Investigating IT Proficiency and Website Characteristics as Signals of Quality: Guilt by Association?

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Honors Thesis
*************************
PASS WITH DISTINCTION
TO THE UNIVERSITY HONORS COLLEGE:

As thesis advisor for Thomas Carignan,

I have read this paper and find it satisfactory.

Thesis Advisor

9/25/06

Date
Signaling theory has gained considerable attention from marketers in recent years, as it explains the cognitive process a consumer goes through to ascertain the quality of a product or service when quality is not apparent. Signals are informational cues, extrinsic to the product itself, that can be manipulated to influence a consumer’s perception of quality. Examples of signals can include such things as pricing, packaging and advertising. Signals are especially important for products and services whose quality can only be determined following its purchase.

In the field of information technology (IT), organizations often create IT-mediated signals such as websites to advertise their products and/or services. With the increasing popularity and widespread use of the internet, consumers are using these websites to determine the quality of products and services of organizations that may or may not have a high IT proficiency. As IT-mediated signals of quality, websites should be a core competency for IT-proficient organizations such as IBM and Microsoft.

Utilizing signaling theory, this study attempts to determine whether users/consumers expect more from a website designed by organizations with a strong IT proficiency. A literature review was conducted to develop experimental hypotheses based on signaling and expectation-confirmation theories. The hypotheses predicted that IT-mediated signals of quality, coupled with expectations and attitude, would affect a consumer’s perception of organizational quality and influence their behavioral intention (i.e., whether or not they would do business with the organization). Four websites were created to represent both high- and low-quality sites for organizations with both high and low degrees of IT proficiency. The websites were for hypothetical courses offered by the Department of English (low IT proficiency) and the Department of Information Systems (high IT proficiency).
One-hundred eighty students were surveyed regarding their expectations of websites and then given one of the four sites to evaluate. Following evaluation, students were asked to evaluate the course and if they would recommend the course to a friend, representing behavioral intention.

Results from this study indicate that students expected more from the websites of IT-proficient organizations and were more accepting of websites from organizations with a low IT proficiency. These results further develop signaling theory and have significant implications for IT-proficient organizations that must meet a higher standard when creating a website. Such an organization may unknowingly send a signal of low quality if consumers believe its website does not meet expectations.

Although these results have made significant contributions to current knowledge of signaling theory, there is still much that can be learned in terms of using signals for conveying service and organizational quality. Further research should be conducted to provide additional support for these findings and to expand beyond the limitations of this study.
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INTRODUCTION

After much deliberation, John decides that he needs a new television for his living room. He arrives at the local electronics retailer and begins to browse the television aisle, noting the many models and brands available to him. One brand, however, stands out to him because he has never seen or heard of it before. He compares warranties, pricing and packaging among other things with similar television sets of different brands, and he concludes that the brand must be fairly comparable to other high-quality brands and purchases a model of the new brand. How did he do this? Or more importantly, how did the marketers of the new brand lead him to draw this conclusion?

In recent years, marketers have placed special focus on a theory that deals with consumers’ assessment of product quality when high information asymmetries exist. Signaling theory explains how various informational cues, extrinsic to the product itself (i.e., not an inherent attribute), can be managed and manipulated to influence consumers’ perception of quality (Bloom and Reve 1990; Kirmani and Rao 2000). An information asymmetry occurs when a consumer knows very little about a product and/or organization. In these situations, it is not uncommon for the consumer to search for various informational cues to ascertain the quality of a product and/or organization. These cues are referred to as “signals” and can include such things as pricing, warranties, advertising and money-back guarantees. Although previous research views such cues as shortcuts for cognitively lazy consumers, signaling theory views consumers as “rational” and expectant of organizations to honor the implications of their signals because to do otherwise would be risky (Kirmani and Rao 2000).

To illustrate why, consider an example of a product that is advertised heavily. Ponder the reasons why consumers may assume that a company would not (and perhaps more importantly,
could not afford to) spend large amounts of money to advertise it unless it were a high-quality product that other consumers were purchasing in large amounts. Conversely, many consumers may also assume that a less advertised product must be of lower quality. Turning to the previous example, when John purchased his new television, he used the various informational cues available to him to assess the quality of the product he was buying. Since the informational cues he gathered were near the same level as other high-quality brands, he assumed the product quality must be high as well even though cues such as warranties, pricing and packaging are all extrinsic to the quality of the product itself.

SUCCESSFUL SIGNALS

Marketing research has empirically tested the effectiveness of signaling for assessing product quality, yet little research exists in terms of the effects of signals on perceptions of both service and organizational quality. Signaling is least important when marketing search products (those that consumers can effectively judge before purchasing) and most important when marketing experience products, whose quality can only be evaluated following consumption (Bloom and Reve 1990). For example, consumers can easily ascertain the quality of a stuffed animal prior to its purchase (making it a search product) while food must be eaten before its quality can be determined (making it an experience product). When quality can never be accurately determined by the typical consumer, such as with automobile repair or multivitamins, the product is referred to as a credence product.

