E-SEQUAL: A Customer-Centred Approach to Providing Value in E-Commerce Environments

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5th April 2004

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ABSTRACT

With an increasing competition in the E-marketplace, generating experiences that exceed the customer's expectations is important in order to acquire and then retain customers. A customer's experience with E-Commerce extends beyond the interaction with the Web site. Other features such as credit card handling, delivery of products, post-sales support, and so on, influence the customer's perceptions of value and service quality. Our research goal has been to investigate how, in addition to usability, Customer Relationship Management (CRM) strategies can be incorporated into the design of E-Commerce. In our cross-disciplinary research programme we have applied a variety of techniques to investigate customers' expectations and perceptions of service quality. In this paper we describe a framework called E-SEQUAL. E-SEQUAL is an evaluation instrument consisting 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.

Author Keywords

Customer-Centred Design; Customer Relationship Management; E-Commerce Environments; Service Encounter; Total Customer Experience; Usability.

ACM Classification Keywords

H.5.2 User Interfaces; K.4.4 Electronic Commerce.

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 [14]. 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 first acquire and then 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%,

[9] – a ratio estimated to be even higher on the Web [10]. The reason for this is that loyal customers are typically willing to pay a higher price and are more tolerant when something goes wrong. They are easier to satisfy because the vendor knows what the customers' expectations are [9]. Indeed the success of some well-known E-Businesses (for example, eBay, Amazon) can be attributed in part to their ability to maintain a high degree of customer loyalty.

On-line retailers feel compelled to keep up with their competition. They are investing in Web site design and usability evaluation to match their offerings to evolving shopping preferences. They wish to create the optimal shopping experience for their customers. However, a customer's experience with E-Commerce extends beyond the interaction with the Web site. Other features such as security in credit card handling, delivery of products, post-sales support via e-mail or with call centres, and so on influence customer's perceptions of quality and value.

Therefore, to encourage repeat purchases and build customer loyalty, organisations need to shift the focus of E-Business from *E-Commerce* (the transactions on the Web site) to *E-Service* (all cues and the interactions that occur before, during and after the transactions). 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, [8], [13]), 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, [3]) 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 [6]. 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 [7].

In the cross-disciplinary research carried out by the User Experience Strategy group within the Computing Department 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, trust, and loyalty. We performed a series of studies to understand customers' requirements and perceptions about service quality from E-Tailing (retail) and E-Travel sites. From these we have developed a framework called E-SEQUAL. E-SEQUAL is an evaluation instrument consisting 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.
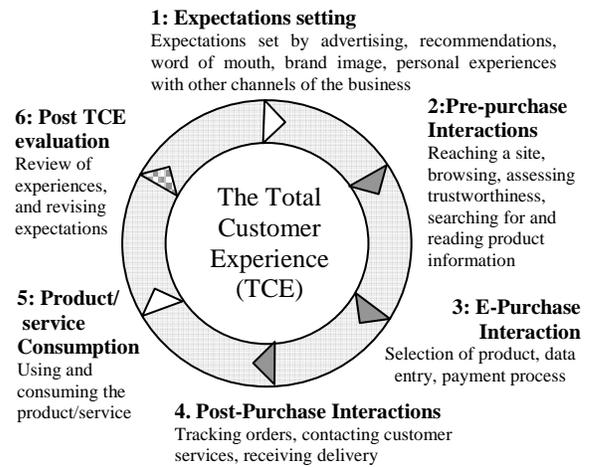
In this paper we first outline the terminology and research concepts related to the customer's interaction with E-Commerce. This is followed by a description of the methods used in the development of E-SEQUAL and how we were able to capture genuine customer experiences of interacting with E-Commerce. Further, we describe a representative group of the E-SEQUAL heuristics. Finally, a discussion of strengths and limitations of E-SEQUAL is supported by a brief comparison with other service quality frameworks in the E-Commerce domain.

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 customer's purchasing experiences with an E-Commerce environment and subsequent evaluation of his experiences. 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.

1: Expectations setting
Expectations set by advertising, recommendations, word of mouth, brand image, personal experiences with other channels of the business

6: Post TCE evaluation
Review of experiences, and revising expectations

2:Pre-purchase Interactions
Reaching a site, browsing, assessing trustworthiness, searching for and reading product information

The Total Customer Experience (TCE)

5: Product/ service Consumption
Using and consuming the product/service

3: E-Purchase Interaction
Selection of product, data entry, payment process

4. Post-Purchase Interactions
Tracking orders, contacting customer services, receiving delivery

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

The next three stages (2-4 in Figure 1) of a customer's interaction with an E-Commerce environment constitute a *service encounter* [2]: 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.

