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Chapter VI

Experiencing Quality:
The Impact of Practice on Customers' Preferences for and Perceptions of Electronic Interfaces

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Abstract

As customers gain Web site-specific skills they come to perceive the Web site differently and more favourably than inexperienced customers. This is not only due to familiarity, emotional attachment, liking, trust, etc. Often, it is the result of an objective change in the utility of the interface as a result of skill acquisition. This chapter reviews recent work on the link between skill acquisition and loyalty in electronic environments, and extends this work by investigating the impact that learning has on consumers' perceptions of electronic interfaces. I report the results of an experiment, which demonstrates that with increasing task experience the probability that participants will choose an incumbent Web site, over an objectively equivalent competitor, increases. In addition the data indicate that with increasing experience participants' perceptions of product quality also increase. Although the two interfaces (i.e., incumbent and competitor) are not perceived to be any different when each has been used only one time, there is a significant difference in quality perceptions between the interfaces when the

incumbent has been used six times and the competitor has only been used once. These findings are important, because perceptions of quality have an impact on the choices that customers make when shopping online. Therefore, changes in perception that occur with increasing exposure to the incumbent are meaningful and can have an impact on a Web site's market share. The data presented in this chapter provide strong evidence that perceptions of interface quality are affected by experience with an interface in a way that gives an incumbent an advantage over competitors.

Time ripens all things; no man is born wise – Miguel De Cervantes

Fitness for Use or Use for Fitness

How do you judge the quality of a car if you cannot drive? Or of a keyboard if you cannot type? Or of an oven if you cannot cook? To the extent that quality is defined as the product's ability to meet the expectations and satisfy the needs of the customer (Parasuraman, Zeithaml and Berry, 1985), a product that the customer cannot use is not a quality product. For example, a customer may be able to speculate on the quality of a retailer's Web site without using it — the advertisements say it's easy to use, it promotes a service guarantee, it is a well known brand, etc. — however, if she cannot access the World Wide Web, the site will not be able to satisfy her shopping needs. Regardless of the excellence of the product or its freedom from defects, if the buyer does not possess the prerequisite skills for use, then the product is of little utility to the buyer. As a result, the product's "fitness for use" (Juran, 1988) depends on the user having acquired the skills necessary to derive value from the product. In other words, use affects fitness.

Although the above examples are rather extreme — the buyer is unable to use the product at all — the same idea applies to judging the relative value of competing products. Having learned to cook with a gas range can make gas ranges preferable to electric ranges. Similarly, having learned to use pull-down menus can make pull-downs preferable to radio buttons. Even between brands with similar attributes, learning can play an important role. For example, having learned to navigate one retailer's Web site can make it a more satisfying shopping experience as compared to a novel Web site with a different layout. The important role played by experience and skill in consumers' product preferences has been recognized by economists who have modeled it as a type of human capital (Stigler and Becker, 1977; Ratchford, 2001). This perspective argues that experience with a particular brand results in a preference for that brand relative to other competing brands, even when the consumer is aware that some of the other brands are equally useful and may be acquired at a lower price. Over time this brand preference strengthens because consumers develop skill at using the brand, and that skill acquisition has a positive effect on the subjective utility of the brand relative to its competitors (Wernerfelt, 1985).

This chapter reviews recent work on the link between skill acquisition and loyalty in electronic environments, and extends this work by investigating the impact that learning has on consumers' perceptions of electronic interfaces. While most of the research that

has been done on interface usability has been concerned with how interfaces can be designed to improve the user experience (e.g., Nielsen, 2000), the research reported here is focused on how the user's experience can affect interface usability (and, in particular, perceptions of interface quality). In fact, in this way usability research is akin to research on quality, the primary interest is to improve usability (quality), rather than to understand how use changes the user (or at least the user's perceptions). However, this is not exclusively the case. Work on human-computer interaction has had a strong interest in how learning affects usage (e.g., Card, Moran and Newell, 1983; Carroll and Roson, 1988; Foss and DeRidder, 1988), and the work reported in this chapter takes a similar approach.

The next section explains how human capital can lead to a competitive advantage. I then drill deeper into how the relevant skills may be acquired and how the importance of a skilled customer base has manifested itself in e-marketing. From there I introduce the idea that learning may affect more than consumer choice, and I discuss some product perceptions that may be especially susceptible to change as experience increases. Following the theory portion of the chapter, I describe a laboratory experiment that replicates previous findings on the link between learning and preference, and extends those findings by examining how perceptions of electronic interfaces change with experience. The chapter concludes with a discussion on the managerial implications of these findings, and some of the opportunities for further research in this area.

