
How Presentation Flaws Affect Perceived Site Quality, Trust, and Intention to Purchase from an Online Store

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ABSTRACT: Although there has been a great deal of research on impression formation, little application of that research has been made to electronic commerce. A research model was constructed that hypothesized errors, poor style, and incompleteness to be inversely related to the users' level of perceived quality of an online store. Further, this perceived quality of the online store's Web site would be directly related to users' trust in the store and, ultimately, to users' intentions to purchase from the store. An experimental study with 272 undergraduate and graduate student volunteers supported all

the hypotheses. In addition, it was found that the relationship between the factors and perceived quality was mediated by the perception of the flaws. The perception of flaws rather than the actual flaws influenced users' perception of quality. Supplemental analysis also seemed to indicate a pattern of diminishing effects with each subsequent flaw.

KEY WORDS AND PHRASES: intention to purchase, trust in e-commerce, Web site credibility, Web site presentation flaws, Web site quality.

ALTHOUGH ONLINE SHOPPING CONTINUES to break new records each year, conventional shopping far overshadows that activity. Figures from the U.S. Department of Commerce for the first quarter of 2005 [70] reveal that although online shopping in the United States reached \$19.8 billion, that figure represents only 2.2 percent of the \$916.9 billion in total retail sales for the same period.

There are several possible reasons for this shortfall. One problem that has received widespread recent attention is consumer trust and distrust in the credibility of online merchants [14, 30, 50]: "Unlike brick-and-mortar transactions, Web transactions involve both depending on an unseen and unknown vendor and transacting business on the Web—a medium with significant fiduciary, security, and privacy risks" [50, p. 1]. Both academic and practitioner literature have recognized how important initiating, building, and maintaining trust between sellers and buyers is to successful e-commerce transactions [30].

These days, it seems that building credibility is not only important but is also quite difficult due to a significant lack of trust. A recent study of 1,500 online users by Princeton Survey Research Associates [60] found that trust is the second-most important antecedent of visiting a Web site. At the same time, the survey found that the e-commerce trust environment can be described as "dismal" [60, p. 4], where only 29 percent of the respondents say they trust e-commerce sites. Hoffman et al. [34] suggest that the main reason consumers are resistant to providing personal information and to buying online is a fundamental lack of trust with online transactions. Furthermore, because e-commerce transactions, which often involve temporal and spatial separation between buyers and sellers, do not involve the simultaneous exchange of goods and money, the level of risk is heightened [30].

Purchasing from a site requires user trust because of obvious financial risk, but even just visiting a site can expose a user to significant risk. For instance, many sites require registration and, in turn, disclosure of personal information. Also, there is growing awareness of spyware, "Trojan horse" worms, and viruses that can be unleashed simply by visiting a rogue site.

In this paper, we examine flaws in an experimental context that we expect would damage a site's credibility and test their effects on the user's assessment of the store's quality, trust in the store, and, finally, intention to purchase. Although the popular

press has implied or expressed such expectations for years, there has been no empirical examination of impression formation in a management information systems (MIS) context. No study to date has established that users will notice flaws or, furthermore, will formulate differential trust and behavioral intentions. Finally, no study has examined interactions among multiple types of flaws.

Background

THIS STUDY CONSIDERS IMPRESSION FORMATION in a Web context. Specifically, it examines the effect of users' perception of presentation flaws of an online store's Web site on their perceived quality of the online store, trust in the online store, and intention to purchase. Each of the constructs will be reviewed below.

Impression Formation

Impression formation refers to the manner in which information presented serves to form users' perceptions of a Web site. A vendor's Web site is often the first point of contact; it is therefore important that a favorable image is presented, as users will form their impressions based on this initial information [1, 2, 15, 20].

Research on impression formation dates back to 1946 [2] and considers the way people perceive others as a process by which an integrated impression is formed from stimulus information. Early models of impression formation [1, 2] assume that when an individual is presented with information about a previously unknown or unfamiliar person, the individual creates a sort of mental slot in which information is received and processed, and thus impressions of others are formed.

Research has shown that negative attributes are given more weight in an individual's overall impression than positive attributes; this is known as the negativity effect in impression formation [20]. Furthermore, attributes with extreme evaluative meaning weigh more heavily on an individual's impression formation than neutral items. Because of the novelty and the unusual nature of both negative and extreme traits, more attention is given to such attributes, and items that are attended to longer are usually weighted more heavily [20].

In recent years, the study of impression formation has been influenced by advances in the field of social cognition, the discipline that studies how individuals process information and think about others [21]. Impression formation, which begins at an initial meeting with others or the initial point of contact with a Web site, does not take place in a cognitive vacuum [5], but rather mental frameworks, also known as schemata, come into play and influences which pieces of information individuals notice about other individuals or things, how such input is stored in their memory, and what evaluations and judgments individuals then make about other individuals and things.

Because of preexisting cognitive frameworks, people do not focus on others' specific traits or basic dimensions, but rather pay attention to what are called person types or object types. A "type" is made up of sets of traits that prior experience suggests are

traits that are likely to be clustered together. To illustrate, a professional Web site is expected to suggest clarity and purpose, consistency across pages, easily navigable pages, updated information, and so forth.

One reason that impression formation is so important is that, according to Cotlier [15], the first seven seconds that a visitor views a firm's Web site are the most crucial, as it is within that time period that a prospective customer can be "turned off" for good. Furthermore, one can expect that the initial amount of time during which customers evaluate a site will decrease as their expectations of sites become more fine-tuned [15]; as a result, firms will have an even briefer period of time to capture a potential customer's attention and keep it.

The information provided on a Web site tends to be imperfect and incomplete and thus requires the consumer to make inferences based on the information presented [35]. Imperfections on a site might provide powerful cues to the users and theories from the marketing literature about how cues have been studied are described next. The effects of those flaws have not been inventoried and assessed completely. One likely impact is to reduce assessments of the site's quality and trustworthiness, which is described later.

Cues and Quality Assessments

The marketing literature has long concerned itself with the effects of cues on customer perceptions. Steenkamp [67] reviews the progress of that literature from 1932 to 1987 as it evolved from single-cue studies to multiple-cue studies. Single-cue studies attempted to account for perceptions via a single cue such as price or brand. Starting around 1969, subsequent studies combined cues, first on an ad hoc basis, then after creating taxonomies of such cues. In the electronic commerce literature, many studies have been concerned with single factors to predict user assessments, but new studies are emerging that consider multiple factors.

Cues that affect the impressions of products are highly dependent upon the characteristics or nature of the products themselves, but they can be integrated into general categories. This is evident in the research of Becker [7], who assessed perceived quality of meat and included cues such as color, smell, and freshness. Those specific factors are those that exemplify search quality (appearance cues), experience quality (usage cues), and credence quality (believability or reliability cues), respectively. There are many specific cues that can be assessed, but those three are the generic categories.

Another model was proposed by Baker et al. [4]. Their work focuses on physical stores, which include social factors (difficulties with salespeople), ambient factors (store aesthetics), and design factors (difficulties in going through the store, such as confusion or inconvenience).

Finally, Bitner [9] includes three similar categories of specific cues: ambient factors (appearance), space/function (conscious design issues), and signs/symbols/artifacts (which deal with communication of the message to individuals).

