Influence of 3D Virtual Worlds on Expectations in 2D E-Commerce Environments

Minh Tran

26 March, 2010

Department of Computing
Faculty of Mathematics, Computing and Technology
The Open University

Walton Hall, Milton Keynes, MK7 6AA
United Kingdom

http://computing.open.ac.uk
Influence of 3D Virtual Worlds on Expectations in 2D E-Commerce Environments

First Year Probation Report

Submitted by

Minh Tran

Department of Computing
The Open University, UK

July 2009
Abstract

This is a first year probation report for the PhD project titled ‘Influence of 3D Virtual Worlds on Expectations in 2D E-commerce Environments’. The report contains research questions, a literature review, a pilot study report, a research methodology and a project work plan. Our project aims to understand the customer experience in 3D virtual worlds and its influence on expectations of 2D e-commerce environments. The proposed research methods are interviews, observations and diary studies. The methodological framework is based within the tradition of phenomenology. Phenomenology is concerned with how things are consciously perceived and seeks to understand the subjective qualities of experience, including its essential structure. The three main research questions are: What are the perceived experiences of customers in 3D virtual worlds? What are the perceived experiences of customers in 2D e-commerce environments who have experience in 3D virtual worlds? What are the differences in experiences and consumption behaviours between 3D virtual worlds and 2D e-commerce environments?

Student

Minh Tran
Department of Computing
m.tran@open.ac.uk

Supervision Team

Dr. Shailey Minocha
Department of Computing
s.minocha@open.ac.uk

Dr. Darren Langdridge
Department of Psychology
d.langdridge@open.ac.uk

Prof. Angus Laing
Business School (University of Glasgow)
a.w.laing@lbss.gla.ac.uk

Mr. Dave Roberts
Department of Computing
d.roberts@open.ac.uk
# Table of Contents

1 Introduction .............................................................................................................. 4  
1.1 Research questions .......................................................................................... 6  
1.2 Report outline ................................................................................................... 6  
1.3 Terminology ...................................................................................................... 7  

2 Literature Review .................................................................................................... 8  
2.1 Introduction ....................................................................................................... 8  
2.2 Customer experience and the service encounter .............................................. 8  
2.3 Service experience and retail environment ..................................................... 11  
2.4 User experience and technology design .......................................................... 14  
2.5 Social experience and computer-mediated interactions .................................. 16  
2.6 Differences between 3D and 2D environments ............................................ 18  
2.7 Summary of literature review ......................................................................... 20  

3 Methodology ........................................................................................................... 21  
3.1 Research approach .......................................................................................... 21  
3.2 Research plan summary ................................................................................... 27  
3.3 Justification of methods ................................................................................... 28  
3.4 Expected contributions of this project ........................................................... 31  

4 Pilot Study Report .................................................................................................. 32  
4.1 Overview .......................................................................................................... 32  
4.2 Results .............................................................................................................. 32  
4.3 Implications on the main study ...................................................................... 37  
4.4 Reflections on the pilot study ......................................................................... 38  

5 Conclusions ........................................................................................................... 43  
5.1 Project plan ...................................................................................................... 45  

6 References ............................................................................................................ 46  

7 Appendices ............................................................................................................ 54  
7.1 Pilot study interview template .......................................................................... 54  
7.2 [Pilot analysis] Participant profile ................................................................... 57  
7.3 [Pilot analysis] All Participant’s Experiences .................................................. 64  
7.4 [Pilot analysis] Extraction of themes ............................................................... 66  
7.5 Abstract written for CRC PhD Student Conference 2009 ............................. 69  
7.6 Poster created for OU Poster Competition 2009 ........................................... 72  
7.7 Progress report of year one ............................................................................ 73
1 Introduction

This report has been submitted towards the first year probation assessment. It is a report of work completed from October 2008 to June 2009.

The objective of this PhD project is to understand the customer experience in 3D virtual worlds, and to understand the influence of the consumer experiences in 3D virtual worlds on the expectations in 2D e-commerce environments.

Virtual worlds are online, persistent, multi-user environments where users interact through avatars in 3D environments (Castronova, 2005). The opportunity to conduct business-to-consumer (B2C) e-commerce in virtual worlds is growing rapidly with the creation of virtual stores and virtual malls (Papagiannidis et al., 2008). Avatar-based interactions in virtual worlds allow customers to walk and browse through stores similar to a real-world shopping experience. Items can also be simulated and rendered in 3D. Furthermore, virtual worlds allow synchronous interactions with other avatars (people). These enhanced interactive features of 3D virtual worlds can provide customers with a more engaging and immersive experience (Hemp, 2006). However, the experience of the customer in 3D virtual worlds and how businesses can integrate 3D and 2D services to improve the customer experience has not been investigated. Thus, this project seeks to understand the customer experience in 3D environments (Figure 1), and how 3D and 2D e-commerce can be blended to improve the customer experience.

![Figure 1. Two stores in Second Life where avatars are shopping for virtual items.](image1)

The research domain is Second Life and various 2D e-commerce environments (or websites). Second Life (2009) is an example of a 3D virtual world. It currently has over 15 million registered users and is growing in popularity (KZero, 2008). Its popularity and open-ended platform has attracted many companies including Adidas, American Apparel, and Toyota (Jana, 2006). Second Life can be used for many marketing activities, such as managing a brand image, increase loyalty, and conducting market tests. Increasingly, there are efforts by companies who want to sell real items to consumers through Second Life.

Second Life allows the sale of both real and virtual items. For example, Reebok created a store in Second Life where they sold real shoes to customers. Rebook also gave customers the option of buying a virtual pair of shoes. Thus, customers were able to wear the Reebok shoes on their avatar before making the real purchase. The experience with the virtual shoe may influence the customer's purchase decision and overall customer experience. It is not known the exact effect the Second Life
marketing strategy had on the customer experience. Nonetheless, the strategy was considered successful because it resulted in increased sales of Reebok shoes from Reebok’s online channels (CMDGlobal.com, 2006).

Other companies have also tried to use Second Life and other virtual worlds as part of online marketing strategies, but their success has been limited (Gartner, 2008). Au (2008) attributes the lack of success to poor understanding of 3D virtual worlds and user needs. Similar to what happened in the early era of website e-commerce, many companies rushed to create an e-commerce website without a fundamental understanding of the web and its users. Poor understanding of user needs and expectations resulted in many unsuccessful e-commerce websites (Han and Noh, 1999).

To help companies and technology designers ensure the same mistakes are not made with e-commerce using 3D virtual worlds, this project aims to understand how 3D virtual worlds is influencing user needs and expectations. Furthermore, we want to understand how virtual worlds can enhance the overall online service experience. Our aim is to understand what features customers in virtual environments perceive as useful in helping them through the consumption process. We also want to understand the uses and usefulness of virtual worlds in contrast to 2D e-commerce environments.

The practical problem this project addresses is how to design e-commerce environments that blends 3D and 2D elements. Our approach is customer-centred. We will start by understanding how customers currently use and perceive the customer experience in existing 3D and 2D environments. To achieve this, we will study customers in Second Life who are already engaged in consumption. These customers, and the companies who designed the services, are leading the way in terms of blending 3D virtual worlds with 2D websites.

Websites provide some advantages for customers that 3D virtual worlds do not, such as a more efficient search interface and low system requirements. Meanwhile, 3D virtual worlds are more immersive and can convey more information about products through 3D simulation. The greatest potential for 3D virtual worlds may be its use as a complementary technology to 2D websites, rather than as a stand-alone platform. Therefore, this study is interested in how the use of both 3D and 2D e-commerce environments will affect the overall customer experience.

The research approach for this project is multi-disciplinary, design-oriented and experiential. This study seeks to incorporate literature in consumer behaviour from Marketing, user experience and e-commerce interface design from Human-Computer Interaction (HCI), and phenomenological methodology from Psychology. The outcomes of this research will be a better understanding of customer experience in 3D and 2D virtual environments, and design guidelines to make the experience more satisfying and productive.
1.1 Research questions

- What are the perceived experiences of customers in 3D virtual worlds?
- What are the perceived experiences of customers in 2D e-commerce environments who have experience in 3D virtual worlds?
- What are the differences in experiences and consumption behaviours between 3D virtual worlds and 2D e-commerce environments?

The overall aim of this project is to understand the influence of 3D virtual worlds on expectations of consumers in 2D e-commerce environments. Since expectations are formed based on the customer experience, we will seek to understand the customer experience. The first research question will investigate the customer experience in 3D virtual worlds. This will provide us with an understanding of how customers use virtual worlds for consumption and how the experience of consumption in 3D virtual worlds is perceived. The second research question will investigate the customer experience in 2D environments of customers who have 3D virtual world experience. This is to understand how customer’s engage with both technologies and to understand how expectations transfer from the 3D environment to the 2D environment. The third research question will investigate the differences in usage and perception of 3D virtual worlds and 2D e-commerce environments. This will give us a better understanding of why customers move between environments. Finally, based on our understanding, guidelines will be developed to help create e-commerce systems that seamlessly integrate 3D and 2D environments.

1.2 Report outline

Section 2 is the preliminary literature review. This review was conducted between October 2008 and May 2009. In looking at the different areas of the literature, it became evident that we needed a research approach that could capture the many facets of customer experience. Ultimately, we decided to use a phenomenological research approach (Creswell, 1998). This affects our methodology, but also the shape of the literature review. The literature review thus far is broad, highlighting the complexity of experience. As the project matures, the literature review will become more focused depending on the issues that emerge through the empirical investigation.

Section 3 is the proposed methodology. It explains the research approach and expected outcomes. The approach is based on qualitative interviews, observation and diary studies. We will also have a component that includes usability evaluations. The expected outcomes are a description of the customer experience in 3D and 2D environments, and guidelines for blending the experience of both environments.

Section 4 is the pilot study report. The pilot study was conducted between March 2009 and April 2009. It was used to evaluate the methodology and to explore current e-commerce practices in Second Life. The findings helped us refine the research questions further and also helped with producing the research protocols.
In Section 5, we have presented the conclusions of this report and project plan. The work plan shows a project timeline beginning August 2009 to completion of the PhD in September 2011.

1.3 Terminology

Several terms are used interchangeably in this report. They are listed here to avoid confusion.

Customer refers to the person using the e-commerce technology to make a purchase. The term is used interchangeably with consumer and user.

3D virtual world refers to an online, persistent, multi-user environment. It is used interchangeably with virtual world, 3D virtual environment and 3D environment. Customers access 3D virtual worlds using a computer application and internet connection. An example of a 3D virtual world is Second Life.

2D e-commerce environments are e-commerce websites. The term is used interchangeably with website, 2D website and 2D environment.
2 Literature Review

2.1 Introduction

We start the literature review by scoping the research context (Section 2.2). Then, we discuss concepts in the literature that we believe customers may perceive within the environment. Our focus is on understanding the elements that influence the perception and evaluation of a customer’s service encounter. In section 2.3, we discuss customer experience from the marketing perspective. We discuss aspects of the marketing services that lead to positive perceptions of the service encounter. Next, in section 2.4, we focus on the user experience from the human-computer interaction (HCI) literature. The e-commerce environment is a technical environment. Therefore, technology design and interaction will likely have an influence on the customer experience. Section 2.5 examines how social interaction and social activities may affect customer's behaviour and experience. Lastly, features of 3D virtual worlds are contrasted with features of 2D e-commerce environments in section 2.6. 3D virtual worlds provide new ways for companies to market services to customers. It also provides new ways for customers to interact with companies and other customers.

2.2 Customer experience and the service encounter

Customer experience

Customer experience refers generally to the thoughts and feelings of the customer throughout the consumption process. Psychological concepts typically associated with customer experience are goals, attitudes, emotions, involvement and decision-making (Puccinelli et al., 2009). Customer experience research is an approach to understanding consumer behaviour based on the customer’s first-person perspective (Thompson et al., 1989). This project aims to understand what aspects of the e-commerce environment influence the customer’s perception and expectations. Ultimately, we want to understand the factors that contribute to positive experiences.

Customer experience is sometimes used synonymously with perceived quality of service (Parasuraman et al., 1985). Perceived quality of service can be measured as either a satisfaction rating or an attitude (Cronin and Taylor, 1992). As a satisfaction rating, the perceived quality of service is equivalent to the evaluation of a specific encounter or point of interaction. As an attitude, the perceived quality of service is a general belief, formed over a longer period and based on multiple encounters. In both cases, the perceived quality of service leads to behavioural intentions (Bitner, 1990). Positive perceptions are likely to result in the intention to re-use a service. Therefore, how to manage perceptions leading to a positive evaluation has practical implications for business, if they want to retain customers.

Positive evaluations are partially based on expectations (Parasuraman et al., 1985). The extent to which expectations are met determines the perception of service quality. Expectations can be based on a variety of factors, including promises by the company, opinions from other customers and past experience (Zeithaml et al., 1993). This project will examine how experience in 3D virtual worlds influences expectations
for 2D websites. Customer’s usage of 3D virtual worlds and subsequent usage of 2D websites will be examined with the framework of service encounters.

**Online service encounter**

The service encounter refers to the time during which the customer is interacting directly with the business (Bitner, 1990). However, it can also include the time before and after the interactions (Hogg et al., 2003). It also encompasses all elements involved during the interactions, but specifically the personnel and the environment within which the interactions occur. In e-commerce, technology is also part of the environment because interactions are mediated by the technology. In this project, the technology is 3D virtual worlds and 2D websites. Furthermore, since these are both online technologies, we will add the term online to service encounter. Thus, this project is concerned with the customer experience during the online service encounter.

Online service encounters occur within an online service channel (Van Dijk, et al. 2007). However, instead of the term channel, we prefer the term environment. The environment encompasses more than just physical or technological properties; it includes elements that are intangible, such as conventions, practices and communities. These elements emerge from practice and use. They are difficult to predict by only looking at technical specifications. They require an examination of the cultural, historical and practical contexts of use. 2D e-commerce websites follow design conventions that have evolved based on how users navigate, browse, and communicate on the web. Similarly, 3D virtual worlds should have different conventions based on behaviour in 3D virtual worlds. Familiarity with the conventions of one environment may influence expectations for the other. Thus, this project will examine how the experience in one environment influences the expectations of the other as customers move between them.