Consumer Skill and Competitive Advantage

As consumers gain product-specific skills they come to perceive the product differently and more favourably than inexperienced consumers. This is not only due to familiarity, emotional attachment, liking, trust, etc. Often, it is the result of an objective change in the utility of the product as a result of skill acquisition (Murray and Häubl, 2003). For example, when one has learned to drive a car it allows one to get around faster and more conveniently. As a result, the car is of much greater utility to a driver than it is to someone who has not learned to drive. Similarly, repeatedly shopping in an online store can reduce the time required to make a purchase. Consequently, to the extent that the consumer values his or her time, acquiring skill at using a Web site increases the utility of that Web site. As the utility of the Web site increases it is better and better able to satisfy the needs of the customer, and hence the subjective quality of the Web site should increase.

The human capital model (Ratchford, 2001) is receiving growing attention as evidence accumulates to suggest that a base of customers skilled in using one particular brand can provide a substantial competitive advantage to that brand — an advantage that has a direct effect on the probability of purchasing the brand (Johnson, Bellman and Lohse, 2003) and increasing the brand's market share (Shaprio and Varian, 1999). One of the most poignant examples of this phenomenon is evident in the development of the QWERTY keyboard. In 1873, E. Remington & Sons created the QWERTY keyboard because it allowed salesmen to illustrate the machine's speed by using only the top row of keys to

type the brand name: *Type Writer*[1]. In the subsequent 130 years, many objectively superior keyboard layouts have been created. Notable among them is the Dvorak keyboard which according to a 1940s test by the U.S. Navy increased productivity so significantly, that the payback time to retrain a group of typists was only 10 days. (U.S. Navy Department, 1944; for an alternative account see Liebowitz and Margolis, 1990). Nevertheless, the QWERTY keyboard has remained the standard, with a dominant and unchallenged market share, because an installed user base has developed skills (human capital) specific to QWERTY.

The results of recent research provide further support for the central role that practice can play in preference formation. For example, Murray and Häubl (2003) have demonstrated that in learning to use a computer interface for online shopping the acquisition of non-transferable skills results in a strong preference for the incumbent interface (i.e., the interface that consumers were initially trained on) versus competing interfaces that the consumers were later exposed to. Their results are surprising in the context of economic models of search, which suggested that low search costs on the Internet would lead to a state of hyper-competition in which loyalty would rarely develop and consumers would have no real preference among alternative vendors (Bakos, 1997). However, when the models are revised to include the value consumers place on their time, and the time savings that result from the accumulation of human capital, it is less surprising that consumers would consistently choose products for which they have acquired relevant skills.

Practice Makes Preference

In the development of loyalty among online shoppers, skill acquisition appears to be playing an important role. Of particular interest is Johnson et al.'s (2003) finding that increasing Web site loyalty is closely related to decreasing amounts of time being spent at the Web site. As the authors point out, this pattern is very similar to other learning curves that follow the *Power Law of Practice* (Newell and Rosenbloom, 1987). While debate continues over the psychological processes that drive the power function of the learning curve (see for example, Kirsner and Speelman, 1996; Logan, 1988; Palmeri, 1999; Rickard, 1997), the importance of this type of learning and skill acquisition in the development of interface loyalty is becoming increasingly clear. Johnson et al. (2003, p. 62) describe it this way:

Imagine a user visiting a Web site to purchase a compact disc (CD). This user must first learn how to use the Web site to accomplish this goal. We believe that after the CD has been purchased, having learned to use this site raises its attractiveness relative to competing sites for the consumer, and all other things being equal (e.g., fulfillment), the site will be more likely to be used in the future than a competitor. Further use reinforces this difference because practice makes the first site more efficient to use and increases the difference in effort between using any other site and simply returning to

the first site, where browsing and buying can be executed at the fastest rate. This reinforcement generates an increasing advantage for the initial site.

These observations have not been lost on those seeking to build companies on the Web. Since the early days of e-commerce, an argument has been made for the importance of developing an experienced user base at the expense of short-term profitability (Krishnamurthy, 2002, Ch. 6). According to Shapiro and Varian (1999), one of the primary advantages of building an installed user base in the information age is the ubiquity of switching costs. They contend that once a buyer has committed to using a particular brand, they become predisposed to that particular brand and are much less likely to search for alternatives or switch to competitors. The importance of developing an installed base of users is evident in the fundamental role played by the *growth over profit* approach in the early business models of many of the Web's leading companies from Yahoo to iVillage and from Amazon to WebMD. Jeff Bezos, founder and CEO of Amazon.com explains the company's initial commitment to growth over profit this way: "Our initial strategy was very focused and very unidimensional. It was GBF: Get Big Fast. We put that on our shirts at the company picnic: They said GET BIG FAST, and on the back, EAT ANOTHER HOT DOG" (Brooker, 2000). Although the link between learning and loyalty is important in a wide variety of domains (Ratchford, 2001), it may be of particular relevance to online shopping because of the latter's relative novelty and because e-commerce allows the vendor to control and personalize the shopping environment to much greater degree than traditional channels (e.g., Häubl, Dellaert, Murray, and Trifts, in press).