Table 1. Possible Mapping of Taxonomies on Cues from Marketing

Proposed scheme	Becker's [7] version	Baker et al.'s [4] version	Bitner's [9] version
Ambience	Search quality	Ambience factors	Ambient factors
Functionality	Experience quality	Design factors	Space/function
Information reliability	Credence quality	Social factors	Signs/symbols/ artifacts

Whereas research is needed to reconcile these theoretical models to ascertain which is the proper set of constructs to apply to an online store, it is useful at this early date to select experimental factors that map to these factors as closely as possible. One potential mapping from the perspective of an online store is shown in Table 1.

In this study, we wanted to represent each of the three potential constructs that would be likely to have particular relevance to an online store and also would be likely to fit the various schemes offered by previous researchers. Common and relevant themes seem to include *ambience*, *functionality*, and *reliability of information*. A single study cannot include all possible cues from each of these themes. However, it is probably useful to examine an example cue from each category, especially those that have been highlighted in the literature. Such cues could have serious effects on trust and credibility, which is discussed next.

Trust and Credibility

Trust and credibility are important, related constructs [24]. Trust refers to a "positive belief about the perceived reliability of, dependability of, and confidence in a person, object, or process" [22, p. 81]; and credibility is a perceived quality of a site or the information contained therein, often equated with believability [22]. If a computer is deemed believable, it is thought to be credible. Terms such as *accepting the advice*, *trusting the information*, and *believing the output* are seen as conveying computer credibility. Although these constructs are related, there are differences in how they are treated in the literature. Each is described below.

Trust

Trust has been defined in various ways, often depending on the context in which it appears. It has been recognized that trust is difficult to define and to measure [14, 30, 63], and only exists in an uncertain and risky environment [47]. Some definitions have focused on the element of risk involved [37], others on the vulnerability of one of the parties concerned [10], while still others on the presence of a significant motivation or incentive at stake [38]. The view that we adopt in this research is of trust in the online store via its Web site. Trust needs to be promoted between suppliers and consumers if commerce over the Web is to continue to develop [66].

One particular type of trust is that which forms at the initial point of contact with a vendor; this type of trust is salient in an electronic commerce environment, where consumers may deal with unfamiliar Web vendors. Initial trust implies that trust is placed in an unfamiliar trustee, in the context of a relationship where the parties do not have credible information about each other and where no tie between the parties already exists [8, 49].

Much research has looked at ways in which an online firm can increase the trust and confidence of its customers (e.g., [25]). Mechanisms such as brand names and secure technologies have been suggested [68]. Designing complete sites without obvious flaws can also build trust [15, 46]. Other ways to increase trust and confidence include help facilities [28]; communities [35, 36, 40]; privacy, security, and refund or replacement policies [16, 35, 40, 59]; and seals of approval [16, 59].

Credibility

The most obvious difference between trust and credibility is that trust is an attribute of an observer (to have trust), whereas credibility is an attribute of another person or an object of interest (to be credible). In a sense, trust is a reflection of credibility, which could be considered to be trustworthiness.

The literature goes beyond semantics, however, in its treatment of credibility. Fogg and Tseng [22] consider credibility to be composed of not only trustworthiness but also expertise. Trustworthiness refers to the perceived accuracy and goodness of the source. Simply put, expertise refers to the ability of the person to be able to follow through on their goodness. In an information systems context, expertise would include perceived knowledge and skills of the developer and elicits terms such as knowledge, experience, and competence [22]. To illustrate, a credible computer product (such as an online store) is perceived to involve high levels of trustworthiness and expertise, which would be especially important for sites that involve financial and confidential information [22].

Developers are faced with the task of building credibility quickly with online users in an attempt to build and maintain long-term relationships with their customers [24]. This task thrusts credibility and trust into a role that is more central than ever before [3, 18, 26, 57]. If a user desiring a particular product or service discovers a new site by using a search engine, only surface cues may be available to formulate a credibility judgment when the site is provided by an unknown party. Such cues that have been found to affect credibility include banner ads [23], ease of use of the site, listings of site author credentials, recognition of return visits to the site, and amateurism [24]. One obvious type of surface cue involves flaws in a site, which is discussed in more detail below. This paper examines how certain flaws in an online store's Web site may lead to a decrease in credibility and trust.

Online stores are concerned with the impression that users form of the online store's Web site, as impressions can have strong effects on the perceived quality of an object or a person. While customers screen the signals gathered from an online store and

form impressions of the store, firms may wish to manage those impressions as best they can.

Presentation Flaws

THERE IS AN ABUNDANCE OF PRACTICAL ADVICE on several sites, such as websiteshatsuck.com and useit.com, on how to improve Web site design. Numerous books have also been published on this topic—for example, *Homepage Usability: 50 Websites Deconstructed* [55] and *Web Style Guide* [46]. Most recently, a governmental agency has become involved, and published the recent and comprehensive *Research-Based Web Design & Usability Guidelines* [42] both in paper and on the Web.

Whereas credibility and trust can be enhanced by users' perceptions of reliable and accurate information being supplied by the computer, flaws in the information provided may serve to destroy that trust; "virtually all researchers agree that computer errors damage credibility—at least to some extent" [22, p. 82]. A presentation flaw is any undesirable feature of a Web site that could interfere with reading or understanding its content or intent.

Unfortunately, presentation flaws have not yet been studied extensively. Although flaws would need extensive study for unambiguous categorization, they can be grouped into tentative categories to provide conceptual clarity and parsimony. Consistent with the taxonomy developed in Table 1, flaws of concern include any features of the system that may degrade the system's ambience, functionality, or information reliability. Examples of those flaws to be used in this study are poor aesthetics (ambience), pages "under construction" (functionality), and language errors (reliability). In some extreme cases, flaws could prevent users from using the system in a meaningful manner [51]. Spelling errors can also be used to form negative impressions about competency and attention to detail [45]. Flaws such as typographical errors, notation that is unfamiliar to or not easily understood by the users, and inconsistent or faulty formatting issues may lead users to choose not to deal with the computer product as a result of a loss of trust. All errors, if serious enough, can stand in the way of understanding or finding information from a site.

In this study, one flaw type from each category is created and integrated into an online store. Presentation flaws are categorized into (1) poor style,¹ which interferes with the ambience; (2) incompleteness, which interferes with functionality; and (3) language errors, which interfere with the reliability of the information on the site. Although there are other flaws that would fit into such categories, such as conflicting colors² (ambience), delay (functionality), or confusing terminology (information reliability), we focused on poor style, incompleteness, and error. These types of errors can be seen immediately and thus can quickly lead to early impressions. We also focused on these types because they are identifiable to the site itself, and a user would not suspect that the flaw was caused by some outside factor.³ Finally, we avoided items that could fit into multiple categories, such as dead links.⁴ Each of our representative factors from our taxonomy will now be described in the context of Web site design.

Poor Style

Although much of good and poor style is inherently subjective, there are some relatively objective measures or symptoms of style problems. Graphical and visual elements can sometimes temporarily interfere with the presentation while the user takes a few moments to fully understand the page. For example, the background can interfere with the text on a page, and font sizes can be inconsistent, making it difficult to determine quickly headings from other text. Also, crooked columns and inconsistent word and line spacing can make it difficult to follow the text horizontally and vertically.

In terms of formatting issues and the overall organization of the Web site, Lynch and Horton [46] argue that the first thing a user sees on a Web page is not the title or the details on the page but, rather, the overall pattern and contrast on the page. For this reason, to increase the users' confidence in the Web site, they recommend the use of a balanced and consistently implemented design scheme, as opposed to haphazardly mixed graphics and text. They further state that the overall organization of the site will have the greatest impact on the users' experience visiting the Web site. These flaws can be related back to Baker et al.'s [4] *ambience* and Bitner's [9] *ambient factor*, which deal with aesthetics and appearance issues.

