



## Full length article

## The influence of image interactivity upon user engagement when using mobile touch screens

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## ARTICLE INFO

## Article history:

Received 1 December 2016

Received in revised form

12 March 2017

Accepted 19 March 2017

Available online 20 March 2017

## Keywords:

Touch screen

Engagement

Smart retail

Clothing

Haptics

Image interactivity

## ABSTRACT

Touch screens are a key component of consumer mobile devices such as smartphones and tablets, as well as an increasingly common self-service component of information retrieval on fixed screens and mobile devices in-store. The ubiquity of touch screens in daily life increases consumer accessibility and extended use for shopping, whilst software innovations have increased the functionality of touch screens, for example the extent to which images respond to fingertip control. This study examines how users engage with interactive visual rotation and tactile simulation features while browsing fashion clothing products on touch screen devices and thus contributes to retail touch screen research that previously focused on in-store kiosks and window displays. Findings show that three dimensions of user engagement (endurability, novelty and felt involvement) are positively influenced by both forms of manipulation. In order to examine the extent to which touch screen user engagement varies with individual preferences for an in-store experience, the paper also examines whether user engagement outcomes are mediated by an individual's need for physical touch. Findings indicate that the need for touch does not explain the variance between individuals. We conclude that touch screen technology complements the physical retail environment.

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## 1. Introduction

Touch screens have transitioned from being present on consumer mobile devices such as smartphones and tablets to becoming an increasingly popular self-service technology present within the retail environment in a range of forms such as information kiosks, window displays and check-outs (Tüzün, Telli, & Alir, 2016). Touch screen technology has a strong appeal for consumers as it allows them to use their fingertips and removes the need for any intermediary devices (i.e. a mouse or a stylus) when retrieving information (Benko, Wilson, & Baudisch, 2006). Survey evidence shows that touch screen presence increases intention to visit a physical store amongst 65% of UK consumers (Gilmartin, 2016) and thus the in-store touch screen provides a competitive response to online challengers (RSR, 2016a) by allowing consumers

to find out more about products or customise their shopping experience. The ubiquity of touch screens on both consumer mobile devices as well as being fixed in-store increases consumer accessibility and enables extended use both in-store and outwith the store (Gilmartin, 2016; RSR, 2016b; Shankar et al., 2016). In the UK and US, mobile traffic now constitutes the greatest proportion of ecommerce traffic (eMarketer, 2016) and online shopping is the most popular web browsing activity for smartphone users in the UK (Deloitte, 2016).

There is a recognised need for research that examines consumer perceptions of specific touch screen features on mobile devices (Blazquez, 2014; Pantano & Priporas, 2016). For fashion retailers in particular, ensuring the effectiveness of screen-based product views is a widely discussed challenge (Eroglu, Karen, Machleit, & Lenita, 2001; Kim, Kim, & Lennon, 2007; Klatzky & Peck, 2012) and mobile marketing requires a distinct set of competencies (Ström, Vendel, & Bredican, 2014). Chung's (2015) experimental study found use of touch screens to browse an item of clothing led to greater shopper engagement, which subsequently led to higher satisfaction with shopping, higher purchase intentions and more positive product evaluations. Focusing on psychological ownership,

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Brasel and Gips (2014) found that browsing on touch screen devices led to higher product valuations than on PCs, concluding that consumer perceptions of online products are filtered through the lens of the interfaces used to explore them.

It is important for retailers to understand the opportunities to enrich the customer shopping experience on mobile devices and in-store touch screens, as mobile marketing requires a distinct set of competencies (Ström et al., 2014). Touch screens have the potential to enhance the in-store customer experience by bringing the benefits of online shopping to ecommerce-savvy consumers (Gilmartin, 2016; RSR, 2016b). Developments in image interactivity technology (IIT) improve product presentation techniques by enabling customers to manipulate images in real-time rather than simply viewing static images. For example, single- and multi-finger gestures such as flicking, rotating and even pinching can be used to access and interact with product views on touch screens (Orzechowski et al., 2012; Padilla, Orzechowski, & Chantler, 2012). IIT has a positive impact on fulfilling users' hedonic needs and positively influences affective aspects of the consumer experience (Kim & Forsythe, 2007; Lee, Kim, & Fiore, 2010; Teo, Oh, Liu, & Wei, 2003). Consequently, it contributes to positive attitudes towards the retailer (Wu, 2005). It is important to determine the extent to which IIT innovation on mobile devices results in user engagement, since the result of failing to engage consumers could be a lost sale, a disloyal consumer or a failure to transmit information online (O'Brien & Toms, 2008). In contrast, engaged shoppers are likely to purchase more items, more frequently than non-engaged shoppers (Shankar et al., 2016). However, there is a paucity of research that examines consumer perceptions of specific touch screen features on mobile devices (Blazquez, 2014).