The Impact of Practice on Perception

Although there is emerging empirical evidence to support the central propositions of the human capital model (e.g., Johnson et al., 2003; Murray and Häubl, 2002), the research to date has not considered the impact of preference on consumers' perceptions of the product itself. Yet, it is natural to suspect that the increase in preference that corresponds with an increase in human capital also has an impact on the consumer's perceptions of the product, service or brand. In other words, it seems unlikely that the consumer acquires human capital that increases preference, but does not change the consumers' perceptions of the product.

For example, because skill acquisition generally increases product usability, to the extent that quality is correlated with usability the accumulation of human capital should affect perceptions of product quality. However, in addition to quality other important product perceptions may also be affected by experience with a product. These include perceptions of risk (Kahneman and Tversky, 1979) and trustworthiness (Hoffman, Novak and Peralta, 1999). It is also possible that affective attachment to the product ranging from simple liking (Oliver, 1999) to an emotional attachment (Fournier, 1998) may develop as a result of repeated experience.

Table 1. Rating scales

1	How would you rate the overall quality of the first interface (Interface A) that you used. (Very Low Quality) 1 – 2 – 3 – 4 – 5 – 6 – 7 (Very High Quality)
2	How would you rate the overall quality of the second interface (Interface B) that you used. (Very Low Quality) 1 – 2 – 3 – 4 – 5 – 6 – 7 (Very High Quality)
3	I feel an emotional attachment to the interface that I chose to use for the last trial. (Strongly Disagree) 1 – 2 – 3 – 4 – 5 – 6 – 7 (Strongly Agree)
4	I liked the interface that I chose to use for the last trial. (Strongly Disagree) 1 – 2 – 3 – 4 – 5 – 6 – 7 (Strongly Agree)
5	I trusted the interface that I chose to use for the last trial. (Strongly Disagree) 1 – 2 – 3 – 4 – 5 – 6 – 7 (Strongly Agree)
6	I felt there was less risk in using the interface that I chose to use for the last trial. (Strongly Disagree) 1 – 2 – 3 – 4 – 5 – 6 – 7 (Strongly Agree)
7	I found the Interface I chose easy to navigate. (Strongly Disagree) 1 – 2 – 3 – 4 – 5 – 6 – 7 (Strongly Agree)
8	I found Interface A (the first interface that I used) easy to use. (Strongly Disagree) 1 – 2 – 3 – 4 – 5 – 6 – 7 (Strongly Agree)

Changes in Preferences and Perceptions Over Time

Based on the human capital model as it applies to consumer behavior (Ratchford, 2001) and recent research into the link between learning and the development of preference (Murray and Häubl, 2003), it is straightforward to predict that as experience with an incumbent Web site increases consumers will acquire skills that make the incumbent preferable to other Web sites, even though with equivalent levels of experience the two Web sites would be equally preferred. In the experiment described below, I examine three key pieces of evidence that are central to this prediction.

First, I look at the participant's task completion times over six trials for evidence that with practice the respondents are able to improve their task performance. Second, I inspect the choice data to see if participant's who have had more experience with the incumbent Web site are more likely to choose the incumbent to complete future tasks. If learning to use the incumbent interface results in the development of non-transferable skills that create a switching cost, as predicted above, it should be difficult for participants to transfer from using the incumbent interface to using a competitor interface (Foss and DeRidder, 1988).

In addition to replicating the general finding that practice leads to preference, the experiment described below was designed to examine the impact that practice has on participants' perceptions of the interface. Recent research has demonstrated that practice with a Web site interface makes that interface easier to use, as compared to competing interfaces (Johnson et al., 2003; Murray and Häubl, 2003). Given the importance of ease of use in consumers' assessments of product quality (Juran, 1988)

and Web site usability (Nielsen 2000), it seems reasonable to assume that the easier a product is to use the higher its quality will appear to the consumer. Therefore, if ease of use increases with practice, consumers' evaluations of interface quality should also increase.

However, evaluations of quality may not be the only perceptions affected by experience. For example, trust is often cited as a key determinant of online retailing success (Hoffman et al., 1999) and effective relationship marketing (Morgan and Hunt, 1994). Moreover, because trust, like skill, is built over time it is reasonable to suspect that repeated interaction with an interface affects the level of trust the consumer has in the interface. Similarly, as experience with an interface increases it is also possible that consumers see another interface, that they have less experience with, as a more risky choice. When faced with the prospect of completing an additional task, choosing the lower risk option (the more familiar interface) would be consistent with the view of people as basically risk adverse (Kahneman and Tversky, 1979).