Incompleteness

The incompleteness of a Web site is another factor that can discourage confidence and trust. Although incompleteness can be thought of as a temporary state, a site owner must use judgment to determine when to release a site to the public. Allowing users to arrive at an incomplete site can be a risky venture and could lead to lasting, negative impressions, as users may feel that the site's functionality has been compromised. Incompleteness in this context refers to a Web site that may include obsolete content or links, nonloading pictures, or "coming soon" pages. Web sites need to be maintained, as do their links, which are perishable and must be updated periodically. By letting a site go stale, users are likely to be disappointed and not return.

Errors

The third type of flaw includes typographical, grammatical, and factual errors. Molich and Nielsen [51] warn against spelling errors, as such errors "distract users and make them suspect a generally poor quality of the system" [51, p. 344]. Moreover, spelling errors can be used to form impressions about competency and attention to detail [45], and may interfere with the user's perception of the reliability of the information provided on the site. In this study, we focus on elements of language usage and, from this point on, we will call this factor "language errors." It is possible that other errors that users notice will have similar effects as language errors, but future studies will need to do careful comparisons to understand this more fully.

In summary, the literature implies that (1) intentions to purchase are at least partly dependent on trust; (2) trust can be affected by site characteristics in categories such

as ambience, functionality, and information reliability; (3) impressions can have strong effects on perceptions of quality of an object or a person; (4) these impressions are formed rapidly, in as little as seven seconds; (5) firms might wish to manage impressions (provide signals) to maximize the persuasiveness of their online store; (6) customers will screen the signals from the online store and form impressions; and (7) powerful signals might be generated from presentation flaws such as poor style, incompleteness, and language errors.

Research Model

THIS STUDY EXPLORES WHETHER WEB SITE presentation flaws affect consumers' (1) perceived quality of the online store, which then leads to (2) trust in the online store, and (3) consumers' intention to purchase from the online store.

The research model for this study is shown in Figure 1. From left to right, the three presentation flaws (poor style, incompleteness, and language errors) affect the user's perception of quality of the online store. This perceived quality in turn affects the user's level of trust in the online store, which influences the user's intention to purchase from the online store.

Effect of Flaws on Perceived Quality

A primary assertion in this study is that flaws will negatively affect users' perceptions of quality of an online store's Web site. Firms are motivated to control how their customers perceive them and their products, and strive to improve the lasting impressions formed by customers [29]. Online stores strategically control the information presented to their customers in an effort to continue to positively affect their impressions [61, 62].

The perceived quality of an online store is measured using a four-item instrument that relates to overall site quality [71]. An online store's Web site serves as the medium through which consumers gather information about the online store and develop impressions, both positive and negative, about the store. Because it is strategically crucial to manage consumers' impressions of the Web site, firms need to ensure that any factors that may convey a lack of integrity are reduced [57]. Lynch and Horton recommend that to convey to users that what the firm is offering is accurate and reliable, high editorial and design standards need to be achieved; "a site that looks sloppily built, with poor visual design and low editorial standards, will not inspire confidence" [46, p. 25]. A site that does not inspire confidence will not be perceived to exude superior quality.

Increasing the level of perceived quality of a Web site requires convincing the user that the Web site is timely and accurate, and that the information being provided is useful. One way to achieve this is to present to the user a Web site that, overall, embodies visual and functional continuity in the site's organization coupled with graphic design [46]. As Lynch and Horton [46] assert, the first thing that a user sees

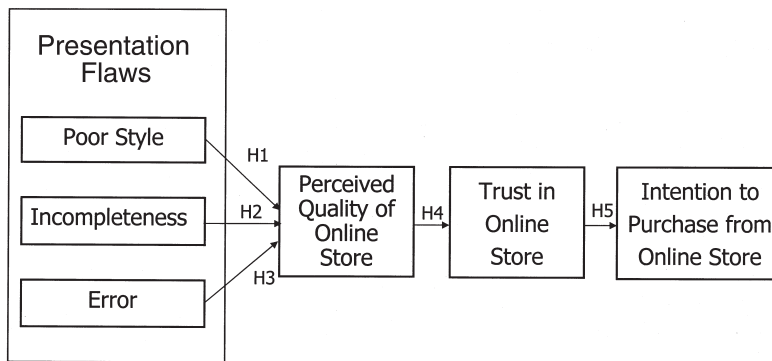


Figure 1. Research Model

on a Web page is not the title or details but, rather, the overall pattern and contrast on the page. Furthermore, because it is the information that is received early that is weighted more heavily than that which comes later, and it is negative information that has greater impact than positive or neutral information [1, 21], it is important that online stores present Web sites that are properly formatted and that have an overall organized look. An overall professional look of a Web site [56] and the good use of visual design elements [39] have been found to provide positive cues to the user. Therefore, an online store's Web site that is characterized by poor style (formatting flaws/an overall messy and disorganized look) will result in a low level of perceived quality.

H1: A Web site with poor style will result in lower perceived quality of the online store than a Web site without poor style.

An online store can manage the impressions that consumers form of the store's Web site by establishing legitimacy. Cotlier [15] asserts that a firm can establish legitimacy by providing users with a finished product in terms of its Web site; this can be achieved by avoiding obsolete links, "coming soon" pages, and images that do not load. Because Web pages are ephemeral, links become, to a certain extent, ephemeral; they need to be maintained [46]. Nielsen et al. [56] found that poor Web site maintenance, which includes broken links, outdated information, and missing images, provides negative cues to the Web site user. Establishing legitimacy will heighten the perceived quality of the Web site in the eyes of the consumers, as they will perceive the information being provided as timely, accurate, and beneficial. It is important for online stores to maintain high standards for their Web sites; otherwise, the impressions that users have will fall [33, 61, 62]. Users are less likely to come back to the site if they are disappointed with their initial visit; it is always more difficult to attract users back to the site once they have been disappointed [21].

H2: A Web site that is incomplete will result in lower perceived quality of the online store than a Web site that is not incomplete.

Molich and Nielsen's [51] assertion that errors make users suspect general poor quality of a system can perhaps be readily applied to a Web site because customers seldom know anything about the site's developer and they formulate their first impressions when they encounter the site. Nielsen et al. [56] and Fogg et al. [24] found that freedom from small grammatical and typographical errors provides positive cues to the site user. In computer-mediated communication, communication style (for example, word choice, paralinguistic cues, typographic information) can provide impression-relevant information; for example, if messages contain several errors, it may be interpreted that the sender is careless or incompetent [31, 44, 46]. Moreover, Goffman warns "we must be ready to examine the dissonance created by a misspelled word" [29, p. 55] and that "the impression of reality fostered by a performance is a delicate, fragile thing that can be shattered by very minor mishaps" [29, p. 56]. As a result, consumers will assign a lower level of perceived quality to an online store's Web site that contains language errors than to one that does not contain errors.

H3: A Web site that contains language errors will result in a lower perceived quality of the online store than a Web site that does not contain those errors.

Trust is increasingly becoming a significant strategic issue in organizational Web site development [57]. Trust is fragile; it is hard to generate, easily lost, and, once lost, difficult to regain [32, 52, 65, 69]. Fogg and Tseng concentrate on the trust that forms between individuals and that is mediated by technology: "trust indicates a positive belief about the perceived reliability of, dependability of, and confidence in a person, object, or process" [22, p. 81]. It follows that if an individual feels positive about the reliability, the dependability, and the confidence of something, then that individual will perceive that something to be of high quality. Furthermore, McKnight et al. assert that perceived Web site quality should positively influence the users' trusting beliefs and trusting intentions as using the Web site provides the first experiential feel of the online store's presence and confirms first or initial impressions: "if consumers perceive the Web site is of high quality, they will assume that the Web vendor has positive attributes and will form trusting intentions" [48, p. 341]. Thus,

H4: Perceived quality of the online store will influence the user's trust in the online store.