For a signal to be successfully transmitted, it must fulfill certain criteria. First, there must be a prepurchase information scarcity in which the quality of the product, service and/or organization is unknown prior to purchase (Kirmani and Rao 2000). This is especially useful
when marketing experience goods. Signals may not be as successful in markets with extremely knowledgeable consumers or for products that are well-known.

Secondly, a signal is successfully transmitted if there is postpurchase information clarity (Kirmani and Rao 2000). If quality is not apparent following consumption (as with credence products), the signal is unlikely to be effective because of consumers’ inability to enforce the credibility of the signal. For example, a 100,000-hour warranty on a hot water heater would probably not be a useful signal since consumers know they will not actually count the number of hours the hot water heater has been running and consequently will not enforce the warranty.

Signals are particularly successful when marketing experience products because they possess both of these criteria (Ibid). In the previous example, John was unable to accurately determine the quality of the television prior to his purchase. However, the signals he gathered implied that the television’s quality was high. After John uses his television he will be able to determine its quality, along with the credibility of the signals transmitted. Because of the prepurchase information scarcity and postpurchase information clarity, John’s television would be considered an experience product, likely to be marketed with signals.

The third criterion of a successfully transmitted signal is payoff transparency (Ibid). A consumer must assume that firms are rational and know their own cost structures to value their signals. If there is a reason for consumers to believe otherwise, the signals lose all credibility.

Lastly, a successfully transmitted signal must show vulnerability (Ibid). Consumers must believe that the signal being transmitted puts the firm at risk, mostly through the threat of boycotts, should the signal not be credible. In situations where claims are not likely to be enforced by consumers, the legal system must make the claim credible (Ibid). If consumers do
not feel that a signal meets all of the above requirements, then a signal will likely lose its effectiveness.

In the information technology (IT) field, organizations are stripped of all physically tangible informational cues, creating high asymmetries of information (Wells and Valacich 2006). To overcome these asymmetries of information, consumers must seek IT-mediated informational cues (e.g., websites) that provide credible and reliable signals that effectively convey the quality of the organization as well as the product/service offering (Ibid).

This study focuses primarily on the effects of signals for people/organizations that use a website as a primary source of information. In particular, the use of signals between non-IT-proficient and IT-proficient people/organizations will be studied in an IT-mediated environment.

**LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

**SIGNALS OF QUALITY / SIGNAL CREDIBILITY**

When individuals evaluate a signal, they must also establish whether the signal will accurately discern the quality of the product, service or organization. A “separating equilibrium” most commonly occurs when low-quality firms either do not signal or at least do not mimic the signals of high-quality firms, making it easy (and rational) for consumers to use such signals to gauge product and/or organizational quality (Kirmani and Rao 2000). On the other hand, a “pooling equilibrium” occurs when a particular signal is being transmitted by both low- and high-quality firms and the benefits of falsely signaling (e.g., a café that claims to make the best coffee) outweigh the costs of being discovered. In a pooling equilibrium, the consumer cannot rely on that particular signal as a marker of quality.
Wells and Valacich (2006) applied signaling theory to consumer-facing technology (CFT) (e.g., websites) when it became apparent in the early stages of eCommerce that consumers desired evidence (i.e., informational cues) that would aid in their ability to make reliable assessments about organization and product offerings. For an interface or website to be considered high-quality by consumers, researchers began examining particular characteristics of various consumer interfaces. Commonly identified characteristics included such things as information/content quality, navigability, technical adequacy, enjoyment and visual appeal (Aladwani and Pavia 2002; Ranganathan and Ganapathy 2002; Zhang et al. 1999). These characteristics were expanded and applied to create website quality measurement tools such as WebQual (Loiacono 2002). Though such tools are intended to measure the quality of a website, they do not explain how or why the aforementioned informational cues can influence online consumer behavior.

Wells and Valacich (2006) came to the conclusion that, because online consumers are often faced with an unknown organization offering experiential goods, signals must serve a dual purpose for IT-proficient businesses; they will serve to overcome asymmetries of information relative to the product or service being offered and the organization itself. Studies have also shown that website characteristics can influence a consumer’s impression of an organization (Winter et al. 2003) and brand quality (Gwee et al. 2002). Thus it is logical to suggest that IT-mediated signals are capable of influencing perceived product and organization quality in an online setting (i.e., a website). This leads to the first hypothesis:

\[ H1: \text{IT-mediated signals in an online setting will affect a consumer's perception of organization quality.} \]
DOMAIN EXPECTATIONS

Expectation-Confirmation Theory (ECT) is a commonly used consumer satisfaction, post-purchase behavior and consumer marketing tool that has been able to predict product repurchase and service continuance intentions in several contexts (Bhattacherjee 2001). ECT posits that a consumer’s repurchase or service continuance intention is developed by their satisfaction with previous product/service experience(s) within a particular domain (e.g., televisions, restaurants, hotels, etc.). For example, high product/service performance for a consumer with low expectations for a given domain will lead to greater confirmation, positively influence their satisfaction with the offering and increase their likelihood to continue use of that product/service (Bhattacherjee 2001). Conversely, low performance coupled with high expectations will lead to disconfirmation, dissatisfaction and discontinuance intention (Ibid).

