

Technical Report No: 2004/11

***Integrating Service Quality into Customer-Centred
Design Approach of E-Commerce Environments***

***Shailey Minocha
Liisa Dawson
Dave Roberts
Nicola Millard***

5th April 2004

***Department of Computing
Faculty of Mathematics and Computing
The Open University
Walton Hall,
Milton Keynes
MK7 6AA
United Kingdom***

<http://computing.open.ac.uk>



Integrating Service Quality into Customer-Centred Design Approach of E-Commerce Environments

Shailey Minocha¹, Liisa Dawson¹, Dave Roberts² and Nicola Millard³

¹*Department of Maths and Computing, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK*

Email: S.Minoch ; L.H.Dawson@open.ac.uk

²*Ease of Use, IBM UK Ltd
Birmingham Road, Warwick, CV34 5JL, UK
daveroberts@uk.ibm.com*

³*BT Exact
Austral Park
Martlesham Heath, Ipswich,
IP5 3RE, UK
Nicola.Millard@bt.com*

With an increasing competition in the E-marketplace, generating experiences that exceed the customer's expectations of E-Commerce is important in order to acquire and then retain customers. A customer's experience with E-Commerce environments extends beyond the interaction with the Web site, including, delivery of products, post-sales support, and so on. It is this total experience that influences the customer's perceptions of value and service quality. Our research goal has been to investigate how Customer Relationship Management (CRM) strategies can be incorporated into the design of E-Commerce. In our cross-disciplinary research programme in HCI and CRM, we have developed an empirically-grounded evaluation instrument called E-SEQUAL, and a generic set of customer personas and their task scenarios for E-Commerce. E-SEQUAL consists of CRM and usability heuristics which can be applied to integrate customers' perceived dimensions of service quality into the design and evaluation of E-Commerce. In this paper we describe a customer-centred design process for E-Commerce which integrates E-SEQUAL, customer personas, and task scenarios of the personas.

Keywords: Usability, Customer-Centred Design, Customer Relationship Management, E-Commerce, Personas, Service Encounter, Task scenarios, Total Customer Experience

1 Introduction

On-line retail will grow from \$95.7 million in 2003 to \$229.9 billion in 2008, according to a report from Forrester Research (Forrester 2003). Most significantly, on-line retail sales will account for 10% of total US retail sales by 2008. In the UK, the on-line sales already make up 4% of the total retail sales. However, with increasing competition in the E-marketplace, and with a choice of off-line business channels (for example, physical stores and mail-order), it is becoming difficult for E-Businesses to retain customers.

Customer retention and loyalty affect profit and growth to a significant extent. Depending on the industry, increasing the percentage of loyal customers by as little as 5% can increase the profitability by as much as 30% or even 85%, (Reichheld & Sasser 1990), which is even higher on the Web (Reichheld & Schefter 2000). The reason for this is that it can be more expensive to acquire a customer than to retain an existing one. Indeed the success of some E-Businesses (for example, eBay, Amazon) can be attributed in part to a high degree of customer loyalty.

Therefore, to encourage repeat purchases and build customer loyalty, organisations need to shift the focus of E-Business from *E-Commerce* (the transaction on the Web site) to *E-Service* (interactions that occur before, during and after the transaction). Businesses should recognise that the quality of E-Service as perceived by customers involves much more than having a state-of-art Web site.

In the Human-Computer Interaction (HCI) literature (for example, Nielsen et al., 2001), research into the success or failure of (B2C) E-Commerce has primarily focused on the usability of the core Web site. Central to this has been how design criteria such as ease of navigation, optimal response time, and appropriate content can be managed to create usable customer-focused E-Commerce sites. It is evident from the relationship marketing literature (for example, Dyche 2002) that such a uni-dimensional focus ignores the broader service delivery system within which the on-line business-customer interaction occurs.

Service Quality is the customer's subjective assessment of the service they are receiving with the service they expect (Gefen 2002). The essence of service quality is the ability to deliver what the customer needs and expects. If the service quality of the customer's experiences with an E-Business exceeds his expectations, he would be willing to come back and conduct further business with the vendor. Conversely, customers who experience low service quality will be more inclined to move to other vendors because they are not getting what they expect.

The rewards of increased customer retention, growth and profitability will go only to those who maintain a competitive edge. They must be proficient at providing value and managing their relationships with their most loyal customers. Customer Relationship Management (CRM) is a set of business strategies designed to add value to customer interactions by providing service quality that exceeds the customers' expectations (Minocha 2000). The aim of CRM is to build customer relationships and, thereby, generate customer loyalty and repeat business. Its strategies involve meeting the service quality expectations of customers such as

reliability, personalisation, privacy, security in transactions, efficiency in customer services, and consistently meeting customers' requirements.

In the cross-disciplinary research carried out in the User Experience Strategy group of the Open University we have been examining the integration of CRM and HCI strategies. We looked at how these strategies could be used in the design of E-Commerce operations so as to engender customer retention and loyalty. We performed a series of studies to understand customers' requirements and perceptions about service quality from E-Tailing (retail) sites. From these we have developed a framework called E-SEQUAL (**E-Service QUALity**). E-SEQUAL is an evaluation instrument consisting of e-CRM and usability heuristics which can be applied to integrate customers' perceived dimensions of service quality into the design and evaluation of E-Commerce.