Trust facilitates cooperative behavior [65]. By trusting someone or something, individuals make themselves vulnerable in a variety of ways: they become vulnerable to being taken advantage of, vulnerable to not receiving what is promised, vulnerable to not receiving full disclosure of important information, and so forth. Trust is evident when individuals are aware that they are vulnerable to harm from others, but they do not believe that these others would harm them even if they could [25]. Technology designers aim to inspire a cognitive state of trust in users so that users will engage in trusting behaviors, which will enable the human-computer interaction to progress without problems [12].

When trust is lacking in a relationship, individuals do not engage in financial or emotional transactions and are not likely to disclose personal information [12, 35].

Conversely, when trust is present, individuals are more likely to engage in cooperative behaviors and are more inclined to engage in emotional or financial transactions, such as completing a purchase. Gefen [27] examined the relationship between familiarity and trust on electronic commerce and found that trust was a good predictor of intention to purchase. Furthermore, Doney and Cannon [18] regard trust as an *order qualifier* for purchase decisions—that is, for consumers to place an order, they must trust the merchant first. Findings by Dwyer et al. [19] and Ku et al. [43] empirically support that trust is an important influence on behavioral intention to purchase online.

H5: Trust in the online store will influence the user's intention to purchase from the online store.

Method

THE HYPOTHESIZED RELATIONSHIPS were investigated empirically using a laboratory experiment. Each flaw factor was operationalized at two levels: style has a “good style” and a “poor style” condition, incompleteness has a “complete” and an “incomplete” condition, and language error has an “error” and a “no error” condition.

As mentioned above, style is partly subjective and partly objective. We tried to minimize subjectivity by making sure that all style problems interfered with subjects' interactions to some extent. The poor style condition provided background graphics that reduced the contrast between the text and the background (see Appendix A). Although legible on a computer screen, it was difficult to read quickly. Also, inconsistent table alignment and font sizes would be initially confusing. These decisions were based on real sites encountered over the years, and examples of each are still found online to this day.

Incompleteness was operationalized by selecting one salient element on each page and replacing it with a placeholder such as “under construction” or “image not yet available.” It was important to use distinct placeholders to make sure that the items did not appear to be the result of loading errors, and Internet Explorer's symbol for images not available could be interpreted as such a technical problem. To ensure that incompleteness was noticed, a few of the tasks involved a missing item. Each task included “don't know/can't tell” as a possible response.

Language errors were operationalized by misspelling words and making obvious grammatical errors on each page. Pilot testing revealed that we needed about one error for every ten words on a page, or a dozen errors on each page, before they would be detected. While this would seem, on the surface, to reduce realism, it was required that the errors be noticed, and our goal was to find if these errors would affect subjects' attitudes about the site. We selected commonly made errors such as double letters (“sucessful”), transpositions (“gaurantee”), substitutions (“skipping” rather than “shipping”), common crude approximations (“libarry”), missing words (“during check-out process”), missing letters (“destinaion”), slips (“te]ephone”),⁵ and errant apostrophes (“helping student's's”).

Table 2. Combinations of Presentation Flaw Treatments

	Completeness	Error	Good style	Treatment
Treatment 1	1	0	1	CNG (complete/no error/ good style)
Treatment 2	1	1	1	CEG (complete/error/ good style)
Treatment 3	1	0	0	CNP (complete/no error/ poor style)
Treatment 4	1	1	0	CEP (complete/error/ poor style)
Treatment 5	0	0	1	ING (incomplete/no error/good style)
Treatment 6	0	1	1	IEG (incomplete/error/ good style)
Treatment 7	0	0	0	INP (incomplete/no error/ poor style)
Treatment 8	0	1	0	IEP (incomplete/error/ poor style)

Notes: 1 = flaw; 0 = no flaw; C = complete; I = incomplete; N = no errors; E = errors, G = good style; P = poor style.

The manipulated factors of style, incompleteness and language errors produced a $2 \times 2 \times 2$ between-subjects three-way fully factorial design. Eight different versions of the site were designed, with all possible combinations of the presentation flaws. Table 2 presents the combinations of the presentation flaws in this study, and the codes assigned for each of the eight treatments.

The experimental materials consisted of a fictitious prototype, limited-scope “pre-view” Web site, on which volunteers answered a list of questions that forced them to find specific information on the Web site and record the answers on a handout (see Appendix B). Similar methods have been used in numerous studies (e.g., [27, 36, 41, 58]). Answering the questions required visiting several pages of the site, assuring that they experienced the treatments.

Two pilot tests were conducted. An early pilot with eight doctoral students (one per treatment) was coupled with open-ended items for each page asking them to search for flaws and give their feedback (Were some too obvious? Did you become suspicious? Are there other opportunities for introducing more flaws?). This early pilot allowed us to calibrate appropriate flaws in adequate quantity. A later pilot test with 54 undergraduate students sampled from an introductory course in liberal arts provided a more extensive test of the materials and procedures, and had the added benefit of making sure that our task did not use too much business jargon. Over three-fourths of the students majored in sociology and psychology. Each student was randomly assigned to one of the eight experimental treatments, and each treatment contained at least six participants. Based on the pilot, questions were reworded and reorganized,

and some were eliminated. The background in the “poor style” treatments was darkened and the contrast was increased because several subjects reacted favorably to the faint background in the pilot. This inconsistency was the result of designing the pages on an LCD display and providing CRT displays in the laboratory when we performed the pilot test and main data collection.

Data were collected from 272 undergraduate and graduate students enrolled at a large northeastern university, or 34 subjects in each of the eight cells. Students were solicited from particular courses around campus based on classes taught by colleagues and their acquaintances. This convenience sample was considered to be adequately representative of the overall student body of the university, but to prevent confounds, it was important to randomly assign subjects in *each* class as uniformly as possible to the treatment conditions. Analysis of demographic data provided significant assurance of random assignment.

Appendix A provides sample screenshots from some of the sites used in various treatment conditions. Once the task was completed, the participants were asked to fill out an online questionnaire (see Appendix C) with questions pertaining to dependent variables measuring perceived quality of the site, trust, and intention to purchase, as well as the control variables (computer experience, Web experience, and computer efficacy) and manipulation checks.

All the scales were established in previous studies. The perceived quality of the site and users’ intention to purchase from the site were measured using items based on Dodds et al. [17] as adapted by Yoo and Donthu [71]. Trust in the online store Web site was measured using items adapted from Jarvenpaa and Tractinsky [35]. There were three manipulation check questions for each factor; these manipulation checks were used to gauge the participants’ perception of the flaws.⁶ The duration of the experiment was approximately three-quarters of an hour.

Following the procedure of Carmines and Zeller [11], we examined convergent and discriminant validity by correlating all the items and scale averages. The averages across items within a scale need to be correlated more strongly with items in that scale than with items in other scales. It was apparent that there were problems with two Trust items. Item 4 was phrased to be reverse-coded, yet subjects did not seem to respond in that manner (the correlation of the item with the average of Trust was 0.655 and should have been negative). Also, the correlation of item 5 with the total was very low (0.343). Therefore, items 4 and 5 in the Trust scale were removed. The final set of intercorrelations is shown in Table 3, and all the remaining item correlations demonstrate convergent and discriminant validity. Reliability analyses were calculated for the final scales used. Alpha scores ranged from 0.814 to 0.918, showing adequate reliability for further analysis (see Table 4).