The process of ECT contains the following five steps (Oliver 1980):

1. Consumer forms an initial expectation of product/service being offered.
2. Consumer accepts and uses offered product/service.
3. Consumer evaluates perceived performance against original expectation and determines the extent to which the expectation was confirmed.
4. Consumer forms a level of satisfaction (or dissatisfaction) congruent with their level of confirmation and original expectation.
5. Satisfied consumer forms a repurchase/service continuance intention, while dissatisfied consumer will most likely discontinue subsequent use.

It is important to consider that ECT is a constantly debated topic in the marketing realm. A major drawback of the theory is that it discounts any changes in expectation that may occur
following use of the service or product. A consumer who has no previous experience with a product or service may form expectations based on signals gathered prior to the consumption experience. However, those expectations may be raised or lowered following consumption if the offering exceeds or falls short of the initial expectations. Bhattacharjee (2001) responded by postulating satisfaction as an additive function of modified (rather than initial) expectation and confirmation.

Bhattacharjee (2001) also noted in his study of ECT that there were close similarities between confirmation and service quality constructs in marketing literature because they relate to the consumer’s assessment of the discrepancy between expectation and performance. However, the constructs do differ on several accounts, mostly due to their intended applications (i.e., service quality constructs apply only to services while confirmation applies to both services and products).

As stated earlier, a consumer will form expectations of a product or service based on the domain in which the offering exists and, through the ECT process, affects the consumer’s perception of quality as a result. Applying this concept to IT proficiency and websites, a consumer will form expectations of an organization’s IT proficiency (and the organization’s website as a potential signal of that proficiency) based on personal experience in the IT domain. Those expectations will directly influence the consumer’s perception of the organization’s quality. This leads to the second hypothesis:

\[ H2: \text{The expectation of an organization’s IT proficiency will affect a consumer’s perception of organization quality.} \]
ATTITUDE TOWARDS DOMAIN

One factor that can impact consumers’ perceptions of organizational quality is their attitude towards the organization’s domain. As mentioned earlier, expectations can affect satisfaction, and it is often easy to group satisfaction with attitude and emotion because all three relate to personal feelings. It is important to distinguish, however, that satisfaction is more short-lived and experience-specific while attitude is more enduring and can span multiple experiences (Oliver 1980). Other researchers argue that while attitude is an emotion, satisfaction is more of a cognitive appraisal of that emotion (Hunt 1977). For example, a consumer’s satisfaction is the result of an evaluation of whether or not the consumption experience was as pleasant as expected. Thus it is possible to have a positive attitude towards a particular domain, but still feel dissatisfied with a product or service because of proportionately higher expectations. So rather than focusing on satisfaction (or dissatisfaction) forming overlying attitudes and respective expectations, it may be important to focus on how an overlying attitude towards a domain can affect an individual’s ensuing satisfaction with offerings from that domain. This is especially important for organizations hoping to enter an area in which their consumers will have positive attitudes towards the domain and higher expectations of the firm’s offerings as a result. From this attitude-expectation relationship a third hypothesis can be formed:

**H3: A consumer’s attitude towards a particular domain will affect their perceptions of an organization’s quality within that domain.**

BEHAVIORAL INTENTION

Marketing literature has researched the connection between perceived quality and behavioral intention. One study concluded that success is largely dependent on product quality, though less important when expectations are low (Richardson et al. 1994). Preliminary research
in IT literature has also provided support for a causal link between perceived organization quality (i.e., strong brand) and consumer purchase intention (Chu et al. 2005). This provides an opportunity to investigate further a causal link between perceived organization quality and behavioral intention. Utilizing the aforementioned three hypotheses, the final hypothesis follows:

\[ H4: \text{A consumer’s perception of an organization’s quality will affect their overall intent to do business with that organization.} \]

**Figure 1** – Summary of four experimental hypotheses

**RESEARCH METHODOLOGY**

An experiment was conducted to investigate the impact of IT-mediated signals of quality, domain expectations and attitude on a consumer’s perception of organizational quality and resulting behavioral intention. All subjects were asked to perform the same tasks on websites designed with differing levels of quality, using dimensions defined by WebQual (Loiacono 2002). The independent variables for this study were *signal quality, domain expectations* and
attitude towards domain. The dependent variables measured were perceived quality and behavioral intention.

PROBLEM DOMAIN

The problem domain for this study was a hypothetical course offered by either the Department of English or the Department of Information Systems at Washington State University. It was important to use a hypothetical course to ensure an information asymmetry occurred when students were asked to evaluate the course. By controlling this, it was likely that a student would search for signals from the course website to ascertain the quality of the course prior to giving their evaluation. As signal (i.e., website) quality was a primary independent variable for this research, high- and low-quality websites were created for each course. Domain expectations were also controlled by asking students to evaluate either an English (non-IT domain) course or a management information systems (IT domain) course. Figure 2 summarizes the design of the four websites for this study.