The objectives of this paper are:

1. To outline the process of how E-SEQUAL was developed;
2. To present some examples of E-SEQUAL heuristics;
3. To describe the process of developing a generic set of customer-personas for the design and evaluation of E-Commerce environments;
4. Discuss the application of E-SEQUAL and use of customer-personas in a Customer-Centred Design (CCD) process, which has been derived from the standard ISO TR 18529 – Human-centred lifecycle process descriptions.

2 Terminology and Research Concepts

An *E-Commerce environment* implies not only the front-end of the E-Commerce, which is the Web site, but also the back-office systems such as the security of credit card handling, delivery of products / services, pre- and post-sales support, and contact with staff. A customer's interaction with an E-Commerce environment can occur via other touch points such as email, phone, or fax. Examples of these situations could be a customer calling up the support hotline, or the customer receiving an e-mail about a special offer, a customer sending an e-mail or fax enquiring about an order.

Figure 1 shows the different stages of a customer's purchasing and consumption experience with an E-Commerce environment. Stage 1 is *expectations setting*. During this stage the customer draws upon a number of social and individual influences from which he will create a personal bench mark of service quality expectations. These influences include his motivations, his needs along with the benefits and costs of using E-Commerce, recommendations, advertising, brand, his own experiences of interacting with off-line business channels of that and other organisations, and so on. These influences play a vital role in his decision about which Web site to visit and whether or not to make a purchase on that site.

The next three stages (2-4 in Figure 1) of a customer's interaction with an E-Commerce environment constitute a *service encounter* (Gabbott & Hogg 1998): a pre-purchase stage; an E-purchase stage; and finally a post-purchase stage. If the customer is also the consumer, he will consume the products /services (stage 5), and finally he will review his experiences of conducting business with the E-Commerce environment (stage 6).

The customer's holistic experience over the stages 1-5 is the *total customer experience (TCE)*. An E-Commerce customer will make a decision about which

Web site to use (expectations setting), search for products and information (pre-purchase stage) and then make a transaction via the Web site (E-Purchase).

If the customer needs to query an order, complain about the state of the delivery or question his credit card handling, he is likely to contact the organisation through other touch points (post-purchase). Unpleasant or unsatisfactory experiences across any of these stages and / or during the consumption stage may render a negative TCE, despite the E-Commerce Website being usable.

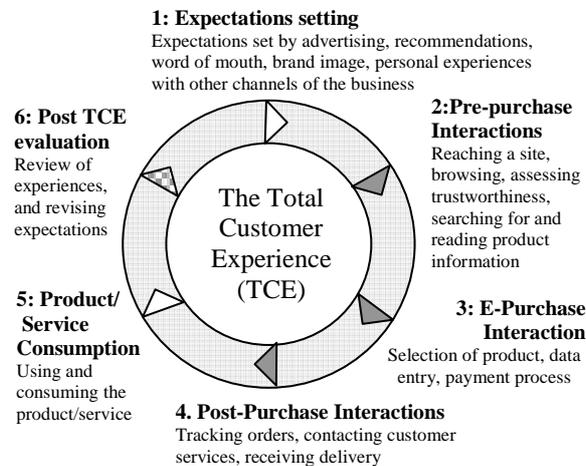


Figure 1. The purchase and consumption process with an E-Commerce environment

To retain customers it is necessary to ensure that the customers perceive value from their experiences with an E-Business (Weinstein & Johnson 1999). *Value* from a customer perspective may be defined in terms of satisfaction with, and perceived quality of, the service received in the course of the E-Commerce experience. A positive perception of value (when customers' experiences meet or exceed their expectations) will exhibit great influence in persuading a customer to return to the site. Therefore, generating a positive customer experience, and then continuously providing one, is important for (B2C) E-Businesses to attract and retain customers (Seybold 2001).

In the research presented in this paper, we identified those characteristics of service quality that help in generating a positive TCE. We observed and interviewed customers performing genuine tasks with E-Tailing environments. We investigated factors, in addition to usability problems, that led to a diminished perception of value during a customer's interaction with an E-Commerce environment. We recorded the factors which prevented the customer from achieving a positive TCE, which we referred to as obstacles.

We define an *obstacle* as an aspect of the E-Commerce environment that makes it unpleasant, difficult, inefficient or impossible for the customer to achieve a positive TCE. Obstacles are not only the usability problems in user-Web site interaction but also situations that could adversely influence, or even erode the customer-organisation relationship (Dawson et al., 2003). Examples of such obstacles are hidden shipping costs, missing return information, or pop-up surveys

that appear at inopportune moments. Obstacles can often cause breakdowns in the customer-organisation relationship. A *breakdown* is a 'deal breaker', for example, when the customer abandons shopping on a site and moves to a competitor site, or when the customer may not want to return for a repeat purchase or visit.

In the next section, we describe the methods that we employed to explore and analyse obstacles which led to the development of E-SEQUAL.

3 Developing E-SEQUAL

E-SEQUAL has been developed through a systematic process of data elicitation, data analysis, and evaluation. The aim of the empirical studies has been to build an understanding of the customer's experience across the service encounter (stages 2-4 in figure 1). However, in order to capture such data we needed to first address a number of methodological concerns.