Results

A $2 \times 2 \times 2$ ANALYSIS OF VARIANCE (ANOVA) revealed that cell means of the perceived site quality scale all differed significantly in the predicted directions, support-

Table 3. Examination of Convergent and Discriminant Validity (following [11])

	SQual	Trust(alt)	PurInt
SQual1	0.905	0.694	0.704
SQual2	0.906	0.705	0.729
SQual3	0.892	0.688	0.712
SQual4	0.858	0.552	0.574
Trust1	0.702	0.822	0.681
Trust2	0.508	0.861	0.519
Trust3	0.604	0.848	0.630
Trust6	0.699	0.877	0.638
PurInt1	0.765	0.685	0.876
PurInt2	0.757	0.691	0.887
PurInt3	0.667	0.635	0.879
PurInt4	0.680	0.620	0.881
PurInt5	0.596	0.574	0.845
PurInt6	0.451	0.499	0.768

Notes: Correlations in boldface represent intraconstruct coefficients; those not in boldface are interconstruct coefficients.

Table 4. Alpha Scores for Constructs in the Model

	Alpha
Site quality	0.896
Trust	0.814
Purchase intentions	0.918

ing H1, H2, and H3. The perceived site quality data show that participants reported higher perceived quality scores in the no error group (2.724) than in the error group (2.085) ($F = 20.993, p = 0.000$). Participants in the complete group (2.783) reported higher perceived quality scores than in the incomplete group (2.026) ($F = 29.425, p = 0.000$) and, finally, participants in the good style group reported higher quality scores (2.807) than the poor style group (2.002) ($F = 33.256, p = 0.000$). Table 5 provides the cell statistics for perceived quality of the site for the eight treatments.

Regression was used to test H4 and H5. In testing H4 (perceived quality affects trust), a model with site quality as the independent variable was significant ($F = 310.873, p = 0.000$) and explained 53 percent of the variance in trust in the online store. Perceived quality of the site was found to be a significant predictor of trust in the online store ($\beta = 0.732, t = 17.632, p = 0.000$).

In testing H5 (trust affects intention to purchase), a model with trust as the independent variable was significant ($F = 286.779, p = 0.000$) and explained 51 percent of the variance in intention to purchase from the online store.

Table 6 summarizes the findings, presenting a list of hypotheses along with the results.

Table 5. Cell Means for Perceived Quality of the Site

Treatment	Mean	Standard deviation
CNG (complete/no error/good style)	4.044	1.117
CEG (complete/error/good style)	2.860	1.550
CNP (complete/no error/poor style)	2.382	1.205
CEP (complete/error/poor style)	1.846	0.992
ING (incomplete/no error/good style)	2.272	0.926
IEG (incomplete/error/good style)	2.052	1.028
INP (incomplete/no error/poor style)	2.199	1.354
IEP (incomplete/error/poor style)	1.581	0.906

Table 6. Summary of Findings

Hypothesis	Expectation	Result
H1	Perceived site quality: good style > poor style	Supported
H2	Perceived site quality: complete > incomplete	Supported
H3	Perceived site quality: no errors > language errors	Supported
H4	Perceived site quality as an antecedent of trust	Supported
H5	Trust as an antecedent of intention to purchase	Supported

Exploratory Analysis: Actual Flaw Versus Perception of Flaws

In addition to the analysis presented above, we also investigated whether the perception of a flaw rather than an actual flaw more strongly influences the users' perception of quality of the Web site. Perception has been defined as the process of selecting, organizing, and interpreting our sensations [53]. Most often, perception requires attention. However, in some cases, unattended stimuli can have subtle effects. In this section, we investigate whether the perception of the flaws mediates the relationship between the flaws and the users' perception of quality.

Participants were presented with three questions for each of the factors (incompleteness, language errors, and style) whose purpose of inclusion was to assess their perception of the flaws present in the Web site. We used dummy variables to describe the three factors, where 0 indicated that the flaw was not present (complete, no error, and good style) and 1 indicated that the flaw was present (incomplete, error, and poor style). In addition to these dummy variables, the perceptions of incompleteness, language errors, and style were captured by the scores on the manipulation checks. These variables were recoded as qualitative variables for each factor in the following manner. To check for consistency with the experimental factors, we defined perceptions of flaws as follows: 1 through 3 were recoded as 1 (low), above 3 but below 5 were recoded as 4 (indeterminate), and 5 through 7 were recoded as 7 (high). For compar-

Table 7. Frequencies of Actual Versus Perceived Flaws

	Consistent with treatment	Indeterminate	Inconsistent with treatment
Complete	62	51	23
Incomplete	130	5	1
No error	33	69	34
Error	117	8	11
Good style	52	41	43
Poor style	121	12	3

ing actual and perceived flaws in each condition, only scores of 1 and 7 were used. All other analysis made use of the raw scores.

Table 7 provides a summary of how the recoding procedure matched our treatments, which is only meant to serve as a rough measure of consistency between treatments and perceptions for each flaw. The table illustrates the moderate negative bias of the participants, described earlier.

Participants who were presented with a complete site and perceived it as such reported higher mean scores of perception of quality (3.415) than participants who perceived the site to be incomplete (1.717). Of the 136 who were presented with an incomplete site, 130 perceived it as such and reported a mean score of perception of quality of 1.981. Only one participant who was presented with an incomplete site reported it as complete (mean score of perception of quality: 2.0).

Participants who were presented with a site without language errors and perceived it as such reported higher mean scores of perception of quality (3.523) than participants who perceived the site to include errors (2.162). Participants who were presented with a site with language errors and perceived the errors reported lower mean scores for perceived quality (1.861) than participants who were presented with the Web site with language errors but did not perceive them (3.796). One hundred and seventeen out of a possible 136 who were presented with a site with language errors perceived it as having those errors.

Participants who were presented with a good style site and who perceived it as such reported higher mean scores of perception of quality (3.948) than participants who perceived a poor style site (1.841). Participants presented with a poor style site and perceived it as poor reported lower scores on perceived quality (1.833) than those who did not perceive a poor style (3.417).

We can reach some tentative conclusions from the dummy variable conversion and analysis of means in each of the categories where the extreme impressions agreed with the subjects' treatments. One conclusion is that the flaws we created seem to be potent determinants of subjects' perceptions, and participants focused on them. However, the unflawed treatments seem to be largely "in the eye of the beholder." Although in the flawed sites, most subjects discovered at least one of the errors, ran into the incompleteness that was planted, and reacted harshly to the poor style, other participants did not carry away an aura of "perfection" in the sites without those flaws.

In spite of the potent treatments, the site exhibits characteristics of many similar sites that one might encounter from day to day, where there are obvious language errors, “coming soon” content that promised to provide content at some undetermined date, and graphics that require some extra effort to read the text material on the site.

Returning to the full range of the perceptions rather than the dummy variables, regression was used to test for the effect of the perception of the different flaws on the perceived quality of the site. Perception of poor style, perception of language errors, and perception of incompleteness were all found to be significant and strong predictors of perceived quality of the site ($\beta = -0.435$, $p = 0.000$; $\beta = -0.239$, $p = 0.000$; and $\beta = -0.172$, $p = 0.001$, respectively).

Given the strength of the perceptions for all three flaws on perceived quality, it is important to consider whether perceived quality is based more on the experimental manipulations or more on perceptions. Thus, it is important to conduct further testing to see if the perception constructs are mediators between the experimental manipulations and the perceived quality of the site.