**Multi-channel consumption**

Understanding the movement between 3D and 2D environments is critical to understanding contemporary customer behaviour. With all the options of channels available to customers, they are unlikely to remain in one environment for an entire service encounter (Black et al., 2002). They choose and blend services from different channels to suit their needs and preferences (Van Dijk et al., 2007). This leads to two research problems. If customers are actively moving between channels, then it is important to understand the factors that lead to their decision to move. Furthermore, if customers are making use of multiple channels, then the management of the customer experience during the transition becomes another important issue since a poorly managed transition can lead to a negative evaluation of the overall experience.

Using multiple service providers simultaneously is also characteristic of contemporary consumption. This situation has been called the “parallel service encounter” (Hogg et al., 2003). The customer usually has choices of competing (or complementary) services from different companies. Thus, we cannot assume that customers will only be in contact with one company at a time. These additional companies play a role in forming expectations of the main service provider. Furthermore, there are other customers involved who provide support and give
opinions as well. Other customers are another source from which expectations can form. This is particularly true in online service encounters where customers are effective at communicating and supporting each other throughout the consumption process (Umit Kucuk and Krishnamurthy, 2007).

The different number of companies and people influencing the service encounter requires us to view the customer experience as constituting many relationships and interdependent services. It is also a collection of different kinds of experiences and processes. First, it is about the relationship between the customer and business. Second, it is an interactive experience involving online technology. Third, it involves people and interpersonal interactions. These three aspects of the customer experience are labelled the service experience, user experience and social experience (Figure 2).

![Diagram](image)

**Figure 2.** Elements that may be perceived during online service encounter and may influence the perceived quality of the customer experience.

At the centre of Figure 2 is an eye to represent the customer’s first person perspective. The first person perspective is important to remember because the customer experience is, fundamentally, a subjective experience (Schembri, 2006). While it is possible to design and have some control over the influencing factors, the customer experience ultimately depends on how the aspects are perceived and
constructed in the minds of the customers. The following sub-sections will expand on the ideas from each of the three kinds of experiences.

2.3 Service experience and retail environment

The service experience refers to the customer’s perception of the marketing aspects. By marketing aspects, we mean the elements that are typically managed by marketing managers (Borden, 1964). This is known as the ‘marketing mix’ and commonly refers to product, prices, promotions and placement. Collectively, they are known as the four P’s (McCarthy, 1971). The concept of the four P’s, however, was created to help understand how products are marketed. For the marketing of services, different elements were added to the ‘mix’ because a different approach is required for marketing a service.

Services

Parasuraman et al. (1985) point out the three main differences in services that set them apart from products: ‘intangibility’, ‘heterogeneity’, and ‘inseparability’. Services are intangible because they cannot be packaged and delivered to a customer. Instead, they are the performance of a skill or transfer of knowledge (Lusch and Vargo, 2006). Being a performance also means it is difficult to assure the exact same quality of service every time. There will be some variability (or heterogeneity) because we are dealing with behaviour and behaviour varies depending on the people involved and situation. The quality of service then can be viewed as a function of the relationship between the service provider and client (Solomon, 1985). This makes service quality intangible and dynamic, as relationships inevitably change over time; the quality of the service experience changes as the quality of the relationships evolve.

There is one exception to heterogeneity of service and that is when the service is provided by a self-service technology, such as in the case of e-commerce. In the case of e-commerce, interpersonal interactions do not play a central role in the provision of services. Rather, it is the human-to-computer interaction that is important. This will be discussed in more detail later in the section 2.4.

The third difference between products and services is that the production of a service cannot be separated from its consumption. Unlike a physical product that can be made in a factory, and then later sold to the customer for use in an entirely different context, services are produced and consumed in the same time and place. For example, a barber provides a haircut as a service, but in ‘producing’ the haircut, the client is also ‘consuming’, or receiving, the service. This makes it more difficult to control and regulate the quality of a service because services cannot be inspected and tested before it reaches the customer.

These differences (intangibility, heterogeneity and inseparability) led Booms and Bitner (1981) to propose three additional “P’s” to the marketing mix. They are ‘physical evidence’, ‘participants’ and ‘processes’. Services may be intangible, but customers still need cues that they can use to make decisions about a service. Therefore, Booms and Bitner (1981) proposed customers would use the physical environment to set their expectations about the service. Hence, physical evidence is added to the mix. The second ‘P’, participants, refers to the service providers and
clients. The participants play a greater role in shaping the customer experience since their relationship affects the quality of the interaction. Lastly, the process of producing a service is also important because the service is delivered and experienced as a process.

This gives us 7 elements in the marketing mix: product, price, promotions, placement, physical evidence, participants and process. These will be useful for understanding perception of the service experience. They provide us with validated concepts to categorize what the customer may perceive during the service experience.

In additional to consuming a service, the customer is also buying products through the e-commerce technology. Therefore, marketing of products will also be part of the experience. The service is the use of technology itself, whereas the product is the item they purchase through the technology. Therefore, the overall customer experience in e-commerce will likely be an evaluation both a product and a service. This project focuses principally on the service aspect, but will also consider how the quality of the products influences the service experience.

Consumption process

The service experience occurs in the context of consumption. More accurately, we refer to it as the consumption process. The consumption process is the stages customers go through when buying a product or using a service. The basic stages of consumption are the ‘pre-purchase stage’, ‘purchase stage’, and ‘post-purchase stage’. Customers will repeat the same stages when they consume in the future. Furthermore, previous purchase experience carries forward and influences the next purchase experience. Thus, there is the cycle of expectation setting (Zeithaml, et al., 1993). For this project, the issue is not only how previous experiences carry forward into the next consumption cycle, but also how previous experience in one environment influences the expectations of another environment.

Throughout the consumption process, customers are making decisions and performing actions. They identify needs, search for solutions, deliberate on the choices, make purchase decisions and then evaluate the experience. This is known as the ‘customer decision process’ (Puccinelli et al., 2009). It is the sequence of decisions that are made across the consumption process and they typically come up in the same order for all customers. During the pre-purchase stage, customers identify their need, search, and deliberate. At the purchase stage, customers make a decision and then purchase the product or service. At the post-purchase stage, the customer makes an evaluation of the product or service. This evaluation feeds back into the pre-purchase stage of the next purchase when customers once again are deliberating.

In some domains, the consumption process has been elaborated further into more than three stages. For website e-commerce, Petre et al. (2006) proposed a 7 stage process (Figure 3). The stages are expectations-setting, accessing the website, pre-purchase interactions, e-purchase interactions, product/service consumption, and post-experience evaluation. This process is useful to our project because it is adapted for the online service encounter. However, it needs to be modified further so that it can be applied to consumption in 3D virtual worlds and not just 2D websites.
Part of the understanding gained from this project can be used to develop newer models that account for consumption involving 3D and 2D e-commerce environments.

Figure 3. Model of online consumption cycle (Petre et al., 2006)

**Retail environment**

In this project, 3D virtual worlds and 2D websites are considered to be retail environments. A retail environment is a place where products and services are sold. In physical environments, this typically means a store or mall. In online environments, it refers to the virtual store or online storefront (website) (Chen and Tan, 2004). Elements of the store’s design that influence the customer experience are the “atmospherics” (Puccinelli, 2009). They also influence behaviour (Underhill, 1999). For services in particular, the environment plays a large role in setting the expectations of service quality because it is difficult to demonstrate a service. Therefore, the customer relies more on cues in the environment to base their expectations.

One example of an atmospheric quality that influences the customer experience is the sense of space, or spaciousness (Ibrahim and Wee, 2002). A related concept is feelings of being crowded in a store (Hui and Bateson, 1991). Both are not applicable to 2D website design. However, in 3D virtual worlds, they may play a role because users are likely to feel as if they are in a real space (Schroeder, 2002). Retail environments in 3D virtual worlds simulate ‘physical’ space, where spaciousness will be one of the features that is perceived. Thus, e-commerce in 3D virtual worlds requires special consideration of the retail space design. The design of the virtual retail environments will be examined in this project.

2D websites have their own design concerns as well. The style, layout and content of a site influence customer perceptions and expectations (Wang and Emurian, 2005; Roy et al., 2001). One attitude that is known to be heavily influenced by the style, layout and content is trust. Acquiring customer’s trust is critical in online environments because it is a necessary condition for making purchases. Unfortunately, since there is less transparency between business and customer, trust in e-commerce is more difficult to acquire compared to face-to-face transactions.
Several researchers, notably Egger (2003), have looked at how website design contributes to gaining a customer’s trust; the website design is consistently named as a major component. In a related study, Wang and Emurian (2005) looked specifically at website elements that influence trustworthiness. A finding from their study was the effect of conveying a real-world presence. Customers are more comfortable interacting with vendors that they know have a real world presence. It is not known how customers perceive the ‘realness’ of vendors in 3D virtual worlds. We will investigate this issue as well as other design issues related to e-commerce.

2.4 User experience and technology design

The user experience refers to technological aspects of the customer experience. Another term for user experience is the interactive experience. In contrast to the service experience which is normally designed by marketers, the user experience is normally designed by software engineers. User experience encompasses the entire set of issues that affect the overall quality of the interactive experiences (Alben, 1996). Given this broad definition, there inevitably will be issues associated with user experience that would not be considered technology-related. The argument is, however, that even these wider issues are still reflected in the technology design (Winograd and Flores, 1986). Furthermore, when dealing with any type of technology, it is important to see how its design constrains user actions and even ways of thinking.

Usability of 2D and 3D interfaces

Our approach to design is based on the usability principles. Usability is about making the interface easy to use and useful, so that the technology fits with the person and task. From a customer experience perspective, it means that the technology should not get in the way of making transactions. Also, it should make all consumer related tasks easy, such as searching, browsing and choosing (Zakaria, 2003). This is achieved by clearly understanding user needs and the context of use. Usability also takes into consideration the limitations of the individual and environmental factors.

Since the customer experience during e-commerce is always mediated by technology, the quality of the customer experience will in large part be determined by how well the technology supports the customer’s activities (Petre et al. 2006). Positive customer experience is related to satisfaction with the technology (Brown and Jayakody, 2008; Shim et al., 2002). Thus, usability is essential to creating an overall positive customer experience.

There is a long list of specific design guidelines, best practices and conventions for creating usable 2D e-commerce websites (Nielson et al., 2001). Nielsen (1993) also has a list of general heuristics for designing usable websites. This list includes learnability, efficiency, memorability, errors, and satisfaction. These heuristics can be applied to almost any interface, including 3D virtual world interfaces. Some suggestions are given for how to apply general usability methods to create usable 3D virtual world interfaces (Hix and Gabbard, 2002). Using the usability principles and methods, our project will develop design guidelines for 3D virtual world interfaces for e-commerce.
Technology acceptance model

Before usability becomes an issue, however, we must address why customers would want to use the technology in the first place. This question has traditionally been tackled with quantitative models, namely the Technology Acceptance Model (TAM). This model has been used extensively to predict the determinants of e-commerce technology. A recent model suggests the main determinants are trust, compatibility, perceived usefulness, perceived ease-of-use, and perceive service quality (Chen and Tan, 2004). These variables are worth exploring in our project, but using a qualitative approach. Trust has been discussed already. Perceived usefulness and ease-of-use are related to expectations of usability. Perceived service quality is based on how well the e-commerce service will meet the customer’s overall expectations (Chen and Tan, 2004). Compatibility refers to the match between the customer’s values and the business’s values. TAM provides us with a statistically validated set of factors that are linked to customer experience (Li et al., 2008). Moreover, they predict technology success. Success refers to a customer’s intention to use the technology again (Brown and Jayakody, 2008). In business terms, it means repeat customers. This study will examine the factor that lead to a positive experience and repeated use.

Self-service technologies

Another area of research linking technology use and customer experience is Self-Service Technologies (SST). SSTs allow business-to-customer interactions without requiring personal contact. 3D virtual worlds and 2D e-commerce environments are both examples of SSTs. The literature on SSTs gives further insight on why customers will use and be satisfied with e-commerce technology. Customer satisfaction of SST comes from the convenience and effectiveness of the technology (Meuter et al., 2000). Conversely, Meuter et al. (2000) also found poor technology design was the leading cause of dissatisfaction. This is further argument for applying usability principles, which emphasises user satisfaction as one of its main goals.

Van Dijk (2007) also showed technologies are often used in conjunction with each other, and customer’s choice of what they use is highly contextual. The idea that customers prefer an active role in tailoring their customer experience is echoed by Burke (2002). Our study continues this line of research by examining why and when customers move between 3D virtual worlds and 2D e-commerce environments. This will also lead to an understanding of how the technologies are perceived to be useful in different situations.

SST research integrates technology research with consumer research. Another example where these fields are combined is research on the “Total Customer Experience” (TCE) (Petre et al., 2006). TCE aggregates B2C interaction experience with the HCI user experience. B2C interaction experience is the company’s tangible performance combined with the customer’s emotional reactions to the service (Shaw and Ivens, 2002). It has been linked to increased loyalty and satisfaction (Pullman and Gross, 2004). The HCI user experience is the technology’s measurable performance combined with the user’s emotional reactions to the technology. This has also been linked to satisfaction (Hassenzahl and Tractinsky, 2006). The TCE recognizes that customer satisfaction is multi-faceted. This study continues the integration of multiple perspectives into the concept of customer experience by looking at technology, service design and social factors together.
In relation to our research, the literature on technology aspects of customer experience shows us how to diagnose and understand issues related to technology use. This allows us to provide solutions that are technology-based. Furthermore, incorporating the technology aspect provides a richer and more accurate understanding of the customer experience. It also facilitates a design-oriented research approach (Gregor and Jones, 2007).

Understanding users is necessary for designing usable systems. While producing the understand will be the main contribution of this project, we also aim to develop design guidelines to help developers. To translate our understanding into design guidelines, we will use User-Centred Design methods (UPA, 2009). These UCD methods are discussed in the methodology section (Section 3).

2.5 Social experience and computer-mediated interactions

The social aspects of the customer experience refer to the personal and intra-personal aspects of consumption. There are three areas of the social domain presented within this section; life-world, social network, and worldview. The life-world is the situation the customer is in, taken as a whole (Ihde, 1990). A more simple, but related concept, is affordances (Gibson, 1986). It is a broad term that includes the entirety of the customer’s situation (their history, environment, culture, personality, etc.). It means experience is always constrained by what can and cannot be performed in the given situation. The second area we discuss is the customer’s social network: their community and culture. Customers interact with other people and develop shared practices that eventually determine what and how they consume. The third area is the customer’s worldview. This includes their biases, expectations and goals. More fundamentally, it refers to how they mentally process experiences. The social aspect of customer experience motivates individual’s need to consume, connects their activities and ultimately determines how they perceive an experience.

