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