Finally, it is possible that with increased use a consumer develops an affective connection to the incumbent interface. Affect is often considered to be a critical component of consumer loyalty that can manifest itself on a continuum from repeatedly choosing the same alternative because one likes it (Oliver, 1999) to a deeper emotionally-based loyalty that goes well beyond simple liking (Fournier, 1998). To test these possibilities, I examine the effect of practice on ratings of interface quality, trust, risk and affect (see Table 1 below). In addition, to link perceptions of quality to choice behavior, I examine the impact that these perceptual measures have on participants' interface choice. The details of these tests and the experimental methodology are described below.

The Experiment

This experiment had two fundamental objectives: (1) to replicate the finding that skill acquisition leads to a preference for an incumbent Web site (Johnson et al., 2003; Murray and Häubl, 2003); and (2) to test the impact that experience with an incumbent interface has on consumers' perceptions of that Web site interface relative to its competitors. The study was fully computer-based, and involved the completion of an online shopping search task. The entire experiment was conducted in an Internet-based electronic store adapted from Murray and Häubl (2002). This study was completed for course credit by 54 undergraduate psychology students in a research laboratory equipped with state-of-the-art networked personal computers. The experimental design was balanced with 27 respondents in each condition, all of who participated via a secure local area network (LAN) and were randomly assigned to one of two experimental conditions (see below).

The data analysis for this experiment is separated into two parts. First, I analyze the relative choice share data, as well as the learning data (mean task completion times, standard deviation of task completion times across subjects, and the relative interface transfer times). Second, I examine the impact that practice has on the rating-scale measures (Table 1).

Table 2. Sample product category (Apple iMac)

Attribute 1	Attribute 2	Attribute 3	Attribute 4	Attribute 5
Color	**Processor Speed**	**RAM**	**Internet Browser**	**Price** 1
Sage	500 MHz G3	32 MB	Netscape Communicator	$2,347.00
Ruby	500 MHz G3	64 MB	Microsoft Internet Explorer	$2,448.00
Snow	500 MHz G3	64 MB	Netscape Communicator	$2,498.00
Indigo	500 MHz G3	64 MB	Microsoft Internet Explorer	$2,647.00
Indigo	450 MHz G3	32 MB	Microsoft Internet Explorer	$1,999.00
Sage	450 MHz G3	64 MB	Netscape Communicator	$2,148.00
Ruby	450 MHz G3	64 MB	Microsoft Internet Explorer	$2,198.00
Snow	450 MHz G3	64 MB	Netscape Communicator	$2,299.00
Snow	400 MHz G3	32 MB	Microsoft Internet Explorer	$1,547.00
Indigo	400 MHz G3	32 MB	Netscape Communicator	$1,648.00
Sage	400 MHz G3	32 MB	Microsoft Internet Explorer	$1,698.00
Ruby	400 MHz G3	64 MB	Netscape Communicator	$1,847.00
Indigo	350 MHz G3	32 MB	Netscape Communicator	$1,199.00
Sage	350 MHz G3	32 MB	Microsoft Internet Explorer	$1,348.00
Ruby	350 MHz G3	32 MB	Netscape Communicator	$1,398.00
Snow	350 MHz G3	64 MB	Microsoft Internet Explorer	$1,499.00

Method

- *Experimental Design.* This experiment is a between-subjects single factor (amount of practice with the incumbent interface) design. The amount of practice was manipulated at two levels: participants are randomly assigned to experience either one or six trials with the incumbent before being exposed to the competitor.

- *Procedure.* Those subjects who completed only one shopping task with the incumbent were required to complete filler tasks so that all subjects completed six tasks in total. Each shopping task required subjects to find a product by searching within a product space that contained 16 products (see Table 2 for an example product category).

To assist them, participants had access to a screening tool that allowed them to specify particular product attributes and thereby reduce the number of products through which they would have to manually search to complete the task. In order to complete the experiment, participants were required to successfully complete each assigned task. As a result, they were motivated to learn to complete the tasks accurately and efficiently. However, it is likely that for many real world utilitarian tasks, consumers are more involved in the purchase and are driven by more powerful motives, which makes the results of this experiment conservative in this regard.

The following is an example of one shopping task: "Your task is to select the Apple iMac with the fastest processor, given that it is under $2,000.00 and is snow colored." Which interface served as the incumbent was counterbalanced between conditions (for example, the condition wherein the screening tool with the pull-down menus served as the

Figure 1. Sample interface screen shots

Example of the Incumbent Interface (in one condition)

Example of the Competitor Interface (in one condition)

incumbent is illustrated in Figure 1). Those participants who did not complete all six shopping tasks were instead exposed to filler tasks based on the same product category as the shopping task that they did not complete. However, the filler task was not search-related and instead required subjects to simply list product attributes and to estimate the product's average price.