<table>
<thead>
<tr>
<th>IT Proficiency</th>
<th>Signal Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Non-IT-Proficient Person/Organization</td>
<td>-High Website Quality</td>
</tr>
<tr>
<td>-IT-Proficient Person/Organization</td>
<td>-High Website Quality</td>
</tr>
<tr>
<td>-Non-IT-Proficient Person/Organization</td>
<td>-Low Website Quality</td>
</tr>
<tr>
<td>-IT-Proficient Person/Organization</td>
<td>-Low Website Quality</td>
</tr>
</tbody>
</table>

**Figure 2** – IT Proficiency and Signal Quality of the experiment’s four websites

Subjects were randomly assigned to evaluate one of the four sites and given a task sheet (see Appendix A) of steps to execute within their particular site. The tasks were ordered in such a way to make site navigability salient and were the same for each user, regardless of the
assigned website. A pre-test survey was given to ensure the occurrence of an information asymmetry with the hypothetical course and its hypothetical instructor. Once the subjects completed their assigned tasks, each was asked to evaluate the website, course and instructor.

INDEPENDENT VARIABLES

Signal Quality To ensure the same information was presented in both the high- and low-quality websites, the same website content (e.g., course schedule, syllabus, etc.) was used for both websites of the hypothetical course. Content was slightly modified between courses to fit the IT or non-IT domain.

Website quality was determined using a number of WebQual dimensions, including response time, informational fit-to-task and visual appeal (Loiacono 2002). Specific questions were asked in the posttest survey regarding each of these dimensions to make sure the manipulations worked across the different sites. Response time was manipulated by coding a download delay into both of the low-quality websites. Informational fit-to-task (i.e., the site’s ability to provide the information necessary for evaluation) was controlled through the way information was organized and presented on the course websites. The visual appeal dimension was modified by changing the color scheme and layout of the websites. For example, the low-quality websites utilized an unattractive brown-and-black color scheme while the high-quality websites utilized a much more appealing black, white and gray color scheme. The low-quality websites, while containing the exact same information as the high-quality sites, were organized in such a way that information was more separated and difficult to locate. Ease of use was controlled primarily through the navigation systems of the websites. The low-quality websites were given a simplistic and navigationally cumbersome hyperlink system, which often required
users to repeatedly return to the home page (often by clicking the “back” button on their browser multiple times) to complete another task on their task sheet. On the other hand, the high-quality sites were given an always-present menu to navigate from page to page, usually resulting in less “clicks” to complete a given task.

**Domain Expectations**  Using a non-IT domain like English and an IT domain like Management Information Systems (MIS) allowed the subject’s course evaluation to be impacted by his or her expectations of the particular domain. To measure these expectations, subjects were asked about their domain expectations in the pretest survey and then asked to evaluate whether those expectations were confirmed in the posttest survey. For example, if a subject held high expectations for the websites of IT-proficient businesses, their evaluation would be based on whether or not those expectations were confirmed (Bhattacherjee 2001). In other words, an IT-proficient organization could be punished severely if a consumer determines the website does not meet expectations. Conversely, subjects might hold low expectations for the websites of non-IT proficient businesses, leading them to be more forgiving when evaluating the quality of the organization. By providing websites for both non-IT- and IT-proficient domains, expectations for a given domain could be controlled.

**Attitude Towards Domain**  An individual’s previous experiences with a domain may lead to the formation of a negative attitude toward that domain. To prevent attitude from skewing data, subjects were asked to be objective and evaluate their assigned course for a friend who held a positive attitude toward the course’s domain. This avoided situations where a subject may intentionally evaluate a course negatively because of their dislike for either English or management information systems. To measure a subject’s attitude toward the domain, survey
questions were asked about his or her perceptions of the domain following evaluation of the course website.

**DEPENDENT VARIABLES**

*Perceived Quality*  As H1, H2 and H3 are all predicting the effects of signals, expectations and attitude on perceived organization quality, it is important to measure the effects of the independent variables on perceived quality. Perceived quality was measured in two different ways: the perceived quality of the course and the perceived quality of the instructor who supposedly designed the course website. The two items being measured are intended to be representative of an organization’s product or service offering and the organization itself, respectively.

Specific questions in the posttest survey were included to make sure the website manipulations worked for both website quality (i.e., signal quality) and domain expectations. For example, subjects were asked how much they agree with the statement: “Overall, this was a quality website for evaluating the course being offered.” The inclusion of “for evaluating the course being offered” qualifies the first part of the statement in that if people’s expectations of the course domain were low, they might be more forgiving than if the statement simply read: “Overall, this was a quality website.”