Application of HCI evaluation techniques such as heuristic evaluations and controlled user-observations (performing set tasks on pre-set site) yield usability problems with the E-Commerce Web site (E-purchase stage of figure 1) but are unable to uncover other factors that mar a customer's TCE. Examples of such factors are: existing mental models of shopping in off-line environments, personal and cultural preferences of on-line interactions, motivations of on-line purchases, perceptions of service quality, etc. The traditional notions of usability and usability problems tend to be inherently limiting in exploring the TCE. Also, one technique may not be sufficient to capture the TCE across the service encounter.

Consequently, we decided to employ a range of complementary techniques to study the service encounter from a customer's perspective: observations of customers performing genuine shopping tasks with E-Commerce, critical incident technique to document and analyse obstacles and breakdowns, semi-structured interviews and workshops. Though our focus was on the service encounter (stages 2-4 in figure 1), data about stages 1 and 5 also emerged in our studies.

In this section we briefly describe our empirical work. For a detailed description of the studies please see Dawson et al., 2003 and Minocha et al., 2003.

3.1 Data Elicitation

We considered the user-observation method described in (Nielsen et al., 2001). In this, the users are asked to stop the shopping tasks prior to entering their credit card details. As a result, such a method cannot be used for evaluating the stages in which a customer completes the transaction (E-Purchase) and the events of the order fulfilment (post-purchase). Jared Spool (URL) has proposed the *compelled-shopping analysis* method. This involves giving the users financial incentives to purchase products on pre-selected E-Commerce sites. However, even this method is not 'naturalistic': first, the users can not select their preferred sites; and second, it does not involve user's own money or credit cards, and hence, will not reveal pre-purchase issues about apprehensions about the security of the site or credit card handling, or concerns about delivery (post-purchase).

Observations that are conducted using staged tasks on pre-defined Web sites as in (Nielsen et al., 2001) and in Spool's study, can not uncover customer's motivations for using E-Commerce and for choosing a particular Web site. Also,

these methods do not allow the customer to decide upon the conclusion of the task. In such situations, the task ends when the customer manages to make the prescribed purchase. In observations of genuine tasks, as we conducted and which are described below, a customer may choose to end the task at any point whether they have completed their task or not. Staged observations, therefore, do not support the elicitation of factors that would make a customer leave a Web site without completing his task.

The Pre- and E-purchase Observations

We conducted naturalistic observations of twenty users carrying out genuine, self-motivated tasks, which we had been invited to observe. The users were volunteers who were planning to carry out some form of task with E-Commerce. Therefore the tasks that they carried out were driven by the volunteer (customer) and involved a wide range of different sites. We video-recorded the observation session and asked the customers to think-aloud which we audio-recorded. Two observers took extensive notes of the sessions, which lasted from 25 minutes, to an hour and twenty minutes. The data collected proved to be rich and insightful about the pre- and E-purchase stages. Evidence emerged of the customers' motivations for using a particular E-Commerce site, their expectations of the Web site, and their good and bad experiences of Web site interaction.

Following the observation session, we conducted an interview with each customer and discussed issues from our observations of the expectations-setting and pre-purchase stages (see figure 1). These issues included motivation for choosing to conduct business with E-Commerce and also with a particular E-Commerce site; had they used the site before, how did they know of the site and what had made them stay on the site? Also, in the post-session interviews we are able to expand our knowledge of the obstacles that we had observed.

The Pre- and the Post-purchase Workshops

In addition to the observations, we conducted workshops to elicit data about the customers' reflective and subjective experiences of the pre-purchase and post-purchase stages. The workshop focused on core questions related to the customers' experiences and expectations from the service encounter. Workshops started with the facilitator relating both good and bad real-life experiences with E-Commerce. This helped to encourage the participants to reflect on their own similar experiences. The discussions were then handed over to the participants by way of open-ended questioning and guided through a set of themes.

During these one hour workshops, it was possible to extract data about several aspects of the TCE: the motivations for using E-Commerce such as 24x7 access, flexibility, the wide range of choices; factors that influence expectations-setting such as recommendations, advertising; experiences across the pre- and post-purchase stages of the service encounter, and the benefits and costs of E-Commerce over other off-line channels. Some of these findings were quite interesting. For example, one customer chose to browse for books off-line in a book store. However, after having decided which books he would like to buy, he

purchases them from Amazon. His motivations concerned price, free delivery and having them delivered to his home to save him carrying them back from the store.

The Post-purchase Interviews

In the final stage of the study, we returned to the customers that we had originally observed interacting with Web sites and conducted semi-structured interviews to elicit their experiences of the post-purchase stage of the service encounter. During these interviews we could ask whether the products had arrived on time; what state the paper work had been in; and whether they had to contact customer services; and so on. This provided rich data in support of the obstacles and breakdowns in the post-purchase stage of the service encounter.

3.2 Data analysis

The observation notes were transcribed from the video and audio recordings, to create a detailed and descriptive account of each session. The notes were then scrutinised, and any suggestion of an obstacle occurring was highlighted. Each obstacle was then captured on an obstacle card (Minocha et al., 2004) using a unique identifier; and a set of headings adapted from critical incident technique (Bitner et al., 1990). The headings included: events leading up to the obstacle, the cause and consequence of the obstacle (was there a breakdown?), customer's response to the situation which arose as a result of the obstacle, and requirements and design solutions that would resolve the obstacle.