Mediation Test

A test of mediation was used to determine whether the perception of the flaws mediates the relationship between the flaws and the users’ perception of quality. In order to establish mediation, (1) the independent variable must be correlated to the mediator variable, (2) the independent variable must be shown to affect the dependent variable in a regression of the independent variable on the dependent variable, (3) the mediator must affect the dependent variable in a regression of both the independent and the mediator variables on the dependent variable, and (4) the effect of the independent variable on the dependent variable in (3) must be less than in (2) [6]. Thus it is necessary to estimate the three following regression equations: (1) the mediator on the independent variable, (2) the dependent variable on the independent variable, and (3) the dependent variable on both the independent variable and on the mediator.

In general, a mediation test focuses on a single independent variable, a single dependent variable, and a single mediator. However, because we found that some of the factors caused participants to be more sensitized to the other factors, we wanted to make sure that the interdependence did not mask or unduly enhance the mediation. We therefore performed the mediation test in two passes. The first pass provided the traditional treatment, one factor at a time, and the second pass used the richest possible set of independent variables in each regression; that is, we included the other two factors when they appeared as independent variables in a given regression.

Incompleteness as a Mediator

The first step is to perform a regression with perceived completeness (the mediator) as the dependent variable and the completeness factor as the independent variable. The single-factor approach reveals that the incompleteness treatment explains 64.7 percent

of the variation in the potential mediator ($F = 496.802$; 1,271 df; $p = 0.000$). If the other experimental factors are included in the regression, the three factors explain 69.3 percent of the variance in the perception of incompleteness ($F = 201.956$; $p = 0.000$). Both completeness/incompleteness and good style/poor style were found to be significant predictors of the perception of incompleteness ($\beta = 0.805$, $p = 0.000$ and $\beta = 0.206$, $p = 0.000$, respectively). Although actual incompleteness is the strongest predictor of perception of incompleteness, it is nonetheless interesting to note that poor style also significantly affects peoples' perception of incompleteness. Thus, the first hurdle (significant relationship) is passed for the mediation test for incompleteness.

The second step is to perform another regression, this time with the completeness treatment as the independent variable and perceived quality as the dependent variable. The single-variable approach shows that the factor explains 7.6 percent of the results in perceived quality ($F = 23.434$; 1,271 df; $p = 0.000$). The beta weight for incompleteness is -0.283 ($t = -4.841$; $p = 0.000$). The multiple-variable approach uses all three factors to explain 21.8 percent of the variation in perceived quality ($F = 26.248$; 3,271 df; $p = 0.000$). The beta weight for the incompleteness treatment is once again -0.283 ($t = -5.262$; $p = 0.000$).

The third step is to regress both the independent variable and the mediator on perceived quality, then examine the beta weight for the independent variable. The single-variable approach reveals a beta weight of 0.222 ($t = -2.642$; $p = 0.009$). The multiple-variable approach employed all three independent variables and all three mediators and examines the effect on perceived quality. The beta weight of the incompleteness factor is -0.049 ($t = -0.605$, ns).

The fourth step compares the result of the second and third steps, and the standardized beta weights were reduced by adding perceived completeness as a mediator. Therefore, the completeness experimental treatment is mediated by perceived completeness.

Language Errors as a Mediator

The first regression included perceived language errors (the mediator) as the dependent variable and the language errors factor as the independent variable. The single-factor approach reveals that the error treatment explains 38.1 percent of the variation in the potential mediator ($F = 167.581$; 1,271 df; $p = 0.000$). If the other experimental factors are included in the regression, the three factors explain 43.6 percent of the variance in the perception of error ($F = 70.745$; $p = 0.000$). Completeness/incompleteness, good style/poor style, and error/no error were found to be significant predictors of the perception of language errors ($\beta = 0.161$, $p = 0.000$; $\beta = 0.182$, $p = 0.000$; and $\beta = 0.619$, $p = 0.000$, respectively). The presence of language errors is the strongest predictor of perception of errors; poor style and incompleteness, however, also affect this perception. One possible explanation for this interesting effect is that seeing one type of flaw will sensitize subjects to other flaws. Thus, the first hurdle (significant relationship) is passed for the mediation test for language errors.

The second step included a regression with the language error treatment as the independent variable and perceived quality as the dependent variable. The single-variable approach shows that the factor explains 5.3 percent of the results in perceived quality ($F = 16.313$; 1,271 df; $p = 0.000$). The beta weight for language errors is -0.239 ($t = -4.039$; $p = 0.000$). The multiple-variable approach uses all three factors, as before. The beta weight for the language error treatment is again -0.239 ($t = -4.445$; $p = 0.000$).

The third step includes the regression of both candidate variables on perceived quality to find the beta weight for the independent variable. The single-variable approach reveals a beta weight of 0.108 ($t = 1.613$; $p = 0.108$). The multiple-variable approach, with all three independent variables and all three mediators, provides a beta weight of -0.023 for the language error factor ($t = -0.385$; ns).

Comparing the results of the second and third steps, both beta weights were reduced by adding the mediator for language errors. Therefore, the language error experimental treatment is mediated by the perceived level of language errors.

Poor Style as a Mediator

The first regression included perceived style (the mediator) as the dependent variable and the style factor as the independent variable. The single-factor approach reveals that the style treatment explains 37.5 percent of the variation in the potential mediator ($F = 163.638$; 1,271 df; $p = 0.000$). If the other experimental factors are included in the regression, the three factors explain 43.2 percent of the variance in the perception of style ($F = 69.627$; $p = 0.000$). Completeness/incompleteness, good style/poor style, and error/no error were found to be significant predictors of the perception of poor style ($\beta = 0.197$, $p = 0.000$; $\beta = 0.614$, $p = 0.000$; and $\beta = 0.148$, $p = 0.001$, respectively). Thus, the first hurdle (significant relationship) is passed for the mediation test for style.

The second regression included the style treatment as the independent variable and perceived quality as the dependent variable. The single-variable approach shows that the factor explains 4 percent of the results in perceived quality ($F = 168.793$; 1,271 df; $p = 0.000$). The beta weight for style is -0.621 ($t = -13.030$; $p = 0.000$). The multiple-variable approach uses all three factors, as before. The beta weight for the style treatment is -0.435 ($t = -8.12$; $p = 0.000$).

The third step includes the regression of both candidate variables on perceived quality to find the beta weight for the independent variable. The single-variable approach reveals a beta weight of 0.131 ($t = 2.175$; $p = 0.031$). The multiple-variable approach, with all three independent variables and all three mediators, provides a beta weight of -0.239 for the language error factor ($t = 4.725$; $p = 0.000$).

Once again, comparing the results of the second and third steps, both beta weights were reduced by adding the mediator for style. Therefore, the style experimental treatment is mediated by the perceived level of style.

Summary of Mediation Test

The results of the mediation test indicate that (1) each independent variable was correlated with the mediator variable, (2) each independent variable affected the dependent variable, (3) each candidate mediator affected the dependent variable in a regression of both the independent and the mediator variables on the dependent variable, and (4) the effect of the independent variable on the dependent variable in (3) was less than in (2). Therefore, the conditions all hold in the predicted direction, and we conclude that the perception of the flaws mediates the relationship between the main factors and the dependent variable, perceived quality. These results illustrate that it is not the presence of a flaw but, rather, the perception of the flaw that affects users' perception of the site's quality. Table 8 provides a simple evaluation of this phenomenon, where beta coefficients in a regression of all actual and perceived flaws on perceived site quality were higher for perceived flaws than actual flaws. Likewise, in two separate regressions, actual flaws explain 21.8 percent of the variance in perceived site quality, whereas perceived flaws explain 46.1 percent of the variance in perceived site quality.