*Behavioral Intention*  After assessing the quality of the three items listed above, subjects were asked to determine the likelihood that they would recommend the course to a friend if he or she was looking to take a course from that particular domain. Since H4 uses perceived quality as a determining factor of behavioral intention, the survey measured behavioral intention as well. The subject’s intention to recommend a course represented their likelihood to do business with
an organization based on their perception of the organization’s quality. Appendix B contains the pretest and posttest survey questions used in this study.

EXPERIMENT

The subjects for this study were undergraduate students who were enrolled in an introductory management information systems course at a major university. A total of 180 subjects participated in this experiment after pre-test screening.

Subjects were randomly assigned one of the four websites and given a task sheet to fit their respective domain. The task sheet provided the subject with the following experiential information-gathering task (for either an MIS or English major):

You have a good friend who is an MIS/ENGLISH major. During the enrollment period for the upcoming term, your friend has asked you to look over a class that they find to be potentially interesting. However, your friend doesn’t know much about the course or the instructor as the course is a new offering and the professor is also new to the university. With no previous information about the professor or course, your friend has asked you to take a look at the course website and give your opinion about the potential quality of the course. With an open mind, you begin to browse the course website, hoping that it will provide you with the information necessary to determine the quality of the course and/or the instructor.

Subjects were then given a period of time to complete their assigned tasks, which were designed to help them in assessing the course website. Following completion of the tasks, the subject was given a survey to measure his or her assessment of the course and the course website. Subjects received credit for their participation in this study.

ANALYSIS OF RESULTS

Manipulation Checks The following tables show how website characteristics differed across the high- and low-quality websites. Download delay (i.e., response time) averages are displayed.
in Table 1 and reflect a large change between the two types of websites. Table 2 contains informational fit-to-task averages, which saw less of an effect than other manipulations but an effect nonetheless. Table 3 contains averages for the visual appearance manipulation which shows a large effect between the high- and low-quality websites.

For the following tables, survey codes ending with ZERO represent survey results for low-quality sites and survey codes ending with ONE represent survey results for high-quality sites. Survey codes beginning with TWO represent survey results for the English course websites while survey codes beginning with ONE represent survey results for the MIS course websites (e.g., a survey code of 21 represents survey results for the high-quality English course website).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Averages for download delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Code</td>
<td>N</td>
</tr>
<tr>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>10</td>
<td>45</td>
</tr>
<tr>
<td>21</td>
<td>45</td>
</tr>
<tr>
<td>11</td>
<td>45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Averages for informational fit-to-task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Code</td>
<td>N</td>
</tr>
<tr>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>10</td>
<td>45</td>
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<tr>
<td>21</td>
<td>45</td>
</tr>
<tr>
<td>11</td>
<td>45</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Averages for visual appeal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Code</td>
<td>N</td>
</tr>
<tr>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>10</td>
<td>45</td>
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<td>21</td>
<td>45</td>
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<tr>
<td>11</td>
<td>45</td>
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</tbody>
</table>
**Hypothesis Testing**  In conjunction with the preceding tests, a Multivariate Analysis of Variance (MANOVA) was run to test hypotheses H1-H3. The results of the MANOVA are shown in Table 4. While signal quality and attitude appear to have a large impact (Prob. > F = .0001) on perceived course quality and behavioral intention (supporting H1 and H3), domain expectations (i.e., IT Proficiency) did not display the same effect (showing no support for H2). However when placed in conjunction with signal quality (i.e., SQ * IT Prof.) domain expectations did have a significant effect on course quality and behavioral intention.

### Table 4 MANOVA Results

<table>
<thead>
<tr>
<th>Source</th>
<th>Dependent Var.</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F-Ratio</th>
<th>Prob. &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-Model</td>
<td>Course Quality</td>
<td>150.719a</td>
<td>4</td>
<td>37.680</td>
<td>36.000</td>
<td>.0001</td>
</tr>
<tr>
<td></td>
<td>Behavioral Intention</td>
<td>186.683b</td>
<td>4</td>
<td>46.671</td>
<td>35.641</td>
<td>.0001</td>
</tr>
<tr>
<td>Signal Quality (F)</td>
<td>Course Quality</td>
<td>98.367</td>
<td>1</td>
<td>98.367</td>
<td>93.982</td>
<td>.0001</td>
</tr>
<tr>
<td></td>
<td>Behavioral Intention</td>
<td>114.404</td>
<td>1</td>
<td>114.404</td>
<td>87.368</td>
<td>.0001</td>
</tr>
<tr>
<td>IT Proficiency (F)</td>
<td>Course Quality</td>
<td>3.911</td>
<td>1</td>
<td>3.911</td>
<td>3.737</td>
<td>.055</td>
</tr>
<tr>
<td></td>
<td>Behavioral Intention</td>
<td>2.684</td>
<td>1</td>
<td>2.684</td>
<td>2.050</td>
<td>.154</td>
</tr>
<tr>
<td>Attitude (C)</td>
<td>Course Quality</td>
<td>14.426</td>
<td>1</td>
<td>14.426</td>
<td>13.783</td>
<td>.0001</td>
</tr>
<tr>
<td></td>
<td>Behavioral Intention</td>
<td>25.699</td>
<td>1</td>
<td>25.699</td>
<td>19.626</td>
<td>.0001</td>
</tr>
<tr>
<td>SQ *IT Prof.</td>
<td>Course Quality</td>
<td>16.195</td>
<td>1</td>
<td>16.195</td>
<td>1.472</td>
<td>.0001</td>
</tr>
<tr>
<td></td>
<td>Behavioral Intention</td>
<td>18.044</td>
<td>1</td>
<td>18.044</td>
<td>.003</td>
<td>.0001</td>
</tr>
<tr>
<td>Error</td>
<td>Course Quality</td>
<td>183.165</td>
<td>175</td>
<td>1.047</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Behavioral Intention</td>
<td>229.155</td>
<td>175</td>
<td>1.309</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-Total</td>
<td>Course Quality</td>
<td>333.883</td>
<td>179</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Behavioral Intention</td>
<td>415.839</td>
<td>179</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a  R-Squared = .451 (Adjusted R-Squared = .439)

