THE ‘ME’ REVOLUTION IN MEDIATED COMMUNICATION: INVESTIGATING
THE PSYCHOLOGY OF COSMETIC AND FUNCTIONAL CUSTOMIZATION

A Dissertation in

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by

Sampada Sameer Marathe

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The dissertation of Sampada Sameer Marathe was reviewed and approved* by the following:

S. Shyam Sundar  
Distinguished Professor of Communications  
Dissertation Advisor  
Chair of Committee  

Mary Beth Oliver  
Distinguished Professor of Communications  

Fuyuan Shen  
Associate Professor of Communications  

Mary Beth Rosson  
Professor of Information Sciences and Technology  

John Nichols  
Professor of Communications  
Associate Dean for Graduate Studies and Research  

*Signatures are on file in the Graduate School
ABSTRACT

Digital information and communication technologies offer myriad ways for users to engage with the interface and content. Some of them come in the form of tools, while others in the form of interface attributes. Customization – an attribute that lets users take control and make changes to the presentation and functionality of the interface – is becoming a hallmark of today’s interactive media devices. Users can change presentation-based cosmetic aspects like colors and fonts on websites, skins and wallpapers on cell phones, avatars in video games, as well as task-based functional aspects such as speed dial numbers on cell phones, email account settings, privacy settings on social networks and different command menus in software, among countless other features. While it is not hard to find such customization features on devices we use every day, there is noticeable dearth of scholarly empirical research that has systematically investigated the psychology and user experience surrounding the interaction with such features. Even fewer papers recognize that there are different types of customization and see the value in studying it.

This dissertation addressed this shortcoming by explicating the meaning of cosmetic and functional customization, and then delving into their theoretical underpinnings. It tested the role of cosmetic and functional customization in influencing user attitudes and behavioral intentions toward a Web portal by exploring sense of identity, sense of control, and intrinsic motivation as intervening factors. A between-subjects experiment (N=300) was designed where participants were randomly assigned to one of the four manipulated conditions. They were asked to perform either cosmetic customization of an interface, functional customization, both cosmetic and functional
customization, or no customization whatsoever before engaging in a task with the interface. In addition to supporting the hypothesized role of customization in promoting positive attitudes via sense of identity, sense of control and intrinsic motivation, this dissertation uncovered the presence of inconsistent mediation, brought on by sense of identity and sense of control that acted as suppressor variables. Theoretical and practical implications of these findings, as well as study limitations and directions for future research are discussed.
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INTRODUCTION

Conceptualizations of media usage and experiences are rapidly changing with new media technologies. Not too long ago, the ability to deliver a message to the masses via a television was considered a profound strength of communication. And yet, what followed was a slow de-massification of the ‘mass’ media. Instead of designing messages that would appeal to undistinguished masses, message creators began to tailor messages to specific groups of people. ‘Know thy consumer’ has become the mantra of the modern media landscape, put into practice through various tailoring/targeting practices. Not only do we have magazines dedicated to a single type of activity to cater to a niche market (e.g. macro photography, Bonsai gardening), but also niche television channels (e.g. B.E.T, Lifetime), newsletters for different professional networks, niche websites, and innumerable other services.

While passive reception of media messages through such channels might still be the most prevalent form of communication, a growing trend also shows active user participation in media consumption. Today, the notion of mass produced messages in traditional media has been replaced by the concept of an ‘audience of one’ (Pancucci, 2001; Sundar, 2008). Many of today’s new media technologies are teeming with opportunities for users to select and respond to content, modify the content (Vorderer, 2000), or even influence form and/or operation of the interface if they so choose. In a way, such a user interface “guides and constrains the patterns of interaction” between users and the system by the nature of interaction it allows (Mackay, 1990, p. 193). This profound shift in our interaction with new media interfaces has been brought along by arguably the single most important attribute of today’s media interfaces – interactivity.
Interactivity has brought about an enormous shift in our conceptualization of what media consumption means and our expectations about our interaction with media devices. As Bucy (2004a) notes, interactivity has been an elusive concept. There have been many diverse conceptualizations of the term and no consensus about its meaning. (Sundar, 2007) sees interactivity as belonging to the medium, source, or even the message loci. Defined based on the type or number of different modalities that a particular medium offers, interactivity can be seen as a modality feature. For example, various multimodal news websites offer content to their users in a variety of modalities, ranging from simple text to advanced graphics, audio, video, animation, pop-ups and so on. These additional modalities are said to enhance user experience of content by expanding their “perceptual bandwidth,” or range of perceptual senses engaged by the medium. On the other hand, interactivity as a source feature allows the user to serve as a gatekeeper of information, essentially influencing his/her content consumption. To the extent the system allows the users to act as their own sources of information, as happens when they customize their information universe, the system is said to be more interactive. Sundar (2007) also contends that interactivity as a message feature is seen in the form of hierarchical hyperlinks and buttons embedded in online content. By offering information in a contingent fashion (i.e., system responses are contingent upon user input), message-based interactivity engages the users in a threaded sequence of interactions, and thereby fosters involvement with content. Among numerous other definitions of interactivity, a few researchers have linked it to: reciprocity (Rogers, 1986), responsiveness (Heeter, 1989), malleability (Steuer, 1995), selectivity (Goertz, 1995), perceptual bandwidth (Reeves & Nass, 2000); capacity for interaction (Sundar, Kalyanaraman, & Brown,

No matter how it is defined, interactivity in essence is an affordance that lets users interact with the interface and be an active part of the environment instead of having to passively consume media content. The source-based conceptualization of interactivity underscores the role of users and their preferences, and puts the users in the driver’s seat, as it were. According to Sundar (2007), interactivity allows for a rich dialogue between a user and the system and creates a strong sense of agency among users. In fact, the Agency model of customization (Sundar, 2007) has explicitly identified customization, and the resultant manifestation of user control, as the mechanism underlying the effect of source interactivity on cognitive, affective and behavioral outcomes. Customizable affordances that embody such source-based interactivity in today’s media are all pervasive. Rather than being mere conduits of information, new media interfaces themselves are being seen as products in their own right (Stoney & Wild, 1998). With seemingly infinite possibilities for active user involvement, these interfaces are opening up new possibilities for various forms of input from the information consumer into the information system (Jensen, 1998). Once the focus shifts from a single media transmitter to every individual who might potentially be the source of information (Dominick, 1999; Sundar, 2008), innumerable unique interactions with media technologies come into play. As the popularity of this so-called ‘participatory web’ (Madden & Fox, 2006) increases, users are increasingly becoming active producers rather than passive consumers (Rubin,
1993) of content. This user activity has been fuelled by access to numerous customizable interfaces designed to offer more and more avenues for users to influence the “functionality, interface, information content or distinctiveness of a system” (Blom, 2000, p. 313). For instance, most portal websites allow users to change the font or color on the website while others like MyYahoo! allow users to add/delete content and change the layout of webpages. iGoogle™ allows users to add/delete different widgets and choose different personal themes according to one’s own taste. Google News even lets its users create different news categories based on their own preferences. For example, a user can create an entire section dedicated to news about mangoes or the movie Harry Potter or even the social media phenomenon Twitter, if they so choose. While different cell phones allow users to choose their own background wallpaper or ringtones, iPods allow their users to create their own idiosyncratic playlists. Most video games allow users to choose their own avatars, difficulty levels, opponents, and some even let them create entirely new environments and scenarios within the original game (modding). This endless list of interface customization options available to users begs the question: Do customization features simply function as decorative embellishments for these new media interfaces or do they have more profound psychological effects that influence our media usage?

This thesis begins with a conceptual explication of customization, then delves into the theoretical underpinnings of the concept. It identifies two types of customization, and provides an experimental demonstration of their respective psychological effects. It then interprets the findings, outlines implications for theory and design, and identifies limitations and directions for future research.
CHAPTER – 1

LITERATURE REVIEW

Customization Explicated

More than a decade ago, content tailoring (also called personalization) was a revolutionary idea that began with the notion of targeting specific audience or user groups in order to offer a media experience that would be considered individualized and personal by each of them. Many e-commerce vendors soon picked up the idea of building a close relationship with their consumers by “understanding the needs of each individual and helping satisfy a goal that effectively and knowledgeably addresses each individual’s need in a given context” (Riecken, 2000, p. 27). Personalization was achieved in three steps – understand consumers, deliver services tailored to them and measure the impact to use it as feedback for further improving the personal relevance and utility of those services (Adomavicius & Tuzhilin, 2005). Personalization involves a system-initiated automatic adaptation of content structure and/or presentation of interface based on user characteristics, usage behavior and the environment (Kobsa, Koenemann, & Pohl, 2001), as well as user goals and preferences (Brusilovsky, 2001).

Hirsh, Basu and Davison (2000) proposed that patterns of typical user interaction with computer systems could be studied and used to build personalized services by employing machine-learning algorithms. User tracking on websites was the epitome of this idea and was carried out by gathering clickstream data to understand how users traversed the web. Placing cookies in browsers and tracking IP addresses is the most commonly used method to collect user data. Another excellent example is Amazon.com’s data mining algorithm that tracks user purchases and correlates them with similar
purchases made by other users to offer personalized suggestions. The ‘customers who bought this item also bought’ and the ‘frequently bought together’ features on their website are the outcome of such an algorithm. These types of data can be further complemented by way of user input related to their location, preferences and browsing habits, among other things. For example, portal interfaces ask users to indicate their choice of topics for newsletters (e.g. news, business, sports), their zip code, their age or even their gender. As a result, users can automatically see information on their web portals about weather in their hometown and movies being played at local theatres based on their zip codes, horoscope based on their birth date, recommendations for different products based on their shopping history, special offers based on their health status and even sponsored advertisements to their inboxes based on the content of their emails. This approach has brought relevant and personalized data to the users and some researchers (e.g. Mulvenna, Anand, & Buchner, 2000) have touted the undeniable ubiquity of such services in the near future. And yet such approaches have also raised concerns for user privacy as well as ethical considerations associated with tracking possibly sensitive user data and its uses for commercial gain (Chellappa & Sin, 2005; Treiblmaier, Madlberger, Knotzer, & Pollach, 2004; Volokh, 2000). Doubts have also been raised about the accuracy of such approaches in predicting user needs & tastes. Reportedly, some users found that TiVo would suggest programs with homosexual content and characters based on a program that users had previously watched that happened to have a homosexual theme (Saffer, 2007). A story published in The Wall Street Journal (Zaslow, 2002) gives many examples of such debacles that TiVo users have reported through the years. One could argue that such letdowns are a thing of the past now and attribute it to infancy of
that technology. While that in some ways is true, we are still a long way from building systems that can accurately predict and serve highly personalized content for every user. More importantly, apart from facing such a challenge of being inaccurate in their predictions of what users might actually be interested in, system-initiated personalization (SIP) (Sundar & Marathe, 2010) also undermines users’ role in their own media consumption by making them passive consumers who do not have control over most of this information. More often than not, users have little to no say in how personalization is achieved and how the personalized content is brought to the user. In most cases, the users are unaware of the processes that are put in place and function in the background to gather data for personalization, thereby reducing the transparency of the system. Thus, machines and algorithms determining what content a user is exposed to, ultimately also undermines the democratic function of the medium.

A conceptually distinct idea is that of customization – a user initiated and user controlled activity that lets them play an active role in influencing different factors in their interactions with the interfaces. While the ultimate goal of building a customizable system is for the user to have access to personally relevant and useful content similar to system-initiated personalization, the primary distinguishing factor is the process by which this is achieved (Sundar & Marathe, 2010). By making the users central players in the interaction, user-initiated customization (UIC) systems let them define their own interaction experience. One aspect of TiVo actually makes it a poster child of this idea. Schwartz (2004) refers to the advent of TiVo as a ‘revolution in TV watching’ and insists that TiVo essentially lets users create their own TV channels by letting them find and record the kinds of shows they want and cut out anything that they might not desire.
Rather than simply focusing on the end result (tailored content), attention to the process brings to the forefront the causes and antecedents of the act (Oulasvirta & Blom, 2007) of customization and hence the ‘human’ who is initiating the process. For example, Sung, Grinter and Christensen (2009) observed 30 householders’ adoption and use of a domestic vacuuming robot – iRobot’s Roomba™ – over 6 months. Each household was given a Roomba for 6 months and 15 among them were also provided with a customization toolkit which contained stickers and skins for the device. The researchers found that the participants customized the device to express identity, to show its value to the household and to make it stand out or disappear into the home décor. The participants who customized the Roomba also reported feeling more connected to the device and thought it performed better.

The hallmark of customization is letting users themselves modify some aspect of an interface to a certain degree so as to increase its personal relevance (Blom, 2000). Bolin, Webber, Rha, Wilson and Miller (2005) define customization as being able to change appearance, rearrange components, and insert or remove user interface widget or data in a web interface. Such flexibility allows users to express their choice and preferences, as well as configure the system to best fit their needs. Allowing for such modifications to fit a specific context of use or personal tastes is then restricted by the degree of flexibility offered by an interface (Andriessen, Hettinga, & Wulf, 2003).

Systems that let users customize different features are also called adaptable systems. While acknowledging that in most cases customization options available in different interfaces today are primitive and limited, Stuerzlinger, Chapuis, Phillips and Roussel (2006) believe that adaptable interfaces help users optimize their performance by
letting them tailor the system to their preferences and needs. Such flexibility in any system is desirable since an interface is not designed for any particular user, but rather for a category of users who perform a set of tasks (Oppermann, 1994) in a given situation. As tasks, knowledge, abilities, needs, tastes and contexts evolve, letting users customize the interface creates a better fit between user and system goals. One of the golden rules (Mandel, 1997) has proposed for a better user interface design is to allow users to influence information presentation (e.g. arrangement), interface behavior (e.g. default actions), and interaction techniques (e.g. shortcut keys).

This sense of reconfiguring and repurposing of a technological device is also evident in Dourish’s (2003) conceptualization of technology appropriation. He defined appropriation as a “process by which people adopt and adapt technologies, fitting them into their work practices” (p. 465). Appropriation refers to the technology usage that evolves beyond the originally designed purposes. The use of a digital camera for note taking, or use of email to send ourselves information that we’d like archived or be reminded of, are classic examples of appropriation. A more humorous example of appropriation comes out of India, where anecdotal evidence suggests that some people used washing machines to churn and make sweet yogurt drinks. What do these examples really suggest? Do users appropriate devices because they like to or does appropriation bring forth the drawbacks in device and information system design? Although not exactly customization, appropriation represents the idea of wanting or needing to use something beyond it’s intended or default function. In a way, such appropriations show that human beings are predisposed to creatively adapting a given tool to fit their timely needs. Thus,
appropriation is widely accepted as an important sign of user’s acceptance and adoption of ICTs (Carroll, Howard, Vetere, Peck, & Murphy, 2002; Dix, 2007).

Customization is not a new idea – it has existed in the form of customizing office spaces (Wells, 2000), dormitory rooms (Vinsel, Brown, Altman, & Foss, 1980) and other personally relevant venues to accommodate personal tastes. Lynn and Harris (1997) have reported increasing popularity of customization among consumers who want to possess products that are unique and hence prefer customizing commonly available products to their own taste. An online survey conducted by Marathe (2007, May) revealed strong correlations between one’s need to convey uniqueness and need for control with the amount of customization they exhibit in their daily lives. Many of us have engaged in such activities in our surroundings and yet there has been a lukewarm response to the same idea in relation to digital technologies. While there are some of us who use different technological gadgets/ features to their fullest extent (Manber, Patel, & Robison, 2000) to keep up with the ‘My’ trend (Ketchell, 2000), most others have been known to utilize only the bare minimum features or the default settings in any given interface (Billsus, Brunk, Evans, Gladish, & Pazzani, 2002; Ketchell, 2000; McGrenere, Baecker, & Booth, 2002; Rosson, 1984). Although dated, data have also suggested that only about 2% of Microsoft Word 2003 users had made use of customization features (Harris, 2005). An empirical study conducted to test this phenomenon by Sundar and Marathe (2010) demonstrated that the so called non-power users of technology showed negative attitudes toward the interface when asked to customize the interface, whereas they showed significantly positive attitudes when presented with ready-made tailored (personalized) content. Power users, however, showed significantly positive attitudes toward the
interface when allowed to customize and negative attitudes when presented with ready-
made tailored content. So who are these power users and why is this finding significant?

Power Users

In a seminal piece on user psychology, Moran (1981) argued that a system cannot exist independent of its users and that users play a crucial role in determining whether a system works or not. He believed this to be especially true for interactive communication technologies which emphasize active user participation. This led him to argue for the inclusion of user psychology, what he labeled ‘science of a user,’ as an integral part of technology design so as to ensure satisfactory human-computer interaction (Moran, 1981). This notion of the interdependence of an interface and its user is also evident in Karat, Karat and Ukelson’s (2000) assertion that design of affordances is successful only when the tool is based on “understanding the user, the users’ tasks, and the context in which the user accomplishes tasks and goals” (p. 50).

Research studies attempting to examine the role of user characteristics have classified users based on different factors. The most frequently appearing distinction between technology users has been made as novices and experts. Moran (1981) proposes that variations in goals, task structures, knowledge and processing limits are what sets users apart from one another. He argues that these four factors affect the extent of technology use for different users and helps us classify them as novice vs. expert users. Novice users would be the users who have had limited encounters with the target technology, whereas experts would have an extensive experience, giving them mastery over some domain of the technology. Keeping with this line of reasoning, expertise has
been studied by various researchers as a function of knowledge (e.g. LaFrance, 1989; Salmeron, Canas, & Fajardo, 2005) and as a function of skills (e.g. Hurst, Hudson, & Mankoff, 2007), among other distinctions.

A growing body of researchers has been studying how digital access influences children that grow up with new media technologies. When access to such digital interactive technologies is not an issue, young users have been known to utilize creative and effective informal learning techniques, be technologically skilled in usage, explore digital social relations, develop multitasking skills, and more importantly possess an element of self-worth that comes from evolved technology use (Sorensen, n.d.). For these young users, growing up with technology facilitates their technology use as adults and puts them among the highly technologically savvy workforce.