Actual flaws (whether they exist or not) must be perceived as such to affect the site's perceived quality. See Figure 2 for a revised model.

Exploratory Analysis of Interactions

ALTHOUGH NO INTERACTIONS WERE HYPOTHESIZED *a priori*, exploratory analysis was performed to determine whether any interactions, either second or third order, were significant. When there are interactions, questions are raised about the interpretability of lower-level interactions and main effects. The interpretability problem is most severe when the interactions reverse the direction of effects of a factor for one group compared to another. For example, a medicine could help females but hurt males. The interpretability problem is not as serious if the interactions merely exaggerate or mute the effects for given levels of each factor. In such cases, both the main effects and the interactions are significant.

Our finding of interactions led us to investigate which of two possible patterns were exhibited by our data. The first possibility is that the cells with more flaws could exhibit drastically lower perceived quality than would be expected by summing each individual condition, exaggerating the effects of each condition separately. Such a pattern would suggest that people will tolerate one flaw but not two, or perhaps they will tolerate two but not three. This could be called in colloquial terms a "two (or three) strikes, you're out" pattern.

A second possibility is that the cells with more flaws would yield higher perceived quality than the sum of each main effect would predict, which means that each additional flaw had a muted rather than a "full" effect. Such a "diminishing effects" pattern would suggest that people will notice one flaw, but that the second will seem less important and the third even less important.

Table 8. Regression Coefficients for Predicting Perceived Site Quality by Actual Flaws Versus Perceived Flaws

Hypothesis	Construct	Regression beta coefficients on perceived site quality for	
		Actual flaw	Perceived flaw
H1	Poor style (actual and perceived)	0.069	−0.495 ($p < 0.001$)
H2	Completeness (actual and perceived)	−0.049	−0.125 (ns)
H3	Errors (actual and perceived)	−0.023	−0.220 ($p < 0.001$)

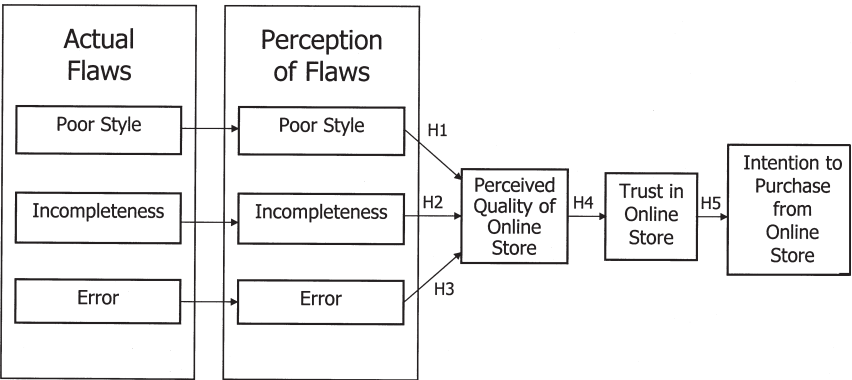


Figure 2. Revised Model

In our sample, one second-order interaction, between incomplete/complete and poor/good style pages, was found to be significant ($p < 0.001$). A third-order interaction, between all three factors, just missed producing a significant effect for perceived quality of the site ($p < 0.063$).

The level of perceived quality in Figure 3 allows us to examine all the interactions graphically. For the second-order interaction, averaging across error conditions, it seems that the “complete” bars on the left have a more severe slope going from good to poor style than the “incomplete” bars on the right. For the marginal third-order interaction, it seems that the largest difference is in moving from the flaw-free condition (the left-most bar in the back row) to most of the other conditions. Therefore, it appears that one flaw appears to damage a user’s impression the most, and further flaws have less impact.

Another way to assess the interactions of the flaws is to examine the level of perceived quality as the number of flaws increases from zero to three. Figure 4 provides a graphical analysis of the progression at each level. It appears that the first flaw

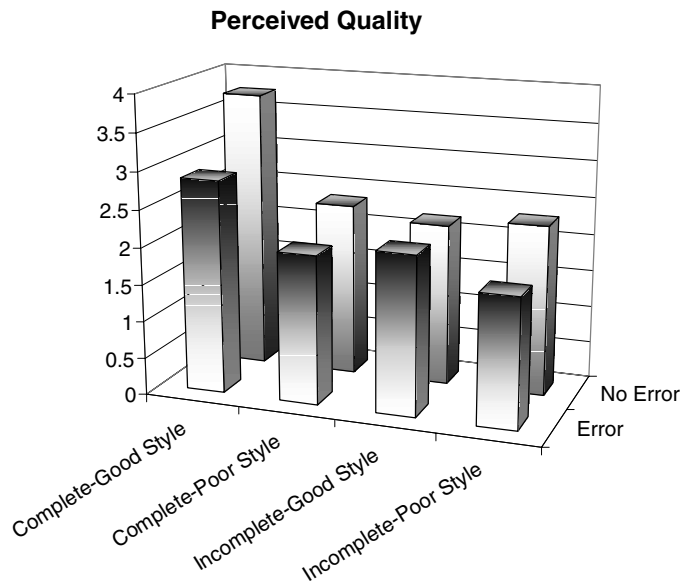


Figure 3. Graphical Analysis of Interactions

involves a decrease of 1.54 units of perceived quality, the next flaw, on average, involves a further difference of 0.47 units, and the following flaw reduces perceived quality by 0.45 units. Thus, it appears that there is indeed a “diminishing effects” model for further flaws, which could be characterized as “one strike, you’re out.”

Discussion

INDEED, THE RESULTS OF THE IMPRESSION FORMATION literature, generally applied to individuals, seem to apply to an online store. Subjects seem to aggregate the flaws that they encounter into an integrated assessment of the store. In our experimental study, higher perceived quality was reported for sites without flaws than sites that contained one or more of three types of flaws: incompleteness, language errors, and poor style.

Each of the flaws examined in this study degraded the users’ perceived quality of the site. Our findings confirm that language errors might make users perceive a site to exhibit poor quality (e.g., [45, 51]). The results also showed that users who were presented with Web sites that were incomplete reported lower perceived quality scores, upholding the warnings of Lynch and Horton [46] and Cotlier [15] to maintain trust and confidence by updating links and avoiding nonloading pictures and “coming soon” pages. Finally, poor style also affected users’ perceived quality of the site. In the experiment, higher perceived quality was reported for users who were presented with good style sites than for those exposed to poor style sites.

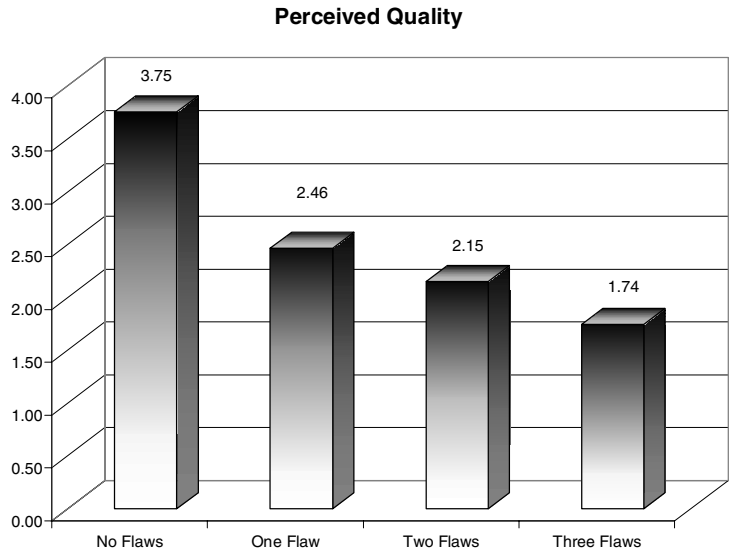


Figure 4. Perceived Quality with an Increasing Number of Flaws

The data also support the balance of the research model. As predicted, a user’s perceived quality of a site is a significant predictor of trust. Also, trust was found to be a significant predictor of purchase intention, as predicted in previous studies.