b  R-Squared = .449 (Adjusted R-Squared = .436)

While domain expectations did not have a direct effect on perceived course quality as originally hypothesized, it did have an effect on perceived course quality when combined with signal quality. This leads to a revision of H2:

**H2 (revised): The expectation of an organization’s IT proficiency will moderate the effect of a signal on a consumer’s perception of organization quality.**
Figure 3 represents the revision of H2 as it relates to the other experimental hypotheses.

**Figure 3** – Revision of four experimental hypotheses

Mediation tests were run to test H4 and the results can be found in Table 5. The relationship between course quality and behavioral intention is considerably high (.767) when using attitude and signal quality as significant contributing factors (only partially mediating), providing support for H4.

**Table 5  Mediation Tests**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Quality</td>
<td>.552</td>
<td>.534</td>
<td>.110</td>
<td>partial mediation</td>
</tr>
<tr>
<td>IT Proficiency</td>
<td>.111</td>
<td>ns</td>
<td>ns</td>
<td>no mediation</td>
</tr>
<tr>
<td>Attitude</td>
<td>.220</td>
<td>.121</td>
<td>.093</td>
<td>partial mediation</td>
</tr>
<tr>
<td>Course Quality</td>
<td></td>
<td></td>
<td>.767</td>
<td>Sig. is required for any type of mediation</td>
</tr>
</tbody>
</table>

**Post Hoc Analysis** Table 6 summarizes the mean values for perceived course quality and behavioral intention across the four websites.
Table 6  Summary of Means

<table>
<thead>
<tr>
<th>Survey Code</th>
<th>Signal Quality</th>
<th>IT Proficiency</th>
<th>Course Quality</th>
<th>Behavioral Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>High Quality</td>
<td>High</td>
<td>5.57</td>
<td>5.86</td>
</tr>
<tr>
<td>10</td>
<td>Low Quality</td>
<td>High</td>
<td>3.34</td>
<td>3.44</td>
</tr>
<tr>
<td>21</td>
<td>High Quality</td>
<td>Low</td>
<td>5.14</td>
<td>5.31</td>
</tr>
<tr>
<td>20</td>
<td>Low Quality</td>
<td>Low</td>
<td>4.14</td>
<td>4.19</td>
</tr>
</tbody>
</table>

Figures 4 and 5 are graphical representations of the data summarized in Table 6. It is especially important to note the significantly larger disparity between the high- and low-quality websites of the IT domain as opposed to the websites of the non-IT domain. This occurred for both perceived course quality and behavioral intention.

Figure 4 – Perceived course quality across domains
Summary of results and post hoc analysis  The results of this study strongly support H1, H3 and H4, with H2 receiving little support on its own. The revision to H2 (H2r), however, did receive empirical support. A summary of these results is represented in Table 7.

Table 7 Hypothesis Testing Summary

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1  IT-mediated signals in an online setting will affect a consumer's perception of organization quality</td>
<td>Supported</td>
</tr>
<tr>
<td>H2  The expectation of an organization's IT proficiency will affect a consumer's perception of organization quality</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H2r The expectation of an organization's IT proficiency will moderate the effect of a signal on a consumer's perception of organization quality</td>
<td>Supported</td>
</tr>
<tr>
<td>H3  A consumer's attitude towards a particular domain will affect their perceptions of an organization's quality within that domain</td>
<td>Supported</td>
</tr>
<tr>
<td>H4  A consumer's perception of an organization's quality will affect their overall intent to do business with that organization</td>
<td>Supported</td>
</tr>
</tbody>
</table>

DISCUSSION

Theoretical Contributions  Given that relatively little research exists that applies signaling to both service and organizational quality, this study may shed some light on an area that can be
expanded on in the future. Due to the fact that certain organizations specialize in services (i.e.,
experience products/services) it is important for them to realize how signals can be manipulated
to convey the quality of the organization and their services. Further research into this realm can
help marketers and organizations better understand these implications as they apply to the
products and/or services they provide.