In this project, we will try to understand how the customer perceives, and then attributes meaning to an experience. Customers are constantly thinking and feeling at every point in the consumption process. This also involves judgement, perception and expectation setting. Capturing these moment-to-moment processes is critical to understanding customer experience because the overall experience is made up of these fleeting moments (Berry et al., 2002).

By looking at the social experience, we adopt an interpretivist epistemology (Willig, 2001). This means that we view each customer as having a worldview that is socially constructed based on their history, personality and culture. The perceived quality of experience is therefore influenced by their goals, expectations and past experiences. This approach requires a focus on subjective experience, or what Clarke et al. (1998) call the “consumer reality”.

Computer-mediated social interactions

The social experience of users in 3D virtual worlds has been studied by Beollstorff (2008). We use this as the starting point for understanding customers in our project. Beollstorff (2008) study reveals that everyday life in virtual worlds is grounded in the
simple facts of the communication medium (i.e. the virtual world technology). Simple facts refer to the mundane characteristics of virtual worlds, such as the ability for one avatar to be ‘owned’ by more than one person. This fact affects how people talk to each other because they cannot assume it is the same ‘person’ all the time. The major contribution of Beollstroff’s (2008) work to informing this study is not any specific finding. Rather, it is in showing how the small details of being in virtual worlds are the ones that occupy the minds of its users and are the things that are more likely to influence behaviour. This is in contrast to popular portrayals of virtual worlds that focus mainly on the fanciful and extraordinary aspects that may never come into the foreground during everyday consumption (Meadows, 2008). Therefore, to better represent the consumer reality, Beollstorff’s work suggests an ethnographic approach that focuses on their everyday activities.

Another study that discusses social interactions in relation to consumption is by Kozinets (1999). He looked at how customers form communities on the internet. These communities share some characteristics with brand communities when the main activity is consumption (Muniz and Guinn, 2001). Nevertheless, virtual communities are more complex because consumption is only one of the many activities they pursue (Taylor, 2002). The influence of communities on customers is two-fold. One, the customer may themselves be a community member. Kozinets (1999) identified four main types of customer’s in online environments: devotee, insider, mingler, and tourist. Each type represents different levels of loyalty and experience. This often represents a change in the type of relationship they have with the business as well (Reichheld and Schefter, 2000). The second way communities influence customers is that customers are likely to interact with community members at some point during their experience. The experience will be different depending on who they meet and talk to. Virtual communities are abundant on the internet and in virtual worlds (Nashville and Kalamazoo, 2007). Therefore, customers are likely to encounter a community member, or be one themselves. This engagement with the community is expected to influence the consumption process, and consequently how it is perceived.

Brand Communities

Still on the theme of communities, we discuss the relevance of brand communities. Brand community refers to a group of customers who share a common interest towards a particular brand. The term can also be used more broadly, referring to a group interested in a company, product or service (McAlexander, 2002). Brand communities develop their own consumption practices and beliefs. One consequence of this is they might redefine the meanings associated to the brand (Muniz and Guinn, 2001). Another is that the monetary value of the brand itself is derived based on how well it embodies certain social values (Shrembi, 2008). These social values are co-created by the company and customer. The concept of brand communities and co-created brand meaning further emphasizes the need to focus on customer’s social domain.

In relation to our research, the literature on social aspects of experience shows us where some constraints and opportunities for customer behaviour are rooted. This is important because the perceived experience is determined by what the customer is actually doing or thinking about doing (Arnould and Thompson, 2005). Therefore, to understand the customer experience, it is necessary to enter their social world.
Furthermore, the social aspect emphasizes the customer as an individual with thoughts and feelings. Thus, it is important to understand how they socially construct their world and interpret their actions. Thus, understanding how the social experience influences the overall customer experience is a critical part of this project.

2.6 Differences between 3D and 2D environments

Thus far, we have looked at service design, technology design and social aspects of the customer experience that are common in both 3D virtual environments and 2D environments. Now we will discuss particularities of the virtual environments. Our assumption is that customers will move between these environments to complete different tasks during the service encounter. The reason for moving between tasks will be varied based on individual preferences. However, in general, the unique characteristics of each environment suggest 3D virtual worlds are better suited for some tasks while 2D environments are better suited for others. This section examines these characteristics.

First, we will define 3D virtual worlds to set them apart from 2D websites. Using Robbins’ (2008) definition, the four essential traits of virtual worlds are persistence, multi-user, avatar-based interactions and internet connectivity. We add 3D rendering as the fifth trait since we are referring specifically to 3D virtual worlds. 2D virtual worlds have been excluded from the scope of this project.

Other common names for 3D virtual worlds are synthetic worlds (Castronova, 2006) and multi-user virtual environments (MUVEs) (Fragoso et al., 2008). Synthetic worlds emphasises that the world is constructed by computers whereas MUVE emphasises a social environment. We will continue to use the term 3D virtual world to emphasise the 3D aspects.

3D environments and presence

3D virtual worlds are often said to evoke feelings of presence or tele-presence. Presence is the “sense of being in an environment” (Steuer, 1992). Tele-presence refers to having feelings of presence, but from using a communication technology such as computers (Steuer, 1992). Normally, this means the computer generates sights and sounds of an alternate place (i.e. the virtual world), and allows interactions so that the user feels they are in an environment different from their physical environment. For the customer experience, a feeling of presence is important because it is linked to several important factors in consumer decision making, such as increased product knowledge and higher purchase intention (Suh and Chang, 2006). Mainly, this link is traced to customer’s perception of having a direct experience with the environment and objects.

Direct experience is the experience of interacting with real physical objects. 3D virtual worlds can only simulate real physical objects, but the simulation is of such quality that the interactions feel real. The quality of these interactions influences the customer experiences. 3D objects can mimic the shape and size of real objects. They can also be manipulated more easily, allowing them to be viewed from different angles. Li et al. (2001) have found that when customers interact with virtual (3D) objects, they were more “involved” in the learning process compared interacting with
2D objects (web and print-based objects). With 3D objects, customers readily identified and related the objects to their own experience. They also were more curious to learn and ask questions about the products. Thus, Li et al. (2001) concluded that when interacting with 3D objects, customers are actively engaged with the virtual product. Thus, the experience with 3D objects closely mimics what would be expected from interactions with real objects.

The ability to have tele-presence and direct experience suggests that customers may be persuaded to enter virtual worlds when they want to learn and deliberate about products. The advanced rendering and simulation of products will allow them to experience the products in a way that is more real, compared to website interactions. Another advantage of 3D virtual worlds is richer interaction quality with other people. 3D virtual worlds may be able to re-create the utility and excitement of shopping together in person (Hemp, 2006).

**Co-presence**

Co-presence is the sense of being in an environment with someone else (Schroeder, 2002). Similar to presence, the feeling of co-presence is influenced by visual and audio cues. However, the key to co-presence is the interactions with others (Taylor, 2002). In addition to the visual and audio effects being superior in 3D virtual worlds compared to websites, the ways to interaction with each other is also greater. Some 3D virtual worlds allow gestures and voice communication. This suggests that 3D virtual worlds are potentially more effective at evoking feelings of co-presence. This leads to more interactions and potentially the creation of shopping communities (Schummer, 2001).

One way to think about co-presence is to look at how the technology allows customers to interact during the service encounter. These interactions mean customers can support each throughout the service encounter. Some of the effects of co-presence are increased awareness, communication and enhanced decision-making through group processes. Shopping together, specifically with friends, is important because it has been linked to positive evaluations of the customer experience and positive attitudes of the company (Mangleburg et al., 2004). Friends also play a role in influence the purchase decision, particularly for those who are not familiar or confident about their product knowledge (Bell, 1967). Friends can help with deliberation and increase confidence when making decisions. Thus, having others present during the service encounter can have a significant impact on the outcome of the customer experience.

Another way to think about co-presence and shared environment is to think about how they allow people to maintain relationships or support communities (Schroeder, 2006). This is particularly relevant in 3D virtual worlds because 3D virtual worlds are persistent, and avatars develop stable personalities over time. Thus, it is an environment that naturally fosters relationships. This applies to customer-customer relationships as well as customer-business relationship. Since co-presence is stronger in 3D virtual worlds, customers may form into groups more readily. Inevitably, the groups would develop their own norms, rules of conduct and culture (Boellstorff, 2008). This online culture may be of interest, especially if it relates to or influences consumption.
Avatars

The feeling of presence and co-presence are increased by having avatars in 3D virtual worlds (Gerhard et al., 2004). Avatars are 3D representations of users (or customers) in the virtual world. They can also refer to the reputation and identity of person in online environments (Adrian, 2007). Avatars in 3D virtual worlds are normally rendered as humanoids; they are visually represented in the likeness of a person (see Figure 4). Thus, avatars are often associated with embodiment (Benford et al., 1995). They allow customers to interact with the environment and other people through a virtual body. The ability to interact through a body is argued to be a critical feature in 3D virtual worlds. They serve two purposes: to provide feedback to the customer about their presence and actions in the world, and to provide cues to other people. The extent to which an embodied experience changes the customer experience and customer behaviours will be investigated by this project.

![Figure 4. Screenshot of avatars in Second Life.](image)

Having avatars also means a separate set of design issues need to be considered. Benford et al. (1995) have listed 19 issues specific to avatars. The issues revolve around dealing with the appearance of the avatar, how they occupy space in the virtual world, their ability to perform different actions and the relation between the avatar and the user. We will explore these issues to determine how the design of avatars best supports the activities of customers during the online service encounter.

2.7 Summary of literature review

Three aspects of customer experience have been reviewed. They are the marketing aspects, technology aspects and social aspects. These provide us with a broad range of factors believed to influence the customer experience during the online service encounter. Furthermore, we have looked at differences in 3D virtual worlds and 2D e-commerce environments. As an emerging technology, 3D virtual worlds are expected to be used more in the future as an alternative to websites for e-commerce. The success of e-commerce in 3D virtual worlds, however, will depend on its design; how well it supports customer’s needs and decision making process. Furthermore, in the context of multi-channel consumption, it is important to integrate the design of different technologies to create a seamless transition between them. Thus, this project will explore the online service encounter in 3D virtual worlds and how this experience influences the traditional uses of 2D website e-commerce.
3 Methodology

3.1 Research approach

This project is a qualitative study of customer experience in 3D virtual worlds and 2D e-commerce environments. The overall objective is to understand the influence of 3D virtual worlds on expectations in 2D e-commerce environments. In other words, we want to understand how customer's perception of their 2D e-commerce experience changes because of their experience in 3D virtual worlds. Do customers have different expectations of 2D e-commerce environments after being exposed to the features of 3D virtual worlds? What are these expectations? How are they transferred from 3D virtual worlds to 2D e-commerce environments?

To build our understanding, we will first explore the experiences customers have in 3D virtual worlds (Phase 1). Next, we will explore how the 3D virtual world experience influences the 2D e-commerce experience (Phase 2). Then, we expand on this understanding further by exploring specific aspects of the customer experience that are affected, such as expectations, behaviour and satisfaction (Phase 3). Finally, we will conduct user-observations to help us develop guidelines for integrating 3D and 2D e-commerce environments. Figure 5 outlines the flow and progression of our research approach.

Figure 5. Research flowchart showing sequence of activities and outcomes

Phase 1

Question: What is the perceived experience of customers in 3D virtual worlds?

Method: Open-ended and semi-structured interviews

Outcome: Description of customer experience in 3D virtual worlds

Phase 2

Question: What is the perceived experience of customers in 2D e-commerce environments who have experience in 3D virtual worlds?

Method: Diary study and semi-structured interviews

Outcome: Description of customer experience in 2D e-commerce environments

Phase 3

Question: What are the differences in experiences and consumption behaviours between 3D virtual worlds and 2D e-commerce environments?

Method: Semi-structured interviews

Outcome: Understanding of differences between 3D virtual worlds and 2D e-commerce environments

Phase 4

Objective: Create design guidelines for integration of 3D virtual worlds and 2D e-commerce environments

Method: Usability testing and heuristic evaluation

Outcome: Design guidelines for blending 3D and 2D e-commerce experiences

Final synthesis and conclusion
The research question for phase 1 is, ‘what are the perceived experiences of customers in 3D virtual worlds?’ The literature suggests there are at least three broad aspects that influence this perception. These are the social aspects, the technology aspects and the marketing service design. Therefore, the sub-questions for the first phase are:

- What are the technical aspects that influence the customer experience?
- What are the social aspects that influence the customer experience?
- What are the marketing services aspects that influence the customer experience?

These questions will be explored using open-ended interviews and observations in 3D virtual worlds. The interview method will provide an understanding of these aspects from the customer’s perspective. Observations will be conducted alongside the interviews to help make sense of the customer’s views of the 3D virtual world and enrich the qualitative analysis. The outcome of this first research phase will be thematic descriptions of what the customer perceives and a collection of features of 3D virtual worlds that play a role in forming expectations of service quality. See Table 1 for the research approach for phase one.

Table 1. Research approach for research question #1

<table>
<thead>
<tr>
<th>Phase 1 of project</th>
<th>Main question and sub-question</th>
<th>Data Collection</th>
<th>Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) What is the perceived experience of customers in 3D virtual worlds?</td>
<td>Open-ended and semi-structured interviews</td>
<td>Recruiting and interviews conducted in Second Life (text chat with avatar presence)</td>
</tr>
<tr>
<td></td>
<td>• What are the technical aspects that influence the perception of customer experience?</td>
<td></td>
<td>Maximum variation sampling (screened during recruitment)</td>
</tr>
<tr>
<td></td>
<td>• What are the social aspects that influence the perception of customer experience?</td>
<td></td>
<td>Recruitment by approaching users in Second Life in shopping-related areas.</td>
</tr>
<tr>
<td></td>
<td>• What are the marketing services aspects that influence the perception of customer experience?</td>
<td></td>
<td>14 - 21 participants.</td>
</tr>
</tbody>
</table>
Resources:
- Recruit participants (1 hour per participant)
- Conduct interview (2 hours per participant)
- Perform analysis (6 hours per participant)

Estimated total hours (if 21 participants):
- 147 hours (21 days @ 7 h/day)

Data Analysis
- Descriptive analysis
- Thematic analysis

Expected Outcomes
- Description of customer experience in 3D virtual worlds.
- Recurring patterns, themes and issues.