In total there were 196 obstacle cards from the studies spanning the entire service encounter. Each obstacle was then grouped with similar obstacles in a process based on card sorting (Rugg & McGeorge 1997). Category and sub-category names were selected based on the card sort producing a 'catalogue of obstacles' (Dawson et al., 2003). The grouping of the obstacles cards was evaluated using a dual-coder process over four iterations of the catalogue of obstacles. The catalogue then helped to structure the development of E-SEQUAL.

Creating heuristics of E-SEQUAL

We developed heuristics and sub-heuristics of E-SEQUAL by working through each category and sub-category of the catalogue of obstacles and examining all of the requirements and design solutions from the obstacle cards. Heuristics were derived in order to resolve or avoid the obstacles that had occurred during the observations. For example, to resolve the obstacle category of "*Failure of E-Commerce experience to match with customer's existing shopping references*" the heuristic "*match existing shopping experiences*" was developed. Sub-heuristics helped provide further clarity to top-level heuristics. For example, "*match existing shopping experiences*" was clarified as:

- *Provide a similar range of products or services on the Web site to that of other off-line shopping channels of the business;*
- *Ensure that functionality matches with that of leading E-Commerce sites;*
- *Provide similar incentives as those which may be found in off-line channels.*

E-SEQUAL, therefore, integrates CRM and HCI strategies for the design and evaluation of E-Commerce environments. Web designers, marketing professionals and developers can apply E-SEQUAL to come up with requirements for integrating customers' expectations, and perceptions of service quality and value into the design and usability of E-Commerce environments. E-SEQUAL can be used by usability professionals as a checklist for evaluating the conformance of an E-Commerce environment against the HCI and e-CRM heuristics.

4 Evaluating E-SEQUAL

After developing E-SEQUAL, we recruited a number of usability practitioners in order to evaluate the heuristics in terms of their usefulness and usability. For these evaluations, each usability practitioner was given £30 to make a purchase from one of the three E-Commerce sites that we had specified. Whilst making the purchase of their choice, they were asked to apply E-SEQUAL for evaluating customer's TCE with the E-Commerce environment. Through these evaluations, the usability practitioners were able to assess how the heuristics of E-SEQUAL supported the evaluation of a customer's TCE across the entire service encounter. Each usability practitioner was asked to complete a questionnaire to elicit their views regarding the usefulness and usability of E-SEQUAL.

The feedback from these evaluations was very encouraging. On the whole they considered the heuristics in E-SEQUAL to be useful for guiding the design and usability of TCE as compared to conventional usability evaluation instruments which are based on Web design guidelines and are applied in industrial settings to evaluate the user-Web site interaction rather than the TCE. The practitioners wanted the heuristics to be presented as per the stages of the customer's purchase and consumption cycle (figure 1). This, they felt, would help divide the heuristics into manageable sections, with different roles in the design team working on different sections to design and evaluate the E-Commerce environment. Some other comments were to:

- Improve the terminology and semantics of the heuristics and the sub-heuristics;
- Incorporate specific examples along the sub-heuristics in order to make the heuristics understandable;
- Identify which heuristics were beyond the roles of the Web designer and the usability evaluator, and so would require input from the other members of the E-Commerce development and management team.

The feedback from the evaluations was incorporated in the next iteration of E-SEQUAL's design. Due to space restrictions, the entire set of heuristics is not presented here but we will be happy to provide it to interested colleagues.

5 E-SEQUAL: The Heuristics

The E-SEQUAL heuristics embody CRM and HCI issues of the service encounter that concern the customer's interaction with the Web site; issues that reflect the customer's interaction at different touch points (phone, e-mail, fax) of an E-Commerce environment; and the issues that arise due to the customers expectations that they bring to the E-Commerce interaction. The heuristics are

divided into the three stages of the service encounter (see figure 1). In this section, a selection of E-SEQUAL heuristics is presented for each of the three stages: pre-purchase, E-purchase, and the post-purchase stages.

5.1 The Pre-purchase Heuristics

The pre-purchase stage of the service encounter (see stage 2 of the TCE, figure 1) involves the customer reaching a decision to make a purchase on that Web site. We derived a number of heuristics related to this stage from our obstacles data. A selected few are presented below and thereafter discussed in more detail:

- Match customers' existing shopping experiences (on-line, catalogue and bricks and mortar shopping experiences);
- Give cues to enhance trustworthiness;
- Provide quality information;
- Support the novice customer;

The expectations setting stage of the TCE (see stage 1 of figure 1) influences the pre-purchase stage. For example, customers prefer to select sites with which they have some familiarity of the brand. For example one customer commented, "*I have used Alamo in the past, and so since I have had a reasonable experience with them that's the one I'll choose this time...and I have to say that I've never used their Web site before.*" However, expectations that arise as a consequence of familiarity with a company or brand can additionally cause problems. Some of the problems that emerged during the pre-purchase stage of the service encounter involved failure of the Web site to meet the customer's expectations.

On the other hand, a customer new to an organisation would not have such expectations, but needs to be reassured during their first encounter that the company is reputable. We observed a number of 'new' customers who looked for signs of trustworthiness. For example, furtive default settings set to retain customer's personal details or a lack of credible logos or affiliations were considered to be signs of an untrustworthy Web site by 'new' customers.

