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Virtual Product Experience: The Effects of Interactivity, Task, and Product Type on Presence Perceptions

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ABSTRACT

This article presents a model of the effects of product types (hedonic versus utilitarian) and object interactivity on presence perceptions (i.e., perceptions of nonmediation in technology-mediated environments, Lombard & Ditton, 1997), as well as on subsequent beliefs about a product and web site. A laboratory experiment has been designed to test the hypothesized effects. The expected findings will have important implications for research and practice, as they will further the understanding of factors influencing presence perceptions and online buying behavior, and provide prescriptive insights for the design of business-to-consumer e-commerce systems.

Keywords

Presence, consumer tasks, product types, electronic commerce.

INTRODUCTION

Over the past decade, retail e-commerce has seen a tremendous increase; the relative growth of online U.S. retail sales by far outpaced the total U.S. retail sales, with an increase in e-commerce sales of 24.6% between the years 2004 and 2005, as compared to an increase of only 7.2% in total retail sales (U.S. Census Bureau News 2006).

Contributing to the tremendous growth of online retail sales are factors such as the decrease in costs for Internet access, but also the growing use of a variety of technologies to influence online consumers' buying behavior. However, unlike traditional retailers, online merchants often face the problem of not being able to represent certain product attributes (Lal and Sarvary 1999); consequently, due to the mediated environment, online consumers lack the ability to directly experience a product. In most cases, online retailers are not able to present their products as they would in a retail store environment, primarily if the dominant product attributes are non-digital (Lal et al. 1999), i.e., can not be represented via a computer interface. However, using technologies such as Macromedia Flash®, online retailers can now provide consumers with Virtual Product Experiences (VPEs, Jiang and Benbasat 2004-2005), to enable virtual interactions with a product prior to purchase (Klein 1998). Although research has demonstrated that indirect product experiences are less powerful than direct experiences (Fazio and Zanna 1981), VPEs can mimic some aspects of direct experiences and can thus influence a consumer's attitudes and intentions.

Overall, prior research has demonstrated the beneficial effects of VPEs, although the conditions under which such VPEs are most effective have only partially been determined. For example, the product's hedonic or utilitarian (functional) nature has yet to receive wider attention; while hedonic products are primarily consumed for their own sake, utilitarian products are consumed for the function they perform (Woods 1960). In other words, hedonic goods are generally associated with excitement, fun, and pleasure, whereas utilitarian goods are consumed for instrumental purposes (e.g., Dhar and Wertenbroch 2000; Hirschman and Holbrook 1982; Strahilevitz and Myers 1998). Prior research has only used a narrow set of different products, such as Sports Watches (Jiang et al. 2004-2005), PDAs (Jiang and Benbasat 2003), Digital Cameras, (Nicholson 2005; Schlosser 2003), or computers and computer desks (Suh and Lee 2005; Suh and Chang 2006), all of which can be considered highly utilitarian in nature. Differential effects of product type (in terms of the hedonic/utilitarian nature) can thus present a boundary condition of prior findings; this can have important implications, especially as marketers can charge a price premium for hedonic products (Dhar et al. 2000).

In an online context, designers of VPEs have some degree of control over the way a consumer interacts with a product; designers can thus modify the content to emphasize the hedonic or utilitarian aspects by modifying the interface to maximize the positive effects on attitudes and intentions. Knowing about different impacts on presence based on product type therefore has important implications for marketers and designers of VPEs alike.

LITERATURE REVIEW

Presence

The concept of presence has played a major role in studies examining users' affective and cognitive responses when interacting with virtual environments. In this context, scholars have conceptualized presence in a number of different ways (e.g., Biocca 1992; 1997; Novak, Hoffman, and Yung 2000; Steuer 1992; Welch 1999). In order to arrive at a unified definition of presence, Lombard and Ditton reviewed past presence research and defined presence as a "perceptual illusion of nonmediation" (Lombard and Ditton 1997, Presence Explicated section, ¶1; see also IJsselsteijn and Riva 2003; Riva 2003). An illusion of nonmediation can be created using sophisticated virtual reality systems; however, using current technology, it is unlikely that users of an online retailer's web site fail to perceive the technology mediating the experience.

Lee (2004) has attempted to arrive at a definition of presence that is independent of any specific technology, so that theories surrounding presence can be applied to any past, present, and future technologies. Further, Lee intended to rid the term presence of any negative connotations. Thus, this study will use his definition of presence as "a psychological state in which virtual (...) physical objects are experienced as actual physical objects in either sensory or nonsensory ways" (p. 44).