This study contributes to the literature on how differences in IIT influence user engagement when browsing clothing images. It links emerging touch screen technology to the stream of research into user engagement commenced by O'Brien and Toms (2008; 2010; 2013). The use of innovative technologies contributes to increasing the value of online retail (Kim & Forsythe, 2007) and if consumers consider their browsing experience as a success and feel highly involved in their shopping task, this should lead to an increased intention to purchase, improvement of the overall online experience, revisit intention or time spent in the website (Lee et al., 2010; Merle, Senecal, & St-Onge, 2012; Park, Lennon, & Stoel, 2005). In this study, data was gathered using a between-subjects design to test the effect of two sensory stimuli, vision and simulated touch, whilst controlling for the individual trait of need for touch whilst shopping. The remainder of this paper will explain the conceptual background, describe the method, report the results, discuss implications for practitioners and researchers and conclude with limitations and recommendations for further research.

## 2. Literature review

### 2.1. User engagement

The construct of user engagement combines behavioural, cognitive and affective responses when using computer-based tools (O'Brien & Toms, 2008; Wiebe, Lamb, Hardy, & Sharek, 2014). User engagement occurs progressively from initial "users' assessment of, and interaction with, interactive media interfaces, followed by deeper absorption with media content and behavioral outcomes" (Oh, Bellur & Sundar, 2015, p3). User engagement is particularly suitable as a way of understanding responses to touch screen technology for the acquisition of product information, as it incorporates both hedonic perceptions such as flow (Trevino & Webster, 1992), utilitarian interface experiences such as perceived usability (Davis, 1989) and task-technology fit (Goodhue &

Thompson, 1995). As such, it provides a "succinct lens" through which to unify and address several established strands of human-computer interaction research (Wiebe et al., 2014, p. 124).

O'Brien and Toms (2010) proposed six dimensions of user engagement: (1) Aesthetics, the visual appearance of the website, (2) Endurability, perceived task-technology fit resulting in intention recommend to others, (3) Felt Involvement, cognitive immersion in task, (4) Focused Attention, flow state that results in temporal and environmental disassociation, (5) Novelty, pleasurable cognitive stimulation and (6) Perceived Usability, the degree of cognitive effort and affective frustration experienced during use. The User Engagement scale was developed by O'Brien and Toms (2008; 2010; 2013) through a survey using the scenario of general online shopping activity (O'Brien & Toms, 2010) and book purchase in a laboratory experiment comprising search tasks (O'Brien & Toms, 2013). However, neither study examined user engagement in the context of consumer acquisition of product information. The process of evaluation of alternatives is an important stage of the shopping process (Shankar et al., 2016).

Continued research is needed due to the dynamic and complex nature of user engagement, the documented fluidity of scale items, and the need to gauge whether the measure allows meaningful comparison between different task contexts (O'Brien & Cairns, 2015) and different application features. Research is also needed to compare user engagement in response to different sensory software stimuli. There is scant research that makes finer-grained comparison to human-computer interaction, with exceptions being Visinescu Sidorova, Jones and Prybutok (2015) who examined the effect of 3D vs 2D image manipulation upon cognitive absorption leading to purchase intention and Xu and Sundar (2016) who differentiated how interactivity and non-interactive elements within a website influence cognitive processing of content. To address these gaps, the present study investigates how different forms of IIT influence user engagement with fashion clothing information.

### 2.2. Image interactivity technology and fashion retailing

Image interactivity technology (IIT) is a website feature that enables the "creation and manipulation of product or environment images to simulate (or surpass) actual experience with the product or environment" (Fiore, Kim, & Lee, 2005, p. 39). This is particularly relevant for clothing products, which suffer from sensory impoverishment when retailed online. There has been sustained development of IIT for the fashion retailing context resulting in a range of IIT features including the ability to rotate and zoom into product features, the ability to assemble distinct clothing images into one image through mix and match technology, and the ability to simulate the appearance of clothing upon a body form through a virtual fitting room (Lee et al., 2010; Merle et al., 2012). Each of these features differs in the range of interactivity and the approximation to physical vision and touch (Yu, Lee, & Damhorst, 2012). A high level of interactivity positively influences affective aspects of the consumer experience (Lee et al., 2010).

Advances in IIT enable the artificial recreation of tactile and visual sources of product information for more intuitive and interactive websites, which, in turn, allow consumers to digitally interact with products using their fingertips in a more natural manner than using a keyboard and mouse. It is therefore closer to the way in which shoppers would actually interact with the item in a physical context (Orzechowski et al., 2012; Padilla et al., 2012). Overmars and Poels (2015) examined IIT that simulates stroking gestures in the context of two textile products (a scarf and a blanket) and showed that use improves product understanding. They highlighted the need for extending research to other ways in

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