A customer is willing to do business with an E-Commerce environment only if he gets *value* from his exchange with

it. *Value* from a customer's perspective may be defined in terms of satisfaction with, and perceived quality of, the service received in the course of his TCE. A positive perception of value (when the customer's TCE meets or exceeds the customer's expectations) will have a major influence in persuading a customer to return to the site.

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 and E-Travel 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 could be:

- usability problems with the site such as use of ambiguous terminology, or use of flashy features that are attractive but only work for those customers with high-speed internet access;

- situations that could adversely influence, or even erode the customer-organisation relationship. Examples of such obstacles are hidden costs, such as shipping costs, taxes or tariffs, 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 following section, we describe the methods that we employed to explore and analyse obstacles which led to the development of E-SEQUAL.

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.

Data Elicitation
To understand those obstacles to the pre- and E-purchase stages of the service encounter, it was necessary to observe customers interacting with Web sites. Application of HCI evaluation techniques such as heuristic evaluations and controlled user-observations (observing users performing 'set' tasks on 'pre-set' sites) yield

usability problems with the E-Commerce Web site. They do not uncover other factors that mar the customer's TCE.

We considered the method described in [8]. 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 fulfillment (post-purchase).

Jared Spool [4] 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 issues of pre-purchase such as apprehensions about the security of the site or credit card handling, or about delivery (post-purchase).

Observations that are conducted using staged tasks on pre-defined Web sites as in [8] and [4] above, 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 that are self-motivated, 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.

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 evaluate the TCE. Though our focus was on the service encounter (stages 2-4 in Figure 1), data about stages 1 and 5 also emerged during our studies.

The processes of data elicitation and data analysis are described below.

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 business with E-Commerce. Therefore the tasks that they carried out were completely dictated by the volunteer 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 providing evidence 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.

We were able to observe the customer's interaction with the Web site(s) during the pre- and E-purchase stages of the service encounter. During these stages, a customer would make a decision about which product / service to purchase, select the product or service, and move to the transaction page in which their personal details would be entered (registering if necessary), terms of agreement could be checked, a final price would be presented and the purchase made.

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 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? For example, a customer's motivation to use E-Commerce over other business channels was seen as convenience and saving of time. One customer who bought her dog's food from a particular site that offered free delivery said, *"I suppose it would be just as easy to go and get Monty's food* [the dog]*, but when you can sit at home for two minutes and have it delivered the next day and not have to carry about big heavy bags of dog food..."*

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 customer's reflective and subjective experiences of the pre-purchase and post-purchase stages. Participants, who were regular customers of E-Tailing, were encouraged to take ownership of the discussion. 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 as examples of interacting 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.

The E-Travel workshops were conducted in a different way. They tried to draw some understanding about the effects E-Travel had had on consumer behaviour and how on-line travel services compared to off-line travel services such as travel agents. The facilitator dealt out a set of cards amongst the participants. On each card was a question related to E-Travel and each participant had 2 or 3 cards in their hand. Each participant, in turn, then read out the questions on his cards and initiated the discussion

with the rest of the group. This made the workshop participative and encouraged the participants to relate their personal experiences and expectations.

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 surprising. For example, one customer chose to browse for books off-line in a book store. However, he would then return home, having decided which books he would like to buy and purchase them from Amazon. His motivations concerned the price of the books 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 shopping or making on-line travel bookings 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 post-purchase stage of the service encounter.

Data analysis

With the support of video and audio recordings, the observation notes were transcribed 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 index card (Table 1) using a unique identifier; and a set of headings adapted from critical incident technique [2]. The headings involved the events leading up to the obstacle, the cause and consequence of the obstacle, and customer's response to the situation which arose as a result of the obstacle. Finally, requirements and design solutions were proposed that would resolve each obstacle. Each obstacle was therefore captured in its context.

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 [12]. Category and sub-category names were selected, based on the card sort producing a 'catalogue of obstacles' [5]. 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 process of developing E-SEQUAL.

User 5 / DM		C2 /5I
1. Events leading up to an obstacle	DM clicks on a site and spends a few seconds looking for something to tell her the site is trustworthy, for example, links to familiar companies, recognisable and credible logos, user comments and reviews, etc. She finds none.	
2. Obstacle situation	To use a Web site for shopping, she must have a level of trust in the site. She cannot find any cues of trustworthiness.	
3. Obstacle (the cause of a diminished TCE)	No signs to ensure that the site is credible	
4a. How did the obstacle affect the customer?	There is no notion of trust that has been built	
4b. What did the customer do in response?	DM leaves the site.	
5. How did the sociological account conclude?	DM now searches again to go on to another site.	
6. Did the obstacle result in a breakdown (from the business perspective)?	Yes	
7. Requirements and design solutions	Introduce signs of credibility on the home page – such as seals of approval, accreditations, certifications, customer reviews, and so on	

Table 1. Obstacle card

Creating heuristics of E-SEQUAL

Heuristics and sub-heuristics of E-SEQUAL were developed by working through each category and sub category of the catalogue of obstacles and examining all of the requirements and design solutions. 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. 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;*

- *Ensure that functionality matches with that of leading E-Commerce sites;*

- *Provide similar incentives as those which may be found in off-line channels.*

EVALUATING E-SEQUAL
E-SEQUAL is an evaluation instrument that 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.