Once the customer has decided to stay on a Web site to at least browse for a product or service, a number of obstacles related to the usability of the Web site can arise. We have not attempted to gather a comprehensive list of usability heuristics as we already have a usability evaluation instrument that we apply in our consultancy activities. In addition, there are several checklists of E-Commerce usability guidelines that are available on the Web. However, some of the most-observed usability obstacles in our studies involved confusing user interface design (UI) controls, or misleading links, or navigation which did not match the expectations of the customer.

In order to support the customer's decision-making process, the provision of quality information is vital. Because of the nature of E-Commerce, the customer relies on photographs and textual descriptions about a product / service to support their decision-making. Consequently, customers find analogous or contextual information to be useful. For example, when a customer was searching for a USB data storage device, information such as, "*it will fit in you top pocket*" or "*this device is discreet and can be attached to your key ring...*" was very useful for the customer as it provided meaningful information about the size of the product.

5.2 The E-Purchase Heuristics

The E-purchase stage (stage 3 of the TCE, figure 1), involves the customer selecting the product or service that he has decided to buy and then taking it to the on-line 'checkout' in order to complete the transaction. Problems that arise during this stage, therefore, primarily concern the order placement process on the Web site, data entry onto forms, and their usability. Examples of the heuristics that we developed to support this stage of the service encounter are:

- Match customers expectations from on-line experiences;
- Ensure that the customers are in control;
- Integrate front-end and back-end processes;

As with the pre-purchase stage, a number of concerns arose due to the influence of customer's off-line experiences and expectations about Web-based systems. For example, customers often expected to be able to complete their tasks more quickly on-line than off-line. In our studies we found that customers were deterred when they were asked to move to another touch point in order to confirm the credit details, or that the Web site didn't actually support real-time purchasing. Additionally, customers' expectations lead them to expect an instant route to achieving their goals compared to other off-line business channels. When a customer was told that an on-line credit card application would still take up to 10 days before it could be confirmed, she was disappointed and felt that the benefit of using E-Commerce was greatly reduced.

During the E-purchase stage, customers expect to be informed if the product is not currently available. However, we observed that a customer was allowed to continue with their transaction despite the product not being in stock. This problem was only discovered when the product didn't arrive in the specified time period. At this point the customer logged a query with the customer services about the delayed product and was informed that the item was not available.

Finally, situations arose in which the customer felt that they had very limited options or control over the events of the transaction. For example, a customer was asked to register in order to continue with the transaction when there was little reason why registration was compulsory or required.

5.3 Post-Purchase Heuristics

The final set of heuristics concerns the post-purchase stage of the service encounter (stage 4 of the TCE, figure 1). During this stage, the customer receives the ordered products or services and the order is fulfilled. Examples of the heuristics that were developed to support the post-purchase stage of the service encounter were:

- Maintain continuity across touch points;
- Provide reliable customer services;
- Provide a reliable delivery service;
- Ensure that customers are in control;

For example, problems occurred when customers failed to gain accurate or meaningful information from customer services, from the paper work or from emails. In the studies that we conducted, one customer was concerned about an order that had been delivered with items missing. The paper work that had arrived

with the part order made no mention of the outstanding items and the customer was unsure if these items would arrive despite the fact that they had been paid for.

We also observed customers feeling frustrated when sudden changes in company policy were made, such as introducing delivery charges for what had previously been free. With one customer, the free delivery had been the single retention factor over competitor sites.

In the next section we propose a customer-centred design process to show how E-SEQUAL can be applied in the design and development of E-Commerce.

6 Using E-SEQUAL within a Customer-Centred Design (CCD) framework

In order to guide the application of E-SEQUAL we have derived a customer-centred design (CCD) process model (see figure 2) from the User-Centred Design (UCD) standard, ISO TR 18529 – Human-centred lifecycle process descriptions. We have employed the term *process model* to infer a framework in which instruments and methodologies can be used in a sequence of stages through which a software product or information system evolves.

The central circle in the CCD model is the purchase and consumption model (see figure 1). This emphasises that the TCE is the central focus for the design and development of an E-Commerce environment. As well as using E-SEQUAL for guiding the requirements and design stages of the CCD process, and the evaluation stage, we have employed personas to build customer profiles and to specify the context of use. In addition, personas provide customer task scenarios for conducting evaluations using E-SEQUAL. In this section we discuss the CCD process model and the instruments that can be applied at its different stages.

6.1 Specifying the Context of Use

In CCD, specifying the context of use involves understanding the customer and their tasks that they hope to achieve via a Web site of an E-Commerce environment. To support this stage, we developed a generic set of personas and task scenarios. Personas were used for two purposes: first to collate the customer behaviour, characteristics, experiences and motivations for using E-Commerce that we observed and second, for providing task scenarios for E-SEQUAL evaluations. The set of personas was developed from data elicited in our empirical studies reported in section 3 of this paper.

Personas are representations of real users, or for this research, real customers that are used as design targets (Wodtke 2002). Cooper (1999) suggests that personas are, 'hypothetical archetypes of actual users' (p 124). He suggests that personas are discovered through an investigation of a problem situation or during the initial stages of a development process. Personas need to be individualised and provide a believable image and description of a customer.