Phase 2

Following from the first research question that asks about experience in 3D virtual worlds, the second research question seeks to understand how that experience influences expectations and behaviours in 2D e-commerce environments. Therefore, the second research question is ‘what are the perceived experiences of customers in 2D e-commerce environments who have experience in 3D virtual worlds?’ We felt this is an important question because the literature on consumer behaviour suggests customers play an active role in switching service channels and technologies (Van Dijk et al., 2007). Therefore, it is unlikely that 3D virtual worlds will be the sole service channel that customers use to buying products online. Since 2D e-commerce websites is the dominant e-commerce technology, it is the one most likely to be used in conjunction with virtual worlds. How well businesses can integrate the 3D and 2D e-commerce technology will determine how well the overall quality of online service encounter is perceived. A step towards the seamless integration of 3D and 2D e-commerce technology is an understanding of how customers transfer expectations and behaviour from one environment to another. Therefore, the sub-questions for this phase of the research are:

- What expectations for the 2D environment do customers develop based on their experience in 3D virtual worlds?
- How does the behaviour of customers in 3D virtual worlds influence their behaviour in 2D environments?

These questions will be investigated with semi-structured interviews and diary studies. Diary studies will be used in conjunction with interviews because diaries will allow data to be collected more conveniently for the participant. The outcomes of this phase will be thematic descriptions of the 2D e-commerce experience, but with a focus on the relation of the 2D e-commerce experience with the 3D virtual world experience. See Table 2 for the research approach for phase two.
### Table 2. Research approach for research question #2

<table>
<thead>
<tr>
<th>Phase 2 of project</th>
<th>Main question and sub-question</th>
<th>Data Collection</th>
<th>Logistics</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2) What is the perceived experience of customers in 2D e-commerce environments who have experience in 3D virtual worlds?</td>
<td>Diary study</td>
<td>Recruiting and interviews conducted in Second Life (text chat with avatar presence)</td>
<td>Descriptive analysis</td>
</tr>
<tr>
<td></td>
<td>• What expectations for the 2D environment do customers develop based on their experience in 3D virtual worlds?</td>
<td>Semi-structured interviews</td>
<td>Maximum variation sampling (screened during recruitment)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• How does the behaviour of customers in 3D virtual worlds influence their behaviour in 2D environments?</td>
<td></td>
<td>Recruitment by approaching users in Second Life and by advertising in real world (e-mail, posters, mailing list, word of mouth).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14 – 21 participants. Some may be from the same set from Phase 1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Resources:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Recruit participants (1 hour per participant)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Collect diaries (span of 4 weeks)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Conduct follow up interviews (2 hours per participant)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Perform analysis (6 hours per participant)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Estimate total hours (if 21 participants):</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 189 hours (or 27 days @ 7 h/day)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Additional details:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Participants in this phase will be encouraged to use 3D and 2D environments.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Virtual money (Linden Dollars) will be provided to encourage additional shopping, for them to have more experiences to write about.</td>
<td></td>
</tr>
</tbody>
</table>
Phase 3

The third research question is ‘what are the differences in experiences and consumption behaviours between 3D virtual worlds and 2D e-commerce environments?’ The answer to this question will provide further understanding of the similarities and differences between 3D and 2D e-commerce experiences. The purpose of this phase is also to reinforce our understanding of the relation between 3D virtual worlds and 2D e-commerce environments. The literature says that 3D virtual worlds provide unique functions that 2D websites do not (Li et al., 2001). It also says that avatars mediate and influence behaviour (Taylor, 2002). These, along with other emergent themes from Phase 1 and Phase 2, will be explored in relation to expectations, behaviour and satisfaction. The initial set of sub-question for phase 3 is:

- What tasks are 3D virtual worlds used for during a service encounter?
- What tasks are 2D e-commerce environments used for during a service encounter?
- How does having avatars in 3D virtual worlds influence choices and behaviours of customers?

These questions will be investigated with semi-structured interviews. The outcomes will be an understanding of how customers perceive the differences between 3D virtual worlds and 2D e-commerce environments. This will help us explain how expectations are transferred and the different purposes one environment is used instead of the other. Furthermore, we will gain an understanding of how these differences influence expectations, behaviour and satisfaction. See Table 3 for the research approach in phase three.

Table 3. Research approach for research question #3

<table>
<thead>
<tr>
<th>Phase 3 of project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main question and sub-questions</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
• How does having avatars in 3D virtual worlds influence choices and behaviours of customers?

<table>
<thead>
<tr>
<th>Data Collection</th>
<th>Semi-structured interviews</th>
</tr>
</thead>
</table>

**Logistics**

- Recruiting and interviews conducted in Second Life (text chat with avatar presence)
- Maximum variation sampling (screened during recruitment)
- Recruitment by approaching users in Second Life and by advertising in real world (e-mail, posters, mailing list, word of mouth).
- 14 – 21 participants. Participants must have experience in 3D and 2D environments.

**Resources:**
- Recruit participants (1 hour per participant)
- Conduct interviews (2 hours per participant)
- Perform analysis (6 hours per participant)

**Estimated total hours (if 21 participants):**
147 hours (or 21 days @ 7 h/day)

<table>
<thead>
<tr>
<th>Data Analysis</th>
<th>Thematic analysis</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Expected Outcomes</th>
<th>Thematic overview of how consumers conceptualize and use 3D and 2D environments.</th>
</tr>
</thead>
</table>

**Phase 4**

The fourth phase will be usability evaluations and additional analyses of the previous data set to develop guidelines for integrating 3D and 2D environments for e-commerce and over a service encounter. The usability test will involve users performing e-commerce related tasks that require moving between 3D and 2D e-commerce environments. This will allow us to observe obstacles and identify issues that result from using the interface in both environments that could not be easily elicited from interviews. This phase will provide us additional data to make practical recommendations about design guidelines.

Table 4. Research approach for creation of guidelines

**Phase 4 of project**
### Data Collection

<table>
<thead>
<tr>
<th>Data Collection</th>
<th>Usability Evaluations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Heuristic Evaluation of the 3D Interface</td>
</tr>
</tbody>
</table>

### Logistics

- Recruiting and testing conducted in person.
- Convenience sampling
- Recruitment through advertising (e-mail, posters, mailing list, word of mouth).
- 7 - 9 participants. Participants should be at least intermediate desktop users.
- Resources:
  - Recruit participants (N/A)
  - Conduct usability test (1.5 hours per participant)
  - Perform analysis (6 hours per participant)
  - Heuristic Evaluation (20 hours)
- Estimated total hours (if 9 participants):
  - 87.5 (~10 days @ 7 h/day)

### Data Analysis

<table>
<thead>
<tr>
<th>Data Analysis</th>
<th>Usability analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thematic analysis</td>
</tr>
</tbody>
</table>

### Expected Outcomes

| Expected Outcomes | Guidelines / design patterns for e-commerce in 3D virtual worlds and 2D e-commerce environments. |

### 3.2 Research plan summary

The data collection will be conducted in four phases starting August 2009 and ending July 2010. Each phase is conducted sequentially with the outcomes of the first phase informing the second phase, and so on. Once data collection is complete, a final synthesis of the data will be performed to consolidate the findings from all four phases.

This project uses qualitative data (Flick, 2009). The principal data collection technique is semi-structure and open-ended interviews. Additional methods are non-participant observation and diary studies. Recruitment will be conducted mainly in Second Life. Second Life provides a convenient place to find participants who have experience in 3D virtual worlds. Where possible, participants with more than just Second Life experience will be recruited. The analysis will be descriptive and
thematic analysis. The descriptive analysis technique will be based on phenomenology. The thematic analysis will be more general interpretive approach. Further explanation of these methods is provided in the next sub-section.

3.3 Justification of methods

Qualitative research

The research seeks to describe subjective experience. Therefore, qualitative data is valued over quantitative data because it will not prematurely reduce the complexity of the reported experience. This project is also exploratory. We are investigating a new area of customer experience in the context 3D virtual worlds. Another new area is the movement between 3D virtual worlds and 2D e-commerce environments. Since this is exploratory, there is not an established theory to test. Furthermore, the goal of this project is not to create a predictive model of consumption behaviour in 3D and 2D environments. Rather it is to understand the nature and constituents of the subjective customer experience. The aim is to collect descriptions of experiences, as they are perceived, in a rich and detailed format. This is done by gathering qualitative data (words, images and video). This will help us build a broad and holistic understanding of the customer experience in virtual environments.

Maximum variation sampling

Sampling of the participants will be for maximum variation. The participants for each analysis group will ideally span across a wide demographic spectrum of age, country, education, technical experience and e-commerce experience. All participants will be English speaking. The sample size for each group is expected to be between 14 and 21. There will be three groups of participant data, known as sets. Each set is analyzed separately. Since the purpose is not to achieve statistical power, a small and uneven sample will be satisfactory. However, we will still seek an even and balanced number of participants. The main criteria for changing the sample size will be based on the quality of incoming data.

The three sets of data will be collected from three phases of the project. The first phase will collect data of customer experience in 3D virtual worlds. The second phase will collect data of customer experience in 2D e-commerce environments. The third phase will collect data of customer perceptions of the 3D and 2D environments. A single participant may be allowed to participate in more than one phase of the data collection. The risk of carry-over effects from one phase to another is minimal; however, it will be accounted for during the analysis if this is the case.

Phenomenology

Integral to achieving the aims of this project, the phenomenological approach has been adopted. Phenomenology started as a philosophy (Smith and Thomasson, 2005), but was later adapted into a research methodology (Valle, 1998). Phenomenology is used to describe how people perceive their presence and actions in the world. Furthermore, every individual has slightly different perceptions. Pollio et al. (1997) call this the “multiplicity of first-person perspectives”. Every customer is expected to have unique experiences: being confronted with different options, giving
their attention to different things, and developing their own ideas along the way. Phenomenology is a method for representing these experiences in a way that remains faithful to the subjective nature of the customer experience, while still providing a generalized description that is useful to the scientific community.

The phenomenological approach is also essential for achieving an experience-based understanding. The level (or unit) of analysis is experience, rather than group, culture, or person. Analysis of experience leads to understanding of what appears in consciousness and how it appears. In relation to this study, it will be used to study what customers perceive and how they perceive it across the consumption cycle. This will provide an understanding of what is important to customers and how it influences their expectations, choices and evaluation of the online service encounter.

**Interviews**

Interviews are the principal data collection method and will be used in all three data collection phases. It is a one-to-one conversation between the participant and researcher. Interviews are an effective means of collecting relevant qualitative data directly from participants (Kvale, 1983). Interviews used in this study can be classified either as open-ended or semi-structured. In the open-ended interviews, the participant will be asked to recall and describe a customer experience in detail. To increase the quality of the interview data, participants will be given prompts, or brief training (Petitmengin, 2006). In the semi-structured interviews, the participant will be asked a series of pre-defined questions and then asked to elaborate on their answers. Both types of questions will be used for this study. In both cases, the qualitative data will contain detailed information of the participant’s perspectives on events, thoughts and feelings.

Another type of interview that will be used is contextual interviews. A contextual interview is an interview during the performance of a task with the participant’s actions visible to the interviewer (Holtzblatt and Beyer, 1993). This type of interview is normally used in usability testing. The advantage of this method comes from having participants engaged in a task. This way, task-related issues can be observed. Furthermore, with the participant engage in the task, they can easily bring up thoughts and feelings without needing to recall distant memories. The contextual interview will be used to the customer’s transition process from 3D virtual worlds to 2D e-commerce environments. Since the whole consumption process is prolonged and happens at unpredictable times, a contextual interview of the entire consumption process is not practical. Therefore, contextual interviews are used in this project for pre-defined tasks.

**Diary studies**

A diary study will be conducted in the second data collection phase. This requires the participants to keep a journal updated with entries describing their recent customer experiences. Our use of diaries will be similar to the technique explained by Rieman (1993), but we will only ask participants to record their activities of consumption in virtual environments. The diary is used instead of open-ended interviews mainly as a matter of convenience. Since participants will be asked to complete tasks on their own time, they will also be given the freedom to describe the task on their own time. Having a diary instead of interviews may make it easier for customers to describe
their experiences since they do not have to recall events that happened long ago; with a diary, the customer can write their experiences immediately after it happens. The data from diaries will be similar to the interview data: detailed and concrete descriptions of the customer experience. Follow-up interviews may be conducted if the original diary entries do not contain enough information.

Non-participant observations

Non-participant observations will be conducted throughout the study. Observation will be used to collect examples of stores, events and activities from the 3D virtual world to help illustrate the customer experience. The observations are mainly used as a way to collect anecdotes to illustrate the experiences reported by participants (Van Manen, 1990). Furthermore, observations are useful, especially early in the data collection because being present in the customer’s world can expose the researcher to revelatory events. This will provide the researcher with context to what customers are saying and also help the researcher focus on what may become important.

Descriptive analysis

Descriptive analysis is the principal data analysis method. This method is explained by Giorgi and Giorgi (2008), Landridge (2007) and Von Eckartsberg (1998). These authors use a phenomenological style of descriptive analysis. The result is descriptions of the essential structure of experience and its constituents. Moreover, it will likely result in several descriptions of experience that account for different subjective and contextual factors. Similar to other qualitative analysis methods, descriptive analysis requires a close reading of the text and stepwise interpretation to move ‘up’ from the raw data to reach a generalized understanding of the reported phenomena. Nevertheless, the descriptive (phenomenological) analysis used in this project has strict conceptual and procedural guidelines to avoid excessive interpretation. Therefore, it will be conducted as a separate analysis to avoid misinterpretation of the data.

Thematic analysis

Thematic analysis is the second data analysis method. This method is used to draw out themes and recurring patterns from data. The results are often concepts that characterize or describe the data set. This method is explained by Braun and Clarke (2006). Similar to descriptive analysis, this method requires rigorous and systematic reading of the text. The difference is thematic analysis from descriptive analysis is that thematic analysis uses more interpretation and may rely on concepts from the literature to find patterns in the data.