Pragmatic Contributions This study illustrates the effects of signaling, combined with domain
expectations, and attitude on perceived quality and behavioral intention. This has significant
implications for IT-proficient organizations in that they must meet a higher standard when it
comes to using a website as a signal of quality. This study examined the WebQual dimensions
of response time, visual appeal and informational fit-to-task as measurements of website quality.
The dynamics between these dimensions for the high- and low-quality websites are indicative of
potential ways an organization might inadvertently send signals of quality through its website. It
is important for organizations, especially those within the IT realm, to consider such dimensions
when designing a website to appropriately convey the quality of their offering(s).

Limitations The use of student subjects in this study was a limitation due to the fact that the
results only apply to individuals primarily within the ages of 18 and 23. By making the service
offering a college course, of which every student is a consumer, this limitation could be
minimized as much as possible. Future research can address this limitation.

It is also important to note that the results gathered cannot be generalized to include other
domains. This study anchored expectations between English and MIS, meaning that the results
can only be applied in comparisons between the two domains. While this study does provide
implications of applicability to other domains, those implications were not supported by this particular study. Future research can address this limitation.

The name and subject (“Web Design”) of the MIS course also provided a third limitation for our study in that it may have indirectly led to the MIS course websites being *intrinsic* rather than *extrinsic* of their quality. This poses a problem because a website for a course titled “Web Design” may very well be indicative of the quality of the course since students may expect to create sites of similar quality as the course website. This may explain the wide gap observed between the high- and low-quality sites for the MIS course. Future research can address this limitation.

**Future Research** The results from this study provide a basic foundation for studying websites as signals of quality for organizations within an IT domain. As the above limitations mentioned, additional studies should study the effects of an MIS course that focuses on a subject *other* than web design. This will remove possibility of the websites being an intrinsic cue of course quality.

Future research can also expand on this study to include a wider variety of subjects and domains. This will increase the ability to apply signaling theory to various organizations offering service products across a number of domains that may be more proficient in IT than others.

**CONCLUSION**

In this study, signaling theory is applied to websites as potential signals of service and organizational quality. The results from this study support the effects of signaling, combined with domain expectations, and attitude on perceptions of service and organizational quality. This
study also examined the effects of perceptions of quality on behavioral intention and supported that connection as well.

Future research will provide further insight into signaling theory as it applies to service and organizational quality by addressing the aforementioned limitations. This study provides a useful theoretical foundation for understanding how signaling can be applied to more than just tangible products and may caution IT-proficient organizations to take extra care when designing a website.
REFERENCES


APPENDIX A

Student ID: ____________________

COURSE WEBSITE SURVEY

Please complete the following questionnaire: www.wright-research.com/survey11/

Next, please read the following scenario:
You have a good friend who is an MIS major. During the enrollment period for the upcoming term, your friend has asked you to look over a class that they find to be potentially interesting. However, your friend doesn’t know much about the course or the instructor as the course is a new offering and the professor is also new to the university. With no previous information about the professor or course, your friend has asked you to take a look at the course website and give your opinion about the potential quality of the course. With an open mind, you begin to browse the course website, hoping that it will provide you with the information necessary to determine the quality of the course and/or the instructor.

Please determine whether you would give your friend a positive or negative evaluation of this course based on the information you ascertain from the website. Below is a list of items that will help you in assessing the course website. Please answer and check off each question as you go through the list.

Go to www.wright-research.com/course/1/

Next, please click on the Award Winning Course (MIS 344 –Web Site Design)

PLEASE READ CAREFULLY! Be sure to read the course description carefully so that you will be prepared to discuss it with your friend who is looking for potential MIS classes. Also, you will be asked a few questions on the post-survey about the course content.
Once you are done browsing the website, please execute the following tasks:

1. What is this course about? (Provide 1-2 sentences)

2. Read the “Spotlight On” section. Briefly summarize the section below?

3. What is the Instructor’s name?

4. When is the first assignment due?

5. In what circumstance are you eligible to receive an “incomplete” grade for the course?

6. What is the instructor’s phone number? 
   (_____) ______ - ______

7. How many points are allotted for student participation?

8. Name one (1) of the suggested publications listed on the main page:

9. What final class GPA range is recommended for this course?

Please complete the following questionnaire: http://www.wright-research.com/survey77/

Survey Code: 11
APPENDIX B

Signaling Constructs

**Course Asymmetries of Information (PRETEST)**
1. I am familiar with the MIS344/ENG344 course.
2. I have a good idea of what the MIS344/ENG344 course will be like.
3. I have sufficient information about the MIS344/ENG344 course to evaluate it effectively and accurately.
4. I know what it is like to take a course from this professor/instructor.
5. I feel that I’m informed about professor/instructor as a professor/instructor.
6. I have a good idea about how professor/instructor interacts with his/her students.