It is evident from the existing literature that the discourse about technology users has focused on expertise, skills, knowledge, or even age of users. While distinguishing users based on the above criteria separately offers valuable insights into how people use technology, it seldom offers a rounded and ecologically valid understanding of users. Technology usage is very rarely influenced only by how expert a user is, or how skilled he/she is. A user might be an expert at using a device, but that does not signify, nor predict on its own, whether or not the user will buy or use that device in their daily life. To counter this drawback, Marathe, Sundar, Bijvank, van Vugt and Veldhuis (2007, May) proposed that understanding technology usage as a multi-dimensional construct was far more meritorious than focusing on any single aspect of technology usage. They proposed that users ought to be differentiated as power users vs. non-power users (regular users) of technology. Power usage is seen as a function of motivation, expertise, efficacy
and behavior with respect to technology use. Power users possess high motivation to use technologies, have high expertise and efficacy and also exhibit extensive use of different technologies. This is not to suggest that the so-called non-power users do not use technology at all, but rather that their technology use is significantly inferior to power users with respect to motivation, expertise, efficacy and exhibited tech usage behavior. How do these aspects then relate to use of customizable interfaces? As discussed previously, Sundar and Marathe (2010) found that power usage moderated users’ reactions to customizable options in the user interface. Power users were more open to the idea of customizing the media interface than non-power users, while demonstrating a significantly negative attitude toward automatic personalization. Non-power users, on the other hand, were more receptive to the idea of automatic personalization and exhibited an unfavorable attitude toward customization. What is it about customization, then, that attracts only a certain type of users and deters most others? Revisiting Sundar and Marathe’s (2010) conceptualization and operationalization of customization brings into light a basic limitation that might be one explanation of their findings – their definition is generic and does not take into account that there might be different levels or types of customization processes. For example, their operationalization of customization in the study included processes such as adding a standard news category (e.g. World, Science/Technology, Business, Entertainment, Sports and Health) and/or creating an entirely new idiosyncratic news category (e.g. Mangoes, Spring Break etc). Both these activities demand high involvement and evolved interest in news consumption from the user. By definition, power users are then more likely to prefer such customization activity than non-power users. However, not all customization activities require user interest in
the subject matter or involvement in the task present within the interface. For example, in most situations, changing the color of a page should not be affected by user involvement with the task at hand. This raises a distinct possibility that customization might be of at least two types: customization (functional) – the involved type of activity and customization-lite (cosmetic) – the more low-brow type of activity.

Cosmetic vs. Functional Customization

An examination of the customization definitions in the above literature review and a quick glance at the existing customization affordances in different technological venues shows a vast variance in the available options in today’s new media interfaces. Users are able to change colors and fonts on websites, dictate positioning of content (to show their priorities) on web pages and portals, change skins on mobile phones, change wallpapers that fit personal tastes, control email settings and manage mailboxes, create custom play lists on iPods, choose an avatar and its characteristics in video game play and tinker with the actual code, among a myriad of other things. So is it adequate and appropriate to group all these different process together? Is changing the wallpaper on your desktop qualitatively and quantitatively similar to creating new news categories on a news aggregator site?

Bentley and Dourish (1995) shed some light on this concept by suggesting that systems that anticipate serving users with different work practices, expertise and preferences are generally built to allow different customization options. Such customization options can then be seen as surface customization options that deal with
aspects of ‘interface and presentation’ versus deeper customization options that deal with aspects of process and functionality (Bentley & Dourish, 1995) in any given interface.

This proposal advances the idea that empirical testing of these possible differences will shed light on the psychological underpinnings of users’ interaction with different customizable affordances. The knowledge gained from such an endeavor will undoubtedly provide interface design implications. The main goal of this proposal, therefore, is to gain theoretical understanding of customization by parsing out the meaning and features of the possible differences between types of customization.

*Cosmetic as presentation-based customization*

With its origin in the Greek word *kosmetikos* meaning ‘skilled in adornment’, the word cosmetic has been used to indicate anything that is aesthetic, superficial, surface-level, ornamental or decorative. Cosmetic changes are thus made for adornment of a product, and hence considered not substantive changes to the product design.

Most of the definitions for cosmetic changes can be grouped into three main categories – definitions that consider what happens to a product, where/when it happens and what the outcome is.

**What happens to a product?**

Definitions in the first category seem to be led by Gilmore and Pine’s (1997) definition. They first classified cosmetic customization as changes made to the representation of an object without changing the nature of that object (also see Saaksjarvi & Santonen, 2003). According to these researchers changes to snap-on accessory covers
for mobile phones or asking for special colors would be considered as cosmetic customization. Sievanen, Suomala and Paranko (n.d.) assert that most customers are prepared to use the same product as everybody else, but want it presented in a different way. A customer asking for a different size of a package, or asking to change surface features on a standardized product are examples of cosmetic customization. Similarly, when core features of a product are standardized and only some surface features are changed (Riihimaa, Ruohonen, & Makipaa, 2004), customization becomes cosmetic. Such customization is seen more as supportive and complementary to the existing product groups, rather than a major design change.

Where it happens?

Definitions that fit in the second category are the ones that define cosmetic based on the fact that it happens at the end of the manufacturing cycle – at the end of the assembly line. The mass customization industry has long ago recognized the value of cosmetic changes. ‘Mass customization’ involves building a product according to design specifications and later making user defined changes to it at the end of the assembly line. For example, a cell phone is built according to factory specification and at the end of the assembly line only the color plate of the cell phone is changed according to customer preferences. Similarly, a product can be tailored or individualized with someone’s name on it after it has been built, as a way to layer an extra service upon a standardized product (Kahn, 1998). Manufacturers seek to make a tremendous value addition to the product by making the product customer specific without having to invest resources in modifying the original design of the product (Broekhuizen & Alsem, 2002). In other words,
customization becomes cosmetic when the product remains standard but wrapping is customized for a particular customer (Sievanen, 2002).

What is the outcome?

Broekhuizen and Alsem (2002) see cosmetic customization as more valuable when customers are generally “satisfied with the functioning of the product but not with the form” or representation (p. 312). According to them, cosmetic customization increases visibility of a product when customers make changes to express themselves.

This idea of expressing oneself by engaging in cosmetic customization is also evident in the video games literature. While discussing avatar customization in virtual worlds and video games, Ducheneaut, Wen, Yee and Wadley (2009) argue that the choices that users make while customizing avatars (e.g. black hair, dark Victorian clothing and piercings vs. athletic tanned body in a swimsuit) present differing statements about their personality, thus letting them create an identity for themselves.

Bharati and Chaudhury (2004) discuss the concept of choice boards – opportunities for consumers/users to tailor products to their own liking. One of the examples they offer is of websites where children can customize their chosen toy’s appearance that is based on a standard form of the toy such as on www.vermontteddybear.com. This customization can be done by purchasing add-ons such as shoes, glasses and colors. Similar change in presentation of the basic product is also seen on www.barbie.com where customers can select a particular Barbie doll and then make their Barbie unique, by choosing different accessories such as apparel, handbags, shoes that Barbie wears and even furniture that Barbie uses.
It must be acknowledged that most of the above definitions (that are specific to mass customization) do not allow the users to actually make these changes themselves. However, all these changes generally are user initiated. These definitions have been used here to mainly illustrate the value of investigating the user demand for cosmetic changes (Liechty, Ramaswamy, & Cohen, 2001) to the products they use.

Tractinsky (2004) has underscored the value of studying aesthetics in interface design for many years. He believes that our interactions with information technology are mainly visual, and hence aesthetics should play an important role in the design of technology. Drawing from this reasoning of aesthetic computing, Tractinsky and Zmiri (2006) conducted an experimental study with 60 undergraduate students, where they were asked to evaluate and choose from 12 different skins for Microsoft’s Media Player, and then perform a set of tasks with each of the skins they chose. These researchers defined skins as “alternative interfaces to commonly used applications that allow users to change the appearances of their applications while preserving their functionality” (p. 2). They found that 80% of their participants had chosen to deviate from the default skin to one of the remaining 11 skins and hence concluded that users show an unmistakable need to customize their applications. This finding provides interesting insight into the variety in user preferences. Not only did majority of their participants engage in customization, their preferences spanned all the available options in skins. Thus, customization allows each user to modify the interface to make it unique and distinct. In fact, Marathe (2007, May) found a strong correlation between one’s need for uniqueness and the amount of customization they report to have engaged in. The agency model of customization (Sundar, 2008) posits that by letting a user function as a source of action, customization
imbues a greater sense of agency in the user, consequently contributing to and helping project one’s sense of identity.

Identity

In the same way that material possessions have been known to closely relate to one’s sense of identity (Ball & Tasaki, 1992; Kleine, Kleine III, & Allen, 1995), researchers report an increasing push toward utilizing aesthetics in information technology use (Tractinsky, 2004) to convey identity in digital/online venues. New media technologies offer extensive opportunities for users to express their identity by way of actively engaging in media selection and use (Papacharissi, 2002). Simply by choosing to use one device vs. another, users try to impress their personality on others around them. Owning and displaying an Apple product (e.g. iPod, iPhone, Macbook or even the new iPad) is a great example of how users have been known to present an image of themselves they want others to see, establish their group identity, and at the same time distinguish themselves from the general masses. Individuals initiate specific behavioral choices and decisions by actively engaging in actions that convey their identity (Sparks & Shepherd, 1992; Stets & Burke, 2003) and thus try to be agentic in different media environments. Consumption and identity have thus been linked together as long as image presentation has been a part of our lives.

Westen and Heim (2003) define identity as a “commitment to aspects of self as defining and meaningful over time” (p. 646). They identify ‘commitment to certain self-representations as self-defining’ as one of the significant components of one’s identity. Cross and Gore (2003) suggest that, at least in the Western cultures, individuals feel the
necessity to constantly verify, reexamine, update and defend their identity to accommodate the transitory culture. As a result, they go through different mechanisms (e.g. self-presentation, self-verification, self-enhancement, etc.) to communicate their identity to others. Self-definition and identity formation have also been known to be an integral part of our development into adolescence (Erikson, 1968; Schmitt, Dayanim, & Matthias, 2008). From wearing specific brand of clothes to buying a specific car, we surround ourselves with possessions that we think tell others about the kind of a person we are. We are known to go to extensive lengths of self-presentation to ensure that our possessions reflect how we want to be seen by others (Kleine et al., 1995).

However, identity-expression has become equally easy and hard in today’s digital environment. While individuals have easy access to different technological devices and interfaces, controlling information that is given and given off (Goffman, 1959; Schlenker, 2003), has become a delicate balancing task. Managing what information is conveyed on social networks, for example, has become a big part of identity management today. Self-presentation in digital/online environments as a means to build/convey one’s identity has been the focus of many research studies (Blom & Monk, 2003; Dominick, 1999; Papacharissi, 2002; Schau & Gilly, 2003). As Papacharissi (2002) reports, scholars have been studying how people “manipulate, reinvent, or reveal aspects of their identity in the context of online environments” (p. 644). In face to face interactions one might be restricted by appearance, access to identity conveying objects or even lack of control over non-verbal behavior. In contrast, personal web pages have unlimited ways in which one can achieve the desired results. Most digital/online venues foster identity construction by offering unlimited time, various modalities, access to specific audiences, customizable
options and an almost unrestricted space for self-expression (Doring, 2002). Schau and Gilly (2003) collected data from personal web spaces and interviews with 35 respondents who managed their own websites. They overwhelmingly found support to the notion of designing and building websites and using text, audio, images, icons, hyperlinks, and animations in order to construct and convey a digital self.

More recent research on identity construction in social networking sites (Kane, 2008) has also looked at how users use different customization options on social networking sites (e.g. MySpace) to convey who they are. Specifically, as Kane (2008) suggests, most of the social networking platforms have an open format that lets users change design elements, background, color, font, layout, text, video, music, graphics, profile photo, photo albums and blogs in order to reflect their personality.

Mobile phones have also been known as a key entity of user customization. Walsh and White (2007) have revealed that in order to express their identity, mobile phone users have reported customizing ring tones and display on their phones. ‘Appearance personalization’ has been immensely popular among mobile phone users throughout the world. In an international study conducted in eleven cities around the world, Cui, Chipchase and Ichikawa (2007) reported multiple ways in which users customized their mobile phones with covers, straps and/or stickers to promote themselves and convey their style and identity.

While extensive research has proved that users actively manage their digital identities (Turkle, 1995), how they do it still needs empirical attention. This investigation proposes that customization features that enable cosmetic or presentation-based changes allow users to adapt the interface to their taste and convey their identity.
Based on the above review, the following hypothesis is proposed:

$$H1: \text{Engaging in cosmetic customization will enhance sense of identity.}$$

*Functional as task based customization*

While cosmetic changes are considered to be superficial and presentation based, other customization options that are operation or task based are also available to users in many new media interfaces. Saffer (2007) acknowledges this difference between the two types of customization by articulating the variation between the changes in appearance and workings of an interface that users can make. Based on Saffer’s (2007) distinction, user preferences about how often to check email, default sound volume, speed-dial numbers on cellphones and other such task related changes can be classified as functional type customization practices. For instance, Microsoft’s online resource for developers categorizes customization as cosmetic vs. functional. According to them, when a user wants an icon that is different from a standard icon for a given file type, the customization is cosmetic. However, when a user wants to change the application that launches when that icon is clicked, the customization becomes functional.

A review of the extant literature reveals that users generally report engaging in functional customization for one or more of the following reasons: 1) to make a system’s goals fit their own 2) to make the system more efficient 3) to manage complexity 4) to control outcome and 5) to manage information overload.

Many of these elements are reflected in Dyck, Pinelle, Brown and Gutwin’s (2003) discussion about customization in video games. They discuss the role of (functional) customization in video games and classify customization practices as
‘anything-goes UI malleability’, ‘natural extensibility’, and ‘portable customizations’.

Various games allow players to remap certain functions in UI controls. Dyck et al., (2003) give an example of remapping the right and left keys to create a ‘crouch down’ function. Such a remapping allows players to influence the progress of the game and finally the game outcome. There are also instances when different games are built with a blank button or two, to allow users to write macros and define the functionality of the button and even create new commands as they please.

Page, Johnsgard, Albert and Allen (1996), who studied user customization of word processors, noted that the most common type of customization options used in word processors by their participants were to add/move toolbars, change menus and write short macros to fit the software to their needs. Providing such options makes it easy for users to personally decide which operations they would perform repeatedly and then customize options on the interface such as to automate those operations. For example, by “adding/removing functions to/from the menus and toolbars, and by moving functions from one menu/toolbar to another” (McGrenere, Baecker, & Booth, 2007) allows users to make a system more efficient for the task at hand. Work requirements can thus be considered a major factor that influences customization practices.

Mackay (1991) studied the customization behavior of 51 users in a UNIX software environment, and classified the 31 unique triggers for customization in 4 different categories – technology influences user (e.g. something breaks), organization or other individuals influence user (e.g. I see something neat), external events influence user (e.g. retrofit when system changed), and individual factors influence user (e.g. notice own repeated patterns). She reported that the most commonly cited trigger for customization
was wanting to automate a process for tasks that the users realized they were doing repeatedly. Users also reported engaging in customization to make the system act as it did before modifications were put in place. These two examples illustrate that when users engage in customization that is related to or influences a task; they expect the system’s utility and/or functionality to ultimately improve that task at hand.

There could be many more reasons for users to engage in functional customization. Bunt, Conati and McGrenere (2004) assert that the growing functionality in different interfaces contributes to the complexity in any interface. Letting users determine what is most relevant to their needs and customize accordingly allows system designers to help users manage such complexity. For example, the complexity of all the options available in previous versions of Microsoft Word™ is well known and anecdotal evidence indicates that it was much lamented by most users. Uncluttering the visual space by managing toolbars is just one way that users have employed to manage the complexity of the interface.

Another research area that acknowledges functional type task based customization is the information processing literature. With millions of web pages being added everyday, information overload has become an inevitable part of information consumption that overwhelmed users face everyday. Berghel, Berleant, Foy and McGuire (1999) see information customization as a way to be able to manage the vast amounts of data available at our fingertips. Although these researchers refer to an automated machine side process, the idea is still that of being able to make task based changes (here, information search) to the existing system to accommodate user preferences and hence help users absorb the information they really need. Clearly, task-based customization is
quite common, and is used mainly to manage information, reduce clutter and complexity, and improve efficiency. Psychologically, what does functional customization really afford? The agency model of customization (Sundar, 2008) argues that control is the critical element underlying the behavioral component of customization.

Control

The concept of control (both actual and perceived) is a significant issue based on the fact that our technology culture shows a growing trend toward letting users control their media environment. Various news websites or information portals let users decide what news is by letting them control what they see on their webpage, TiVo gives users the ultimate control over TV viewing (Palmer, 2003), and some have even gone as far as proposing an online Do-Not-Track list (Story, 2007) that would, in theory, let consumers take action against behavioral targeting by advertisers. In fact, the issue of user control over online profiles, information and content is so remarkable that Alpert, Karat, Karat, Brodie and Vergo (2003) reported significantly strong results in favor of user control over personal information and content in a study about adaptive user interfaces. According to these researchers, a feeling of loss of control would prove a ‘deal-breaker’ for most users, to an extent that users would not provide personal information to an interface they could not trust.

Customizable systems are designed to let users play a significant role in the interaction with technology. A survey of 513 respondents conducted by Marathe (2007, May) established a significant correlation between one’s need for control and the amount of customization they engage in regular life. This means that those who exhibit high need
for control are psychologically attracted to interfaces that gratify this need. Customizable systems provide control to the user by being modifiable, offering predictability of the outcome of interaction, by letting users initiate actions, and by proving ample choice to the users (Sundar, Marathe, & Kang, 2009).

According to the theory of effectance motivation, human beings have an innate drive to explore and manipulate their surroundings (White, 1959). By their very nature of promoting active user participation, customizable systems let users explore, manipulate and rearrange their technological surroundings (Klimmt & Hartmann, 2006). Sundar (2008) equates the manipulability of such interfaces with one’s sense of agency (see also Klug & Schell, 2006) – a feeling of being the source of an interaction or being a relevant actor in a given situation. Such a feeling of agency, he states, gives a sense of immediate control to the user. Hence, the sheer modifiability of an interface can contribute to one’s sense of control in a new media environment (Sundar et al., 2009).

Customization also affords predictability to user interaction with the interface. For example, by creating a customized playlist, a user can reliably expect to hear the specific songs one after another that he/she put into the list. Similarly, creating a new category for Entertainment news about actress Angelina Jolie, and placing the category on the top right hand corner of the Google News page, a user can comfortably predict that he/she will be able to read about the actress on the top right corner of their webpage every day. Klug and Schell (2006) equate this sense of predictability, with controllability. Essentially, this predictability and thereby controllability arises from being able to make decisions that affect the path to an outcome or the outcome itself. These researchers apply this concept to the video game context and argue that most game players are looking for
such controllability in interfaces that allows them to maximize the efficiency of the gameplay. Such adaptable interfaces (Bunt et al., 2004), by way of user manipulation, afford greater predictability in terms of what comes up on the interface and hence place users in control of the interface. Keeping with this theme, Shneiderman and Maes (1997) have long argued that direct manipulation interfaces bring predictability to the interface and amount to user control.

Customizable interfaces also encourage user initiated action. When systems are adaptable, users can make modifications to the system based on their needs. Adaptable systems let users take control of the interface by letting them initiate actions. These systems are designed to wait for the user to specifically ask for system help in the tasks they perform. Research related to technology assisted learning environments has shown that the opportunity to initiate actions in such environments provides a strong sense of control to the learner (Lepper & Chabay, 1985).

Conceptually, customizable interfaces let users choose between different options rather than make their choices for them. Barkhuus and Dey (2003) found that users felt a significant loss of control when the system personalized information for them (fully context aware), but felt in control when they were allowed to customize the application themselves. This feeling of control came from being able to choose between different services offered on the mobile phones rather than the system making the choices for them. Different types of systems can offer different types of choice options. In video game play, users are able to choose between many difficulty levels based on their proficiency, thus ensuring optimum levels of challenge. This choice determines how the game will be played and ultimately contributes to the end result. Similarly, in many
games, users are able to determine which tools and weapons they can take, which affects their ‘skills’ and ‘powers’ during play. On a portal website, this same choice can manifest itself in the form of selecting which news source to display on the webpage or on some cell phones where users are able to customize and (re)define the tools that are summoned for specific keystrokes. Such customization activities let users influence how their systems should behave. Such activities have been shown to positively affect one’s sense of control over their environment (Botti, McGill, & Iyengar, 2003; Grodal, 2000).