After developing E-SEQUAL, we decided to get it evaluated by usability practitioners for determining its 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 professional 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 to be useful. They commented on the sequence in which the heuristics were presented and the phrasing of some of the heuristics which they felt required clarity. Their feedback was used in the design of the next iteration of E-SEQUAL.

E-SEQUAL: THE HEURISTICS
The E-SEQUAL heuristics embody both usability issues that concern the customer's interaction with the Web site and the issues that arise due to the customers expectations that they bring to the E-Commerce interaction. In this section, a selection of E-SEQUAL heuristics are presented in three categories; those heuristics which are concerned with the pre-purchase stage, those which address the E-purchase stage and finally, those concerned with the post-purchase stage of the service encounter.

The Pre-purchase Heuristics
As the pre-purchase stage of the service encounter involves reaching the state of deciding to make a purchase on a particular Web site, many factors need to be taken into account. A number of heuristics each with a set of sub-heuristics were developed from the obstacle categories. A selection of these is presented below and thereafter discussed in more detail:
- Match existing shopping experiences
- Give cues to enhance trustworthiness
- Support the customer interface experience
- Provide quality information
- Support the novice customer

The pre-purchase stage of the service encounter involves two routes by which the customer may reach a Web site: through searching for a product and following a link from a list of search results, or by going directly to a Web site. The latter route requires prior knowledge of the Web site, which may stem from advertising, recommendation, or encounters with the off-line business channels.

We observed that customers would be likely to choose sites with which they had some familiarity, whether it was with the on-line channel, the bricks and mortar store or the mail-order catalogue. For example one customer

commented, *"I'm going to look at Boots first, mainly because the brand Boots, means quality to me..."* Another customer who wanting to hire a car, went directly to a particular company, *"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, along with familiarity come expectations. Some of the problems that emerged during this stage of the service encounter involved failure of the Web site to meet expectations about the ranges of products available on the Web site, incentives or special offers, and so on. For example, if a customer was aware about the range of shoes from previous experiences with the off-line store, they would feel frustrated and unwilling to continue with the interaction on that particular Web site.

If a customer searches for a product or service on a search engine, the Web sites that they may browse through will need to provide the potential customer with a number of reassurances during this first brief encounter. The customer needs to feel that the site is at least trustworthy and so will look for cues that show some credibility. For example, furtive default settings set to retain customer's personal details, or a lack of credible logos or affiliations were observed to be signs of an untrustworthy Web site.

Once the customer has decided to stay on a Web site to at least browse for their required product or service, there are a number of usability issues that need to be considered. 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. For example, UI design controls such as radio buttons caused problems for a customer who had poor vision. She found the radio buttons problematic as she couldn't always relate the correct radio button with the appropriate instruction.

Another requirement from a potential customer involves the provision of quality information. Because of the nature of E-Commerce, the customer can not physically experience the product which he may wish to purchase. Nor is it always possible to ask a sales assistant for advice or for further information. Consequently, the customer only has limited pictorial evidence and product information to support his decision-making process.

A related problem exists for customers who have little knowledge about the business domain from which they wish to make a purchase. For example, a customer looking for a product that they don't know very much about in a bricks and mortar store would rely on the help of a sales assistant. In the on-line environment, assistance of some form must also be directly accessible. Furthermore, the customer should be able to identify such support within the first few seconds of visiting a site. One customer who we observed had tried to overcome the fact that she did not know very much about the domain in which she was searching. *"I asked our spinning instructor which shoes I should buy, and she gave me a couple of ideas* [of types of spinning shoes to buy]". In this instance the customer had done some background research before embarking on the task of finding a product on-line. However, if she could not find a match on the home page with the brand of shoe that she knew, or with the term 'spinning shoes', she left that site within seconds.

The E-purchase Heuristics
The E-purchase stage 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 and its 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 of the service encounter, many usability issues arose during this stage. Such obstacles primarily involved the forms for entering personal information and the registration process. A number of other concerns also arose. For example, customers who came to the Internet to conduct business with E-Commerce often expected to be able to complete this transaction on-line. The customer was therefore somewhat deterred when they were then 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 accommodation booking. Additionally, customers' expectations of E-Commerce lead them to expect an instant route to achieving their goals compared to using other off-line business channels. This speed of transaction was, in some instances, considered one of the key benefits of E-Commerce over other business channels. But 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 very disappointed and felt that the benefit of using E-Commerce was greatly reduced.