After completing the shopping task either once or six times with the incumbent interface subjects were forced to use a competitor (i.e., different) interface to complete a seventh shopping task. Having completed the seventh task using the competitor, subjects were asked to choose which of the two interfaces they would like to use to complete one more shopping task. In addition to choosing between the two interfaces subjects were asked to indicate how much they preferred the interface that they had chosen on a scale from 1 (just barely prefer) to 10 (very strongly prefer). Having made a choice and indicated the extent of their preference, participants completed one more shopping task using the interface of their choice. After completing the last shopping task the participants completed a series of rating-scale responses (Table 1).

Results

Skill Acquisition and the Development of Preference. Figure 2 illustrates the learning curve of participants in the six-trial condition. It is clear from this figure that a substantial amount of learning has occurred between the first and sixth trial as the mean task completion times decrease from approximately 76 seconds on the first trial to approximately 24 seconds by the sixth trial. Moreover, the standard deviation of the task completion times across participants has fallen from approximately 68 seconds on the first trial to only seven seconds by the sixth trial (Figure 3).

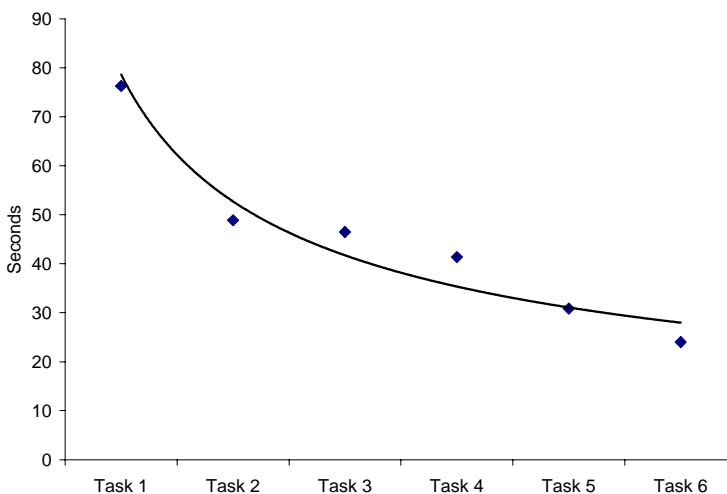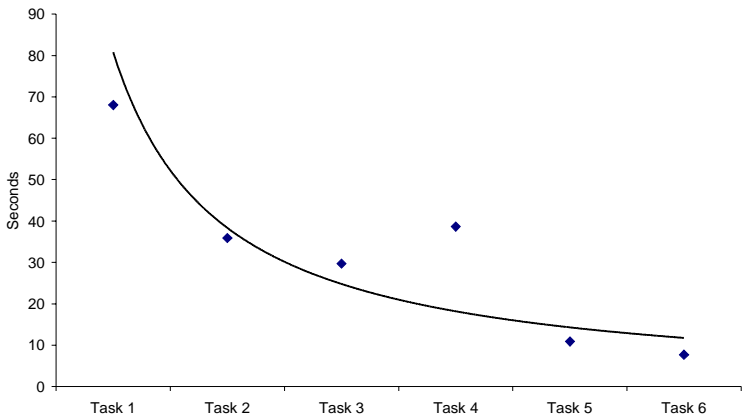*Figure 2. Task completion times (six trial condition)*

Figure 3. Standard deviations of the task completion times (six trial condition)

As predicted by the research on the power law of practice (Johnson et al., 2003; Logan, 1992), both of these curves are well approximated by a power function (task completion times $R^2 = 0.918$; standard deviations, $R^2 = 0.740$). In combination these two pieces of data indicate that a considerable amount of skill acquisition has taken place that allows for significantly faster task completion times (t-test of task completion times between trials 1 and 6 within the six trial condition: M = 76.3 seconds & 24.0 seconds; p-value < 0.0001), and that as a group participants are converging towards a minimum task completion time.