Weissman (1988) has argued for a close relation between customization and control in the context of programming. According to her, even the non-programmers experience a sense of empowerment when given control by way of customization. Based on the above review, the following hypothesis is proposed:

H2a: Engaging in functional customization will afford a greater sense of control.

A re-examination of the nature of customization used by Sundar and Marathe (2010) revealed that the tailoring activities performed by users were mainly related to the task at hand. In particular, participants in that study interacted with a news portal and customized various news elements. For example, they were asked to add a standard news category and/or create an entirely new news category during the study session. This essentially meant that they were asked to make task-related changes to the portal interface. This study found that power users showed significantly more positive attitude toward the portal interface when they were allowed to make those changes, compared to when they were not allowed to make such changes or when the system tailored the news for them. Sense of agency, and subsequently a sense of control fostered by user-initiated
customization, was one explanation for this result. Based on this rationale and the finding, we propose:

**H2b**: Power users who engage in functional customization will report significantly more sense of control with the interface than non-power users.

**Intrinsic motivation**

Customizable systems which allow the user to make cosmetic or functional changes to the system essentially provide a lot of choices to the user. Exercising the freedom to make these choices can enhance one’s feeling of autonomy – a sense of individual authority over the environment. By letting the user decide whether they want to control the environment or give up that control to the system, new media interfaces put the locus of control squarely into the user. In that sense, such interface options allow the user to be self-determining (Deci & Ryan, 1985), thereby affecting their sense of personal causation (DeCharms, 1968; c.f. Bumpus, Olbeter & Glover, 1998).

User control as a significant predictor of motivation is a robust and commonly acknowledged finding in the psychology literature (Cordova & Lepper, 1996; Deci & Ryan, 1985; Garris, Ahlers, & Driskell, 2002; Malone, 1981).

Self-determination theory (Deci & Ryan, 1985) proposes that all human beings are self-determining. When given a chance to experience freedom in initiating one’s behavior, intrinsic motivation to engage in that behavior is enhanced. At such a juncture, the activity or behavior becomes enjoyable and interesting and hence less driven by reward contingency or external control (Deci, Schwartz, Sheinman, & Ryan, 1981). Researchers posit that rather than being externally motivated to do a certain task, freedom
of choice enhances internally motivated action (Iyengar & DeVoe, 2003) that brings out the inherent value of engaging in that activity. By providing venues for users to be creative, flexible and spontaneous, customizable interfaces ensure that users become the origin of activity and remain intrinsically motivated. An inherent interest in the activity or being intrinsically motivated to do an activity has long been considered a central factor in determining continued patronage or acceptance of technology. Several studies that have tested the theoretical framework of the Technology Acceptance Model (e.g. Venkatesh, 2000) have established a strong relationship between intrinsic motivation (as a function of computer playfulness), internal control (as a function of computer self-efficacy) and one’s behavioral intention to use the technology.

Apart from the link between customization and intrinsic motivation through control, research points to the linkage as a function of being able to convey one’s identity, which is a function of cosmetic customization. Cordova and Lepper (1996) have found that the opportunity to make a choice increases intrinsic motivation, even when the choice is not related to the specific task or central activity at hand. They conducted an experiment with elementary school children, where the children were asked to engage in educational computer activities. Children were randomly assigned to an experimental condition in which they had no control over the activities, or a condition in which they were allowed to make non-task related choices such as choosing icons as well as names for characters in the activities. They found that those who had a choice in the activities reported liking the activity more, enjoying the activity more and performed better on the post-activity math test than those who were not allowed to make any choices.
Other researchers have also investigated intrinsic motivation as a dimension of flow that arises from interacting with a flexible and modifiable interface. Ghani (1995) proposed a theoretical model of flow that placed task challenges, perceived control, and cognitive spontaneity as antecedents of flow, which he defined in terms of sense of enjoyment and concentration within a human-computer interaction setting. He believed that an environment that offers optimal challenge, intense concentration and enjoyment triggers intrinsic motivation and proves conducive to the flow experience. He tested this model in an experimental setup, where participants filled out a questionnaire after a programming and writing activity. Results from this study provided support for the model and proved that there is a strong relationship between intrinsic motivation (augmented through optimal activity), and sense of flow with the activity. Webster, Trevino and Ryan (1993) discuss such interfaces that encourage playful interaction and exploration by the users and help users become absorbed in the activities and tasks with the interface, as well as prove to be optimally challenging. These researchers believe that intrinsic motivation is an inherent part of the sense of flow that such interfaces help create among users. Many other researchers have also made a case for the connection between perceived control of an interface, interactivity, customization and sense of flow (Dholakia, Zhao, Dholakia, & Fortin, 2000; Ha & James, 1998). Indeed, empirical data supports the idea that enjoyment in being able to tailor an interface (Malone & Lepper, 1987; c.f. Webster, Trevino & Ryan, 1993) contributes to the feeling of flow (Webster et al., 1993). Hence, the following hypothesis is proposed.

H3: Sense of control and sense of identity will positively influence intrinsic motivation.
The literature on user acceptance of technology has some interesting insights into the role of intrinsic motivation. Across two studies testing the effect of intrinsic motivation on user perceptions, Venkatesh (1999) found that using an intrinsic motivator during training showed significantly favorable user perceptions compared to training sessions without the element of intrinsic motivator. Various other empirical works (as well as the Theory of Reasoned Action) have also established the relationship between intrinsic motivation and enhanced performance, improved thinking, positive affect, memory recall, and willingness to engage in other tasks (see Bumpus, Olbeter, & Glover, 1998) thereby affecting attitude toward the interface (Davis, Bagozzi, & Warshaw, 1989; Moon & Kim, 2001). Multiple investigations of the Technology Acceptance Model (TAM) have also found a significant correlation between system playfulness or intrinsic motivation and a user’s attitude toward using that technology. For example, Moon and Kim (2001) added the dimension of playfulness to the original Technology Acceptance Model (TAM) in the context of WWW and conducted a survey of 152 graduate students who had prior experience with the use of WWW. For this study, they defined perceived playfulness as “the strength of one’s belief that interacting with the WWW will fulfill his/her intrinsic motives”, and attitude toward using WWW as “the strength of one’s feeling of favorableness toward the WWW use” (p. 224). They found that there was a significant positive relationship between perceived playfulness and user attitude toward using the WWW.

H4a: Intrinsic motivation will positively influence attitude toward the portal.
Further, intrinsically motivated individuals have been known to score high on perceived ease of use (Venkatesh, 2000) related to a system, thereby leading to significantly higher behavioral intention to use the system (Agarwal & Karahanna, 2000; Venkatesh, Speier, & Morris, 2002). Venkatesh et al. (2002) concluded that the role of intrinsic motivation is critical in understanding short-term technology acceptance or rejection decisions by users. Many of the Technology Acceptance Model studies have established such connections between intrinsic motivation and behavioral usage intention. Hsu and Lu (2004) found a significant relationship between flow (a function of intrinsic motivation) and intention to play an online game. They concluded that developers of such interfaces need to build user experiences that enhance their intrinsic motivation. Hence the following hypothesis is proposed.

H4b: Intrinsic motivation will positively influence behavioral intention.

Based on the above hypotheses, the following theoretical model is proposed for study (please refer to Figure 1):

Figure 1. Theoretical model
CHAPTER – 2

RESEARCH METHODS

In order to test these hypotheses, a between-participants, fully crossed 2 (cosmetic customization – present, absent) x 2 (functional customization – present, absent) factorial experiment was conducted where participants were randomly assigned to one of the four experimental conditions. Handouts were given to each participant that provided them information about the portal and ways to customize the portal. Participants in each condition were told about customization options belonging to the particular condition. For example, participants in the ‘cosmetic present – functional absent’ condition were introduced to all the different features that could be used to cosmetically customize the portal. Participants in the ‘cosmetic absent - functional present’ conditions were introduced to the functional options only, and participants in the ‘cosmetic present – functional present’ condition were told about all the different cosmetic as well as functional options. ‘Cosmetic absent – functional absent’ condition served as a control, with participants only being told what the portal was about, and not about any specific type of customization features. Participants in this final condition were also told not to make changes, but rather simply browse the portal. All participants were first asked to answer a questionnaire (power usage), customize and then interact with the stimulus website for about 10 minutes according to instructions provided and then answer another questionnaire measuring their response to the stimulus website. Each study session lasted for about 35 minutes.
Participants

Participants for this study were recruited from undergraduate courses at Penn State. A total of 300 undergraduate students participated in this study either for credit or as a course requirement. Out of the total 300, 56.3% were female, the mean age being 19.54 years. Participants were randomly assigned to one of the four conditions (27% cosmetic-present, functional-absent, 28.7% cosmetic-absent, functional-present, 25.3% cosmetic-present, functional-present and the remaining 19% cosmetic-absent, functional-absent condition). Please see Figure 2 for distribution of participants across experimental conditions.

Figure 2. Distribution of participants across conditions

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Stimulus

Many different digital venues (e.g. iGoogle, Facebook, iPod, Escape from Paradise by Yahoo Games, Second Life, Puzzle Quest: Challenge of the Warlords – a video game by Infinite Interactive) were investigated as potential stimulus for this study. A careful examination revealed that Netvibes, an online portal, was the only website that had enough customization options to fit the study protocol. Hence, the Netvibes portal
website (www.netvibes.com) was used as a stimulus website for this study (please refer to Figure 3a).

Figure 3a. *Netvibes portal interface*

A portal website, also called Internet Start Pages, is used to display information from diverse sources such as email, weather, entertainment, news, and shopping on a webpage. These various chunks of information are shown in the form of widgets on the portal. For example, a weather widget is designed to be a customizable gadget that users can use to show the local weather on their home page. A weather widget generally asks the user for their zip code and their preference in showing the local temperature in Fahrenheit vs. Celsius. Similarly, a news widget can be designed to bring snippets of news for the user from diverse sources that the user prefers (e.g. a New York Times widget or a BBC News widget).
Figure 3b. Netvibes portal interface used for the study

Figure 3c. Netvibes portal interface: Customized
According to the Netvibes portal website, “Netvibes lets individuals assemble their favorite widgets, websites, blogs, email accounts, social networks, search engines, instant messengers, photos, videos, podcasts, and everything else they enjoy on the web - all in one place” (www.netvibes.com). As Figure 3a shows, Netvibes is a fully customizable Website that offers many options for users to adapt the interface to their taste. The ‘Add content’ button on the left top of the page lets users add as many widgets as they want on different topics. Users are able to add different widgets to their personal page, create different tabs for different types of content, (e.g. general, work, fun etc) and manage their digital life through one interface. All the widgets are customizable by the users and can also be dragged, moved around and arranged as the user pleases. The portal website also lets the user give a page title, change color of widgets, change theme and background, and do many other widget specific changes. Figure 3b shows the Netvibes interface that was used for the study, while Figure 3c shows a fully customized interface.

Experimental treatment conditions

As revealed by the literature search, the most widely accepted definition for cosmetic customization was by Gilmore and Pine (1997). They defined cosmetic customization as changes to the representation, but not the nature of a product. Although this definition appears to make sense at first glance, it proves limited in its scope and confusing when applied to contexts other than mass customization. What do representation and nature convey in a website portal context? What about a customizable video game? Many video games allow players to change the name of the character they play as. Does this action change the presentation or representation? Changing the name
does not change the way the game is played or does not change the outcome of the game. However, instead of simply being used for aesthetic and superficial purposes, it could also serve to prove useful by helping identify different players in the game. Similarly, changing the font or font size could be done solely for ornamental purposes, but such a change could also serve to make the text easier to read. Different ringtones for different callers might show that the user likes variety in ringtones, but could also be done to identify one or more specific callers. Does that make these changes functional? On the other hand, being able to choose which opponent to play and which skills to play with could easily affect how the game is played and hence could be called purely functional.

A meaning analysis was conducted through two pretests to clarify the definitions.

*Meaning analysis pretest 1*

The first pretest was an informal questionnaire filled out by five fellow graduate students. Participants were asked to indicate their agreement with the following statements on a scale from 1 to 7, 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’: I change colors on the website because I think they make the website look good, I change the colors on the website because they make me feel more ‘at home’, I change the fonts on a website because I want the website to represent my taste, I change fonts on a website so I can read better, I specify different ringtones on my cell phone for different people because that makes it easy for me to identify who’s calling without looking at the phone display, and I specify different ringtones on my cell phone for different people because I like it when my cell phone rings in different ways every time somebody calls.
A review of the answers and an informal discussion about the questions with the participants revealed that how and why customization was done depended a lot on the context. For example, one participant reported that she sometimes changed fonts to show her preference, while other times to be able to read better.

*Meaning analysis pretest 2*

Insights gained from the first pretest were used to design a more extensive second pretest. In another informal setting, 15 participants answered a series of open-ended questions (please refer to Appendix A). Open ended questions asked participants what comes to their mind when they think about customization, to describe their customization practices, describe an instance where they used customization options creatively, what they enjoy most about customization and why, if at all, they do not customize. While there was much variability in what participants reported as coming to mind first about customization (e.g. it is mine, identity, making it work most efficiently), answers revealed that participants either had *hedonic* or *utilitarian* motivations for engaging in customization and that such motivations changed with every context.

Based on these results, it was then decided that the definition for cosmetic and functional customization could not be based on user motivations, but rather should be based on the attributes of the interface. This decision also made it easy to untangle the effects of *content* from the definitions.

*Cosmetic customization*

For this study, particularly in the context of a portal Website, cosmetic customization was operationalized as *presentation-based* changes to the interface. Hence
any changes to the interface and/or to the widgets that were appearance based were called cosmetic changes. As shown in Figure 4a, all widgets on the Netvibes portal allow the users to change colors based on their own preferences. Similarly, as shown in Figure 4b, users are able to choose a theme and background to suit their interests. They can also give their home page the title they want and move widgets around by dragging and dropping them to arrange them as they like.

**Figure 4a. Cosmetic changes: Change colors**

![Image of cosmetic changes: Change colors]

**Figure 4b. Cosmetic changes: Change theme and background**

![Image of cosmetic changes: Change theme and background]
Functional customization

Functional customization was operationalized as task-based changes that are made by the user to the interface and/or the widgets. Since Netvibes is a web portal, the task at hand could be anything from adding different widgets for photos, websites, blogs, podcasts, email accounts, social networks, search engines and more along with modifying widget operation related changes (refer to Figure 5a and Figure 5b). Hence any changes initiated by the users that modified the functionality of the website and/or different widgets were measured as functional changes.

Figure 5a. Functional changes: Change widget operation

Figure 5b. Functional changes: Change widget operation
Stimulus and Procedure Pretest 1

The first pretest for the study was conducted with 17 participants and was designed to evaluate Netvibes as a potential stimulus website. The participants were introduced to the Netvibes portal through a handout (please refer to Appendix C, Part II) and told about the different types of customization options. They were asked to customize the website according to their preferences and browse for about 20 minutes. The baseline portal website had the following 5 widgets: Weather, Web Note, To Do List, Web Search, and Image search. Participants’ browsing behavior was recorded via software called uTIPu. uTIPu records everything that happens on the screen during the given timeframe. The entire 20 minute session for each participant was recorded and later evaluated. This evaluation revealed that majority of the participants were done with the customization tasks and browsing in about 8 minutes and were then simply clicking about. Insights about optimum session time, questionnaires, and protocol instructions gained from this pretest were then used to design the study procedure.

Stimulus and Procedure Pretest 2

The second pretest with the Netvibes website and a new set of protocol instructions was conducted with 32 participants. A successful manipulation check proved the protocol and procedure acceptable.

Measured independent variables

Power Usage

Power usage was one of the measured independent variables. The scale was adapted from Marathe et al. (2007, May) and consisted of 20 items about participants’
liking of technology, extent of their technology use, dependence on different technologies and attitude toward using different technologies among other things (please refer to Appendix B). All items were measured on a 7-point Likert-type scale, each anchored between ‘Strongly Disagree’ and ‘Strongly Agree’. 3 of the items were reverse coded for consistency. An exploratory factor analysis revealed 4 factors based on Eigen values, together explaining 59.02% of the variance. However, contrary to the original work (Marathe et al., 2007, May), a principal components analysis with Varimax rotation revealed multiple cross loadings and no meaningful theoretical distinctions among factors (please refer to Table 1). Hence all items were combined to form a single index - power usage (Cronbach’s $\alpha = .89$). A median split revealed that among the 81 participants randomly assigned to the cosmetic-present, functional-absent condition, 38 were power users and 43 were non-power users. Out of the 86 participants assigned to the cosmetic-absent, functional-present condition, 42 were power users and 44 were non-power users. Out of the 76 participants in the cosmetic-present, functional-present condition, 40 were power users and 36 were non-power users; and out of the 57 participants randomly assigned to the cosmetic-absent, functional-absent condition, 32 were power users and 25 were non-power users, showing a fairly balanced distribution of across all 4 conditions.

Table 1. Factor Loadings for Power Usage Scale

<table>
<thead>
<tr>
<th></th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Love to use technological gadgets</td>
<td>.10</td>
<td>.78</td>
<td>.22</td>
<td>.13</td>
</tr>
<tr>
<td>Make good use of features</td>
<td>.39</td>
<td>.72</td>
<td>.10</td>
<td>.13</td>
</tr>
<tr>
<td>Have to have latest available upgrades</td>
<td>.34</td>
<td>.68</td>
<td>.08</td>
<td>-.07</td>
</tr>
</tbody>
</table>
Love exploring features   .60  .53  .14  .11 
Often multitask with tech devices   .16  .59  .35  -.01 
Prefer to ask friends how to use tech gadget (R)   .42  .00  -.03  .60 
Using tech devices comes easy   .55  .34  .28  .37 
Tech part of daily life  .20  .22  .64  .23 
Like cell phones with multiple features   -.02  .63  .37  .17 
Info tech improves productivity   .06  .36  .69  .11 
Tech offers greater control over work   .15  .25  .76  .14 
Like to challenge myself to figure out how to use new tech   .72  .19  .16  .24 
Bit of intuition is all that is needed to figure out new tech   .52  .29  .18  .29 
Would feel lost without info tech   -.08  .41  .50  -.11 
Need detailed instructions when using tech interface for first time (R)  .26  -.06  .05  .79 
Like to learn new tech and software on my own   .75  .14  .10  .23 
Friends come to me for help with tech   .76  .08  .16  .12 
Most gadgets are complicated to use (R)  .18  .31  .17  .71 
Use keyboard shortcuts  .36  -.10  .54  .07 
Use of info tech has replaced use of paper  .31  .19  .51  -.29 

*Note:* (R) denotes items that were reverse coded for consistency

**Need for Cognition**

The second measured independent variable, need for cognition, was adapted from Cacioppo, Petty and Kao (1984), and had 7 items about participants’ response to situations requiring lot a thinking, perceived fun in thinking, interest in solving puzzles etc. (please refer to Appendix B). All items were measured on a 7 point Likert type scale anchored between ‘Strongly Disagree’ and ‘Strongly Agree’. Three of the items were reverse coded for consistency. Based on Eigen values, 2 factors were revealed in an
exploratory factor analysis that explained 61.32% of the variance. The first factor, called ‘Preference for analytical thought’ was made up of the following 3 items (all reverse coded): I only think as hard as I have to, it’s enough for me that something gets the job done; I do not care how or why it works, and thinking is not my idea of fun (Cronbach’s α = .60). The second factor was called ‘Preference for analytical tasks’, and consisted of the following 4 items: I like to have the responsibility of handling a situation that requires a lot of thinking, I prefer my life to be filled with puzzles that I must solve, I really enjoy a task that involves coming up with new solutions to problems, and in general, I would prefer solving complex to simple problems (Cronbach’s α = .80). Table 2 shows the factor loadings for the need for cognition scale.