Personas have been applied in a variety of ways in UI design: for identifying user (or customer) characteristics and patterns of behaviour concerning a particular context (Cooper 1999; Wodtke 2003); or as demonstrations of how customers' interactions affect the information architecture of the system (McQuaid, et al., 2003). More generally, personas have been used as ways of communicating user data to the development team by helping to avoid the problems of generalness that

can occur with using only one “generic” persona or user model. Instead, a set of personas can speak for specific users and adopt specific user traits (Barnum 2002).

Deriving Personas

Through the studies that we conducted, described in section 3, we identified a number of characteristics and situations that affected customer’s experiences:

- Whether the customer was new to a Web site, a repeat customer, loyal to a brand, registered, or new to the business, that is, not having visited the bricks and mortar store or used the catalogue channel of the business;
- How the customer had arrived at the Web site, for example; as recommendation from a friend; via a search engine; through advertising or a link from another familiar Web site;
- Whether the customer had a specific product / service that they were looking for or were they simply “e-window shopping”?;
- What prior IT and Internet experience did the customer have?

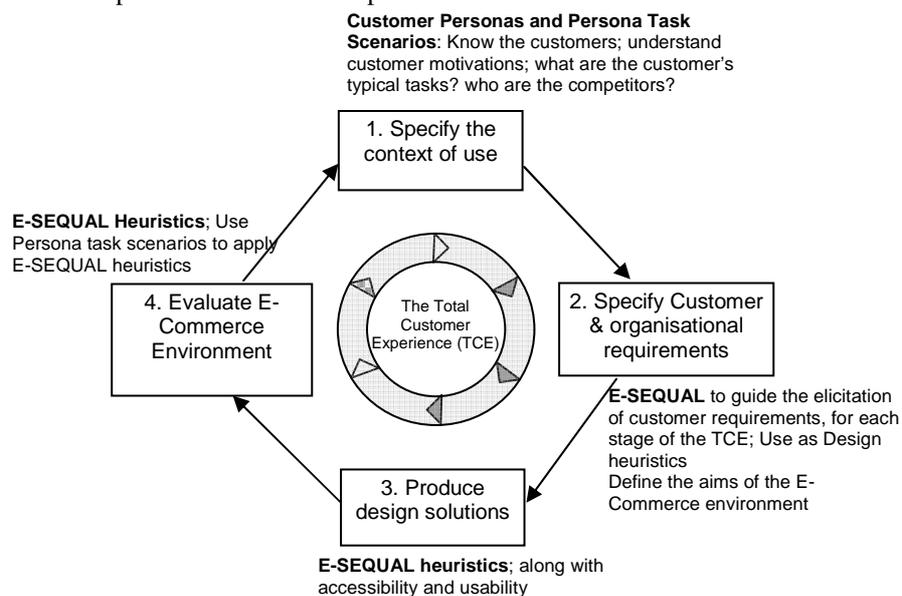


Figure 2. A Customer Centred Design process model for the development of E-Commerce

In order to create a set of personas, we collated the customer profile data from our empirical studies and built the different characteristics and situations into a generic set of personas, which include:

- a returning customer to the Web site but who was not registered;
- a registered customer to the Web site;
- a customer who had visited the bricks and mortar store but never used the Web site, and who was also an expert Internet user;
- an expert Internet user but a new customer to the business;

- a new customer with no experience of the business through any off-line or on-line channel and who was also an infrequent customer of E-Commerce;
- a new Internet user with some experience with the off-line business channels of the company; an example of such a persona is in figure 3.

Though this set is not an exhaustive one, we believe that it is representative of a wide range of customer characteristics and behaviours. Such a manageable set of personas can guide the designers of E-Commerce environments involved in deriving customer profiles for a variety of situations and customers. We have not included the complete set of personas here but we will be happy to provide it to interested colleagues.

Deriving Persona Task Scenarios

For each of the personas, we developed a task scenario (see the bottom half of figure 3), which would be triggered by a motivation. The persona in figure 3 is that of Susan's: Susan Armitage is 52 and lives with her daughter in Aberdeen. She is a new Internet user with experience with the off-line business channel (catalogue) of a particular company. She is a specialist seamstress and would like to buy some accessories to match the 1920's dress that she has been commissioned to make. However, because of time restrictions and enthusiasm to learn more about E-Commerce, she decides to use the Web site of the company rather than go into town. The scenario then follows the progress of Susan's interaction with the E-Commerce environment.

Personas / www.pasttimes.com – a new Internet user with experience of the catalogue and the bricks and mortar



Susan Armitage is 52 and lives in Aberdeen. She is a seamstress specialising in ladies evening wear. She works from home and has a loyal set of clients who provide her with enough of a customer base. She is a widow and currently her daughter who has just come back from travelling around the world is living with her. She kept in touch with her daughter via Email as she travelled from county to county, this was her original motivation for getting on-line. Susan is a novice to E-Commerce and has only recently begun to use E-Commerce for ordering dress making materials cheaply from a Web site that was recommended by a colleague. She knows of Past Times as there is a bricks and mortar store in Aberdeen. She has also used the catalogue and she often buys accessories from the catalogue for the dresses that she makes. She doesn't like having to go into town and so quite likes the idea of the Internet as it could save her time and hassle of finding parking. She found the Past Times web address on the back of the catalogue. **Task:** She is currently making a dress for a client in the style of the twenties. She would like to purchase both an evening clutch bag and a necklace to suit the style of the dress. She feels that Past Times will have some items that might be suitable. The cost of the items is not an issue as this would be added onto the cost of the outfit, however, she finds the products from Past Times to be well priced and of a good quality. She has never had any problems with delivery from using the catalogue, or when using the other Web site that she uses, as she works from home.