Although it is often believed that a sense of presence can arise from all media (e.g., Kim and Biocca 1997), scholars agree that current technologies offer the greatest potential in this regard (e.g., Steuer 1992). Prior research has proposed that factors associated with the medium (Steuer 1992), the user, or the content (IJsselsteijn, de Ridder, Freeman, and Avons 2000) can contribute to presence.

Whereas factors associated with the user are outside the control of online businesses, factors associated with the medium or the content can be manipulated to influence presence. Factors associated with the *medium* are vividness (which depends on the quantity of sensory channels employed and the bandwidth available) and interactivity (i.e., the user's ability to modify and interact with the virtual environment) (Steuer 1992). In online shopping environments, the most relevant *content* is the representation of the product itself. Marketing scholars have suggested a variety of dimensions to categorize different products; recently, Suh and Lee (2005) integrated those dimensions and classified products as virtually high experiential or virtually low experiential, depending on whether or not the salient attributes can be effectively communicated in virtual environments. One dimension that has not been captured in their classification is the functional/experiential dimension (e.g., Crowley, Spangenberg, and Hughes 1992). The experience of presence has, as an outcome, a strong influence on beliefs, attitudes and intentions (see also Ajzen and Fishbein 1980).

THEORETICAL BACKGROUND AND HYPOTHESES

This study will test the effects of interactivity and product type on presence (see Figure 1). Interactivity and vividness (Steuer 1992) are often regarded as primary factors enabling VPEs, where vividness includes the number of sensory channels involved in the experience, and interactivity is influenced by visual control (e.g., the ability to rotate the virtually represented product) and functional control (the ability to manipulate the object, e.g., by virtually "pushing" buttons with a mouse pointer) (Jiang et al. 2004-2005).

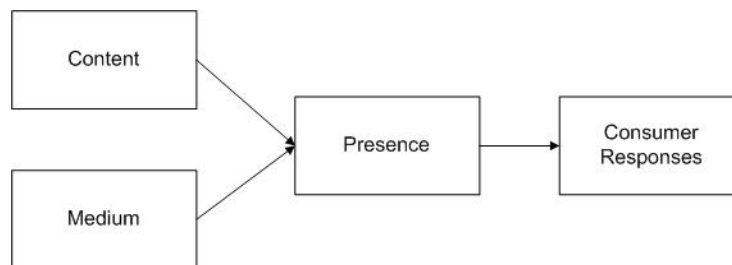


Figure 1: Conceptual Model

A higher degree of interactivity will let users feel more "in control"; thus, the consumer experiences similar feelings to what s/he experiences when interacting with a real object (cf. Klein 2003). Users interacting with a virtual product display high in interactivity should therefore experience higher degrees of presence.

H1: Increased interactivity will lead to increased presence.

However, user reactions to virtual product displays might differ depending on the object of the interaction. Specifically, online consumers might be looking for different forms of interaction when interacting with hedonic (i.e., experiential) or utilitarian (i.e., functional) goods (Dewi and Ang 2001). If the information presentation format fits the target product, this may have beneficial consequences in terms of consumer reactions (Dewi et al. 2001). As consumers primarily derive fun and enjoyment from the interaction with hedonic products, they are more likely to suspend disbelief, and thus are more likely to feel a sense of presence than consumers interacting with utilitarian products.

H2: Consumers interacting with a hedonic product will experience a higher sense of presence than consumers interacting with a utilitarian product.

For consumers interacting with hedonic products, the primary focus is on the experiential aspects of the interaction. Kempf (1999) suggested that the representation of these experiential aspects can be enhanced by increasing interactivity, leading to a better fit between the way the product is presented and the information presentation needed to derive fun and enjoyment (Vessey 1991). Thus, under conditions of high interactivity, consumers interacting with a hedonic product should have a higher likelihood to suspend disbelief and should therefore experience a higher sense of presence.

H3: Product type and interactivity will interact to influence presence such that under conditions of high interactivity, consumers interacting with a hedonic product will feel the highest sense of presence.

In addition to factors relating to the medium and the product, factors relating to the individual are expected to influence presence. However, for purposes of the proposed study, factors such as mood, computer-self efficacy, playfulness, and prior experience with the product domain will be measured and statistically controlled within the hypothesis testing.

Researchers in the area of social psychology and consumer behavior have theorized about the effects of advertising as compared to direct product experience. According to Smith and Swinyard (1988), a person trying out a product himself or herself is more likely to believe his or her own experience than an advertising claim due to higher levels of source credibility. Klein (2003) conceptualized a virtual experience as being closer to the real experience than advertising is to a real experience. A higher level of presence should therefore lead to increased belief strength (Klein) about the product and the web site.