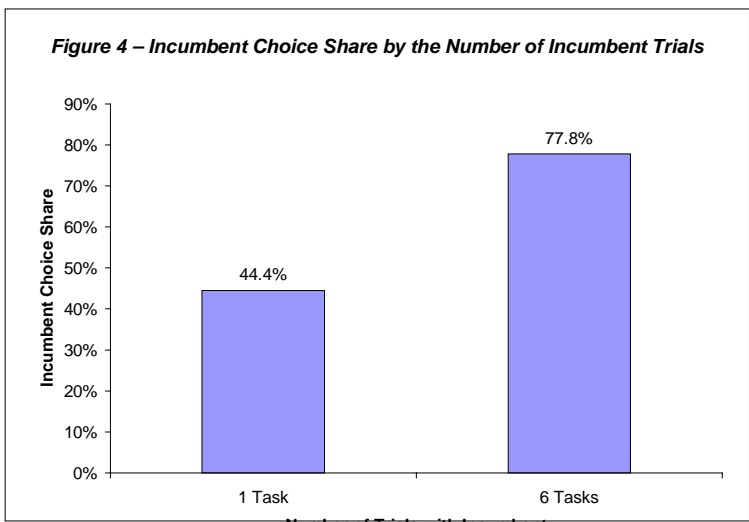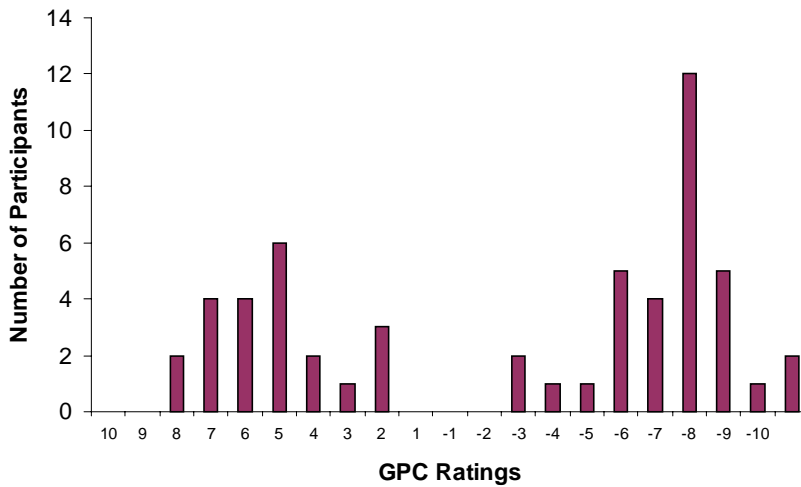*Figure 4. Incumbent choice share by the number of incumbent trials*

Figure 5. Distribution of graded pair comparison (preference) ratings

Next, I look at the relative choice shares for the incumbent interface between the two levels of practice (Figure 4). While initially, there is no difference in the choice shares between the incumbent and the competitor (based on a binomial test, using equal choice shares as the null hypothesis, p-value = 0.351), by the sixth trial there is a strong preference for the incumbent (again using a binomial test with equal choice shares as the null hypothesis, p-value = 0.003).

To model the impact that the number of tasks has on the participants' preference for the incumbent, a logit model is employed, with choice of interface (incumbent or competitor) as the dependent variable and the number of tasks completed with the incumbent before exposure to the competitor as the independent variable. The results indicate that the number of tasks completed with the incumbent before exposure to the competitor had a significant effect on participants' choice of interfaces ($c\delta^2 = 5.445$, p-value = 0.020).

Although preference data were collected in addition to the choice data, I have modeled the choice shares alone because of the extreme non-normality of the preference data (Figure 5). Nevertheless, the bi-modal distribution of the preference data does indicate that, in general, participants have a strong preference for the interface that they chose.

The above analysis provides compelling evidence that participants are acquiring skills that allow them to complete the task more rapidly with additional trials and that with additional trials a preference develops for the incumbent interface.

The Effect of Practice on Perception. The next step in our analysis is to look at the impact of practice on participants' perceptions of the two interfaces. A separate t-test was run for each of the key rating-scale responses (Table 1), comparing ratings between the two levels of practice (either 1 or 6 incumbent trials). The results indicate that only perceptions of the quality of the incumbent interface (question 1) change significantly, such that as experience increases so do perceptions of quality (M = 6 & 7.11; t-test p-

Figure 6. Incumbent and competitor ratings of interface quality by trials
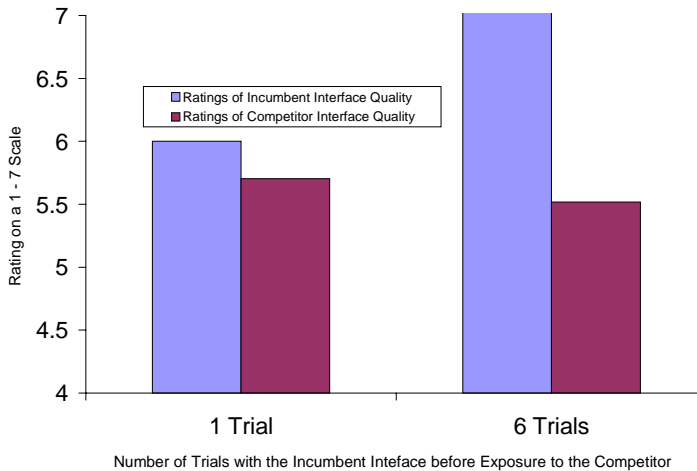
value = 0.035).   The difference in ratings of emotional attachment to the incumbent (question 3) between the two conditions is marginally significant (M = 2 & 3.33; p-value = 0.094), while the difference between conditions for all other rating scales is not significant (all p-values > 0.400).   An analysis of variance (ANOVA) testing the differences in quality ratings for the incumbent (question 1) and the competitor (question 2) in both the 1 and 6 trial conditions (Figure 6) is significant (F = 2.692; p-value = 0.013). Follow-up t-tests indicate that while there is no difference between quality ratings for the competitor interface across trial conditions (p-value = 0.728), and there is no difference in quality ratings between the competitor and the incumbent in the one trial condition (p-value = 0.590), there is a significant difference between the competitor and the incumbent in the six trial condition (p-value < 0.002).