Table 2. Factor Loadings for Need for Cognition Scale

<table>
<thead>
<tr>
<th></th>
<th>Analytical Tasks</th>
<th>Analytical Thought</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer my life to be filled with puzzles that I must solve</td>
<td>.72</td>
<td>.15</td>
</tr>
<tr>
<td>I really enjoy a task that involves coming up with new solutions to problems</td>
<td>.86</td>
<td>.07</td>
</tr>
<tr>
<td>In general, I would prefer solving complex to simple problems</td>
<td>.78</td>
<td>.16</td>
</tr>
<tr>
<td>I like to have the responsibility of handling a situation that requires a lot of thinking</td>
<td>.73</td>
<td>.23</td>
</tr>
<tr>
<td>I only think as hard as I have to (R)</td>
<td>-.02</td>
<td>.85</td>
</tr>
<tr>
<td>It’s enough for me that something gets the job done; I don’t care how or why it works (R)</td>
<td>.32</td>
<td>.62</td>
</tr>
<tr>
<td>Thinking is not my idea of fun (R)</td>
<td>.20</td>
<td>.69</td>
</tr>
<tr>
<td>Eigen Value</td>
<td>3.03</td>
<td>1.25</td>
</tr>
<tr>
<td>-------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Proportion of Variance</td>
<td>43.34</td>
<td>17.91</td>
</tr>
</tbody>
</table>

*Note: (R) denotes items that were reverse coded for consistency*

Mediating variables

**Sense of identity**

Measures for sense of identity were adapted from Tractinsky and Zmiri (2006) and Ball and Tasaki (1992). All 7 questions were measured on a 7 point Likert type scale anchored between ‘Not at all’ and ‘Very much’. The questions pertained to participants’ belief about the interface reflecting personal identity, reflecting personality, interface being a true representation of who they are, a feeling of ownership toward the interface, and interface feeling personal (please refer to Appendix B). An exploratory factor analysis with these seven items yielded a single factor. They were then combined to form the sense of identity index (Cronbach’s $\alpha = .96$).

**Sense of control**

Measures for sense of control were adapted from Ariely (2000), Venkatesh (2000) and Witmer and Singer (1998) and consisted of 15 items about participants’ belief about being able to transform the interface, interface being rigid and inflexible, being able to adapt interface to personal taste, being able to initiate actions to modify interface, feeling in charge of the interface, free to decide how to browse, free to make different choices, able to influence widgets, able to influence how portal looked, able to influence how portal worked and environment being responsive (please refer to Appendix B). All questions were measured on a 7 point Likert type scale anchored between ‘Not at all’ to
‘Very much’. One of the items was reverse coded for consistency. An exploratory principal components factor analysis, with Varimax rotation revealed 2 factors based on the examination of Eigen values. Together, they explained 65.08% of the variance. A close examination of the items in both factors did not reveal a meaningful theoretical distinction (please refer to Table 3). Hence all 15 items were combined to form the sense of control index (Cronbach’s $\alpha = .93$).

Table 3. *Factor Loadings for Sense of Control Scale*

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was able to control my interaction with the interface.</td>
<td>.17</td>
<td>.80</td>
</tr>
<tr>
<td>The environment was responsive to the actions that I initiated (or performed).</td>
<td>.13</td>
<td>.81</td>
</tr>
<tr>
<td>My interactions with the environment seemed natural.</td>
<td>.21</td>
<td>.79</td>
</tr>
<tr>
<td>I was able to influence how the portal looked.</td>
<td>.84</td>
<td>.24</td>
</tr>
<tr>
<td>I was able to influence how the portal worked.</td>
<td>.69</td>
<td>.36</td>
</tr>
<tr>
<td>I was able to influence which widgets to include on the portal.</td>
<td>.76</td>
<td>.21</td>
</tr>
<tr>
<td>I was able to influence how each widget on the portal looked.</td>
<td>.84</td>
<td>.20</td>
</tr>
<tr>
<td>During my interaction with the interface I was able to make choices freely.</td>
<td>.45</td>
<td>.61</td>
</tr>
<tr>
<td>I was able to adapt the website in a way I wanted.</td>
<td>.87</td>
<td>.31</td>
</tr>
<tr>
<td>I was free to decide how I browsed the website.</td>
<td>.22</td>
<td>.62</td>
</tr>
<tr>
<td>I felt in charge of my experience with the website.</td>
<td>.41</td>
<td>.72</td>
</tr>
<tr>
<td>I was able to initiate actions to modify the website.</td>
<td>.84</td>
<td>.30</td>
</tr>
<tr>
<td>Interface rigid &amp; inflexible (R)</td>
<td>.07</td>
<td>.53</td>
</tr>
</tbody>
</table>
I was able to adapt the interface to my personal taste. \textit{.83} \textit{.20}
I was able to change the aesthetics of the interface to my preferences. \textit{.84} \textit{.06}

\textit{Note:} (R) denotes items that were reverse coded for consistency

\textit{Intrinsic motivation}

Measures for intrinsic motivation were adapted from the Intrinsic Motivation Inventory by Deci and Ryan (1985), as well as scale items from Graef, Csikszentmihalyi and Gianinno (1983) and Ryan and Deci (2000). The scale consisted of 8 items that were measured on a 7 point Likert type scale and anchored between ‘Not at all’ and ‘Very much’. The questions were about participants’ interest/enjoyment and perceived competence (please refer to Appendix B). After reverse coding the necessary items for consistency, an exploratory factor analysis revealed a single item. These items were combined to form the intrinsic motivation index (Cronbach’s $\alpha = .92$).

\textit{Dependent variables}

\textit{Attitude toward portal}

The measures for the dependent variable Attitude toward the portal were adapted from Kalyanaraman and Sundar (2006). They were measured on a 7 point Likert type scale and anchored between ‘Not at all’ and ‘Very much’. This variable consisted of 7 items relating to a user’s satisfaction with the interface, feeling of fun, trust toward interface, coolness of the interface and its visual aspects (please refer to Appendix B). Factor analysis revealed a single factor. All 7 items were combined to form the attitude index (Cronbach’s $\alpha = .85$).
**Browsing experience**

These measures were adapted from Flowerday and Schraw (2003) and were measured on a 7 point Likert type scale. They were anchored between ‘Not at all’ and ‘Very much’ and consisted of 10 items: anxious, stressed, tensed, exhausted, agitated, involved, satisfied, bored, frustrated, and absorbed (please refer to Appendix B). The item ‘bored’ was reverse-coded for consistency. An exploratory principal components factor analysis with Varimax rotation revealed 2 factors based on the examination of Eigen values. Together, they explained 63.72\% of the variance. The first factor, labeled ‘Navigational distress’, consisted of the following items: Frustrated, anxious, tensed, stressed, agitated, and exhausted (Cronbach’s $\alpha = .83$). The second factor, called ‘Navigational flow’, consisted of the following items: Absorbed, involved, satisfied, and bored (Cronbach’s $\alpha = .82$). Table 4 shows the factor loadings for the items.

Table 4. **Factor Loadings for Browsing Experience Scale**

<table>
<thead>
<tr>
<th></th>
<th>Navigational Distress</th>
<th>Navigational Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frustrated</td>
<td>.56</td>
<td>.31</td>
</tr>
<tr>
<td>Anxious</td>
<td>.72</td>
<td>.17</td>
</tr>
<tr>
<td>Tensed</td>
<td>.87</td>
<td>.00</td>
</tr>
<tr>
<td>Stressed</td>
<td>.87</td>
<td>.07</td>
</tr>
<tr>
<td>Agitated</td>
<td>.75</td>
<td>.33</td>
</tr>
<tr>
<td>Exhausted</td>
<td>.63</td>
<td>.30</td>
</tr>
<tr>
<td>Absorbed</td>
<td>.02</td>
<td>.86</td>
</tr>
<tr>
<td>Involved</td>
<td>.01</td>
<td>.88</td>
</tr>
<tr>
<td>Bored</td>
<td>.23</td>
<td>.66</td>
</tr>
<tr>
<td>Satisfied</td>
<td>.19</td>
<td>.75</td>
</tr>
</tbody>
</table>
**Conation**

These measures were adapted from Flowerday and Schraw (2003) and were measured on a 7 point Likert type scale. They were anchored between ‘Not at all’ and ‘Very much’ and had two items about likelihood of users coming back to the portal for personal use and likelihood of users recommending the portal to others (please refer to Appendix B). The two items were combined to form a Conation index (Pearson’s $r = .86$, $p < .001$).

**Control variables**

**Ease of use**

Measures for the “ease of use” variable were adapted from Venkatesh (2000) and measured on a 7-point Likert type scale, anchored between ‘Not at all’ and ‘Very much’. A total of 10 items were used to measure ease of use and were related to participants’ perceptions about ease of browsing, design of interface, confusion and frustration as a result of interacting with the interface, mental effort needed to browse the interface, and difficulty with getting familiarity with the interface (please refer to Appendix B). 6 items were reverse coded for consistency. All 10 items were combined to form the ease of use index (Cronbach’s $\alpha = .87$).
Media consumption motivation level

Items for this variable were created for this study and were based on various digital media activities users generally engage in. This variable was included to account for any differences in user expectations of customization based on their motivation levels to engage in certain activities every day. Responses to 15 items were measured on a 7 point Likert type scale, anchored between ‘Not at all’ and ‘Very much’. This section asked users to indicate their motivation level to do the following on a regular basis: keep up with current political news, keep in touch with friends via social networks, keep up with latest fashion trends, keep up with latest entertainment news, read blogs, keep up with local weather, keep up with the most popular videos, look at photos being uploaded daily by different users, keep up with the latest sports news, share photos with friends, keep online calendar for activities, search for information through search engines, search for podcasts, online shopping, and create online content. All 15 items were combined to form the motivation index (Cronbach’s $\alpha = .79$).

Procedure

The study was conducted over a period of one week in a computer lab on the campus. The Netvibes website was used as a stimulus for this study. After a brief in-class introduction to the study, an email was sent to prospective participants to provide more details about the study (please see Appendix C, Part I). Each participant signed up on an online sign-up sheet to come to the lab for one session that lasted for about 35 minutes. Before the participants arrived for their session, the researcher prepared the computers by deleting the previous browsing history and then bringing up the implied consent page on
the monitor. The Netvibes portal was brought up in another browser instantiation. The researcher created a portal design (6 specific widgets, color black, and arrangement in 3 columns) that was used for each participant and served as a baseline (please refer to Figure 3b). The 6 widgets used for the study were: Weather, YouTube, Google News, To Do List, Flickr Photos, and Web Search. After a brief introduction to the study, all participants were asked to read the online implied consent form and then click on ‘I agree’ on the consent page. The participants were told to let the researcher know if they wanted a paper copy of the consent form for their records. The ‘I agree’ link on the consent page was linked to the first questionnaire on SurveyMonkey. This questionnaire contained questions about power usage, need for cognition, technology usage, and media consumption motivations.

Once the users finished the first questionnaire, the researcher went over to their computers one by one and opened up the flash introduction file. The instructions for each experimental condition were provided to the participants as a printout (Please see Appendix C, Part II) as well as in the form of Macromedia/Adobe Flash player (.swf) files. The same instructions were provided twice (in two different modes) to each participant in each session to increase comprehension. This flash file provided detailed information of the different customization options on the Netvibes website according to the specific experimental condition each participant was assigned to. The handouts and the Adobe Flash files began with a welcome message and a brief introduction about the Netvibes portal. Participants were told that Netvibes was a time efficient and creative way to manage one’s digital life and asked to imagine using that portal as their daily entry point on the web. Participants in the ‘cosmetic-present, functional-absent’
conditions were introduced to all the different cosmetic changes (e.g. change title of page, move widgets) they could make and told to customize the *look* of their page. Conversely, participants in the ‘cosmetic-absent, functional-present’ condition were introduced to all the different functional changes they could make and asked to customize the *functionality* of their page. Participants in the ‘cosmetic-present, functional-present’ condition were informed about all the different types of cosmetic and functional changes and were asked to customize the *look* and *functionality* of their page. The remaining participants in the ‘cosmetic-absent, functional-absent’ condition (which served as control) were only told that Netvibes could be customized in different ways, but were not introduced to any specific customizable features. They were also told not to make any changes, rather simply browse the interface.

After having seen the instructions in the form of the Flash animation file, each participant was given a paper copy of the same instructions and told to refer to it in case they needed to look at the instructions again during the session. They were then directed to the Netvibes webpage open in a browser and told to browse the website according to the instructions for 10 minutes. Pretest had revealed that 10 minutes is enough time for each participant to familiarize themselves with the website and the customization options and then customize it according to their taste and preferences. After each participant had spent about 10 minutes customizing the webpage and browsing the website, the researcher went over to each participant’s computer terminal and opened up the second questionnaire. In order to connect both pre and post manipulation questionnaires for each participant, a randomly assigned unique code number was provided to each participant at the beginning of the session. They were asked to enter the same code number in the two
questionnaires they answered. The second questionnaire contained questions about their browsing experience, sense of identity, sense of control, ease of use, intrinsic motivation, attitude toward portal and conation.

Once the participants finished answering the second questionnaire, they were debriefed and thanked for their participation. After the participants left, the researcher went over to each participant’s terminal, retrieved their customized Netvibes page and saved that image in a word file. These files were used at the end of the study to conduct a manipulation check. All the changes made to the portal website by each participant were counted as either cosmetic or functional. Changes were measured based off of the original portal template used for the study.

Manipulation check

Instructions for the study did not specify what changes the users should make, rather introduced them to the different changes they could make. In other words, experimental manipulation was achieved by simply introducing those features specific to each condition instead of every feature available on the website. Since the Netvibes interface was not restrictive in any way, in theory each participant was free to use any features they discovered. Hence it was extremely necessary to conduct a manipulation check to examine if participants had strayed away from the changes they were supposed to make based on the condition they were randomly assigned to.

To that effect, the total number of cosmetic and functional changes made by each participant was measured after saving the final screens for each participant following each session. Incidentally, along with making changes that were introduced to them,
participants had also made changes to their Netvibes webpage that were not a part of their experimental condition. For example, a participant who was introduced only to the functional change features of the website had also made a few cosmetic changes along with functional changes. However, a successful manipulation check revealed that participants in the ‘cosmetic-present, functional-absent’ condition made the most number of cosmetic changes ($M = 5.67, SE = .20$), significantly more than cosmetic changes initiated in the ‘cosmetic-present, functional-present’ ($M = 4.86, SE = .21$), ‘cosmetic-absent, functional-present’ ($M = 3.36, SE = .20$) and then ‘cosmetic-absent, functional-absent’ ($M = 0.17, SE = .24$) conditions. Similarly, participants in the ‘cosmetic-absent, functional-present’ condition ($M = 8.30, SE = .47$) initiated the most number of functional changes - significantly more than functional changes initiated in the ‘cosmetic-present, functional-present’ ($M = 6.60, SE = .50$), ‘cosmetic-present, functional-absent’ ($M = 4.07, SE = .48$) and then ‘cosmetic-absent, functional-absent’ conditions ($M = 0.49, SE = .58$).

Two separate 2-tailed independent sample t-tests also revealed that there were no significant differences in amount of customization done by power users and non-power users for each type of customization. In other words, there was no significant difference between the number of cosmetic changes made by power users and non-power users, $t(298) = .04, p = .96$. Similarly, there was no significant difference between the number of functional changes made by power users and non-power users, $t(298) = 1.59, p = .11$. 

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CHAPTER – 3
DATA ANALYSIS AND RESULTS

Prior to analyses, the data were examined for normality and outliers. Measures of skewness indicated normally distributed data. All values of skewness were between -1 and +1. Please refer to Table 5 for descriptive statistics for the hypothesized variables. Values of mean, standard deviation and the minimum and maximum values for each variable were found to be within acceptable parameters. Table 5a shows descriptive statistics for each condition.

Table 5. *Descriptive statistics for measured variables across conditions*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Power usage</td>
<td>5.07</td>
<td>.80</td>
<td>1.60</td>
<td>6.90</td>
</tr>
<tr>
<td>2. Sense of identity</td>
<td>4.43</td>
<td>1.57</td>
<td>1.00</td>
<td>7.00</td>
</tr>
<tr>
<td>3. Sense of control</td>
<td>5.65</td>
<td>1.03</td>
<td>2.28</td>
<td>7.00</td>
</tr>
<tr>
<td>4. Intrinsic motivation</td>
<td>5.37</td>
<td>1.16</td>
<td>1.37</td>
<td>7.00</td>
</tr>
<tr>
<td>5. Attitude toward portal</td>
<td>4.89</td>
<td>1.05</td>
<td>1.42</td>
<td>7.00</td>
</tr>
<tr>
<td>6. Conation</td>
<td>4.59</td>
<td>1.67</td>
<td>1.00</td>
<td>7.00</td>
</tr>
</tbody>
</table>

Table 5a. *Descriptive statistics for each condition*

<table>
<thead>
<tr>
<th></th>
<th>Condition1</th>
<th>Condition2</th>
<th>Condition3</th>
<th>Condition4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sense of identity</td>
<td>4.49 (1.51)</td>
<td>4.68 (1.52)</td>
<td>4.97 (1.24)</td>
<td>3.24 (1.57)</td>
</tr>
<tr>
<td>2. Sense of control</td>
<td>5.76 (.87)</td>
<td>5.72 (.93)</td>
<td>6.00 (.91)</td>
<td>4.93 (1.18)</td>
</tr>
<tr>
<td>3. Intrinsic motivation</td>
<td>5.59 (1.19)</td>
<td>5.53 (1.05)</td>
<td>5.25 (1.24)</td>
<td>4.98 (1.08)</td>
</tr>
</tbody>
</table>
4. Attitude toward portal | 5.12 (1.03) | 4.86 (1.06) | 4.81 (1.11) | 4.72 (.97)  
5. Conation | 4.38 (1.72) | 4.77 (1.69) | 4.70 (1.63) | 4.44 (1.62)  

Notes: Means are reported first, followed by standard deviation scores in parentheses  
Condition 1 = Cosmetic-present, Functional-absent; Condition 2 = Cosmetic-absent, Functional-present; Condition 3 = Cosmetic-present, Functional-present; Condition 4 = Cosmetic-absent, Functional-absent  

Test of the theoretical model

A systematic step by step analysis was conducted to test the study hypotheses. Prior to testing, zero-order correlations were computed to examine the interrelations among the main hypothesized measured variables. Table 6 shows the zero-order correlations. These bivariate correlations among variables were consistent with hypothesized predictions.