Usability evaluations

Usability evaluations will consist of user-observation and heuristic evaluation (Nielsen, 1994). User observation involves a contextual interview while participants are performing a task. The task will be users moving from 3D environments to 2D environments on a desktop computer. The heuristic evaluation involves a systematic assessment of an interface by experienced researchers and expert users who are familiar with usability principles. These principles will be tentatively based on Nielsen’s ten usability heuristics (Nielsen, 1994). Additional heuristics may be added
based on results of the findings in this study. With usability testing, we will identify and categorize obstacles during the transition between 3D and 2D e-commerce environments. This will help us produce design guidelines for systems where users moving between 3D virtual worlds and 2D websites.

3.4 Expected contributions of this project

The expected theoretical contribution of this project is an enhanced understanding of customer experience in 3D virtual worlds and 2D e-commerce environments. This project will extend research that integrates customer perceptions of service design (marketing) and interaction design (technology and user experience). This project will also explore perception and behaviour of the users who have experience in both 3D virtual worlds and 2D e-commerce environments.

The expected practical contributions are guidelines for designing usable e-commerce environments that include 3D and 2D elements. This project will also produce guidelines to design services that seamlessly integrate the different technologies included in an online service encounter.

Other contributions will be to the application of research methods to study virtual worlds. Furthermore, we plan to apply the phenomenological tradition to study customer experience in virtual worlds. This will further expand the application of phenomenology outside of the psychology discipline. We will also be conducting “in-world” research, an emerging form of online research that is conducted within virtual worlds. Our reflection on the process and lessons learned will help other researchers working in similar domains for future research.
4 Pilot Study Report

4.1 Overview

A pilot study was conducted between March 2009 and May 2009. The purpose of the pilot study was to gain a preliminary understanding of the customer experience in 3D virtual worlds. It also was an opportunity to work out methodological issues. Conducting this study helped us refine the research questions, methodology and estimate the timelines for our project. The study also provided an opportunity to work through the research process that included acquiring ethical approval from the Open University’s Human Participant and Materials Ethics Committee (HPMEC), developing a research protocol, recruiting in-world, interviewing online, and performing qualitative data analysis.

The data collection was from seven interviews with customers –6 female and 1 male– from Second Life. In-world observations were also conducted. The interviews were open-ended and descriptive. The participants were asked to describe, in detail, a recent experience they had shopping in Second Life.

Their answers were analyzed using phenomenological methods (Appendix 7.1). The result of the analysis is a description of the essential structure (or process) of the customer experience throughout the service encounter. These processes are then further analyzed to extract issues common to all customers. The analysis combined techniques from Langdridge (2007) and Colaizzi (1978), which are both are descriptive phenomenological analysis techniques. Langdridge’s (2007) methods were used to distil the essential structure from individual descriptions. Then Colaizzi’s (1978) methods were used to extract the themes across multiple descriptions and create a general description of the customer experience (Table 6). See Appendices 7.2, 7.3 and 7.4 for examples of the analysis.

4.2 Results

This section describes the results of the pilot study’s preliminary analysis.

Themes from the customer experiences

The themes presented here are grouped based on when they became prevalent during the service encounter. The service encounter is divided into three stages: pre-purchase, purchase and post-purchase. The pre-purchase stage includes everything that happened before entering a virtual store. The purchase stage refers to the customer experience inside virtual stores. The final stage refers to the experience after buying an item.
Table 5. Thematic overview of customer experience.

<table>
<thead>
<tr>
<th>Service Encounter Stages</th>
<th>Theme</th>
<th>Issue (C = customer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-purchase</td>
<td>Outward intention</td>
<td>C is attending social event</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C wants to inform or inspire others</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C wants to impress</td>
</tr>
<tr>
<td></td>
<td>Searching</td>
<td>C is finding a seller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C is finding a store</td>
</tr>
<tr>
<td>Purchase phase</td>
<td>Preparations or strategy forming</td>
<td>C clears up the interface</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C moves into position for better view of store</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C orients oneself</td>
</tr>
<tr>
<td></td>
<td>Affective reactions</td>
<td>C feels nostalgic from simulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C is impressed by design</td>
</tr>
<tr>
<td></td>
<td>Non-trivial effort / decision-making</td>
<td>C has limited options, must be selective on what to buy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C looks at price and value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C considers usefulness of item</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C believes items must be purchased or risk being lost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C is wary of travelling time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C is cautious about buying decision</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C must try before buying</td>
</tr>
<tr>
<td></td>
<td>Delay and pauses</td>
<td>C waits for store to load</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C is happy when no lag</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C waits for items to transfer into inventory</td>
</tr>
<tr>
<td></td>
<td>Acknowledged presence</td>
<td>C gets personal alerts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C is greeted upon arrival in store</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C is offered of membership</td>
</tr>
<tr>
<td>Post-purchase</td>
<td>Comfort of privacy</td>
<td>C goes home before changing into new clothes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C is embarrassed to use demos in public</td>
</tr>
</tbody>
</table>
Satisfaction and relief

| C thinks effort was worth it
| C needs rest after shopping
| C take prides in ownership

Further customizations

| C organizes item into inventory
| C is editing items to suit taste
| C is matching outfits

Table 6. Description of the essential structure of experience.

One develops a need to express an inner desire outwards to others. The expression of the desire inevitably requires the purchase of objects of a visual nature (due to constraints of the virtual world). One must search for a place or person where the object can be purchased. One must prepare for the search and develop a strategic plan so that their effort and time is not wasted. The process of the search itself is intensive and requires patience. It can be a process of discovery leading to feelings of fascination, or it can be a drudging process, filled with frustration and boredom. In both cases, it is a process to be taken seriously because decisions are permanent and have real-life consequences. When the search is over and the object is purchased, one returns to the comfort of their private virtual space. One feels satisfied and relieved that the experience is over; it is time to customize and enjoy the result of the effort.

Two weak themes also emerged from the data; they were Diminishing returns (C wear things immediately; C has limited future use for items) and Serendipitous discovery (C was not intending to buy, but bought something; C buys on impulse). These will not be discussed here; however, they may be expanded on if the themes reoccur from future data collection. The other themes will be discussed here. The names of participants have been anonymised using 2 letters (e.g. AV, DA, etc.).

Outward intention

Outward intention refers to user’s purpose for consumption. The purpose for an individual’s need to purchase is towards some external object, usually a person. The goal of consumption is often to express one’s self to others or to belong with others. An example of belonging is shown here, where one customer intends to purchase clothes so they can fit in at a party:

“I enjoy hanging out with a group of friends who attend themed events here in second life. When I found out the next theme was to be one that required a uniform/work clothes I began a search for an outfit that would have the look of a constructions worker.” - AV

An example of expression is with this customer who is purchasing items to build a tribute to an artist. In this case, the intention is interpreted as being outward because we view it as the need to teach others, and to share feelings.

“My most memorable shopping trip in SL was when I was looking to purchase Graceland. I had a virtual ‘business plan’ in mind to re-create [an area]
entirely devoted to Elvis, to build an exact replica of his home, and include his heartbreak hotel. [...] I think we have done a great job and that with all the other attractions in place, its overall the most authentic. It’s going to be open to the public next weekend.” - DA

Searching

Typically, every customer reported the need to find a place or person to buy items from. This invariably led to using the in-world search feature since it is convenient and readily accessible. Alternative methods include world-of-mouth and asking a friend. Few customers reported using websites to help with the search despite websites options being available.

Preparations or strategy forming

Once in the store, customers prepare and develop a strategy for how they will browse the store. Usually this is done in some systematic order. Some participants have even developed preferences for how stores should be laid out to help them.

“I also liked the layout of the store, walls were built up high and all the pictures of the hair were on all the walls, so you didn't need to walk anywhere and get lost, you just needed to spin around and use your camera controls to look up and up and up.” – SS

Preparations also refers to adjusting the interface for browsing, such as by clearing all the alerts and positioning the camera angle and avatar.

“I first click off the annoying red arrow that indicates where I am to go, then I step a few steps to the left or right to clear the landing point so no one lands on my head.” - AV

Affective reactions

Customers reported strong emotions, including nostalgia and excitement.

“Well, I feel really good when I buy things. I enjoy [having] all this stuff.” - RG

“Seeing the mansion reminded us that Elvis was gone. But then also more happiness because buying it, and letting people visit it will keep his memory alive!” - DA

Non-trivial effort and decision-making

Shopping in virtual worlds takes effort and cost real money. Customers seem to be cognizant of this. Evidence that shopping is taken seriously is from their deliberation and rationalizing about purchases.

“Another factor that I take into consideration when buying an item is "is it worth the real life money I’m about to put into it?" – RH
Moving from store to store is also perceived as somewhat tedious. An interesting question may be to explore how the effort of moving from store to store is different from moving from website to website.

“It took over 5 shops before I found what I was looking for. By that I mean 5 teleports to the actual shops, as opposed to just reading of them in the search feature.” - AV

**Delays and pauses**

Loading, or ‘rezzing’, is an issue. Customers must wait upon arriving at each store for the objects in the store to load. There is also waiting for the time between purchase, and arrival of the item in the customer’s inventory. This prolongs the shopping experience. It also breaks the

“I get to the [area], then I hope that the page loads well because sometimes there is a lag and it takes more time [to shop]” - RG

**Acknowledged presence**

Second Life tracks avatar movement. When a customer logs into the game, they are alerted with messages. When they enter a store, they are given an automated greeting. Some stores have store attendants that will offer help as well. This means advertisers can better target customers.

“I logged in while it was quiet, and received an ad from one of my favourite shops.” – MS

**Comfort of privacy**

Privacy is an issue. Customers typically go ‘home’ before putting on new clothes. They do not simply swap on new clothes in the store. Furthermore, there is a feeling of embarrassment when trying on demo items.

“I felt dumb because the demo hairstyles were all in hot pink and had a pole with a sign attached to the top of the hair that said demo” - SS

**Satisfaction and relief**

There is a sense of relief and satisfaction gained after the shopping experience is done. This may be result from the experience being perceived as effortful.

“Since the items I had purchased were on sale, I felt pretty good about the whole process.” – MS

“I was excited and happy and relieved that I finally found something.” – JS

“[I felt] good that my shopping was over. It takes a long time to shop here with so many stores lurking around” - SS

**Further customizations**
After a purchase, items typically need to be further customized so they fit the avatars. This seems to be an accepted fact of shopping for avatars in Second Life. In some cases, the customizations after purchasing the item add to the fun and excitement of the purchase itself.

“I think because there are so many different shaped heads a little adjusting need to happen sometimes.” - JS

“We went back to our land and immediately [raised] the building up. This was 4 weeks ago, and it’s still not finished, lol [sic]. I couldn’t wait to start building and furnishing.” – DA

4.3 Implications on the main study

The pilot study findings are promising. They give us good reason to believe that with more data, we will be able to provide substantive answers to our research questions.

This pilot study started to investigate the first research question, ‘what is the perceived experience of customers in 3D virtual worlds?’ The analysis is on-going and will be strengthened with more data and insights from the literature. However, two examples of what customers perceive we have tentatively named the temporal and intentional aspects.

Temporal refers to time. Customers perceive the shopping experience to be time-consuming. Although it should be noted, this is different from time-wasting. One contributor to the perception of time is lag. As Boellstorff (2008) notes, lag is pervasive in Second Life. Lag is caused when large amounts of data must be sent across a network with low bandwidth. Lag can also be caused by a computer with a weak 3D rendering engine. Lag means customers wait for the game world to appear, or render on their screen. Waiting negatively affects their experience and many customers have complained about it already during the pilot study. Conversely, they have also mentioned being happy in the absence of lag.

Another aspect that customers perceive is the intentional aspect. Customers are goal-driven. This allows them to focus their effort more effectively. Having a focus is particularly important in virtual worlds because the options are vast. In real life, customers may be constrained by sizes, prices or store offerings. However, in Second Life, when buying virtual items, there are fewer constraints on what can or should be purchased. There is no concern for size limitations; it is easy to change in and out of shapes. There is no concern for reputation; a person’s identity transcends their appearance. It is possible to change from business attire into a costume, or change from male to female, without any long-term consequences. Modifying personal appearances is easy and is one of the many things to do for fun in Second Life. Lastly, a person is never limited by what is displayed by a store. Most items can be modified after they are purchased. When shopping for clothes, a customer in Second Life is not limited by shape or size of clothes. Most things are modifiable. There is more freedom to be creative and less constraints of usage. Thus, the customer must be actively thinking about uses when looking for items; otherwise they will be overwhelmed by the selection.
Temporal and intentional are only tentative themes, however, they begin to represent some differences in shopping habits of virtual world customers. For future analysis, we will also apply a more refined analysis methods that uses concepts from the literature (e.g. elements of retail design and the marketing mix) to categorize what customers perceive. This will allow us to link our findings back to the existing literature.

The findings of this study also provide three insights that lead to refinement of our research design.

**What items are customers buying?**

This pilot study gave us a better idea of what customers are buying in 3D virtual worlds. We learned that they buy items to customize their avatars, such as hair and clothing. This will help us when designing the tasks to investigate the differences in 3D and 2D environments. Based on what customers presently do, we can create tasks that are more familiar to them. It will also help us make tasks that are relevant and informative about current practice in 3D virtual worlds.

**Do customers use Second Life to buy real life items?**

We have found that buying real life items through Second Life is rare. Although many customers in Second Life are aware of the opportunity to purchase real life items, they choose not to buy real life items. Further study can investigate attitudes towards using Second Life to buy real life items. However, that is not the primary focus of this project. Since it is uncommon for the typical customer to use Second Life to buy real life items, a better strategy will have to be used to find the few customers who do. One possible solution is to recruit from stores that sell real life items, rather than general shopping areas. Although there will be less customers who go through these areas, the ones who do go through these areas will fit our required profile.

**How social is the shopping experience?**

One other finding of this pilot study is that the social shopping experience in Second Life is fragmented. This means that customers do not engage in continuous interaction with other people throughout the shopping experience. Interactions seem to be confined to the pre-purchase and post-purchase stages. Customers interact with others to determine needs and find store locations. The purchase stage, however, is done alone. Afterwards, the customer may interact once again with others when they use and evaluate the purchased items. One reason mentioned by a customer for not shopping with others is that the interface does not support shopping together well. It is difficult to communicate and browse at the same time. This suggests further studies should be conducted to determine how the interface can be designed to support a cooperative mode of shopping.