The final section of the analysis examines the impact that interface perceptions (the ratings-scale questions 1 through 6) have on choice. Each of the rating-scales is included as a predictor variable in a logit model with choice as the dependent variable. The only rating-scale variable that has a significant effect on choice at conventional levels is question 1, the perceived quality of the incumbent interface (t-value = 2.130; p-value = 0.034). With the exception of question 2 (quality of the competitor), which has a marginally significant effect on choice (t-value = -1.707; p-value = 0.091), all other rating-scales have no effect on participants' interface choice (all p-values > 0.350).

Discussion

The results from this experiment replicate previous findings (Johnson et al., 2003; Murray and Häubl, 2003) by demonstrating that with practice learning does occur and that with increasing task experience the probability that participants will choose the incumbent

increases. However, in addition to replicating previous findings, this experiment was designed to examine the impact that experience has on a number of perceptual measures. The results indicate that with increasing experience, participants' perceptions of product quality increase. Although the two interfaces are not perceived to be any different when each has been used one time, there is a significant difference in quality perceptions between the interfaces when the incumbent has been used six times and the competitor has only been used once. In addition, while there is a significant difference in incumbent quality perceptions between the one and six trial conditions, there is no difference in competitor quality perceptions in the one and six trial conditions.

It is worth noting that perceptions of quality have an impact on the choices that participants make. Therefore, changes in perception that occur with increasing exposure to the incumbent are meaningful and can have an impact on an interface's market share. In sum, these data provide strong evidence that perceptions of interface quality are affected by experience with an interface in a way that gives the incumbent interface an advantage over competitors.

General Discussion

The Internet and the advent of online shopping provides managers and researchers with an interesting glimpse into consumer behavior in an environment that is not entirely natural or familiar. While a number of generations have grown up in North America with the traditional retail setting of a bricks and mortar store, only the next and following generations will grow up shopping in electronic environments. As a result, it is interesting to examine how consumer learning and skill acquisition, which can be observed from a relatively immature starting state, affects the formation of perceptions and preferences. According to an Ipsos-Reid survey, as of 1999 only 28% of Internet users worldwide had made a purchase online, by 2000 that number had grown to 36% and by 2002 it had grown to 62% (Gilbert, 2003). In other words, most Internet users have only just begun shopping online and many consumers are still not Internet users. Understanding how people learn to consume in electronic environments, and how that learning affects their judgement and decision making, promises to be an interesting area of research for many years to come.

This is not to say that the experience will necessarily alleviate the lock-in or the perceptual changes that occur with use. In fact, researchers in the field of human computer interaction have recognized that in learning to use a computer interface, people prefer to "jump right in" and begin using the system by applying knowledge they have from previous experience with other relevant tasks. This creates the *paradox of the active user*. Users prefer to focus their learning on achieving goals (as opposed to learning for the sake of learning alone) and they tend to rely on past experience to guide current behavior. As a result, "when situations appear that could be more effectively handled by new procedures, they [users] are likely to stick with the procedures they already know, regardless of their efficacy" (Carroll and Rosson, 1988, p. 81). In other words, as experience with computer interfaces increases, especially those interfaces that are linked

to particular goals (shopping, reading news articles, checking stock quotes, etc.), the difficulty in transferring to different types of interfaces is likely to increase.

Managerial Implications

The managerial implications arising from this line of research center around three strategic decisions: interface design, market entry and market research. My view on interface design echoes that of Johnson et al. (2003) who argued that "a navigation design that can be learned rapidly is one of a Web site's strongest assets … the layout of a site can be an important strategic tool" (p. 72). In particular, I would argue that any computer interface that can facilitate the development of non-transferable skills has an advantage over its competitors, because consumers that acquire such skills will, as a result, perceive the competitors to be of lower quality. A commonly used example of such a design feature is Amazon.com's one-click technology. "One-click" expedites the purchasing process for Amazon's customers. In many online stores once a product has been selected for purchase the customer has to go through a lengthy process of entering credit card and shipping information. In contrast, when a shopper at Amazon.com finds an item that they wish to purchase they simply click on the "one-click" button and the checkout process is automated. Amazon has vigorously and litigiously defended this feature arguing that it is a patented technology of central importance to Amazon's customer relationships.