**Signal Credibility (PRETEST)**
1. If I see a high quality website, I typically associate that with a high quality organization or person.
2. An organization or person’s website is an accurate indicator of their commitment to overall quality.
3. A quality website helps me determine if I am dealing with a high quality organization or person.
4. Designing and maintaining a high quality website takes significant effort.
5. When I see a high quality website, I assume that a person/organization must invest a lot of time to design and maintain it.
6. The design and maintenance of a high quality website requires a person/organization to make a significant time investment.

**Attitude Towards Domain (PRETEST)**
The thought of taking an MIS Application Development class is...
1. Dull....Interesting (MA1)
2. Boring....Exciting (MA2)
3. Unappealing....Appealing (MA3)

My Attitude toward taking an MIS class is....
Extremely negative....Extremely Positive (MA4)

The thought of taking an English Composition class is...
4. Dull....Interesting (EA1)
5. Boring....Exciting (EA2)
6. Unappealing....Appealing (EA3)

My Attitude toward taking an English Composition is....
Extremely negative....Extremely Positive (EA4)

Given the choice, I would rather take...
MIS Application Development------Don’t care either way------English Composition (MEA1)
Domain Expectancy of IT Proficiency (PRETEST)

Note: For the following 4 questions, English is denoted as ENG and Management Information Systems is denoted as MIS

I would expect a(n) ________ course website to be more technologically advanced (MIS - Neutral- ENG)

With respect to the quality of a course website, I would have higher expectations of a(n) ________ department. (ENG-Neutral-MIS)

I would expect a(n) ________ department to be better equipped to deliver a high quality course website (MIS -Neutral- ENG)

A(n) ________ department has the better resources and more advanced expertise to design and deliver a high quality course website. (ENG-Neutral-MIS)

Expectancy Confirmation (Bhattacherjee, 2001) (POSTTEST)

1. My experience with using the course website was better than what I expected (SA/SDA):
2. The quality of the interaction provided by the course website was better than what I expected (SA/SDA)
3. The quality of the course website was higher than what I expected (SA/SDA)
4. Overall, most of my expectations from using the course website were confirmed (SA/SDA)

Perceived Professor/Instructor Quality

5. I would expect professor/instructor to be an efficient professor/instructor:
6. Professor/instructor appears to me to be a reputable and credible professor/instructor
7. I would expect professor/instructor to be a high-quality professor/instructor

Perceived Course Quality

8. Based on my knowledge of the course(s) being offered, I would rate its quality as:
9. What is your perception of the quality of the course(s) being offered?
10. What is the likely quality of the course(s) being offered?
11. I perceive the MIS344/ENG344 course to be well designed (SA/SDA)
12. I perceive the MIS344/ENG344 course to be an effective learning experience (SA/SDA)
13. I perceive the MIS344/ENG344 course to be comprehensive and complete (SA/SDA)

Behavioral Intention

1. Assuming your friend is looking to take a course from this department, what is the likelihood that you would recommend this course?
2. Suppose your friend was looking to take a course from this department. How likely would you be to encourage them to select this course?
3. Presume your friend is looking to take a course from this department, what is the likelihood that you would encourage them to enroll in this course?
Interface Manipulation Constructs (POSTTEST)

Download Delay
1. When I use this website, there is very little time between my actions and the website’s responses.
2. The website loads quickly.
3. The website takes very little time to load.

Information Gathering
1. This website provides various assortments of features.
2. The information provided is easy to understand.
3. Information related to the services offered in this course is accurate.
4. The latest information related to the course is adequately provided.

Informational Fit-to-task
1. The information on the website is essentially what I need to carry out my tasks.
2. The website adequately meets my information needs.
3. The information on this website is effective.

Visual Appeal
1. The website is visually pleasing.
2. The website displays visually appealing design.
3. It is pleasant to follow the overall flow of the website.
4. The images and typographies (fonts, lettering, etc.) used in the site are stylish.

Overall Website Quality
1. All in all, I would rate the course website as being of high quality. (SA/SDA)
2. How would you rate the general quality of the course website? (HQ/LQ)
3. All things considered, how would you rate the quality of the course website? (HQ/LQ)
4. Overall, how would you rate the quality of this website? (HQ/LQ)

Other Constructs (Post-Test)

Ease of Use
EOU1: My interaction with the course website is clear and understandable.
EOU2: Interacting with the course website does not require a lot of my mental effort.
EOU3: I find the course website to be easy to use.
EOU4: I find it easy to get the course website to do what I want it to do.

Usefulness
PU1: The website helps make evaluating this course fast and easy
PU2: The course website is convenient to use
PU3: The course website makes my browsing activity more efficient
PU4: Overall, the website is useful for evaluating this course.
Enjoyment
PE1: Using the course website is a pleasant experience
PE2: The course website is fun to use
PE3: The website makes evaluating this course more interesting
PE4: Overall, using the evaluating this course is enjoyable.
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Thesis Author  Carignan, Thomas

Thesis Title  Investigating IT Proficiency and Website Characteristics as Signals of Quality: Guilt by Association?

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