4.4 **Reflections on the pilot study**

How to conduct in-world interviews
Logistics of conducting in-world interviews were evaluated during the pilot study. The main logistical issues are having the proper computer set up, how to find participants, how to conduct the in-world interviews and how to take advantage of the features in Second Life. Some of these issues were presented by us at a Second Life conference on best practices for educators (Minocha and Tran, 2009).

There are many advantages to conducting in-world interviews. First, all the textual communications are automatically recorded. Thus, no manual transcription is required. Another advantage is concurrent access to a computer desktop. Second Life can be run as a single window on the desktop. This means that the interview script, prompts and questions can be available on the same desktop screen. Furthermore, notes about the interview can be typed directly into an electronic document and saved to the computer. This lowers the interview set-up and overhead considerably. Also, since accessing Second Life is simply a matter of turning on a computer application and connecting to the internet, the interviews can be conducted almost any time of the day as long as there are participants in-world.

In-world interviews can also be conducted in different virtual settings. Participants can be interviewed in the virtual store itself, in a public gathering area, at their home or at the home of the interviewer. Some participants may prefer certain settings for privacy or comfort. Second Life can accommodate all sorts of preferences. We will also build a private interview area in Second Life for this project, in case users prefer a private setting.

Second Life also has a few other features that can help with interviewing. One key feature is the support for voice communication. Interviews can be conducted the same way telephone interviews would be, but with the added advantage of an avatar presence. Voice interviews can be recorded into an electronic format as well. This, however, does require transcription into a text format afterwards.

Another useful feature is the note card feature. This feature is similar to in-world e-mail. The note cards, however, are stored in the avatar’s inventory. This allows some information, such as interviewer’s contact information, to be accessible in a more permanent form. Second Life is also compatible with third party software that allows recording of screenshots and in-world events. Events can be video recorded and analysed with video analysis tools. Lastly, each avatar has a profile that is public to everyone (Figure 6). This profile has valuable information about the participant and can be used to predict, to an extant, the type of participant they will be. Many profiles will contain information about a person’s experience in Second Life, their interests, and even their personality. This information is useful for recruiting purposes because it allows brief description of the user/participant. Overall, several features of Second Life make it ideal for conducting in-world interviews.
Figure 6. An example of a user’s profile from Second Life.

The main disadvantage of interviewing in Second Life is not having the social cues that are available during face-to-face interviews, such as facial expressions and body language. This issue concerns the role of the body in communicating and eliciting responses (Landridge, 2007). In contrast to email or instant messaging, in-world interviews provide avatars and a simulation of a real environment. Therefore, it might be a middle-ground between traditional online interviews and face-to-face interviews because it allows some non-verbal cues, such as gestures. The issue regarding the interview setting will be considered and discussed during as part of the analysis.

How to conduct phenomenological interviews

The pilot study provided opportunity to practice phenomenological interviews. A main issue that recurred was participants tended to provide general information about their customer experience rather than specific information. For example, they would describe typical behaviours, rather than describe a concrete instance. While typical behaviours are useful, for phenomenological analysis, concrete instances of actual experience are better. Therefore, this pilot study has been useful for highlighting this tendency of participants to refer to abstract terms during the recall of experiences. To correct this issue, the wording of the questions will be more explicit about what needs to be described and the type of information required.

Another lesson from the pilot study interviews was maintaining a coherent flow of questions. This comes mainly with practice, but is made easier with proper note-taking. Participants will sometimes mention more than one aspect at a time with a given response. It is up to the interviewer to have the participant elaborate on each of these aspects, but to do so in a way that fits in the flow of the conversation. Thus, this requires remembering each of the aspects and working them back into the conversation. From the participant’s perspective, phenomenological interviews should feel like a normal conversation, rather than a research exercise (Thompson et al., 1989).
How to design online interviews

Through the pilot study, the interview script has been streamlined to increase the chances of getting participants to consent. The pilot reinforced the need to have concise wording of the instructions. Also, the pilot study revealed some redundancy in the flow of questions. Thus, some questions were eliminated to shorten the interview session. The pilot study has also provided a good opportunity to test the comprehension of the questions. For the most part, the current script seems to work well (Appendix 7.1). Nevertheless, it is important to remain flexible. Some participants require more explanation, while others will provide very detailed answers that make further questioning not necessarily. A brief pilot study will be planned for phase 2 and phase 3 of this research as well to test their protocols.

How to conduct ethical research

This pilot study was approved by the Human Participants and Materials Ethics Committee (HPMEC). Since the main study is similar to the pilot study and we are taking the same precautions to protect participants, we do not foresee major concerns coming from HPMEC. Specific steps were taken to protect participants, such as removing participant’s real and avatar names from the data, storing the data on secured network folders, and providing full disclosure of the study’s purpose. Participants are allowed to withdraw themselves and their data from the study at any time. Consent is voluntary and not induced with payment. Any activity they partake in will not bring greater risk to them than they would expect from their normal everyday activities. This project uses the ethical guidelines set by the British Psychological Society (BPS, 2009).

Risk assessment

One critical roadblock to completing this study would be the closure of Second Life. This, however, is unlikely to happen. Second Life is a popular 3D virtual world application and has been growing consistently in the previous few years. If Second Life closes, then alternative 3D virtual worlds exist that can be used to find participants (see Wilson, 2009). These alternatives will be considered if the need arises. Currently, Second Life attracts between 40,000 and 80,000 simultaneous users, making it one of the most popular virtual world applications currently online. Therefore, the risk of closure is small.

The second foreseeable roadblock is getting enough participants. The pilot study suggests this will not be a problem. Recruiting participants from within Second Life has not been difficult. Furthermore, most of the participants in the pilot study have said they are willing to be contacted again. Another positive characteristic of users in Second Life is their dispersion worldwide. It is possible to sample participants from English-speaking customers from many continents, including Europe, North America and Asia. For parts of the study, some participants will be recruited in person. Thus, we will be using multiple recruitment modes.

Limitations of pilot study

The method of finding participants for the pilot study was convenience sampling. This led to a significantly higher number of females than males. Also, no advanced
screening was done so it was difficult to purposefully vary the age, ethnicity or other defined traits. For the main study, we will seek a closer parody between male and female participants. There will also be a greater effort to vary the other demographic traits. Nevertheless, the demographic in Second Life is not the same as the general population. Therefore, this will have to be taken into consideration. This study will seek to find a balance between having a participant pool that represents Second Life users versus a population that represents e-commerce users in general.

The second limitation was inconsistent use of the interview script. This made comparing answers between participants more difficult. The original script was revised during the study to remove redundant questions and create a better flow in the question sequence. Ideally, in the main study the wording and flow will be properly worked out beforehand. There will inevitably be some variation during the interviews due to the open-ended structure, but ideally there should be a core set questions all participants receive. This core set will be adhered to more strictly in the main study.
5 Conclusions

This report outlined the work completed in the probation year of this PhD project. We have begun our literature review, developed research questions and have a proposed research methodology. A pilot study was also conducted to test our methodology. We have also presented our work to an internal audience at The Open University (see Appendices 7.5 and 7.6 for materials). Appendix 7.7 summarizes the work completed in the probation year.

To conclude this report, we reflect on the outcomes of the pilot study and literature review; we will discuss how it will affect future decisions in this project. Moving forward, the issues we need to consider more carefully are the use of the literature for qualitative analysis, methods for recruiting a good sample of participants and the value of online data collection methods.

How much of the literature affects the data collection and analysis?

In the preliminary literature review, we have discussed concepts in marketing, human-computer interaction and psychology relating to the online service encounter. This was a critical step for situating this research with the existing body of knowledge. However, we must now consider how the literature will affect the analysis and collection of data (Creswell, 1998). This project has two overall objectives: (1) to provide a phenomenological description of customer experience in 3D and 2D e-commerce environments, (2) to enhance understanding of expectation formation and expectation transfer between 3D and 2D e-commerce environments. Following the tradition of phenomenology, the literature will play a less prominent role during the analysis. We will try to keep existing theoretical concepts separate from the inductive process to avoid being influenced by pre-conceptions of the domain and phenomena. This "bracketing" of pre-existing knowledge it is an important step for allowing the essential structure of the experience to emerge (Langdridge, 2007). However, to achieve the second objective, we should the literature, particularly what has already been done on expectation formation of services (Roland et al., 1999; Zeithaml et al., 1993; Parasuraman, et al., 1985). Thus there are two ways to conduct the analysis, each with a different emphasis on the literature. One solution will be to do the analysis in both ways, but at different times. The phenomenological analysis can be performed first. Then a more traditional thematic analysis can be performed second.

Recruiting strategy in Second Life

Based on the pilot study, we do not foresee major difficulty in finding or conducting interviews in Second Life. However, there are two strategies we plan to use to increase the value of the data. One strategy is to have stricter screening methods to have a more varied set of participants. We want the sample to be more representative of a general population, rather than being dominated by female participants. The second strategy is to keep an option of giving in-game currency to customers. This is to encourage more instances of consumption so that participants have more experiences to report on.
Future methodological considerations

A methodological issue that needs to be addressed by this project is quality of data from virtual worlds research, particularly if we are recruiting all our participants from one virtual world. Although virtual worlds research is widely use across various disciplines, there is still debate about how it should be conducted. We will examine these issues more in-depth and learn from other researchers who are currently engaged in this type of research either from a review of current practices or a face-to-face workshop. An area worth noting about virtual worlds research is embodiment (or representation) (Hine, 2000). Being in control of an avatar may influence participant’s behaviour and responses. Understanding how the communication medium mediates the interactions between researcher and participant could be a critical part of the data analysis. This is an area that we intend to explore further.

Next steps

The next step in this project is to fulfil the remaining administrative requirements of the probationary assessment (skills audit and development plan). Then, we will complete preparation of the materials for the main study. Data collection will begin as soon as the materials and protocol are approved by the Human Participants and Materials Ethics Committee. A work plan for August 2009 – September 2011 is presented in the next sub-section.
## 5.1 Project Plan

### Legend

1. Literature Review (Jul-09 to Oct-11)
2. PPIEC Ethical Approval (Jul-09 to Aug-09)
3. Preparation of Study Materials (Jul-09 to Feb-10)
4. Main Study (Aug-09 to Jul-10)
5. Thesis Write-up (Jul-10 to Sep-11)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Literature Review</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Ethics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Study Preparations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Study Phase One</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recruitment and Data Collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis and Discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Phase Two</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recruitment and Data Collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis and Discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Phase Three</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recruitment and Data Collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis and Discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Phase Four</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usability Test and Heuristic Evaluation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis and Discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Thesis Write-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thesis Outline and Drafting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-monthly Progress Review</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-monthly Progress Review</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-monthly Progress Review</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viva</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5-day Activity Breakdown

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Study (3 days / week)</td>
<td>Main Study (2 days / week)</td>
<td>Literature Review (2 days / week)</td>
<td>Literature Review (1 days / week)</td>
</tr>
<tr>
<td>Literature Review (1 day / week)</td>
<td>Literature Review (1 day / week)</td>
<td>Thesis Write-up (3 days / week)</td>
<td>Thesis Write-up (4 days / week)</td>
</tr>
<tr>
<td>Thesis Write-up (1 day / week)</td>
<td>Thesis Write-up (2 days / week)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6 References


7 Appendices

7.1 Pilot study interview template

// revised April 4, 2009 (unrevised script on Penelope server)

[Interview Phase 0: Recruiting and introduction]

Hi <participant name>

(wait for reply)

I am a student doing a study of shopping experiences in Second Life. Would you be interested in sharing your experiences?

(wait for reply)

Great!
We may end up talking up to an hour, but we can stop and resume any time at your convenience.

(wait for reply)

I am going to give you 2 note cards now that have more information about the study

(give project summary (Appendix C) and consent note card (Appendix D)

(wait for reply)

When you understand what the study is about, just type 'I consent' to continue.

(wait for reply)

I'll start with the first question. Feel free to type your replies on multiple lines to make replying easier.

[Interview Phase 1: Discuss one specific shopping experience]

- In as much detail as possible, describe a shopping experience in SL that you remember well. Describe the entire process, including the events leading up to the purchase and after the purchase. Describe what prompted the shopping experience, what you did to get the item and what you did with the item. Also include your thoughts and feelings throughout the process. The more detail you can provide the better. Write as much as you can and spend as much time as you need writing the description.

Allow participant to respond and only ask questions that prompt participant to describe more of their experience. Do not have them rationalize or explain their behaviour.
To encourage more detail of the experience, use these probes…

- What was X like?
- How did you feel when X?
- Can you tell me more about X?
- What do you think about X?

Try to get answers on pre-purchase, purchase and post-purchase.

If they cannot easily think of an experience, try these alternatives…

- Can you describe a time when you went to looking for an item in SL?
- Can you describe a time when you went shopping with friends in SL?
- Can you describe a time you used internet websites to help you with purchases in SL?

[Interview Phase 2: Discuss general shopping experience]

Phase 2: Add-on questions

- Do you shop with friends in SL?
  - Probe option 1: Can you describe a time when you went shopping with a friend in SL?
  - Probe option 2: How did you feel when X?
  - Probe option 3: What did your friend do while shopping with you?
  - Probe option 4: What do you think about the communication options in SL?

- Do you use internet sites to help you with purchases in SL?
  - Probe option 1: Can you tell me about a time when you used an internet site to help with your purchase?

- What do you think is the biggest problem with shopping in SL?

- What is the best part about shopping in SL?

[Interview Phase 3: Demographic questions]

Phase 3: Short answer questions

- How many purchases have you made in SL?
- What items do you typically buy in SL?
- How much would you say you’ve spent on items in SL?
- Are there any particular SL shops that you go to regularly?
- Have you ever used SL to learn about or buy real life products?
- Have you visited any SL shops that also exist in RL?
- Do you made purchases on Internet websites?
- What type of things do you buy from Internet sites?
• Have you ever used Internet sites to help you with making purchases in SL?
• How long have you been playing SL?
• How many hours do you typically spend in SL per week?
• What is your sex in real life?
• What is your age in real life?
• What is your profession in real life?
• What is your ethnic background?
• What city do you live in right now?