Lands' End's *My Virtual Model*™ is another example of a Web site feature that aims to make online shopping, in this case for clothes, easier. After an initial registration process, that takes less than 10 minutes to complete, *My Virtual Model*™ allows the shopper to "try clothes on" while browsing through the e-store. You can even e-mail your model to a friend or family member, which allows them to see how the clothes would look on you before they make a purchase. Having learned to effectively use *My Virtual Model*™ to shop for clothes online leads to a set of non-transferable skills that should help Lands' End lock more customers into its online shopping experience.

Innovative interface features like Amazon's "one-click" and Lands' End's *My Virtual Model*™ offer clear advantages to online shoppers. However, it is important to recognize that the effects demonstrated in this chapter arise from much more subtle differences between the two interfaces. In other words, if simply exchanging radio buttons for pull-down menus can create a 33% difference in market share over only six trials with a task that at its peak takes an average of 76 seconds to complete, the switching costs that can be built into more sophisticated real-world Web sites have the potential to create a meaningful competitive advantage.

On the other hand, if a company is a second-mover, competing with a market leader that has already developed an installed base of skilled customers, this research suggests that a copycat strategy may be beneficial. Specifically, a second-mover should attempt to maximize the degree to which skills gained using the market leader can be transferred to the follower's Web site. For example, Barnes and Noble's Internet store developed its own version of Amazon's "one-click" technology, which allowed customers to automate the checkout procedure on bn.com in much the same way that they could at Amazon.com.

Barnes and Noble's top-screen navigation features are also very similar to Amazon's "tab-based" navigation. While such a copy-cat strategy alone may not be enough to overcome the first-mover advantage (Carpenter and Nakamoto, 1989) that a site like Amazon has acquired, recent research has demonstrated that the copy-cat approach can make the second-mover much more appealing than any other competitors and it can do so without causing any negative customer reactions — e.g., the second-mover being perceived as a poor imitation (Warlop and Alba, in press). Extrapolating from the current research, part of the appeal of a copycat may be a perception of higher quality inherited from the market leader.

Finally, this research reinforces the conclusions of Murray and Häubl (2003), who argued that:

Early in the market research and product development process an effort [should] be made to understand the accumulated human capital of the target user group(s). It is important to consider that, from a user perspective, the cost of a new piece of software or of a purchase at a new online store incorporates not only the price of the product, but also the time cost associated with learning to use the product or to complete the purchase transaction.

Limitations and Future Research

The research described in this chapter has a couple of limitations worth noting. First and foremost, the data are based on a single experiment, with a specific type of search task and a limited range of interface designs. While this is not a concern for the basic finding that skill acquisition leads to a preference for the incumbent, as this finding has been replicated in a number of other domains with a variety of tasks (see for example, Johnson et al., 2003; Murray and Häubl, 2002, in press), additional tests of the effect of skill acquisition on consumers' perceptions are warranted. In addition, this study focused on a relatively select set of simple measures of consumers' perceptions. Other perceptual measures and/or more in-depth measures (e.g., multi-item scales) would add to our understanding in this area.

In terms of future research, an interesting extension of this work is the impact of interface personalization on both consumers' learning curves and the formation of preferences over time (see for example, Häubl et al., in press). Given the important role that ease of use plays in effective Web site design (Nielsen, 2000) and consumers' choice of interfaces (Murray and Häubl, 2002), it seems clear that personalization has the potential to enhance the ability of Web sites to lock buyers in. In addition, human capital theorists (e.g., Ratchford, 2001) have laid out a number of variables that could play an important role in moderating the impact of skill acquisition on preference. These include, but are not limited to, the value the consumer places on his/her time, the complexity of the consumption task (i.e., the amount of learning required to successfully complete the task), the generalizability of acquired skills, and the degree to which consumers are

forward looking. Finally, the majority of research to date has focused on skill acquisition for utilitarian purposes, such as finding a specific product or searching out particular pieces of information or making a purchase online. However, computer interfaces are used for hedonic purposes as well. An interesting question in this regard is what role skill acquisition plays in determining the interface choices people make when their goals are hedonic rather than utilitarian.

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Endnotes

[1]   An alternative, equally plausible but less interesting, account contends that the QWERTY keyboard layout is the result of the inefficient operation of the first machines. Layouts other than QWERTY resulted in the jamming of the type bars, so QWERTY was developed to intentionally slow the typist's speed down.

[2]   All prices are in Canadian Dollars