Table 6. Zero-order correlations for all measured variables across conditions

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sense of identity</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sense of control</td>
<td>.73***</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Intrinsic motivation</td>
<td>.63***</td>
<td>.56***</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Attitude toward portal</td>
<td>.77***</td>
<td>.70***</td>
<td>.73***</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>5. Conation</td>
<td>.47***</td>
<td>.35***</td>
<td>.64***</td>
<td>.57***</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note: *** Correlation is significant at \( p < .001 \)

Data analysis

**Step 1: Cosmetic x functional x power usage on sense of identity and sense of control**

An omnibus General Linear Model (GLM) analysis was conducted with the three predictor variables, cosmetic (present, absent), functional (present, absent) and power
usage on sense of identity and sense of control. To be able to conduct a Multivariate Analysis of Variance (MANOVA), the zero-order correlation for the two dependent variables was examined and found to be .73, p < .001. A MANOVA revealed significant multivariate effects, for cosmetic, Wilks’ $\Lambda$ = .08, $F(2, 291) = 12.99$, $p < .001$, functional, Wilks’ $\Lambda$ = .10, $F(2, 291) = 15.03$, $p < .001$, power usage, Wilks’ $\Lambda$ = .05, $F(2, 291) = 8.10$, $p < .001$, and a significant interaction between cosmetic and functional, Wilks’ $\Lambda$ = .03, $F(2, 291) = 4.86$, $p < .01$. All other effects were non-significant.

To understand these relationships in more detail, two univariate analyses were conducted for the two dependent variables (sense of identity and sense of control) separately. The first univariate test for sense of identity revealed a significant main effect for cosmetic, $F (1, 292) = 19.73$, $p < .0001$, partial $\eta^2 = .06$, such that those who engaged in cosmetic customization reported a higher sense of identity with the interface ($M = 4.72$, $SE = .11$) than those who did not ($M = 3.96$, $SE = .12$). **Hypothesis H1 was thus supported.** The same test revealed a main effect for functional, $F (1, 292) = 29.51$, $p < .0001$, partial $\eta^2 = .09$, such that those who engaged in functional customization reported a higher sense of identity with the interface ($M = 4.80$, $SE = .11$) than those who did not ($M = 3.87$, $SE = .12$). The interaction between cosmetic and functional was also significant, $F (1, 292) = 8.81$, $p < .001$, partial $\eta^2 = .03$. A post-hoc Student’s t test revealed that participants who did not engage in any kind of customization activity showed significantly less sense of identity toward the interface than those participants who engaged in either cosmetic or functional or both types of customization (please refer to Table 7).
Table 7. Sense of identity: Cosmetic customization x functional customization

<table>
<thead>
<tr>
<th></th>
<th>Cosmetic Customization</th>
<th>Functional Customization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (SE)</td>
<td>No (SE)</td>
</tr>
<tr>
<td>M</td>
<td>4.93 (.16)</td>
<td>4.51 (.16)</td>
</tr>
<tr>
<td></td>
<td>4.68 (.15)</td>
<td>3.24 (.19)</td>
</tr>
</tbody>
</table>

F (1, 292) = 8.81, p < .001, partial $\eta^2 = .03$

Note: Using Student’s post-hoc test, means with no subscript in common differ at p < .05.

The same analysis also revealed a main effect for the power usage variable ($\beta = .22, p < .001$) such that power usage was significantly positively correlated with sense of identity, F (1, 292) = 6.95, adjusted $R^2 = .01, p < .05$.

To further understand the relationship between these variables, an Analysis of Covariance (ANCOVA), with sense of control as a covariate, was performed with three predictor variables, cosmetic, functional and power usage on sense of identity. This would probe for potential mediation of sense of control in the relationship between the independent variables and sense of identity. This analysis revealed a significant main effect for the covariate, sense of control ($\beta = .69, p < .001$), F (1, 292) = 262.60, p < .001, adjusted $R^2 = .39$. More interestingly, when sense of control was introduced into the model, the main effects for cosmetic customization and power usage were no longer significant, thus implying that sense of control acted as a full mediator for both variables. However, the main effect for functional customization retained its significance, F (1, 291) = 10.67, p < .05, partial $\eta^2 = .04$, such that those who did functional customization
reported a higher sense of identity with the interface \((M = 4.61, SE = .08)\) than those who did not \((M = 4.19, SE = .09)\).

The second univariate analysis for the response variable, sense of control revealed a main effect for cosmetic, \(F (1, 292) = 23.85, p < .0001,\) partial \(\eta^2 = .08\), such that those who engaged in cosmetic customization reported a higher sense of control with the interface \((M = 5.87, SE = .07)\) than those who did not \((M = 5.33, SE = .08)\). A main effect for functional customization was also found, \(F (1, 292) = 18.77, p < .0001,\) partial \(\eta^2 = .06\), such that those who did functional customization reported a higher sense of control with the interface \((M = 5.84, SE = .07)\) than those who did not \((M = 5.36, SE = .08)\).

Hypothesis H2a was thus supported. A significant interaction effect between cosmetic and functional, \(F (1, 292) = 7.56, p < .05,\) partial \(\eta^2 = .03\), was followed by a post-hoc Student’s \(t\) which showed that participants who did not engage in any kind of customization activity reported significantly less sense of control toward the interface than those participants who engaged in either cosmetic or functional or both types of customization (please refer to Table 8).

### Table 8. Sense of control: Cosmetic customization x functional customization

<table>
<thead>
<tr>
<th></th>
<th>Cosmetic Customization</th>
<th>Functional Customization</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>(M (SE))</td>
<td>(5.96_b (.10))</td>
<td>(5.72_b (.10))</td>
<td></td>
</tr>
<tr>
<td>(M (SE))</td>
<td>(5.78_b (.10))</td>
<td>(4.93_a (.12))</td>
<td></td>
</tr>
</tbody>
</table>

\(F (1, 292) = 7.56, p < .05,\) partial \(\eta^2 = .03\)

*Note:* Using Student’s post-hoc test, means with no subscript in common differ at \(p < .05\).
The same analysis also revealed a main effect for the power usage variable (β = .22, p < .001) such that power usage was significantly positively correlated with sense of control, $F(1, 292) = 16.22, p < .001$, adjusted $R^2 = .04$ (please refer to Table 10).

Next, an Analysis of Covariance (ANCOVA) was then conducted for the three predictor variables on sense of control, with sense of identity as covariate. A main effect for the covariate (β = .68, p < .001) was observed similar to the previous ANCOVA analysis, $F(1, 291) = 262.60, p < .001$, adjusted $R^2 = .38$. However, unlike in the previous analysis, the introduction of sense of identity eliminated the effect of functional customization. Cosmetic customization retained its significant main effect, $F(1, 291) = 5.91, p < .05$, partial $\eta^2 = .02$, such that those who did cosmetic customization reported a higher sense of control with the interface ($M = 5.74, SE = .05$) than those who did not ($M = 5.54, SE = .06$). Power usage also showed a significant main effect (β = .12, p < .01) on sense of control, $F(1, 291) = 9.05, p < .05$, adjusted $R^2 = .003$. The interaction between functional customization and power usage approached significance, $F(1, 291) = 3.32, p = .06$, such that those who were on the lower end of the power usage scale showed higher sense of control when they did not engage in functional customization compared to when they did, while those who were on the high end of the power usage scale showed higher sense of control when they did engage in functional customization than when they did not, essentially lending support to hypothesis H2b.

The two univariate analyses showed that cosmetic customization affects sense of identity as well as control, and so does functional customization. In order to explore whether this was because cosmetic customization affected both identity and control or because participants in the cosmetic condition ended up making functional changes as
well, further analyses were conducted using the actual amount of each type of customization done by the participant as the independent variables (instead of the manipulated conditions) in two separate General Linear Model (GLM) analyses for sense of control and sense of identity. A pattern similar to the above findings was observed. The three predictors – number of cosmetic changes, number of functional changes and power usage, as well as the interaction between cosmetic and functional changes, were all found to significantly predict one’s sense of control, as well as sense of identity. Further, controlling for the effect of the experimental manipulation showed that the number of cosmetic changes $F(1, 286) = 4.85, p < .05$, number of functional changes $F(1, 286) = 3.31, p = .06$, as well as power usage ($\beta = .18, p < .01$), $F(1, 286) = 10.47, p < .01$, significantly predicted sense of control. On the other hand, only the number of functional changes, $F(1, 286) = 7.10, p < .01$, significantly predicted sense of identity. Power usage approached significance, ($\beta = .09, p = .08$), $F(1, 286) = 3.07, p = .08$. Interestingly, the interaction between number of cosmetic and functional changes also turned out to be a significant predictor of sense of identity, such that sense of identity did not change significantly with increases in the number of cosmetic changes, for those who made a lot of functional changes. However, sense of identity increased significantly with number of cosmetic changes for those who had made very few functional changes.

**Step2: Cosmetic x functional x power usage on intrinsic motivation**

To further understand the relationship between the three predictor variables and intrinsic motivation, a general linear model analysis was conducted. This analysis revealed a significant main effect for functional customization, $F(1, 292) = 9.80, p < .05,$
partial $\eta^2 = .03$, where those who engaged in functional customization showed
significantly more intrinsic motivation to use the portal ($M = 5.54, SE = .08$), than those
who did not engage in functional customization ($M = 5.13, SE = .09$). Power usage ($\beta = .20, p < .001$) was also found to significantly positively correlated with intrinsic
motivation, $F (1, 292) = 12.65, p < .001$, adjusted $R^2 = .03$.

To understand the role played by sense of control in this relationship, an Analysis
of Covariance (ANCOVA) was performed for the three predictor variables on intrinsic
motivation, with sense of control as a covariate. The only significant effect on intrinsic
motivation was that of the covariate - sense of control ($\beta = .56, p < .01$), $F (1, 291) =
116.34, p < .001$, adjusted $R^2 = .25$. The previously significant main effects for functional
customization and power usage ceased to be significant, thus indicating that sense of
control fully mediated the relationship between the two predictor variables and intrinsic
motivation.

Similarly, an Analysis of Covariance (ANCOVA) was then performed with the
three predictor variables on intrinsic motivation, with sense of identity as a covariate. The
covariate of sense of identity was significant ($\beta = .63, p < .001$), $F (1, 291) = 172.04, p <
.001$, adjusted $R^2 = .33$. Without the covariate in the analysis, power usage significantly
predicted intrinsic motivation as shown in previous analysis. However, once the covariate
of sense of identity was included in the analysis, the significance level went down
compared to the previous test, illustrating that sense of identity partially mediated the
relationship between power usage and intrinsic motivation. However power usage ($\beta = .11, p < .05$) still significantly predicted intrinsic motivation, $F (1, 291) = 5.89, p < .05$,
adjusted $R^2 = .002$. 

Interestingly, while cosmetic customization did not have a main effect on intrinsic motivation in the previous analysis, inclusion of the covariate of sense of identity brought cosmetic towards significance, $F(1, 291) = 3.29, p = .07$, partial $\eta^2 = .01$. The most surprising element of this effect was the reversal of the direction of the effect on intrinsic motivation. After controlling for the effect of sense of identity on intrinsic motivation, it was found that participants who engaged in cosmetic customization showed lower level of intrinsic motivation ($M = 5.28, SE = .07$), than those who did not engage in cosmetic customization ($M = 5.48, SE = .07$).

To further explore this relationship, another Analysis of Covariance (ANCOVA) was performed with the three predictor variables on intrinsic motivation, with both sense of identity and sense of control as covariates. This analysis revealed that both covariates – sense of control ($\beta = .23, p < .001$), $F(1, 290) = 12.01, p = .001$, adjusted $R^2 = .01$, and sense of identity ($\beta = .48, p < .001$), $F(1, 290) = 53.30, p = .001$, adjusted $R^2 = .09$, were significant predictors of intrinsic motivation. Hypothesis H3 was thus supported.

Further, with the inclusion of both covariates in the analysis, power usage ceased to be a significant predictor of intrinsic motivation. More interestingly, cosmetic customization now showed a significant main effect on intrinsic motivation, $F(1, 290) = 5.38, p = .05$, partial $\eta^2 = .02$, in the opposite direction, thereby suggesting a suppressor effect (MacKinnon, Krull, & Lockwood, 2000). Those who engaged in cosmetic customization showed significantly lower intrinsic motivation ($M = 5.25, SE = .07$), than those who did not engage in cosmetic customization ($M = 5.51, SE = .07$). To further explore the specific effects of these intervening variables (sense of identity and sense of control), an indirect effects test (Hayes, 2009; Preacher & Hayes, 2008) was conducted.
with 5000 bootstrap samples to test the relationship between cosmetic customization and intrinsic motivation (please refer to Table 9 and Figure 6 for details).

Table 9. *Mediation of cosmetic customization on intrinsic motivation through sense of identity and sense of control*

<table>
<thead>
<tr>
<th>Point Estimate</th>
<th>Product of Coefficients</th>
<th>Bias-corrected 95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of identity</td>
<td>.22  .07  3.13  .09  .38</td>
<td></td>
</tr>
<tr>
<td>Sense of control</td>
<td>.13  .05  2.78  .05  .26</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.35  .09  3.78  .18  .53</td>
<td></td>
</tr>
</tbody>
</table>

Taken as a set, sense of control and sense of identity mediated the relationship between cosmetic customization and intrinsic motivation (total indirect effect = .35, \( p < .001 \)). An examination of the specific indirect effects indicates that both sense of control and sense of identity are significant mediators, since their 95% bias corrected and accelerated confidence intervals do not contain zero, .05 to .26 and .09 to .38 respectively. The directions of the a and b paths show a positive relationship between the variables such that cosmetic customization leads to greater sense of identity and sense of control, which then lead to greater intrinsic motivation. This analysis also shows that the total effect of cosmetic customization on intrinsic motivation has a positive sign (.11), yet it is not significant (\( p = .43 \)). However, the direct effect of cosmetic customization on intrinsic motivation is significant (\( p < .05 \)) and carries a negative sign (-.24).
Figure 6. *Mediation of cosmetic customization on intrinsic motivation through sense of identity and sense of control*

\[ c = c' + a_1 b_1 + a_2 b_2; \text{total effect of cosmetic customization on intrinsic motivation}\]

* \( p < .05 \)

*** \( p < .001 \)

c = .11, \( p = .43 \)

\[ c = .24^* \]

**Step3: Cosmetic x functional x power usage on attitude toward portal**

Finally, a general linear model analysis was used to explore the relationship between the three predictor variables and the main outcome variable – attitude toward portal. Power usage was the only significant predictor (\( \beta = .16, p < .01 \)) of attitude toward portal such that as power usage increased, attitude toward portal increased, i.e., they became more positive, \( F(1, 292) = 7.85, p < .05, \text{adjusted } R^2 = .02 \).

Furthermore, two Analyses of Covariance (ANCOVAs) were conducted to examine the effect of sense of control and sense of identity separately as covariates. Sense of control as a covariate showed a significant positive correlation (\( \beta = .76, p < .001 \)) with attitude toward portal, \( F(1, 291) = 299.08, p < .001, \text{adjusted } R^2 = .48 \).

Controlling for the effect of sense of control also turned the previously non-significant main effects and interaction effect for cosmetic and functional customization into
significant effects, thus exhibiting presence of a suppressor effect. Moreover, those who engaged in cosmetic customization showed significantly inferior attitude toward the portal \((M = 4.78, SE = .05)\) than those who did not engage in cosmetic customization \((M = 5.05, SE = .06)\), \(F (1, 291) = 8.61, p < .05\), partial \(\eta^2 = .03\). Similarly, those who engaged in functional customization showed significantly inferior attitude toward the portal \((M = 4.82, SE = .05)\) than those who did not engage in functional customization \((M = 5.01, SE = .06)\), \(F (1, 291) = 4.17, p < .05\), partial \(\eta^2 = .01\). The interaction effect between cosmetic and functional, however, was more telling, \(F (1, 291) = 11.81, p < .001\), partial \(\eta^2 = .04\). After controlling for the effect of sense of control it was found that those who did not do any kind of customization \((M = 5.29, SE = .10)\) showed significantly more positive attitude toward the portal than participants who did both cosmetic and functional changes \((M = 4.84, SE = .08)\), followed by those who did only functional \((M = 4.81, SE = .07)\), and then those who did only cosmetic \((M = 4.73, SE = .08)\). Table 10 provides the details.

**Table 10. Attitude toward portal: Cosmetic customization x functional customization; controlling for Sense of control**

<table>
<thead>
<tr>
<th>Cosmetic Customization</th>
<th>Yes (M (SE))</th>
<th>No (M (SE))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Customization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4.84(b) (.08)</td>
<td>4.81(b) (.07)</td>
</tr>
<tr>
<td>No</td>
<td>4.73(b) (.08)</td>
<td>5.29(a) (.10)</td>
</tr>
</tbody>
</table>

\(F (1, 291) = 11.81, p < .001\), partial \(\eta^2 = .04\)

*Note:* Using Student’s post-hoc test, means with no subscript in common differ at \(p < .05\).
The previously significant effect of power usage on attitude toward portal ceased to be significant, thus illustrating that sense of control fully mediated the relationship between power usage and attitude toward portal.

The second Analysis of Covariance (ANCOVA) with sense of identity as a covariate provided equally interesting results. Similar to the previous ANCOVA, sense of identity was significantly positively correlated with attitude toward portal ($\beta = .84, p < .001$), $F (1, 291) = 499.00, p < .0001$, adjusted $R^2 = .60$. Controlling for the effect of sense of identity also turned the previously non-significant main effects and interaction effect for cosmetic and functional customization into significant effects again showing suppression. Specifically, those who engaged in cosmetic customization showed significantly inferior attitude toward the portal ($M = 4.79, SE = .05$) than those who did not engage in cosmetic customization ($M = 5.06, SE = .05$), $F (1, 291) = 12.27, p < .001$, partial $\eta^2 = .04$. Similarly, those who engaged in functional customization showed significantly inferior attitude toward the portal ($M = 4.76, SE = .05$) than those who did not engage in functional customization ($M = 5.09, SE = .05$), $F (1, 291) = 18.11, p < .0001$, partial $\eta^2 = .06$. The interaction effect between cosmetic and functional found in this analysis mimicked the previous one, such that those who did not do any kind of customization showed significantly more positive attitude toward the portal than participants in the other conditions, $F (1, 291) = 21.32, p < .001$, partial $\eta^2 = .07$. Please refer to Table 11 for details.
Table 11. Attitude toward portal: Cosmetic customization x functional customization; controlling for Sense of identity

<table>
<thead>
<tr>
<th></th>
<th>Cosmetic Customization</th>
<th>Functional Customization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (M)</td>
<td>No (M)</td>
</tr>
<tr>
<td></td>
<td>SE</td>
<td>SE</td>
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<tr>
<td></td>
<td>(0.07)</td>
<td>(0.06)</td>
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<tr>
<td></td>
<td>4.78</td>
<td>5.40</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.08)</td>
</tr>
</tbody>
</table>

\[ F(1, 291) = 21.32, p < .001, \text{ partial } \eta^2 = .07 \]

*Note*: Using Student’s post-hoc test, means with no subscript in common differ at \( p < .05 \).