That’s all of the questions <participant name>! Thanks so much for your time. May we contact you in the future if we have additional questions?
7.2 [Pilot analysis] Participant profile

Only one participant profile is provided here as an example.

**Participant’s Profile**

Pseudonym: JS  
Avatar Gender: Female  
Items purchased: more than 1,000  
Real money spent on items: more than 300 USD  
Typical purchases: Ball gowns, hair, clothes  
2D e-commerce experience? Yes.  
Combines 3D and 2D shopping? Yes.  
Hours per week in Second Life: 14h/week  
Real life gender: Female  
Real life age: 41  
Profession: Stay-at-home mom  
Ethnicity: White  
Country: Chicago, USA

**Researcher’s “natural attitude” (impression after first reading)**

JS is buying hair for the first time. She is an independent person, determined to figure it out on her own. She tried many stores, so is willing to ‘tough it out’; not give up after a few failures. JS is technology literate. JS probably has some computer design skills.

The key ideas seem to be a learning curve, ‘real time’ shopping and enjoyment. JS mentions it is her first experience, refers to getting help from friend and getting no help from service reps. There is a trial and error process, of a prolonged browsing process (i.e. a real sense of lost time and effort). Nevertheless, JS enjoys the experience of acquiring items.

**Level one analysis: Extracting meaning units**

<table>
<thead>
<tr>
<th>Text (scrubbed)</th>
<th>Meaning Unit (JS substituted with P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 // My first shopping experience was for hair.</td>
<td>P wants hair</td>
</tr>
<tr>
<td>2 // I noticed other avatars wearing much better hair than the one you start with</td>
<td>P notices other avatars with nicer hair</td>
</tr>
</tbody>
</table>
3 // This was when I first got to second life so I first had to figure out how to buy the lindens.

4 // Then I typed hair in the search box and just started hitting all the stores with hair.

4a // I think I must have tried on at least 20 before I decided on one.

5 // Oh. I had to ask a friend how to purchase it though. I wasn't very SL literate at the time so I needed a lot of guidance. That's my first experience.

[16:57] Minh Twine: Can you tell me more about how you found the right store with the hair? What happens when you enter a store? When do you decide they don't have what you need?

6 // Well I just typed hair in search and the places that sell hair came up so I started at the top of the list and teleported to it and looked around.

7 // When I found hair I thought I might like I grabbed the demo and tried it on.

8 // When I entered the stores I'm asked by an automated greeter if I want a landmark to the store

8a // and if I would like to join the group.

9 // Then I just walk around browsing at the products.

10 // If they don't have what I need I pull up the search list and go on to the next store.

11 // If I saw someone with really great hair and I wasn't feeling too shy I would sometimes ask them where they got it.

[17:02] Minh Twine: Can you tell me

- P acquires game currency
- P looks for stores that sell hair
- P ‘physically’ visits stores to find items
- P asks friend on how to buy things
- P systematically searches for stores with hair
- P will ‘wear’ hair she finds attractive
- P is greeted by robot agent
- P is offered membership to store’s club
- P walks around store
- P brings up list of new stores and teleports to one of them
- P might find stores by asking other people for referrals
**more about your experience in the store where you did find the hair you liked?**

12 // Hmmmmm. I really didn't have an experience. I didn't talk to anyone or get help from a sales person or anything.

13 // I just walked around and shopped just like in RL

17:03 Minh Twine: *How did you feel as you walked around?*

14 // Well because it was my first time I guess I was a little nervous because I didn't want to make a mistake and buy the wrong product

15 // Then I just got bored

17:05 Minh Twine: *What did you get bored of?*

16 // I was very picky about the hair

17 // and I got tired of just wandering from store to store and not finding anything that I really liked.

18 // Once I found the stores that I liked though it wasn't so bad

17:07 Minh Twine: *Can you elaborate more on what you mean by 'shopped just like in RL'?*

19 // I went to a store and wandered around the aisles looking at the products until I found one I liked enough to try on. Then I purchased it.

17:09 Minh Twine: *How did you feel about having to shop by yourself without talking to anyone, or without sales help?*

20 // I enjoy shopping alone most of the time.

21 // And I dislike pushy sales people although sometimes it’s nice to have one around if you have questions.

<table>
<thead>
<tr>
<th>P did not talk to other shoppers or sales personnel.</th>
</tr>
</thead>
<tbody>
<tr>
<td>P walked and looked at items just as she would as if browsing in a real store.</td>
</tr>
<tr>
<td>P got bored of browsing</td>
</tr>
<tr>
<td>P was cautious was buying a bad item</td>
</tr>
<tr>
<td>P had high standards for purchase</td>
</tr>
<tr>
<td>P got frustrated when she could not find anything suitable</td>
</tr>
<tr>
<td>With a perseverance, she found a store she liked and became less frustrated</td>
</tr>
<tr>
<td>P found right item, wore it, and then bought it.</td>
</tr>
<tr>
<td>(general) P usually enjoys shopping</td>
</tr>
<tr>
<td>[17:11] Minh Twine: What was it like to find the hair you eventually bought?</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>22 // I was excited and happy and relieved that I finally found something.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[17:12] Minh Twine: And what did you do with the hair immediately after you bought it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 // As fast as it popped into my inventory that's how fast I put it on.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24 // Right afterwards I went offline because I got a headache from staring at the computer for so long.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>25 // Then I realized that sometimes hair needs to be adjusted so when I got back I had to learn to do that</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(general) P does not like being pressured by sales people, but finds them useful at times.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P was excited, happy and relieved to find the right hair product</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P wore the item immediately after purchase.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P went offline after shopping because playing the game made her sick</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P came back to the game to adjust (edit) her item so that it fit her better</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P realizes editing items is part of the game</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P makes a hobby out of having and collecting new hair styles</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P does not wear the hair anymore</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Some items are easier to edit than others</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P does not wear the hair anymore</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>P makes a hobby out of having and collecting new hair styles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaning Unit</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>P wants hair</td>
</tr>
<tr>
<td>P notices other avatars with nicer hair</td>
</tr>
<tr>
<td>P acquires game currency</td>
</tr>
<tr>
<td>P looks for stores that sell hair *</td>
</tr>
<tr>
<td>P systematically searches for stores with hair</td>
</tr>
<tr>
<td>P ‘physically’ visits stores to find items</td>
</tr>
<tr>
<td>P asks friend on how to buy things</td>
</tr>
<tr>
<td>When inside a store, P is greeted by robot agent</td>
</tr>
<tr>
<td>When inside a store, P will ‘wear’ hair she finds attractive</td>
</tr>
<tr>
<td>When inside a store, P is offered membership to store’s club</td>
</tr>
<tr>
<td>When inside a store, P walks around store</td>
</tr>
<tr>
<td>When a store has been exhausted, P brings up list of new stores and teleports to one of them</td>
</tr>
<tr>
<td>(general) P might find stores by asking other people for referrals</td>
</tr>
<tr>
<td>P did not talk to other shoppers or sales personnel.</td>
</tr>
<tr>
<td>P walked and looked at items just as she would as if browsing in a real store.</td>
</tr>
<tr>
<td>P was cautious was buying a bad item *</td>
</tr>
<tr>
<td>P had high standards for purchase</td>
</tr>
</tbody>
</table>
P got bored of browsing
*P got frustrated when she could not find anything suitable
With a perseverance, she found a store she liked and became less frustrated *
P was excited, happy and relieved to find the right hair product
P found right item, wore it, and then bought it.
(general) P usually enjoys shopping
(general) P does not like being pressured by sales people, but finds them useful at times.
P wore the item immediately after purchase.
P went offline after shopping because playing the game made her sick
P came back to the game to adjust (edit) her item so that it fit her better
P realizes editing items is part of the game
Some items are easier to edit than others
P does not wear the hair anymore
P makes a hobby out of having and collecting new hair styles P wants something

<table>
<thead>
<tr>
<th>P is not always enjoying experience</th>
<th>P is not always enjoying experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>P eventually finds store with effort and is happy</td>
<td>P eventually finds store with effort and is happy</td>
</tr>
<tr>
<td>P wears item right away</td>
<td>P wears item right away</td>
</tr>
<tr>
<td>P goes offline</td>
<td>P goes offline</td>
</tr>
<tr>
<td>P comes back online to play with item</td>
<td>P comes back online to play with item</td>
</tr>
<tr>
<td>P does not think about item much anymore</td>
<td>P does not think about item much anymore</td>
</tr>
</tbody>
</table>

**Level three analysis: Creating structural description of experience**

For JS, the consumer experience starts with noticing other avatars look better than she does. The solution, for her, is to purchase the thing that makes them look better. Items are not free, however, so she must acquire some amount of currency. JS knows how to travel to stores so she does this systematically, starting from one store to the next, in order. She embarks on her shopping journey alone. Upon entering a store, JS is greeted by a robot agent and offered a ‘customer membership’ to the store. JS must walk through the stores to see their range of offerings. Each store has a limited range, and so far none of the stores has the item she desires. To help with
her evaluation, JS tests selected items by wearing them on her avatar. When she
decides the store does not have what she wants, she teleport to the next store. The
experience of walking and browsing is familiar to shopping in real life for her. She is
bothered by having to browse so many stores, but is happy when she eventually
finds the store with something she likes. As always, she puts on items that interests
her first to get a better idea of how look. She does not want to make a bad purchase.
When she finally finds and purchases the item, she wears it immediately. All this time
spent shopping has given her a headache so she exits the game. When she enters
the game again, she edits the appearance of the item so it fits better on her avatar.
For now, the item remains in of her item inventory.

Level four analysis: Beginning extraction of invariant properties from customer
experiences in 3D virtual world (full analysis requires data from multiple
participants)

Nature of the 3D virtual worlds is fundamentally aesthetic; if this was a text-based
environment, she would not compare ‘looks’.

Bridge between ‘want to do’ and ‘how to do’; there is a learning curve and skill set
required to be a consumer in 3D virtual worlds.

Baseline expectations rooted in real world; shopping experience in 3D virtual world
reminds participant of real world shopping.

Avatar and person split; she must transfer currency to her avatar and at the end
abandons her avatar (exits game to tend to her real life situation).
7.3 [Pilot analysis] All Participant’s Experiences

**Participant 1.** AV is planning to attend a social event. She checks her inventory and decides that she must buy a new outfit. It is important that the outfit makes her look nice, while being unique from everyone else. She does not know where to buy the outfit yet, so she starts by using the search interface. A few places are recommended to her. She has to visit several of them before finding a store with the item she wants. She is disappointed that finding a good store is difficult. When she teleports to a store, she first turns off the interface alerts. She also moves away from the ‘landing area’ so that other avatars do not land on her. One of the first things she tries to do is figure out what kind of place she has teleported to. She looks for certain clues to determine if she is in a store versus a mall, etc. While browsing for items, AV reminds herself that attractiveness of the display is not always indicative of the real quality of the item. To get the real value from an item, AV knows it will depend on how well they mix and match with the rest of her inventory items. On this occasion, AV bought more than one outfit so that she would have something to change in and out of. After the purchase, AV went home and then wore the item. P then looked for other items in her inventory to match the new outfits. The items remain in her inventory.

**Participant 2.** For DA, the customer experience starts with an idea to create a tribute to Elvis. She realizes the scale of the tribute will need more resources than she has. Therefore, she partners with a couple friends for the endeavour. DA finds a seller of Graceland’s (Elvis’s house) and initiates contact. In the meantime, DA becomes excited by the prospect of owning a Graceland. When she finally sees the house, she is thoroughly impressed. The qualities in the house make her nostalgic. While being escorted around the house by the seller, she feels like a home buyer. She had limited options, but finally settled on one. Once purchased, she immediately transported the house to her lot. The ‘renovations’ to the house began right away, but there were some disagreements on how it should be renovated between the partners. This made the process unpleasant at times. In the end, she did not get everything she wanted but is happy with the overall product. DA knows other Graceland’s exist, but she wants hers to be the best. She will open the tribute for public viewing soon.

**Participant 3.** For MS, the customer experience started when he logged into Second Life. He was immediately alerted of a new item being sold at a store he visited before. MS decided to see the new offering. Upon teleporting to the store, MS was happy that the store loaded quickly. He saw the advertised item, but was not impressed. MS continued to browse the store nonetheless. He eventually found items that better suited his style. He bought several of them. The items did not appear in MS’s inventory right away and that got him anxious. Nevertheless, he teleported home expecting that it would be copied safely. The item did arrive after MS was home. MS made some alternations to the item and wore them. He kept the items on for the entire day. He was happy with the value and style of the items. Overall, it was a satisfying experience.

**Participant 4.** For JS, the consumer experience starts with noticing other avatars look better than she does. The solution, for her, is to purchase the thing that makes them look better. Items are not free, however, so she must acquire some amount of currency. JS knows how to travel to stores so she does this systematically, starting from one store to the next, in order. She embarks on her shopping journey alone.
Upon entering a store, JS is greeted by a robot agent and offered a ‘customer membership’ to the store. JS must walk through the stores to see their range of offerings. Each store has a limited range, and so far none of the stores has the item she desires. To help with her evaluation, JS tests selected items by wearing them on her avatar. When she decides the store does not have what she wants, she teleport to the next store. The experience of walking and browsing is familiar to shopping in real life for her. She is bothered by having to browse so many stores, but is happy when she eventually finds the store with something she likes. As always, she puts on items that interests her first to get a better idea of how look. She does not want to make a bad purchase. When she finally finds and purchases the item, she wears it immediately. All this time spent shopping has given her a headache so she exits the game. When she enters the game again, she edits the appearance of the item so it fits better on her avatar. For now, the item remains in of her item inventory.

Participant 5. For RH, the customer experience did not start with a specific consumption need. Instead, she was participating on a scavenger hunt. Scavenger hunt is a game where free items are scattered across random stores. The object is to find the randomly placed items. In doing so, the player must travel to different locations, mainly stores. During one stop at a store, RH’s attention was caught by an item for sale. It was cute clothing item. RH finds that shopping is easy in Second Life because she never has to worry about the size of the clothes. It was not RH’s intention to purchase anything during the hunt, but she felt if she did not buy the item now, she would never be able to find it again. After buying the item, she continued on the scavenger hunt. The item was used the day after purchase. It remains in her inventory and is used only for casual occasions.