During the E-purchase stage, a customer expects that if the product is not currently available, they will be notified. Problems were observed however when 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 who then informed the customer that the item was not available.

Finally, situations arose in which the customer felt that they had very limited options or even no control over the events of the transaction. This may occur for a number of reasons. For example, when a customer is asked to register in order to continue with the transaction there may seem little reason why registration is compulsory. In our second study of the E-Travel domain, half of the customers who were asked to register for purchasing the travel ticket protested and in some cases even refused to continue with the transaction. There was no reason provided to describe why registration was necessary or why it was not optional for customers who could see that they may gain some advantage from registering.

Post-purchase Heuristics

The final set of heuristics concerns the post-purchase stage of the service encounter. During this stage, the order fulfillment occurs in which the customer receives the ordered products or services. Examples of the heuristics that were developed to support the post-purchase stage of the service encounter were:

- Maintain continuity across touch points

- Provide a reliable customer services

- Provide a reliable delivery service

- Ensure that customers are in control

For example, problems might occur when a customer fails to gain accurate or meaningful information from customer services, from paper work or emails, and so on. In the studies that we conducted, one customer was concerned about an order that had been delivered with items missing from an order. The paper work that had arrived with the part order failed to mention anything about the remaining items and the customer was unsure whether these items would indeed arrive despite the fact that they had been paid for. She contacted customer services who reassured her that the remaining items would be sent. However, they were unable to tell her when they would be delivered. The items were delivered that day. The customer felt that the customer services should have been aware of the dispatch date and that the paper work that had arrived with the initial order could have informed her as to the whereabouts of the remaining items. This mismatch between touch points left this customer with a sense of unease. She felt that the different touch points of this organisation were not integrated and decided not to conduct business with them again.

The need to ensure customer's control over situations also occurred within the post-purchase stage of the service encounter. We observed customers feeling frustrated when sudden changes in company policy were made, such as introducing delivery charges for what had previously been a free tariff. With one customer, the free delivery had been the single retention factor over competitor sites. Now that this was not available, she was free to find a competitor that offered her the free delivery service that she required.

A COMPARISON OF E-SEQUAL

We have compared E-SEQUAL with other service or Web quality frameworks for E-Commerce in HCI and other disciplines: e-SERVQUAL [15] from service marketing; WebQual [1] from the Management Information Systems; and Zhang and von Dran's Web site design features [16] from HCI.

The first difference is the way in which each of these frameworks has been developed. e-SERVQUAL has been derived from SERVQUAL (service quality framework for off-line environments), and from surveys and focus groups. WebQUAL is based on the application of communication theory to understand customer-E-Commerce interaction, and therefore, the emphasis is on information quality - timely information, accurate information, etc. The empirical evidence for WebQUAL was gathered during a series of workshops to elicit customer perceptions. Finally, Zhang and von Dran have based their framework on the Kano model of quality [11] and have built from data gathered via questionnaires and customers' prioritisations of Web site design features. E-SEQUAL has been derived from observations of customer experiences with E-Commerce and refined by practitioner testing. Each heuristic and sub-heuristic can be traced back to the raw data of obstacles from which it was derived and so traceability is supported.

Second, we have examined the content of each framework and the support it provides for evaluating the usability of the Web site and service quality of the TCE. Zhang and von Dran's framework of Web site design features concerns the Web site usability. Consequently, this framework fails to encompass the interactions that a customer may have with other touch points of the business. e-SERVQUAL and WebQUAL cover some aspects of usability of Web sites but their use of HCI terminology is too general (for example, ease of use, efficiency) and, therefore, these frameworks don't provide explicit guidance to Web designers for incorporating HCI design principles in the design of E-Commerce sites. e-SERVQUAL and WebQUAL cover aspects of the post-purchase stage such as fulfillment and reliability but not to the level of guidance provided by E-SEQUAL. E-SEQUAL takes a holistic view of the TCE (stages 1-6 of Figure 1), starting from what makes a customer visit an

E-Commerce site and reaching the point where a customer evaluates his experiences to check whether his expectations have been met or not. E-SEQUAL provides specific guidelines for the practitioners to elicit customers' requirements for a positive TCE, and for evaluation of service quality of E-Commerce environments.

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 of the service encounter. Therefore, we propose that E-SEQUAL be used in conjunction with a usability evaluation instrument and an accessibility checklist.

CONCLUSIONS AND FURTHER WORK

E-SEQUAL is a service quality framework that is empirically grounded and integrates CRM and HCI strategies for the effective 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 Web sites. Furthermore, it can be used as an evaluation instrument by usability professionals for evaluating the conformance of an E-Commerce environment against HCI and e-CRM heuristics.

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.

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