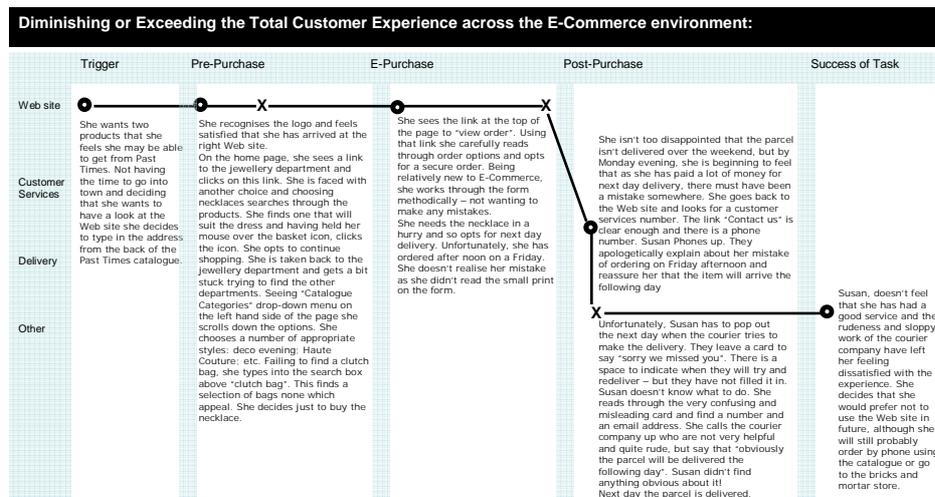


Figure 3. Example of Persona and scenario of E-Commerce experience

The scenario is presented in a linear format, telling the story of the customer's experience with the organisation in order to achieve a particular task. The scenario maps onto two axes (figure 3): one that represents the E-Commerce environment by illustrating the different touch points that a customer may interact with, such as Web site, customer services and delivery; and another that represents the service encounter (pre-purchase, E-purchase and post-purchase). Additionally, during the scenario possible obstacles to the TCE are illustrated, such as concerns about delivery (indicated by 'X' in figure 3).

Personas help to consolidate and document the data gathered about customers during the first stage of CCD (see figure 2): customer's tasks, their expectations, skills, and previous experiences.

6.2 Specifying Customer and Organisational Requirements

In CCD, specifying the customer and organisational requirements involves deriving business requirements to meet customer requirements and expectations. E-SEQUAL provides a set of heuristics from which relevant customer and business requirements can be derived for attracting and retaining customers. For example, one of the e-CRM heuristics relates to providing incentives for attracting customers. This would help the development team consider the business perspective: whether incentives were viable for encouraging a customer to make a purchase. Another heuristic concerns the efficiency of delivery. In our studies, inefficient delivery and follow-up was often observed as one of the major causes for a breakdown in customer-organisation relationship. Therefore, a business could gain competitive advantage by providing an effective and flexible delivery service.

By working through the E-SEQUAL heuristics, both customer and business requirements can be derived for TCE in order to promote customer retention.

6.3 Producing Design Solutions

To produce design solutions, CCD involves Web site design, interaction design, and conducting usability evaluations of early design solutions. However, as the customer's experience with E-Commerce goes beyond the Web site so too must the design solutions. Therefore, E-SEQUAL proposes design solutions for each stage of the service encounter and across each of the touch points with which a customer may interact with the E-Commerce environment. For example, a customer who has experience with the catalogue shopping channel of a business may expect the categorization of products / services to be displayed in the same way on the Web site. Similarly, the invoices, emails and other correspondence between the business and the customer should be designed to be clear, informative and personalised.

6.4 Evaluating the E-Commerce Environment

In this final stage of the CCD process (see figure 2) the design is evaluated against customer's tasks. The task scenarios, that we have derived for personas are realistic, concrete and specific and help to guide the evaluator through heuristic evaluations. The evaluator will interact with the E-Commerce site to role-play a stereotypical customer persona and carry out the task scenario. While walking

through the scenario and navigating through the site, the evaluator will check for the site's conformance against E-SEQUAL, and makes a note of situations in the scenario where the E-Commerce environment does not adhere to the heuristics.

For example, in one of our personas, Emily wishes to use an E-Commerce environment in order to buy a Christmas gift for her father and her grandmother. Emily is a returning customer to this Web site and so has experience of using the Web site. The developer can use this situation to trace the steps that Emily would be likely to make to complete her task, and assess the service quality of the E-Commerce environment against the E-SEQUAL heuristics for each stage of the service encounter (stages 2 – 4, figure 1).

This process can be conducted for each of the personas and the task-scenarios spanning the TCE. The grouping of E-SEQUAL's heuristics as per the three main stages of the service encounter provides flexibility in breaking up the task of evaluating the TCE into smaller chunks.

7. Conclusions

The development of E-Commerce involves taking into account customers' motivations, expectations and perceptions of service quality. While maintaining a customer-centred (HCI) perspective, we have considered customer relationship issues that extend beyond the interaction with the Web site. This has involved conducting an inter-disciplinary research programme to integrate HCI and relationship marketing issues in the design and evaluation of E-Commerce.