Participant 6. For RG, the customer experience started when she wanted to buy hair to make her avatar look better. She teleported to a store then waited for the area to load. It was quick to load so that made her happy. She was exciting now that to begin shopping. RG browsed the store for hair that might interest her. She tries on many styles, keeping in mind the prices. She does find one that is the right style and price. After the purchase, RG renames the hair to something more memorable. RG enjoys the feeling is acquiring new items.

Participant 7. For SS, the customer experience starts when she feels the need to purchase new item for a formal event. SS uses the search feature to get a list of stores that sell the item. She finds a store. Once in the store, her attention is drawn to the layout and architecture of the store. She prefers stores that have things laid out vertically, so that she does not have to move about as much to find items. She tries on many demo items. While wearing the demo, she feels a little awkward because when wearing demos, your avatar is marked with a demo signal. Nevertheless, she believes using demos are worth the minor embarrassment. SS is also delighted by the prices in this store. SS is drawn to the items that look realistic, and she eventually finds one she likes. She buys the item. After the experience, she is relieved it is over because it was a long trip. SS will reuse the items at other formal events in the future as well.
7.4 [Pilot analysis] Extraction of themes

To extract themes, the themes, each of the essential structures were broken down into their constituent components (psychologically significant statements). Then they were stripped of their context and rephrased using a more general phrase (see Collaizi, 1978). Finally, recurring themes were amended to the phrases. The final cluster of themes are presented in Section 4.2.

Stepwise extraction of themes

Psychologically significant statements -> “Creative insight” -> [Theme]

Before arriving at right store

1. One is planning to attend a social event -> one wants to fit in [consume to belong]
2. One determines one’s existing items are insufficient -> one wants something new [acquisition]
3. One does not know where to buy an item -> one needs direction [help finding]
4. One makes use of search facilities -> one uses computer search [help finding]
5. One is given recommendations for places to visit -> one gets ideas [help finding]
6. One is disappointed that good items are hard to find -> one learns shopping requires effort [effort and resources]
7. One is creating a tribute area -> one wants to express one’s interest [expression]
8. One realizes item requires more resources than one has -> one assesses resources [effort and resources]
9. One looks for seller -> one needs to buy from something [finding a seller]
   One is excited by prospect of creating a tribute -> one is excited [excitement – emotion]
10. One is visiting different stores for fun (RH1-2) -> one is not interested in shopping [serendipity – discover shopping]
11. One wants to beautify one’s self -> one wants to impress [impress]
12. One is alerted of a sale -> one is told where to go [given direction]
13. One notices one other people look better -> one is not happy with one’s image [want to improve]
14. One acquires money -> one needs to use money [requires real money]
15. One is systematic in search -> one is strategic in finding items [search strategy]
16. One shops alone -> one is alone in the experience [shopping is personal]
17. One is attending a formal event -> one needs special item for event [need for item]
18. One uses search feature -> one uses computer search [help finding]

Upon arrival at right store

19. One turns off interface alerts -> one clears the screen [remove interface clutter]
20. One moves away from landing area -> one moves into position [get ready to shop]
21. One determines what kind of store she is in -> one orients oneself [orienting]
22. One is on guard against false or deceptive advertising -> one is on guard for bad deals [wise decision making]
23. One is thinking about how item will fit with rest of inventory -> one reflects on what one has [old and new]
24. One is impressed by the quality -> one is impressed [impressed by quality]
25. One is nostalgic -> One remembers why one is shopping [stirring memories]
26. One feels like a home buyer -> one feels engaged in non-trivial task [non-trivial]
27. One has limited option, but picked one -> one makes a decision [decision-making]
28. One’s attention is drawn to an item -> one must be attracted visually [attention grabbing]
29. One does not think about size -> one has special concerns in avatar shopping [different way of shopping]
30. One had to buy the item now, or risk not finding it again -> one is pressured to buy items immediately or risk not seeing them again [items come and go]
31. One is happy store loads fast -> one is frustrated by a slow shopping experience [slowness is a problem]
32. One tries on many styles -> one has to be sure the item is right (no refunds) [decision making]
33. One keeps an eye on the prices -> one considers that one can afford [prices are real]
34. One is happy the store loaded quickly -> one can start shopping right away [store has to load]
35. One is not impressed by advertised item -> one cannot like everything [have to be selective]
36. One continues to browse the store while there -> one looks around store for fun [joy of discovery]
37. One is greeted by service reps -> one’s arrival is noted [welcomed presence]
38. One is offered membership to the store -> one is invited to develop deeper connection to store [developing bonds]
39. One must walk through store to see everything -> one is revealed things [objects are organized]
40. One visits many stores -> one visits different places [it’s a trip]
41. One demos items to see how they look on one’s self -> one tests look of items [testing choices]
42. One teleports store to store -> one can leave and move instantly [shopping is travel]
43. One feels like one is shopping in non-trivial sense (ergodic?) -> one exerts effort [a real effort]
44. One is bothered by having to visit so many stores -> one is tired by having to move [a real effort]
45. One is happy when the right store is finally found -> one get joy after good find [delight for discovery]
46. One demos items -> one tries items [careful buyer]
47. One is careful not to make regretful purchase decision -> one is careful about purchases [careful buyer]
48. One pays attention to the layout of store -> one appreciates architecture and design [an appreciation of space]
49. One prefers vertical layout of items; easier to see items without moving -> one develops preferences for searching [strategic preferences develop]
50. One uses the demo feature -> ones tries things on [try before you buy]
51. One is embarrassed while using demos because they draw attention -> one can feel awkward if they look weird [don’t want to appear odd]
52. One is happy when prices are reasonable -> one is happy to get deals [prices are important]
53. One prefers realistic items -> one has specific preferences in mind [preference for style]

After purchase

54. One goes home before wearing item -> one re-dresses in private [privacy (about not looking odd)]
55. One creates a new outfit, matching new item with old ones -> one combines old and new [old and new, reuse]
56. One keeps the item in an inventory -> one keeps items [keep]
57. One brings the item home -> one takes item home [go home first]
58. One edits the items to their liking -> one puts more effort into item after purchase [post-purchase edits]
59. One is happy with the end-product -> one is satisfied [satisfaction from creating/editing]
60. One wants item to be the best -> one takes pride in ownership [pride]
61. One will make item viewable to public -> one will let others enjoy their work [show off]
62. One returns to their other tasks -> shopping is a break from other activities [relaxing activity?]
63. One uses the items again -> one will use item again [re-use]
64. One keeps items in inventory -> one retains access to item [access / re-use]
65. One renames the item to be memorable -> one integrates the item into their inventory (semantic) [new and old, searchable]
66. One likes the feeling of acquisition -> one desires more [more more more]
67. One must wait for item to come into inventory -> one must wait for item after purchase [lag is pervasive]
68. One leaves immediately home after purchase -> one goes back to comfort of home [privacy of home]
69. One makes alternations to item before wearing them -> one must tailor items [editing]
70. One wore item for rest of day -> one uses item right away [Utility declines after first moment of acquisition]
71. One is happy with value of item -> one is happy [satisfaction from finding deal]
72. One wears item immediately -> one does not wait to use items [instant gratification]
73. One exits game to recuperate from experience -> one expends energy from shopping [shopping is tiring]
74. One edits appearance of item -> one must customize items [editing]
75. One keeps items in inventory -> one keeps items [items are stored]
76. One is relieved experience is over -> One's experience was exhausting [Relief when over]
77. One will reuse item at other formal events -> one can reuse item [reuse]
7.5 Abstract written for CRC PhD Student Conference 2009

This abstract was written for the Centre for Research in Computing's PhD Student Conference, June 18-19, 2009. A link to the accompanying presentation can be found online at http://www.box.net/shared/4uc5j142jd

Introduction

3D virtual worlds are online, persistent, multi-user environments where users interact through avatars in 3D environments (Castronova, 2005). The opportunity to conduct business-to-customer (B2C) e-commerce in virtual worlds is growing rapidly with the creation of virtual stores and virtual malls (Papagiannidis et al., 2008). Avatar-based interactions in virtual worlds allow customers to walk and browse through stores similar to a real-world shopping experience. Items can also be simulated and rendered in 3D. Furthermore, virtual worlds allow synchronous interactions with other avatars. These enhanced interactive features of 3D virtual worlds can provide customers with a more engaging and immersive experience (Hemp, 2006). However, the experience of the customer in 3D virtual worlds, and how businesses can integrate 3D and 2D services to improve the customer experience has not been investigated. Thus, this project will address how 3D and 2D e-commerce can be blended to improve the customer experience. Our research questions are:

• What is the perceived experience of customers in 3D virtual worlds?
• What is the perceived experience of customers moving from 3D virtual worlds to 2D e-commerce environments?
• What are the perceived differences in 3D virtual worlds and 2D e-commerce environments?

Background

Most B2C e-commerce is performed with websites. Through an understanding of the consumption process and website usability, many guidelines have been created to help business and technology designers create usable e-commerce websites. Typical tasks, such as searching, comparing and making payments are well supported by the 2D website interface (Nielsen et al., 2001). However, other technologies are now appearing that offer alternatives to website e-commerce (Zakaria, 2003). 3D virtual worlds is an example of an emerging ecommerce technology. With the emergence of 3D virtual worlds, researchers have begun to develop new understanding of online consumer behaviour (Shin, 2008). In addition, 3D virtual worlds require new ways of thinking about interface design. Features of virtual worlds, such as a shared environment, requires a different approach to design compared to the single user paradigm (Schroeder et al., 2006). Design issues more relevant in 3D virtual worlds include communication, collaboration and representation of self. However, an understanding of consumer behaviour and technology design of 3D virtual worlds alone only provides a partial understanding of the overall customer experience.

Van Dijk et al. (2007) have shown that e-commerce technology is frequently used in conjunction with other technologies or business channels (e.g. telephone, high street, etc.). Therefore, it is important to understand how 3D virtual worlds are used in the context of other technologies. This project focuses specifically on how 3D virtual worlds are used in conjunction with websites.
Generally, it is understood that customers prefer one technology over another based on effectiveness (Meuter et al., 2000). Therefore, we want to understand how customers perceive the effectiveness of 3D virtual worlds compared to 2D websites. Features of 3D virtual worlds, such as avatar-based interaction and co-presence, suggests they are more effective for shopping together (i.e. the social shopping experience). Meanwhile, the speed of browsing websites and large catalogues on 2D websites may make it better for searching. This project will investigate how both environments can be blended so customers can make use of the most effective features from each environment. We are also interested in how the experience in one environment influences the expectations and perceptions of the other.

Understanding how expectations form and what influences perceptions is a key aspect of understanding customer experience. Closely associated to customer experience is the perception of service quality (Parasuraman et al., 1985). From a business perspective, positive perceptions of service quality are important because it contributes to e-commerce success (Brown and Javakody, 2008). E-commerce success depends on both the service design and the technology design. Furthermore, the perception of the service design (customer experience) often depends on the perception of the technology (user experience). Thus, to understand what contributes to positive perceptions of service quality in e-commerce; it is necessary to understand the interdependence of the service design and technology design.

To help develop a more holistic understanding of customer perceptions, some researchers have integrated user and customer experience into a single concept. It has been labelled as ‘Total Customer Experience’ (TCE) (Petre et al., 2006). TCE recognizes that customer experience is multi-faceted based on the combined performance of the technology and the business. Moreover, performance is also a multi-faceted concept that includes tangible aspects (efficiency, effective) and non-tangible aspects (emotions, fun). Following the same line of research, this project seeks to understand how technology, service design and social factors influence customer experience in 3D virtual worlds and 2D e-commerce environments. Thus, the background upon which this study is built includes knowledge of human-computer interaction and marketing.

**Methodology**

The research approach is qualitative and interview-based which will focus on experience and the formation of expectations. The participants will be sampled from within virtual worlds and in real life. The theoretical research framework is phenomenology. Phenomenology is a method normally used by psychologist to study consciousness and perception (Valle, 1998). It helps us understand how people perceive their presence and actions in the (virtual) world. Furthermore, every customer will likely have different perceptions: being confronted with different options, giving their attention to different things, and developing their own ideas along the way. Pollio et al. (1997) call this the “multiplicity of first-person perspectives”. Phenomenology provides the theoretical and methodological framework to represent these experiences. More importantly, the methodology preserves the subjective nature of the perceived experiences, while still producing a general understanding that is useful to the scientific and design community. The main outcomes of this project will be thematic descriptions and guidelines that highlight key issues in the customer experience. This will help business and technology designers create more usable and effective e-commerce systems that integrate 3D and 2D features.

**References**


Shopping in Virtual Worlds: User and Customer Experience

Minh Q. Tran
Centre for Research in Computing, The Open University

Introduction
This project investigates customer experience in 3D and 2D e-commerce environments. The aim is to understand how experiences in one environment influences the expectations and perceptions of the other.

Methodology
We will conduct interviews and user-observations in both 2D and 3D environments.

Concept 1: Avatars
Avatars in virtual worlds are representations of the customer. Having an online persona helps personalize the online shopping experience (see pictures).

Concept 2: Community
Virtual communities are a way for customers to connect to a network of other people. Communities bring a social element to online shopping.

Concept 3: Products
Products in virtual worlds are represented in 3D. This enables a customer to get a better idea of what is being sold so they can make better decisions about what they will buy.

Expected Outcomes
The expected outcomes will be an enhanced understanding of how customers use virtual environments for shopping, and guidelines for blending 2D and 3D e-commerce.
## Progress Report of Year One

### Development and Training
- Doctoral Training Workshops
- CRC Postgraduate Discussion Forums
  - Induction (CU / CRC)
  - Time Management Workshop (RCUK)
  - Methods Conference (OU)
  - Academic Writing Workshop (SRHE)
  - Poster Design Workshop (OU)

### Critical Review
- Literature search and annotation

### Empirical Work
- Informal Study
  - Analysis
- Pilot Study
  - Analysis

### Documenting and Reporting
- Literature Review
-Probation Report

### Dissemination
- Virtual Worlds Conference
- Oral Presentation
- Poster Presentation

---

* CU Poster Competition and CRC PhD Student Conference
* OU Doctoral Workshop Training Student Conference and CRC PhD Student Conference