The previously significant effect of power usage on attitude toward portal ceased to be significant again, thus illustrating that sense of identity fully mediated the relationship between power usage and attitude toward portal.

For the next step in the analysis, another Analysis of Covariance (ANCOVA) was conducted with the three predictor variables on attitude toward portal, with both sense of identity and sense of control as covariates. Similar to the previous two ANCOVAs, sense of identity was significantly positively correlated with attitude toward portal (\( \beta = .61, p < .001 \), \( F(1, 290) = 161.37, p < .0001 \), adjusted \( R^2 = .16 \), and so was sense of control (\( \beta = .33, p < .001 \), \( F(1, 290) = 47.15, p < .0001 \), adjusted \( R^2 = .04 \). Controlling for the effect of sense of identity and sense of control also turned the previously non-significant main effects and interaction effect for cosmetic and functional customization into significant effects again showing suppression. Specifically, those who engaged in cosmetic customization showed significantly inferior attitude toward the portal (\( M = 4.76, SE = .04 \)) than those who did not engage in cosmetic customization (\( M = 5.10, SE = .05 \), \( F(1, 290) = 22.10, p < .001 \), partial \( \eta^2 = .07 \). Similarly, those who engaged in functional
customization showed significantly inferior attitude toward the portal ($M = 4.75, SE = .04$) than those who did not engage in functional customization ($M = 5.11, SE = .05$), $F (1, 290) = 23.90, p < .0001$, partial $\eta^2 = .08$. The interaction effect between cosmetic and functional found in this analysis also mimicked the previous one, such that those who did not do any kind of customization showed significantly more positive attitude toward the portal than participants in the other conditions, $F (1, 290) = 28.59, p < .001$, partial $\eta^2 = .09$. Please refer to Table 12 for details.

Table 12. Attitude toward portal: Cosmetic customization x functional customization; controlling for sense of identity and sense of control

<table>
<thead>
<tr>
<th>Cosmetic Customization</th>
<th>Functional Customization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>$M$ ($SE$)</td>
<td>$M$ ($SE$)</td>
</tr>
<tr>
<td>4.77$b$ (.06)</td>
<td>4.73$b$ (.06)</td>
</tr>
<tr>
<td>4.75$b$ (.06)</td>
<td>5.46$a$ (.08)</td>
</tr>
</tbody>
</table>

$F (1, 290) = 28.59, p < .001$, partial $\eta^2 = .09$

*Note:* Using Student's post-hoc test, means with no subscript in common differ at $p < .05$.

The previously significant effect of power usage on attitude toward portal in the original analysis ceased to be significant again, thus illustrating that sense of identity fully mediated the relationship between power usage and attitude toward portal.

The final step in this analysis was to include intrinsic motivation as a covariate along with sense of control and sense of identity. This ANCOVA revealed that the covariate sense of identity was significantly positively correlated with attitude toward portal, $F (1, 289) = 92.65, p < .0001$, adjusted $R^2 = .07$, and so was sense of control, $F (1,
The newly introduced covariate intrinsic motivation was also significantly positively correlated with attitude toward portal, $F(1, 289) = 85.09, p < .0001, \text{adjusted } R^2 = .06$. This finding established that hypothesis H4a was supported. Controlling for the effect of sense of identity, sense of control, and intrinsic motivation also turned the originally non-significant main effects and interaction effect for cosmetic and functional customization into significant effects again showing suppression. Specifically, those who engaged in cosmetic customization showed significantly inferior attitude toward the portal ($M = 4.79, SE = .04$) than those who did not engage in cosmetic customization ($M = 5.05, SE = .04$), $F(1, 289) = 16.36, p < .001$, partial $\eta^2 = .05$. Similarly, those who engaged in functional customization showed significantly inferior attitude toward the portal ($M = 4.75, SE = .04$) than those who did not engage in functional customization ($M = 5.09, SE = .04$), $F(1, 289) = 28.59, p < .0001$, partial $\eta^2 = .09$. The interaction effect between cosmetic and functional found in this analysis also mimicked the previous one, such that those who did not do any kind of customization showed significantly more positive attitude toward the portal than participants in the other conditions, $F(1, 289) = 29.44, p < .001$, partial $\eta^2 = .09$. Please refer to Table 13 and 14 for details.
Table 13. Attitude toward portal: Cosmetic customization x functional customization; controlling for sense of identity, sense of control and intrinsic motivation

<table>
<thead>
<tr>
<th>Cosmetics Customization</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$ ($SE$)</td>
<td>$M$ ($SE$)</td>
</tr>
<tr>
<td>Cosmetic Customization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Functional Customization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4.79$_b$ (.06)</td>
<td>4.71$_b$ (.05)</td>
</tr>
<tr>
<td>No</td>
<td>4.80$_b$ (.06)</td>
<td>5.39$_a$ (.07)</td>
</tr>
</tbody>
</table>

$F(1, 289) = 29.44$, $p < .001$, partial $\eta^2 = .09$

*Note*: Using Student’s post-hoc test, means with no subscript in common differ at $p < .05$.

Table 14. Predictors of attitude toward portal

<table>
<thead>
<tr>
<th>predictor</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of identity</td>
<td>.44***</td>
</tr>
<tr>
<td>Sense of control</td>
<td>.25***</td>
</tr>
<tr>
<td>Intrinsic motivation</td>
<td>.35***</td>
</tr>
</tbody>
</table>

$F(10, 289) = 94.86$, $p < .001$, adjusted $R^2 = .75$

*** $p < .001$

**Step4: Cosmetic x functional x power usage on conation**

Apart from the attitudinal variable, a behavioral intention variable – conation – was also included in the analysis. The same General Linear Model (GLM) analysis was conducted to explore the relationship between the three predictor variables and conation. No significant effect was observed. An Analysis of Covariance (ANCOVA) with sense of control as a covariate showed that cosmetic customization was a significant predictor of conation such that participants who did not do cosmetic customization showed significantly higher intention to return to the portal ($M = 4.82$, $SE = .13$) than those who
did cosmetic customization ($M = 4.39, SE = .12$), $F (1, 291) = 5.00, p < .05$, partial $\eta^2 = .02$. The covariate, sense of control, also showed a significant positive relationship with conation ($\beta = .39, p < .001$), $F (1, 291) = 43.70, p < .001$, adjusted $R^2 = .12$. A similar Analysis of Covariance (ANCOVA) with sense of identity as a covariate also showed a similar main effect for cosmetic customization, such that participants who did not engage in cosmetic customization showed significantly higher intention to return to the portal ($M = 4.87, SE = .12$) than those who did cosmetic customization ($M = 4.36, SE = .11$), $F (1, 291) = 8.02, p < .01$, partial $\eta^2 = .03$. The covariate, sense of identity, was also significant ($\beta = .52, p < .001$), $F (1, 291) = 89.60, p < .001$, adjusted $R^2 = .22$. When sense of control and sense of identity were both added to an Analysis of Covariance (ANCOVA), sense of identity came up as a significant predictor of conation ($\beta = .48, p < .001$), $F (1, 290) = 40.37, p < .001$, adjusted $R^2 = .09$. Cosmetic customization showed a significant main effect on conation that mimicked the previous finding. Particularly, participants who did not engage in cosmetic customization showed significantly higher intention to return to the portal ($M = 4.88, SE = .12$) than those who did cosmetic customization ($M = 4.36, SE = .11$), $F (1, 290) = 8.43, p < .01$, partial $\eta^2 = .03$.

In the final step, another Analysis of Covariance (ANCOVA) was conducted on conation, with sense of control, sense of identity and intrinsic motivation as covariates. Cosmetic customization again showed a significant main effect on conation, such that participants who did not do cosmetic customization condition showed significantly higher intention to return to the portal ($M = 4.76, SE = .11$) than those who did cosmetic customization ($M = 4.45, SE = .10$), $F (1, 289) = 3.97, p < .05$, partial $\eta^2 = .01$. Sense of identity was again significantly positively correlated with conation, $F (1, 289) = 8.24, p <
Intrinsic motivation was also significantly positively correlated with conation, $F(1, 289) = 95.77, p < .001$, adjusted $R^2 = .18$. Thus hypothesis H4b was supported (please refer to Table 15).

Table 15. Predictors of conation

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sense of identity</td>
<td>.20*</td>
</tr>
<tr>
<td>Intrinsic motivation</td>
<td>.57***</td>
</tr>
</tbody>
</table>

$F(10, 289) = 94.86, p < .001$, adjusted $R^2 = .75$

* $p < .01$
** $p < .001$

Gender effects

Multiple analyses showed that power usage emerged as a significant predictor of sense of control, sense of identity, intrinsic motivation, and attitude toward the portal, such that those participants who showed more power usage reported feeling significantly more sense of control, more sense of identity, intrinsic motivation and more positive attitude toward the portal, than those who showed low power usage. To test if gender played a significant role in these results, further analyses were conducted with gender and power usage as predictor variables. The first analysis with sense of control as response variable revealed that gender had a main effect on sense of control, such that females ($M = 5.84, SE = .07$) showed significantly higher sense of control than males ($M = 5.42, SE = .08$), $F(1, 296) = 12.75, p < .001$, partial $\eta^2 = .04$. Power usage ($\beta = .31, p < .001$) was also found to be significantly positively correlated with sense of control, $F(1, 296) = 18.04, p < .001$, adjusted $R^2 = .07$. However, no significant interaction was found
between the two predictor variables gender and power usage. Subsequent analyses showed the same pattern, such that gender and power usage showed significant main effects on sense of identity, intrinsic motivation and attitude toward portal. Particularly, females \( (M = 4.67, SE = .12) \) reported higher sense of identity than males \( (M = 4.14, SE = .13) \), \( F(1, 296) = 8.20, p < .01, \) partial \( \eta^2 = .02 \), and power usage \( (\beta = .32, p < .001) \) was significantly positively correlated with sense of identity, \( F(1, 296) = 7.90, p < .01, \) adjusted \( R^2 = .03 \). Furthermore, females \( (M = 5.50, SE = .08) \) showed higher intrinsic motivation than males \( (M = 5.16, SE = .10) \), \( F(1, 296) = 6.39, p < .05, \) partial \( \eta^2 = .02 \), as well as significantly more positive attitude toward the portal \( (M = 5.13, SE = .07) \), than males \( (M = 4.58, SE = .09) \), \( F(1, 296) = 20.49, p < .001, \) partial \( \eta^2 = .06 \). None of the above analyses showed a significant interaction between gender and power usage.

Summary of results

H1 and H2a proposed that engaging in cosmetic customization will enhance sense of identity and engaging in functional customization will afford a greater sense of control, respectively. H2b proposed that power users who engage in functional customization will report significantly more sense of control with the interface than non-power users. H3 proposed that two intervening variables, sense of control and sense of identity, will both be significantly correlated with intrinsic motivation. Finally, H4a and H4b proposed that intrinsic motivation will positively influence attitude toward the portal and conation respectively. Analyses of data showed support for all hypotheses (refer to Figure 7).
Specifically, a significant impact of both forms of customization on one’s sense of identity and sense of control with the interface was observed such that those who customized cosmetic elements of the web portal showed higher sense of identity, and those who customized functional elements of the stimulus web portal showed higher sense of control with the interface. Sense of identity and sense of control were significantly positively correlated with intrinsic motivation, which in turn was significantly positively correlated with attitudes toward the portal website, as well as conation.

However, when we controlled for the effect of sense of identity and sense of control in various analyses, a suppressor effect was observed such that a previously non-significant effect became significant in the opposite direction after the inclusion of the control variables. For example, cosmetic customization did not show a main effect on intrinsic motivation, but when sense of control and sense of identity were included in the analysis as covariates, cosmetic customization became a significant predictor, such that
those who engaged in cosmetic customization showed significantly lower intrinsic motivation than those who did not engage in cosmetic customization.

Further analysis also revealed that while cosmetic and functional customization did not show a significant main effect on attitude toward portal, they became significant once sense of control, sense of identity and intrinsic motivation were entered as covariates in the analysis. However, the effect of the predictors on conation was less pronounced. None of the predictors showed a significant main effect for conation at first. But, when the intervening variables were included in the analysis, cosmetic customization showed a reverse main effect, such that those who did not engage in cosmetic customization showed higher conation than those who engaged in cosmetic customization. The other two independent variables, functional customization and power usage, did not show a significant relationship with conation.
CHAPTER – 4

DISCUSSION

This study was designed to understand the psychological constructs of sense of identity and sense of control in the context of cosmetic and functional customization of a portal website. To that effect, a meaning analysis of cosmetic and functional customization was conducted. The effect of both types of customization on attitude toward the portal and conation was tested in a controlled experiment. Cosmetic customization and functional customization were manipulated such that participants were randomly assigned to either perform cosmetic customization, or functional customization, or both or no customization. Participants’ sense of identity, sense of control, intrinsic motivation, attitude toward portal and intention to revisit the portal were measured after the customization activity. Statistical analyses showed support for all the proposed hypotheses. As predicted, cosmetic customization was significantly associated with one’s sense of identity while functional customization was associated with one’s sense of control. Both sense of identity and sense of control were significantly correlated with intrinsic motivation, which in turn was significantly correlated with attitude toward portal and conation. Power usage consistently came up as a strong predictor of sense of identity, sense of control, as well as intrinsic motivation and attitude toward portal.

This chapter interprets these findings and discusses the implications of those interpretations for advancing theory and practice. It concludes by identifying limitations of the study and outlining directions for future research.
Interpretation of findings

A quick review of different technological devices around us shows that the potential to engage in customization is pervasive. In addition to the portal websites that we visit, computers, MP3 players, cell phones, video games, digital cameras, digital photo frames and countless other devices are designed to accommodate user preferences and offer a great deal of control to users. Considering that it is a very involving process, customizing an interface has the potential to take up a lot of time. For example, a survey (Ducheneaut et al., 2009) found that citizens in Second Life spent as much as 93 minutes per week on average, customizing their avatar. Based on the depth of customization allowed by an interface, it can be an effortful and sometimes complex process. Given that, the initial reaction of most individuals might be to stay away from customization. Indeed, in an online survey, only 186 of 318 (58.5%) users of a health portal reported that they had engaged in some customization of the portal (Marathe, Kang, & Sundar, 2010). Those who did not, reported that the most important reason for not customizing was lack of time. This dissertation study holds meaning for both these groups of users as it clearly demonstrates that customization has deep psychological value when users indeed take the time to engage in it. Data show that both cosmetic and functional customization are associated with two psychologically meaningful gratifications.

Cosmetic customization

Cosmetic customization, or presentation-based changes to the interface, provided many insights into user psychology. First, it emerged as a significant predictor of sense of identity. Specifically, those who made cosmetic changes to the stimulus portal website
showed significantly stronger sense of identity with the customized interface, than those who did not. This finding lent support to hypothesis H1. However, this effect disappeared when a follow-up ANCOVA was conducted, with sense of control as a covariate. In other words, sense of control helped explain the variance in sense of identity caused by cosmetic customization. This was echoed in the omnibus General Linear Model (GLM) test, which also revealed a significant relationship between cosmetic customization and sense of control. That is, those who engaged in cosmetic customization showed higher sense of control than those who did not. Upon careful consideration, the connection between cosmetic customization and sense of control is not surprising. When users make cosmetic changes to the interface, they are essentially exerting control over the design of the interface. Whether it is changing the color of a webpage or dressing up an avatar in a video game, users are able to express their desires and preferences through various seemingly trivial cosmetic changes. Engaging in cosmetic customization should therefore imbue some sense of control in users. Whether it is the same kind of control one experiences while making non-cosmetic changes to the interface (e.g., altering privacy settings) remains to be seen. When an Analysis of Covariance (ANCOVA) was conducted to further explore this relationship between cosmetic customization and SOC, with sense of identity as a covariate, the magnitude of the effect of cosmetic customization on sense of control was lower, but it still remained significant.

Cosmetic customization thus shows two distinct patterns of effects on the intervening variables. While the effect of cosmetic customization on sense of identity is fully mediated by sense of control, some part of the effect of cosmetic customization on sense of control still remains unexplained after including sense of identity in the
statistical model. Psychologically, it means that when users engage in cosmetic customization, expressing identity is all about having control, but having control has implications beyond simply expressing identity. In other words, cosmetic customization leads to a strong sense of control, part of which is tied to one’s identity. Therefore, user experience of customization tools is fundamentally tied to the perceived degree to which the interface can afford control by way of user adaptability and tailoring. It appears therefore that control is related to the actual process of customization whereas identity is an outcome of cosmetic changes to the interface.

More interesting results were revealed when the effect of cosmetic customization on intrinsic motivation was analyzed. In an omnibus General Linear Model (GLM) test with the three independent variables on intrinsic motivation, it was found that cosmetic customization did not have a main effect on intrinsic motivation. This finding did not change even after controlling for sense of control in an Analysis of Covariance (ANCOVA). On the other hand, the main effect of cosmetic customization on intrinsic motivation approached significance when sense of identity was introduced as a covariate instead of sense of control. But when they were both entered as covariates, the previously non-significant effect of cosmetic customization on intrinsic motivation became significant, thus suggesting a “suppression effect” (MacKinnon et al., 2000) - an increase in the magnitude of the relationship between the independent and dependent variables when the effect of a mediational or confounding effect is statistically removed. Those who engaged in cosmetic customization showed significantly lower intrinsic motivation than those who did not engage in cosmetic customization. These results were mimicked when the same analysis was done with cosmetic customization as the only predictor.
Such a phenomenon, when seen in a mediational model, is called an ‘inconsistent mediation model’ (Tzelgov & Henik, 1991) – a model where the direct and indirect effects of an independent variable on dependent variable have opposite signs. In the case of this study however, the first criterion of mediation – significant relationship between independent and dependent variables – specified by Baron and Kenny (1986) is not satisfied. A hypothetical example of such a scenario, where even the absence of a significant relationship between the independent and dependent variables shows an inconsistent mediation effect, was discussed by McFatter (1979). Our finding fits that description perfectly and suggests presence of indirect effects (Hayes, 2009). An indirect effects macro (Preacher & Hayes, 2008) was used to further explore the indirect effects. Results indeed showed that sense of control and sense of identity mediated the relationship between cosmetic customization and intrinsic motivation, even in the absence of a total effect. The direct and indirect effects were of fairly equal magnitude and opposite signs, hence producing an overall non-significant relationship, as pointed out by MacKinnon, Krull and Lockwood (2000).

While this finding is statistically interesting, its theoretical implication is even more remarkable. The reversal in direction for the effect suggests that if the portion of intrinsic motivation that is due to sense of identity and sense of control is removed, then the remainder of the intrinsic motivation is negatively explained by cosmetic customization. So, for the part of intrinsic motivation that is unrelated to sense of identity and sense of control, engaging in cosmetic customization reduces intrinsic motivation. In other words, cosmetic customization opportunities that do not engender some sense of identity or sense of control with the interface will serve to minimize intrinsic motivation.
**Functional customization**

Functional customization, i.e., task-related changes to the interface, led to a stronger sense of control. A follow-up ANCOVA, with sense of identity as covariate, revealed that the previously significant effect of functional customization on sense of control ceased to be significant, thus suggesting full mediation. This result implies that sense of identity fully mediates the effect of functional customization on sense of control.