E-SEQUAL, one of our research outcomes, is an empirically-grounded service quality framework that integrates e-CRM and HCI strategies for the design and development of E-Commerce environments. E-SEQUAL can provide guidance to E-Businesses regarding integration of front- and back-end business processes, and across different customer touch points such as phone, fax, e-mail, and so on. It can be applied by Web designers, marketing professionals and developers to come up with requirements for integrating customers' expectations, and perceptions of service quality and value into the design of E-Commerce. Furthermore, it can be used as an evaluation instrument by usability professionals for evaluating E-Commerce environments against HCI and e-CRM heuristics.

E-SEQUAL is based on actual customer-observations; we were not able to capture a wide range of usability issues. In addition, E-SEQUAL does not cover accessibility issues. Therefore, we propose that E-SEQUAL be used in conjunction with a usability evaluation instrument and an accessibility checklist. We have derived a generic set of personas and task scenarios to guide the application of E-SEQUAL within a CCD process of E-Commerce.

In our investigations, we have found that a customer's off-line shopping behaviour, preferences and motivations influence his on-line shopping behaviour. The next phase of our research is to identify and analyse individual, organisational and social influences from *off-line experiences* that influence customer's behaviour and expectations of service quality and value from E-Commerce environments.

Acknowledgements

This research programme in CRM and Service Quality was first initiated in 2001 and supported by BT Exact Technologies (2001-2002). It is currently being supported by the EPSRC Grant No GR/R60867/01 (2001-2004) and BT Exact Technologies (2003-2004). We are grateful to all the participants and we thank Dr. Ann Blandford of UCL, Dr. Marian Petre of the Open University, and Dr. Gordon Rugg of Keele University for their support and advice on this research.

References

- Barnum, C. M. *Usability Testing and Research*, Pearson Education, Inc, 2002.
- Cooper, A. *The Inmates are Running the Asylum*. SAMS, 1999.
- Bitner, M. J., Booms, B. H. and Tetreault, M. S. The Service Encounter: Diagnosing Favorable and Unfavorable Incidents, *Journal of Marketing*, **54**, 71-85, 1990.
- Dawson, L. H., Minocha, S. and Petre, M. Social and Cultural Obstacles to the (B2C) E-Commerce Experience, *Proceedings of BCS-HCI 2003*, Springer-Verlag Ltd, **1**, 225-241, 2003.
- Dyche, J. *The CRM handbook: A Business Guide to Customer Relationship Management*, Addison-Wesley, 2002.
- Forrester, *US eCommerce To Hit nearly \$230 Billion in 2008* <http://www.forrester.com/ER/Press/Release/0,1769,823,00.html>, last accessed 22nd January, 2004.
- Gabbott, M. and Hogg, G. *Consumers and Service*. John Wiley & Sons, 1998
- Gefen, D. Customer Loyalty in E-Commerce, *Journal of the Association for Information Systems*, **3**, 27-51, 2002.
- ISO TR 18529: 2000 *Ergonomics of human-system interaction -- Human-centred lifecycle process descriptions*, <http://www.iso.ch>, last accessed 22nd January 2004.
- McQuaid, H. L., Goel, A., and McManaus, M. Designing for a Pervasive Information Environment: The Importance of Information Architecture. *Proceedings of BCS-HCI 2003*, Springer-Verlag Ltd, **2**, 41 – 44, 2003.
- Minocha, S. Design of E-Business Sites for Effective Customer Relationship Management, in C. Paris, N. Ozkan, S. Howard & S. Lu (eds.) *Proceedings of Australian Conference on Computer-Human Interaction OzCHI 2000*, IEEE Computer Society Press, 68 – 69, 2000.
- Minocha, S., Dawson, L.H., Blandford, A., and Roberts, D. The Customer's Perspective: Sociological Accounts of E-Commerce Encounters, in Isaias, P. & Karmarkar, N. (eds.), *Proceedings of the IADIS International Conference WWW/Internet 2003*, **1**, IADIS Press, 69-76, 2003.
- Minocha, S., Dawson, L., Blandford, A., and Millard., N., Providing Value in E-Commerce Environments: The Customer's Perspective, in *Contemporary Research in E-Marketing, Volume 1*, to be published by Idea group, April 2004.
- Nielsen, J., Molich, R., Snyder, C. and Farrell, S. *E-Commerce User Experience*. Nielsen Norman Group, Fremont, CA, 2001.
- Reichheld, F.F. and Sasser, W.E.J. Zero Defections: Quality comes to Services, *Harvard Business Review*, **68**, 105-111, 1990.

- Reichheld, F. F. and Schefter, P. E-Loyalty: Your Secret Weapon on the Web, *Harvard Business Review*, **78**, 105-113, 2000.
- Rugg, G. and McGeorge, P. The Sorting Techniques: A Tutorial Paper on Card Sorts, Picture Sorts and Item Sorts, *Expert Systems*, **14**, 80-93, 1997.
- Seybold, P. B. *The Customer Revolution*, Random House, 2001.
- Spool, J. M., *Compelled-shopping analysis service* <http://www.uie.com/csa.htm> last accessed 22nd January 2004.
- Weinstein, A. and Johnson, W.C. *Designing and delivering Superior Customer Value*, CRC Press Ltd, 1999.
- Wodtke, C. *Information Architecture: Blueprints for the Web*, New Riders, 2003.