H4a: Presence will positively affect belief strength about the product.

H4b: Presence will positively affect belief strength about the web site.

Ajzen and Fishbein's (1980) theory of reasoned action provides support for the beliefs-attitudes-intentions link. Although Ajzen and Fishbein (1980) hypothesize a relationship between intentions and behavior, this is beyond the scope of the proposed study. Thus, H5 and H6 follow:

H5a/b: Beliefs about the product will positively affect a consumer's attitudes about the product/web site.

H6a/b: Consumers' attitudes will positively affect their purchase intention/intention to return to the web site.

RESEARCH DESIGN

To test the hypotheses provided, the proposed study will employ a laboratory experiment using student subjects; specifically, the study will employ a 2 x 3 factorial design, manipulating product type (hedonic/utilitarian) and interactivity (low/medium/high, using visual control and functional control). The experiment will be conducted using students enrolled in an introductory management information systems course, who will be randomly assigned to the different conditions. The proposed study is conducted in the context of online shopping, thus, the sample is appropriate for the experiment, as young adults are heavy users of online shopping sites (Hoffman, Novak, and Venkatesh 2004). Using a laboratory experiment will further help to increase precision and control (Calder, Phillips, and Tybout 1982; McGrath 1982).

Experimental Task

The study will be conducted in separate sessions in a controlled computer laboratory. Having completed an electronic consent form, the subjects will be redirected to a page containing a brief scenario to set the stage for the experiment. Then, the subjects will be redirected to a page of a fictitious online retailer; depending on the condition, this page will present the target product as being either hedonic or utilitarian, with different levels of interactivity.

Interactivity will be manipulated by providing one of three different sites; the conditions will be low interactivity (static interface), medium interactivity (visual control only), and high interactivity (visual and functional control). In the low

interactivity interface conditions, the subjects will see a number of static pictures and will be presented with the relevant information in textual form. In the medium interactivity condition, the subjects will be able to rotate the product using their mouse pointer to view the product from all sides; all relevant information will be presented in textual form. In the high-interactivity condition, the subjects can rotate the product and interact with the virtual target product by using their mouse pointer to operate the product's different menu functions. The subjects in all conditions will be provided with the same information on the same page, but the information will be presented in different ways.

In order to control for differences other than differences on the hedonic/utilitarian dimension, product type (hedonic/utilitarian) will be manipulated by highlighting certain aspects of the product. In the utilitarian condition, the functional aspects will be highlighted, while in the hedonic condition, the experiential aspects will be highlighted. All product information will be held constant across conditions.

After a period of time visiting the web site, the subjects will be redirected to a web page containing manipulation check questions, as well as measures of presence, mood, attitudes, and intentions. The subjects will then be debriefed, thanked, and dismissed.

Instruments and Measures

Presence: Many researchers have attempted to arrive at measures of presence (see IJsselsteijn et al. 2003). The proposed study will use self-ratings (i.e., subjective measures), adapted from Lessiter et al. (2001) and Witmer and Singer (1998).

Beliefs: Measures for product and web site beliefs will be created using the free elicitation method, as recommended by Fishbein and Ajzen (1980).

Attitudes, Intentions: To measure these constructs, items will be adapted from the marketing literature (e.g., Voss, Spangenberg, and Grohmann 2003).

Measures of potential covariates (such as computer self-efficacy (Compeau and Higgins 1995), playfulness (Webster and Martocchio 1992), domain familiarity, or skepticism toward the ad (Obermiller and Spangenberg 1998)) will be assessed during a separate session. All measures will be pretested and validated prior to the actual study.

Pilot Studies

Pilot studies will be conducted to refine and test the interface. Once the interface has been thoroughly tested, a pilot study will be conducted to validate the instruments, test the efficacy of the manipulation, and provide preliminary results. These pilot studies will follow the methodology and manipulations as outlined above.

Data Analyses

The hypotheses will be tested using structural equation modeling (SEM). Although SEM has primarily been used for observational studies, it has been argued that it can add substantial value to experimental studies using manipulated exogenous variables as well (MacCallum and Austin 2000). Following suggestions of scholars such as Rigdon, Schumacker, and Wothke (1998), the interaction term will be tested using a "multisample" approach, as described MacKenzie and Spreng (1992).

CONCLUSION

The proposed dissertation will help to further clarify factors leading to increased presence during a consumer's interaction with virtual product displays. The results of the study will help designers of virtual product displays choose which features to employ in order to increase a user's experience of presence, depending on the desired effect.

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