Tests also revealed a significant relationship between functional customization and sense of identity. That is, those who engaged in functional customization showed higher sense of identity with the interface than those who did not. A significant relationship between functional customization and sense of identity is surprising. This finding essentially suggests that making functional changes to an interface, such as customizing different settings and making the interface do exactly what one wants, is all part of a user’s identity. One possibility for such a finding is that the participants in our study are used to customizing different interfaces. They are probably high-end technology users whose identity is wrapped around what they can do with an interface and how they can make it work for them. If this is the case, one would expect to see the sense of identity among power users to be stronger, compared to non-power users, when making functional (task-based) changes to an interface. That is, power usage should moderate the relationship between functional customization and sense of identity. However, an analysis failed to yield a significant interaction between power usage and functional customization. The addition of other controls--gender, need for cognition and amount of media consumption--did not reveal anything of significance either.
Another reason for this could be the fact that participants in all conditions had engaged in customization activities that were not a part of their condition. As discussed before, participants who were in the functional customization condition had also performed some cosmetic customization and vice versa. To control for the effect of such contamination, we decided to use the actual number of cosmetic and functional changes by participants as proxies for the manipulated independent variables – cosmetic and functional customization. This analysis showed the same pattern as before – namely, all three predictor variables showed significant main effects on sense of identity. However, when we controlled for the effect of customization activities that may have been done solely because of the instructions, (i.e., when we entered the manipulated condition variable as a covariate in the analysis), we found that making cosmetic changes did not influence sense of identity. However, the number of functional changes did affect sense of identity. The significant interaction between number of cosmetic and functional changes on sense of identity showed interesting insight, suggesting a reason for the absence of the main effect of cosmetic customization on sense of identity. Specifically, those who made a lot of functional changes showed no significant change in the level of sense of identity with increase in the number of cosmetic changes. However, for those who made fewer functional changes, sense of identity increased significantly with increase in the number of cosmetic changes. This result implies that functional changes contribute to a sense of identity, and cosmetic changes contribute significantly to it only when the number of functional changes is low.

When sense of control was introduced as a covariate in the second step of this analysis, the main effect for functional customization remained significant on sense of
identity, although its magnitude was reduced. This analysis shows that while sense of control contributes significantly to the sense of identity arising from functional customization, there are probably other mediators explaining this unexpected outcome of functional customization. In general, the influence of functional customization on sense of identity (both via sense of control or other, unknown mediators) and the absence of an interaction with power-usage implies that interface tools can serve as potential tools for self-realization even among the uninitiated. By allowing users of all skills levels to self-tailor their information universe, functional customization features can be quite influential in helping shape one’s self-representation, both for oneself and others. If these features are easy to use, as they were in this study, they seem to offer a sense of control over the interface, thus holding out the potential for combating digital divide. This perhaps explains the widespread adoption and popularity of interfaces such Facebook, Tivo and iPod, all of which offer a variety of simple tools for functional customization.

A General Linear Model (GLM) with the three predictors on intrinsic motivation revealed a significant main effect for functional customization, such that those who engaged in functional customization reported higher intrinsic motivation than those who did not engage in functional customization. This effect became non-significant when first sense of control, then sense of identity and then both were entered into the analysis as covariates. This finding supports the claim made by Sundar (2007) that source interactivity, through customization, leads to greater user engagement with content because it generates higher levels of cognitive involvement with the interface. Beyond this, the finding also helps expand our understanding by demonstrating the role of two mediators which explain the relationship. Essentially, this study shows that source
interactivity, or functional customization, instills a sense of identity and sense of control in the user, and thus affects their attention, involvement, and enjoyment with the task and interface at hand.

*Cosmetic x functional customization*

Significant interactions between cosmetic and functional customization revealed that participants who engaged in some kind of customization (be it cosmetic, functional or both) showed significantly more sense of identity and sense of control than those who did not perform any customization. One implication is that, regardless of the nature of customization outcomes, offering some features that are manipulable by users is better than offering none. As suggested by the agency model of customization (Sundar, 2008), the ability of the user to serve as source or gatekeeper of content is critical for realizing the benefits of self-agency. Our findings suggest that cosmetic and functional customization features are fungible when it comes to influencing user’s sense of agency.

Presence of a suppression effect for both cosmetic and functional customization on attitude toward portal undoubtedly also shows that the mediators – sense of identity, sense of control and intrinsic motivation – play a vital role in ensuring positive attitudes. We found that cosmetic and functional activities that do not foster SOI, SOC and intrinsic motivation, eventually have a negative effect on attitudes. The effect of these predictors on conation (behavioral intention), however, are more telling. We found that while none of the predictors significantly affected behavioral intention, a suppressor effect was found only for cosmetic customization after controlling for the mediators. This finding suggests that while both cosmetic and functional customization play a vital role in influencing
one’s attitudes, behavioral intention is influenced solely by cosmetic customization, as dependent on one’s sense of identity, sense of control and intrinsic motivation.

**Power usage**

Across multiple analyses, power usage emerged as a significant predictor of sense of identity, sense of control, intrinsic motivation and attitude toward portal. As power usage increased, participants reported a higher sense of control, sense of identity, intrinsic motivation as well as attitudes toward the portal.

An omnibus General Linear Model (GLM) with the three predictors on sense of identity showed that power usage was significantly positively correlated with one’s sense of identity with the interface. This significant effect, however, disappeared once sense of control was introduced into the analysis as a covariate, thereby suggesting that sense of control mediates the effect of power usage on sense of identity. It appears that power users tend to derive their identity from the control afforded by customization.

The omnibus analysis which revealed a significant interaction effect between functional customization and power usage on sense of control (after controlling for sense of identity) further explains this phenomenon by showing that those who were on the lower end of the power usage scale showed higher sense of control with the interface when they did not engage in functional customization, while those who were on the higher end of the power usage scale showed higher sense of control when they engaged in functional customization. This finding not only supports H2b, but also provides an explanation for the positive attitudes resulting from user-initiated customization (as compared to system-driven personalization) discovered by Sundar and Marathe (2010).
Clearly, the act of making task-related changes to the interface that go beyond serving an identity-enhancing purpose bring with them the ability to exert control over the interface, but this ability is appreciated by power users more than regular users. Do non-power users not seek control? Do these findings imply that non-power users are somehow inhibited in their use of functional features that keeps them from experiencing control? Theoretically, this finding implies that the sense of agency has somewhat different meanings for power users and regular users, such that control is an integral part of agency for the former whereas identity is a key aspect of agency for the latter. Exploring the role of convenience, usefulness and ease of use of customization features for non-power users, as well as other possible antecedents to sense of control, will help shed more light on the reasons behind this finding.

*Insights on the role of gender*

Multiple analyses found a monolithic effect of gender on the various response variables and no significant interaction with power usage, such that females reported feeling more sense of control, sense of identity, intrinsic motivation and more positive attitude toward the portal, compared to the males in the study. It seems that females actually derived a better experience from the customization and portal browsing activity in the study than males. A potential alternative explanation could be that females felt freer in acknowledging that they derived a rich experience. Although the data in this study do not lend a concrete explanation, future research should explore the role of gender in various customization activities.
Theoretical implications

The most significant contribution of this study is the demonstration of a theoretically governed manner of studying something that has been, until now, investigated in terms of different interface features. Rather than thinking about customization in feature-specific terms, can we instead design for higher-order needs (Maslow, 1943)? In other words, instead of building interfaces that have one or the other customization features, can we think about building identity-enhancing and control-enhancing interfaces? Thinking about customization in terms of different features (e.g. changing color, adding widget, creating news category), we gain only limited insights into an individual’s use of technology, not a nuanced understanding of the psychology surrounding customization. We lose the opportunity to understand why a user wanted to change color or add a particular widget. Instead, taking a goal-centered approach (Cooper, Reimann, & Cronin, 2007) allows us to understand user motivations and higher order psychological drivers that lead them to use those particular features. Thus, defining customization as presentation-based and task-based, and exploring its relationship with different psychological variables, offers a deeply insightful and rich understanding of the process, as shown by this study.

Another theoretical insight of this dissertation comes from the mixed finding about the relationship between cosmetic and functional customization with the intervening variables of sense of identity and sense of control. As expected, results indicated that presentation-based cosmetic customization is strongly related to one’s sense of identity, while task-based functional customization is related to one’s sense of control. However, contrary to initial theoretical conviction, sense of identity was found to
be closely tied to functional customization as well, and sense of control to cosmetic customization, thus ruling out a possibility that they are theoretically distinct set of gratifications. Taking the cue from the agency model of customization (Sundar, 2008), one could reason that sense of agency subsumes the overall feeling of identity and control in an interface that allows a user to act as a source of information and action. Sense of agency is connected with our awareness of being an initiator of action, of being volitional in our environment. It is no surprise that one’s sense of personal agency is closely tied with sense of control. Sundar (2008) also argues that the ability to serve as a source offers the user a chance to assert his/her identity in an interactive digital space. Psychologically then, sense of control and sense of identity may form two operationalizations of a single construct – sense of agency. Possibly, in this study context, sense of agency acts as a latent variable and provides rationalization for the theoretically non-distinct gratifications. More importantly, this insight highlights the need to include sense of agency as an important aspect of a user’s experience with customizable technology. The key to designing successful user experiences with customizable media lies in grounding the design in gratifications that offer “agentic value” to the end user.

As mediators, this study has helped establish sense of control and sense of identity as two meaningful routes from customization to intrinsic motivation and to attitude beyond that. However, both factors do not manifest themselves equally in the overall theoretical model. Data show that sense of control plays a more significant role in the overall study model than sense of identity. To begin with, sense of control fully mediates the sense of identity caused by cosmetic customization, but sense of identity fails to do the same with sense of control. Similarly, sense of control fully mediates the relationship
between functional customization and intrinsic motivation, as well as power usage and intrinsic motivation. But why does sense of control play such a significant role? Does it address a more basic need than identity? The Uses and Gratifications (Katz, Blumler, & Gurevitch, 1973) framework in mass communications posits that basic social-psychological needs drive user behaviors, and that media are preferred over functional alternatives (i.e., non-media ways of fulfilling felt needs) especially when they offer individual use and choice (Rubin, 1994). Both forms of customization studied here afford user choice in a much more pronounced manner than what was possible with older media. The concept of “audience activity” introduced by this framework is used typically in reference to users expressing their choice by way of selection behavior using remote-control devices while watching television. Customization tools, like the ones introduced in this study, take the concept of audience activity to a whole new level, affording users a much more profound sense of choice and control, leading perhaps to a new suite of gratifications (Sundar & Limperos, 2010). As Marathe, Kang and Sundar (2010) discovered in a recent survey of health portal users, website customization gratifications manifested themselves in 3 distinct ways – conveying personality, establishing efficiency, and enhancing social life. These higher-order gratifications are probably rooted in the sense of control and sense of identity emanating from customization activities.

Given significant effects of both types of customization on persuasion outcomes such as attitudes and behavioral intentions toward the portal, this study holds implications for captology, i.e., the study of technologies as persuasive devices (Fogg, 1998). Suppressor effects described earlier imply that if customization features offered by an interface fail to engender sense of control and/ or sense of identity in a user, they will
indeed negatively affect one’s attitude toward portal. Clearly, customization tools require user attention and energy, and they will invite scorn if they do not let users to exert control over the interface and/or help shape their personal identity. Expectancy theory suggests that when multiple options are available, individuals choose among them based on their perceived effort-performance relationship (Vroom, 1964) and the value they think each offers. It appears that the mere offering of customization tools serves to raise expectations for personal fulfillment – be it establishing one’s control over the interface or construct one’s identity. This has obvious implications for how customization tools are designed and marketed in interfaces.

Practical implications

While this study was conducted with a portal website as stimulus, it is safe to say that it holds implications for other customizable technologies as well.

Mass customization

The mass customization industry has always provided users with simple, mostly presentation-based, cosmetic customization options. For example, Apple Inc. allows their customers to choose a color and write/ engrave a short message on the iPod Shuffle during the purchase. While the actual iPod shipped to all the consumers is exactly the same, the customers receive a product that is highly personal to them. Such cosmetic changes abound many different products that are mass produced. This study shows that cosmetically customizing an interface stimulates a strong sense of identity among the users and finally helps enhance attitude toward the interface. Mass customization
marketers however need to be careful in providing different cosmetic features to their consumers. Cosmetic customization features that do not trigger sense of identity among users will ultimately prove more harmful than helpful in attracting users to the interface.

Marketing domain

One obvious practical implication of this study and its findings is in the marketing domain. Marketers strive to understand consumer needs and motivations so as to be able to predict market behavior. By understanding consumer needs and meeting those demands, product manufacturers can make their product stand out in the market. Promotion of a product or an interface thus depends on nuanced understanding of the gratifications users are seeking when they buy the product. This study proves that promoting customization features based on consumer needs of identity enhancement or control enhancement will have a greater chance of user acceptance than simply suggesting that a product or an interface is customizable. Most customizable interfaces & products available in the market simply present a long list of available options, and never try to appeal to a user’s innate psychological needs.

Design of user interfaces

Interactive and customizable products can no more be seen as simple tools with features designed to fulfill users’ instrumental goals. It is clear that customization has gone beyond the cognitive, usability and affective outcomes of traditional HCI research. Thinking about interfaces as identity-enhancing or control-enhancing tools provides us with a chance to actually design user experiences with systems, rather than solitary and
dispersed customization features. Thinking about an entire product experience lets designers define and create harmonious user experiences and frees them from having to design any single customization feature in one part of the system. Design of user experiences also brings to the fore a simple but elegant fact – by fulfilling higher order needs like enhancing identity or control, designers can create an interface that is an end in itself rather than a means. This approach will undoubtedly also guide designers away from the trap of deploying the coolest new features and then trying to find users for the tools. When the primary focus of design is based on generating value for users, it ensures attention to user goals and the psychological aspects of customization.

As discussed previously, results show that while sense of control fully mediates the relationship between cosmetic customization and sense of identity, having control holds implications beyond expressing one’s identity. From an interface design point of view, it makes sense to include customization features that offer controllability first and foremost. This should also take care of stimulating sense of identity among users. Identity can then be considered as a marketing appeal that possibly functions as an outcome of the afforded controllability. In designing interface features, UI designers need to consider what gratification each cosmetic and functional feature will imbue in the user and strategically include them based on the larger design goals of the system.

This study showed that once the effect of sense of identity was controlled for, functional customizers who were on the lower end of the power usage spectrum reported lower sense of control with the interface compared to those who did not engage in functional customization. Thus, UI designers need to recognize that engaging in functional customization serves to threaten non-power users’ sense of control with the
interface, in the absence of identity enhancement. Clearly, non-power users cannot be considered ‘blank slates’ (Carroll & Rosson, 1987). Indeed, it is entirely possible that many novice users, although on the lower end of the power usage scale, are actually experts in the content domain and hence may have evolved functional needs from an interface. For example, an already skilled musician learning to use a digital musical instrument might want to be able to customize many different functional settings (e.g., pitch) on the instrument. But, different barriers (e.g. difficulty of use, no knowledge of existing features, low self-efficacy) might keep him/her from using these features to their fullest extent and thus possibly taking full advantage of interface functionality. Examples of users falling prey to accidental customization (Harris, 2006) are reported frequently. Dyck, Pinelle, Brown and Gutwin (2003) share such a hypothetical example about video games allowing users to remap certain keys into different functions. Players generally remap keys in order to bring efficiency or extra functionality to a video game. However, these researchers concede that allowing users to do that might lead to chaos if users make mistakes while remapping. When users make such mistakes, their sense of control with the interface is bound to be impaired, which could perhaps be mitigated by providing a heightened sense of identity. Designers thus need to be conscious of the identity-enhancing potential of functional customization options, given its ability to affect users’ sense of control.

Given the demonstrated empirical significance of the concept of sense of control in user interactions with customizable devices, system designers ought to understand the fine line between features that give meaningful control to users and those that simply offer pseudo-control. Paying attention to the context of the interaction might shed some
light on this issue. For instance, a health portal dedicated to weight loss issues (e.g. www.weight-loss.fitness.com) allows users to only change their screen name and account settings (e.g. email address). On the other hand, another health portal dedicated to issues of healthy eating and weight loss (nutritiondata.com) allows its users to customize a meal planner and lets them create and print shopping lists based on their individual dietary needs, in addition to offering email and account-setting customization. Clearly, the latter offers functional control to users, which is much more in tune with the context of health portal usage than the former.

Customization has always been a secondary activity – we customize interfaces and devices to get them ready to do the task at hand. Managing privacy settings on a social networking website, getting an avatar ready in a video game and setting a wallpaper on a cell phone screen are all done so that one is able to start communicating and networking, start playing the video game and start making phone calls. Irrespective of whether the changes one makes are presentation based or task based, they generally surround and generally precede a primary activity that one is about to do. And yet, this present investigation shows profound psychological repercussions of engaging in an activity that is designed as a supporting mechanism to the task at hand. The fact that intrinsic motivation about using a system is deeply affected by whether or not customization features enhance one’s sense of identity and control with the interface offer credence to the notion that customization can become an end in itself rather than a means to an end. It becomes imperative therefore that UI design actively focus on building cosmetic and functional customization features as separate value-added components of
the interface (that together build strong user experiences) instead of viewing them simply as enhancements to other task-central tools on the interface.

The strong relationship between functional customization and sense of identity offers another practical implication to designers. Functional customization is generally associated with work-related practices and cosmetic customization with embellishments surrounding those work practices. For most features, systems, and scenarios, this equation hold true. However, in social software, which promote social interaction between users and let users communicate, interact and form social relationships with other users (e.g., social networking services such as Facebook and MySpace, social bookmarking venues such as del.icio.us, social search engines, file sharing and tagging venues such as YouTube, multi-player online games, and other social media such as blogs and wikis), carefully constructing and conveying an identity to other users is quite task-central. Results from this dissertation study provide evidence for this by showing a significant relationship between functional customization and sense of identity, especially for power users. Thus, creators of social software and communication interfaces will need to take into account the identity-enhancing aspect while designing functional customization features.

Limitations

Although using an existing commercial portal for the study provided strong ecological validity to the findings, it also proved to be a significant limitation in the present investigation. Netvibes portal was chosen after careful examination of many different interfaces because it provided multiple customization features that were faithful
representations of cosmetic and functional customization as operationalized in this study. However, since it was a commercial portal, no control over the structure of the portal was possible. This meant that all the customization options were technically available for the participants to explore and use. Although a manipulation check proved successful, it was also seen that all participants, possibly unknowingly, had made changes to the interface that were not a part of their experimental condition. It is possible that at least one reason for the unexpected, but significant, connection between cosmetic customization and control, and that between functional customization and sense of identity, could have been due to such contamination of condition. Hence, a true test of cosmetic and functional customization will happen only when user interaction is restricted to those changes that are actually part of their experimental condition, i.e., either only functional or only cosmetic customization.

Bunt, Conati and McGrenere (2004) have pointed out that to be able to better deploy customizable tools, we need to understand the value of customization, and whether or not users can customize effectively. This dissertation study follows through with the first objective by exploring customization as task-based and presentation-based changes and the psychology surrounding these activities. While that in itself is a most valuable contribution, the design of the study does not offer any insight into how effectively users are able to make task-based and presentation-based features. Are one set of changes easier than the other? Is cosmetic change actually customization-lite? To be actually able to answer these questions and successfully implement cosmetic and functional customization, future research should explore the ease of use and usability of various customizable systems.
Directions for future research

Although power usage emerged as a significant predictor of different psychological variables, this study was not able to bring forward any understanding of how the variable interacted with other predictor variables, except one. In other words, none of the analyses showed any significant interaction of this individual difference variable with cosmetic and functional customization. Methodologically, the only two manipulated variables were cosmetic and functional customization, while power usage was measured once the participants came to the lab. Future research might benefit from an experiment where participants are assigned to specific conditions based on their level of power usage.

An enhanced understanding of customization practices will come out of understanding the reasons for customization and the gratifications users seek when they engage in different types of customization. Blom and Monk (2003) conducted 3 comprehensive qualitative studies to explore the reasons behind customization practices reported by computer and mobile phone users. Frequency of use, ownership of the system, knowledge of customization, ease and cost of customization, socioeconomical context of use, as well as seasonal and peer influences, were the most common reasons reported by respondents. They also reported cognitive, social and emotional effects of engaging in customization activities. Another similar survey of 318 prevention.com users conducted by Marathe, et al (2010) also revealed that customization activities on the health portal were mainly driven by gratifications related to efficiency of health information management, conveying identity on the portal, and socialization with other users of the health portal. All three gratifications were significantly correlated with health
information-seeking on the portal. Further research on gratifications sought will prove most revealing of the psychology surrounding customization practices and will help us design better interfaces.

The linkage between cosmetic customization and sense of control also merits further examination. This study employed a questionnaire for sense of control that might have been too generic to discover the nuances between sense of control experienced through presentation-based vs. task-based customization. For example, participants were asked to indicate their agreement with statements such as: ‘I was able to initiate actions to modify the website’, ‘I was able to adapt the website in a way I wanted’, ‘I was able to adapt the interface to my personal taste’ and ‘During my interaction with the interface I was able to make choices freely’, among many others. Although an exploratory factor analysis for sense of control with these data did not show a theoretically meaningful pattern, it is possible that further exploration of the literature and modifications to the questions might reveal some interesting insights.

While experimental research is invaluable for exploring causal relationships between variables, it creates an artificial environment for user testing. Although this problem is true for all experimental research, it is particularly problematic when user control is the subject of study. Manipulating customization, i.e., having participants customize presentation-based and task-based features in the lab, takes away some of the control from them. For the action that is supposed to be self-determined, a researcher ends up deciding what and how long participants will spend in customization. Similarly, people engage in customizing an interface when they want to use that interface for a prolonged interval of time. Customization takes effort and time, and it is safe to assume
that users who engage in customization activity with an interface also show significant involvement with that interface. Hence, while this experimental study provides causal interpretations and has strong internal validity, a more qualitative longitudinal study of customization will reveal more ecologically valid insights into customization practices.

Conclusion

We are already in the midst of the ‘me’ revolution. With seemingly infinite customization choices that help us control our own media and technology experiences, we are fundamentally changing the way we communicate. And yet we know very little about the nuances underlying these changes. This dissertation study was designed to investigate the effect of engaging in presentation-based cosmetic customization and task-based functional customization on attitudinal and behavioral outcomes. Through a controlled lab experiment, this study found that cosmetic and functional customization are associated with two psychological constructs – sense of identity and sense of control – that play a key role in enhancing intrinsic motivation to use and explore the interface.

Today, a user defines his/ her experience with an interface as much or probably more than a designer who builds that interface. It is clear that customization has become a powerful tool in this process. Going forward, we need to consider how users shape this tool and are shaped by it, both psychologically and behaviorally.
REFERENCES


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APPENDIX A

MEANING ANALYSIS PRETEST MEASURES

1. What is the first verb/action word that comes to mind when you think about the following:

E.g. Chair: Sit
   a. Cell phone: _________________________________
   b. TiVo: _________________________________
   c. Facebook: _________________________________
   d. Personal computer: _________________________________
   e. Youtube: _________________________________
   f. Gmail: _________________________________
   g. Mozilla Firefox: _________________________________
   h. TV: _________________________________
   i. iPod: _________________________________
   j. Flickr: _________________________________
   k. Radio: _________________________________
   l. Instant messenger: _________________________________

2. If following are the things you generally do, please list your favorite online/technology venues for each one of them.
   a. Email: _________________________________
   b. Blog: _________________________________
   c. Social networking: _________________________________
   d. Search engine: _________________________________
   e. Instant message: _________________________________
   f. Share/view photos: _________________________________
   g. Share/view videos: _________________________________
   h. Weather: _________________________________
   i. Maps: _________________________________
   j. Books: _________________________________
   k. To do list: _________________________________
   l. Shopping: _________________________________

3. On different technological interfaces you use, do you customize?
   *Customization = user initiated, user controlled changes to the default state of any technological system*
   
   Yes        No

4. What is the first thing that comes to mind when you think of customization?
5. Do you have different ring tones for at least some people on your cell phone? If yes, why? If no, why?

6. If you do have different ring tones, which end of the scale would you be on?

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<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I think they make it easy to quickly identify who is calling without looking at the screen</td>
<td>I like the variety in ring tones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. What do you enjoy most about customizing an interface, be it something like a cell phone or a website you use?

8. Please describe one instance where you think you’ve used the customization potential of an interface very creatively (to get the interface to do something that isn’t the default setting, or get it to be a certain way…).

9. In general, why do you customize interfaces?

10. Consider an interface that you use exactly as it is (or almost) without customizing. Name of the interface: ________________________________
    a. The defaults are generally so good, I don’t need to make any changes
    b. The customization tools are generally too difficult
    c. I don’t have enough time to customize
    d. I don’t need customized interfaces
    e. I had no idea they allowed users to make changes!
    f. It just doesn’t let me make the change I really want to.
    g. Other? ________________________________
APPENDIX B

STUDY QUESTIONNAIRES

QUESTIONNAIRE I

Power Usage Scale Questions

Please indicate your agreement with the following statements on a 1 to 7 scale, 1 being Strongly Disagree and 7 being Strongly Agree.

1. I love to use most of the communication technological gadgets like computers, cell phones, PDAs, cameras, ipods etc.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

2. I make good use of most of the features available in any technological device.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

3. I have to have the latest available upgrades of technological devices that I use.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

4. I love exploring all the features that any technological gadget has to offer.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

5. I often find myself using many technological devices simultaneously (multitasking).

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

6. I prefer to ask friends how to use any new technological gadget instead of trying to figure it out myself. R

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7. Using any technological device comes easy to me.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

R = Reverse coded for consistency
8. I feel like information technology is a part of my daily life.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

9. I think cell phones that have multiple features like a camera, email etc. are terrific.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

10. Using information technology improves my productivity.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

11. Using information technology gives me greater control over my work environment.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

12. I like to challenge myself in figuring out how to use any new technology.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

13. A little bit of intuition is all that is needed to figure out how to use any new technology.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

14. I would feel lost without information technology.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

15. I need very detailed instructions when using any technological interface for the first time. R

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
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<th>5</th>
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<th>7</th>
<th>Strongly Agree</th>
</tr>
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</table>

16. I like to learn new software or use new technological devices on my own.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
17. Many of my friends come to me to get help related to technological gadgets.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>7</th>
<th>Strongly Agree</th>
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</table>

18. I think most of the technological gadgets are complicated to use. R

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
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<th>3</th>
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<th>7</th>
<th>Strongly Agree</th>
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19. I find myself using keyboard shortcuts on the computer.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
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<th>7</th>
<th>Strongly Agree</th>
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</table>

20. Use of information technology has almost replaced my use of paper.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
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<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
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**Need for Cognition Scale Questions**

*Please indicate your agreement with the following statements on a 1 to 7 scale, 1 being Strongly Disagree and 7 being Strongly Agree.*

1. I only think as hard as I have to. R

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
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<th>3</th>
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<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

2. It’s enough for me that something gets the job done; I don’t care how or why it works. R

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
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<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

3. Thinking is not my idea of fun. R

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
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<th>4</th>
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<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

4. I like to have the responsibility of handling a situation that requires a lot of thinking.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
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<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
5. I prefer my life to be filled with puzzles that I must solve.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

6. I really enjoy a task that involves coming up with new solutions to problems.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
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<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

7. In general, I would prefer solving complex to simple problems.

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>1</th>
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<th>3</th>
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<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

**Technology Usage Scale Questions**

Which of the following do you regularly use? Check ALL that apply.

- Desktop computer
- Laptop computer
- Cell phone
- Blackberry, Palm or other personal digital assistant
- iPod or other MP3 player
- Digital camera
- Video camera

**Media Consumption Motivation Scale Questions**

On a scale of 1 to 7, 1 being ‘Not at All’ and 7 being ‘Very Much’, please indicate your motivation level to do the following on a regular basis.

1. Keep up with current political news

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

2. Keep in touch with friends via social networks

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

3. Keep up with latest fashion trends

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>
4. Keep up with the latest entertainment news

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

5. Read blogs

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

6. Keep up with local weather

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

7. Keep up with the most popular videos

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

8. Look at photos being uploaded daily by different users

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

9. Keep up with the latest sports news

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

10. Share your photos with friends

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

11. Keep an online calendar for your activities

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

12. Search for different types of information on search engines

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

13. Search for different podcasts

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>
14. Online shopping

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

15. Create online content

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

**QUESTIONNAIRE II**

Were you familiar with THIS PORTAL (NetVibes) before the study?
Yes            No

**Browsing Experience Scale Questions**

*On a scale of 1 to 7, 1 being ‘Not at All’ and 7 being ‘Very Much’, please indicate how you felt while browsing the portal.*

1. Absorbed

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

2. Involved

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

3. Frustrated

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

4. Satisfied

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>

5. Anxious

<table>
<thead>
<tr>
<th>Not at All</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Much</th>
</tr>
</thead>
</table>
6. Tensed

| Not at All | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very Much |

7. Stressed

| Not at All | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very Much |

8. Agitated

| Not at All | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very Much |

9. Exhausted

| Not at All | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very Much |

10. Bored

| Not at All | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Very Much |

**Sense of Control Scale Questions**

*On a scale of 1 to 7, 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’, please indicate your agreement with the following statements.*

1. I was able to control my interaction with the interface.

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly Agree |

2. The environment was responsive to the actions that I initiated (or performed).

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly Agree |

3. My interactions with the environment seemed natural.

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly Agree |

4. I was able to influence how the portal looked.

| Strongly Disagree | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Strongly Agree |
5. I was able to influence how each widget on the portal looked.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

6. I was able to influence how the portal worked.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7. I was able to influence which widgets to include on the portal.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

8. During my interaction with the interface I was able to make choices freely.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

9. I was able to adapt the website in a way I wanted.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

10. I was free to decide how I browsed the website.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

11. I felt in charge of my experience with the website.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

12. I was able to initiate actions to modify the website.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

13. The interface was rigid and inflexible to interact with. R

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

14. I was able to adapt the interface to my personal taste.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
15. I was able to change the aesthetics of the interface to my preferences.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**Sense of Identity Scale Questions**

*On a scale of 1 to 7, 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’, please indicate your agreement with the following statements.*

1. I feel ownership toward the interface.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

2. The interface reflects my personal identity.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

3. The interface reflected my personality very well.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

4. The interface is now a true representation of who I am.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

5. I was able to transform the interface into something I’d like to call my own.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

6. The interface fits my image.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7. The interface feels personal.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
**Ease of Use & Usability Scale Questions**

*On a scale of 1 to 7, 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’, please indicate your agreement with the following statements.*

1. The portal interface had a very simple design.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

2. Browsing the portal was easy.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

3. The portal interface was really complex. 

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

4. The portal interface had a very user friendly design.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

5. Interacting with the interface was often frustrating.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

6. Interacting with the interface required a lot of mental effort.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

7. I often became confused while browsing the interface according to the instructions.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

8. Learning to use the interface was tedious.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

9. It was difficult to become familiar with the portal interface.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
10. The activity I was asked to do with the interface was easy.

Intrinsic Motivation Scale Questions

On a scale of 1 to 7, 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’, please indicate your agreement with the following statements.

1. I kept browsing ONLY because I was asked to. R

2. I wanted to keep browsing the interface once I started.

3. Interacting with this interface did not hold my attention at all. R

4. I got personally involved with the interface task.

5. I enjoyed participating in this study.

6. I felt good about overall experience.

7. I liked what I was asked to do in this study.

8. The activity I was asked to do with the interface was fun.
Conation Scale Questions
On a scale of 1 to 7, 1 being ‘Not at all Likely’ and 7 being ‘Very Likely’, please indicate your agreement with the following statements.

1. How likely are you to use this portal for your personal use?

<table>
<thead>
<tr>
<th>Not at all Likely</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Likely</th>
</tr>
</thead>
</table>

2. How likely are you to recommend this portal to others?

<table>
<thead>
<tr>
<th>Not at all Likely</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Very Likely</th>
</tr>
</thead>
</table>

Attitude toward Portal Scale Questions
On a scale of 1 to 7, 1 being ‘Strongly Disagree’ and 7 being ‘Strongly Agree’, please indicate your agreement with the following statements.

1. The visual aspects of the portal were very involving.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

2. I am satisfied with the widgets on the interface.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

3. I am satisfied with the way the interface looks.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

4. The interface is fun.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

5. I would trust the content on this interface.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

6. The interface I interacted with was really cool.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>
7. The interface I browsed was really funky.

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

**Demographic Questions**

Gender: Male  Female

Age: _________ years

Class standing: Freshman  Sophomore  Junior  Senior
APPENDIX C

INSTRUCTIONS AND STUDY PROTOCOL

PART I: EMAIL SCRIPT

Hello,

This email is being sent out to give you more information about the Portal Usability study that was announced in class today.

Here are the study details:

**Name:** Portal Usability Study  
**Place:** Media Effects Research Lab, James Building, South Burrowes St (Collegian building; diagonally across Subway in downtown)  
**Dates:** From October 01, 2008 (Wednesday) to October 09, 2008 (Thursday)  
**Sessions:** From 9am to 7pm

The study will take about 35 minutes to complete. Once you sign up for the study and come to the lab for your session, you will be asked to answer a questionnaire, browse a portal website for about 15 minutes and then answer a questionnaire.

**To sign up for the study, please click here** [link].

This online signup page will close after 8pm on Monday, September 29th. Please make sure you sign up for this study before that time. To sign up for the study after that date, please send me an email at ssm161@psu.edu.

If you are interested in getting credit for participation, but cannot or do not want to participate in this study, you may choose to do an alternative assignment which is a 1 page (single spaced) critique of a journal article. **More information about the alternative assignment is here** [link].

If you have any questions, please feel free to send me an email at ssm161@psu.edu.

Thank you,  
Sampada.
PART II: INSTRUCTIONS AND STUDY PROTOCOL

Instructions for stimulus and procedure pretest

Welcome to the study and thank you for your participation.

Please imagine using this portal as your daily entry point on the web.

Here are a few things you can do on this page along with a lot others!

Place your cursor on the widgets to -

• Change color of the widgets by clicking the small triangle on the right top corner
• Move the widgets by dragging and dropping
• Rename the tab by clicking on the name
• Give your page the title you want
• Change the theme of the page by clicking on the settings link on the right top corner and then clicking on the themes tab

Please browse this website and its content as you like for about 20 minutes.

Thank you.

Instructions for study

Instructions – Cosmetic customization

Hello. Welcome to the study. Thank you for your participation.

The interface you are about to explore is called Netvibes.

Netvibes is a time efficient and creative method to manage your digital life and access cool new content everyday!

Exactly the way you want it.

The best startpage you can have is the one that you create for yourself!

Please imagine using this portal as your daily entry point on the web.

You will have about 10 minutes to customize the LOOK of this page to exactly how you want it.

Here are a few things you can do to customize the page

(Cosmetic options explained)

All of this information is also available to you in the handout provided.

Now please wait for further instructions.
**Instructions – Functional customization**

Hello. Welcome to the study. Thank you for your participation.

The interface you are about to explore is called Netvibes.

Netvibes is a time efficient and creative method to manage your digital life and access cool new content everyday!

Exactly the way you want it.

The best startpage you can have is the one that you create for yourself!

Please imagine using this portal as your daily entry point on the web.

You will have about 10 minutes to customize the **FUNCTIONALITY** of this page to exactly how you want it.

Here are a few things you can do to customize the page

*(Functional options explained)*

All of this information is also available to you in the handout provided.

Now please wait for further instructions.

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**Instructions – Cosmetic and Functional customization**

Hello. Welcome to the study. Thank you for your participation.

The interface you are about to explore is called Netvibes.

Netvibes is a time efficient and creative method to manage your digital life and access cool new content everyday!

Exactly the way you want it.

The best startpage you can have is the one that you create for yourself!

Please imagine using this portal as your daily entry point on the web.

You will have about 10 minutes to customize the **LOOK & FUNCTIONALITY** of this page to exactly how you want it.

Here are a few things you can do to customize the page

*(Cosmetic & Functional options explained)*

All of this information is also available to you in the handout provided.

Now please wait for further instructions.
Instructions – No Customization

Hello. Welcome to the study. Thank you for your participation.

The interface you are about to explore is called Netvibes.

Netvibes is a time efficient and creative method to manage your digital life and access cool new content everyday!

Exactly the way you want it.

Please imagine using this portal as your daily entry point on the web and browse the portal for about 10 minutes.

Please **DO NOT** change anything or add anything or delete anything on this page.

All of this information is also available to you in the handout provided.

Now please wait for further instructions.
VITA

Sampada Sameer Marathe

EDUCATION

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<th>Year</th>
<th>Degree</th>
<th>Institution</th>
<th>Location</th>
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<tbody>
<tr>
<td>2010</td>
<td>Ph.D.: Mass Communications</td>
<td>The Pennsylvania State University</td>
<td>University Park, PA, USA</td>
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EXPERIENCE

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<tr>
<th>Company</th>
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<tr>
<td>Verizon Wireless</td>
<td>User experience research intern, LTE Innovation Center</td>
<td>Nov 2009 – May 2010</td>
</tr>
<tr>
<td>Microsoft Inc.</td>
<td>User experience research intern, user eXperience Design &amp; Research</td>
<td>Jun 2009 – Sep 2009</td>
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RESEARCH INTERESTS

- Psychological aspects of new media technology
- Human Computer Interaction
- User centered design practices
- Media Effects
- Quantitative research methods, statistical analysis

AWARDS

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<tr>
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<tr>
<td>ACM SIGCHI Doctoral Consortium Award</td>
<td>Spring 2009</td>
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<tr>
<td>The University Graduate Fellowship</td>
<td>Fall 2004 – Sp 2005</td>
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PAPERS (Recent)