This research also examined the effects of the perception of poor style, incompleteness, and language errors on users’ perceptions of Web site quality. The perception of poor style affected users’ perception of site quality. More favorable perceptions of quality were reported by users who were presented with good style than for those exposed to poor style. Likewise, more favorable perceptions of quality were reported for sites perceived to be complete than sites that were perceived to be incomplete. Finally, more favorable perceptions of quality were reported for sites perceived to be without errors than sites that were perceived to contain errors.

Some of the participants mistakenly reported the levels of flaws they perceived in the materials. Ideally, all subjects presented with a flawed site would report those flaws, and all subjects presented without those flaws would judge them to be flaw-free. In our study, we found that nearly all subjects correctly reported the flaws that they encountered. However, 23 of 136 subjects judged the complete site to be incomplete, 34 of 136 subjects judged the error-free site to contain errors, and 43 of 136 subjects presented with the good style site judged it to have relatively poor style (see Table 7). Because we did not interview subjects, we cannot state with confidence the reason for these inconsistencies. It is possible that subjects (1) exhibited a negative bias (consistent with the negativity effect in the impression formation literature), (2) were inattentive or careless, (3) “ratcheted up” their expectations when obvious flaws were not present, or (4) were not confident enough of their positive judgments (that is, it is easier to recall seeing something than to recall not seeing something).

These points are likely to be vexing to site designers because users seem to be quite critical, negative, and unforgiving. Such a conclusion requires future study.

On a related point, our results also show that the perception, rather than the actual existence of flaws, affects users' perception of site quality. Whether language errors, incompleteness, or poor style were actually present did not directly result in the users' perception of quality; rather, what triggered their perception of quality was their perception of the flaw. Because it is the perception of flaws on Web sites rather than the actual presence flaws that affects users' quality assessments, it is fundamental for Web stores to pay attention to how the features they present are perceived, as opposed to only following generally accepted Web site design procedures.

An exploratory analysis of interactions seemed to indicate a decreasing marginal impact of each additional flaw. That is, it is the first flaw that is most damaging in terms of decreasing users' perception of quality of a Web site. As moving from being flawless to having one flaw is the most detrimental, it would be advisable for practitioners to exercise much scrutiny before releasing a site.

Limitations

AS WITH ANY EMPIRICAL STUDY, limitations need to be recognized. One limitation of this study is the use of students who were used as a convenience sample. It is expected that there are no systematic differences between students and online shoppers in general for the purposes of testing our model. If there are differences, it is possible that students in a laboratory will have less caution than online shoppers, which would indicate that our results are conservative. A future study can ascertain if students in a laboratory behave like actual shoppers in forming impressions and trusting online stores.

A second limitation is that the site was fictitious, though an attempt was made for it to be representative of a realistic site. A related issue is that it is possible that the site was not of interest to the participants. However, we chose to present a site that would offer at least moderate interest: that of sales of books. Presumably, in an academic setting, students would have at least a small amount of interest in such products given that they spend thousands of dollars buying them for courses.

Finally, the time period covered by this study was rather short in duration. The previous literature about the future power of short-term initial impressions leads us to believe that these findings will hold over time. In a future study, it may be possible to look at how these flaws affect consumers in the long term, rather than only upon an initial visit.

Possible Future Directions

THERE ARE SEVERAL COMPELLING FUTURE DIRECTIONS that the research presented here could adopt. Future research may look at how the attribution of flaws affects consumers' impressions of the site. To what source these flaws are attributed and how the attributions affect users' impressions of the site would shed light on factors de-

serving of the attention of firms. For example, a flaw that is attributed to personal deficiencies (typographical errors) is expected to be judged differently than one that is attributed to external factors (delay due to network traffic). Similarly, formatting errors that are attributed to causes controllable by the designer (for example, insufficient testing performed) may be more harshly judged than formatting problems that are deemed to have been caused by other circumstances beyond the designer's control—for example, due to the use of a low-resolution monitor, the choice of a small browser window, or global settings of text size. We would expect these results to parallel the results of Sears and Jacko [64]: users have kinder reactions to problems that might be caused by external causes than to those obviously caused by the designer.

McKnight et al. [50] argue that studies looking at trust in electronic commerce environments have focused on an individual's disposition to trust, rather than recognize the importance of an individual's disposition to distrust. According to the McKnight et al. study, disposition to distrust, which is characterized by an individual's feelings of fear, insecurity, and nervousness about the Internet, was better able to predict high-risk Web constructs, whereas disposition to trust predicted low-risk Web constructs. Future research may look at how individuals' disposition to trust as well as to distrust affects impressions of Web site quality and intention to purchase.

On a related note, future researchers may wish to investigate the relationship between individuals' level of risk perception (as measured by Jarvenpaa and Tractinsky [35]), their ability to perceive flaws, and their level of trust in the Web site.

A student sample was used in this research to test the experimental conditions. Although the participants came from diverse educational fields and were enrolled in various departments within a university, to what extent the results are generalizable to a wider public is uncertain. Future research may consider how different "Web publics" might be differentially influenced by the various flaws.

Finally, future studies could focus on whether or not an online Web site and a physical bricks-and-mortar store are perceived by users as the same entity. It may be interesting to study whether users carry over their perceptions of a flawed Web site to affect their impression of the store's physical bricks-and-mortar-type of store. It is an open question whether the site and the store are perceived as one entity, and we do not know if or how the perception of one may influence the perception of the other.

As the proportion of online sales to total retail sales continues to climb slowly, researchers and practitioners will have a rare and unprecedented chance to study the impressions of both new and repeat shoppers. This opportunity will provide the fodder for scores of studies of online shopping trust and distrust over the next several years.

NOTES

1. As shorthand, difficulties in the area of ambience and aesthetics will be called "poor style" in the remainder of this paper.

2. Colors can conflict when the resolution and color depth are not high enough to resolve them completely. The conflict can result in illegible, blurred text on some screens and could look perfectly fine on others.

3. That is, we wanted to focus on the impression of the site and avoid issues that could be interpreted in different ways by different participants, leading some to deflect the perception of flaws onto impressions of other outside forces.

4. Interestingly, dead links might be considered by some users as incompleteness, by others as an error, and, finally, by others as a functionality difficulty. Also, multiple shortcomings of a site can cause the same outcomes. For example, dead links can be the result of either an unfinished site or an error.

5. Such slips are sometimes difficult to see and are deliberate substitutions, commonly made by "spammers" and those who masquerade as large firms and attempt to perform identity theft, called "phishing."

6. The following are the manipulation checks: these items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree. For incompleteness: some pictures were not visible, some pages were "under construction," the site had some missing information. For language error: there were typographical errors in the Web site, some words were misspelled in the Web site, there were spelling errors in the Web site. For poor style: overall, the Bookends Web site looked rather unattractive, some of the pages were hard to read, some pages were rather messy.

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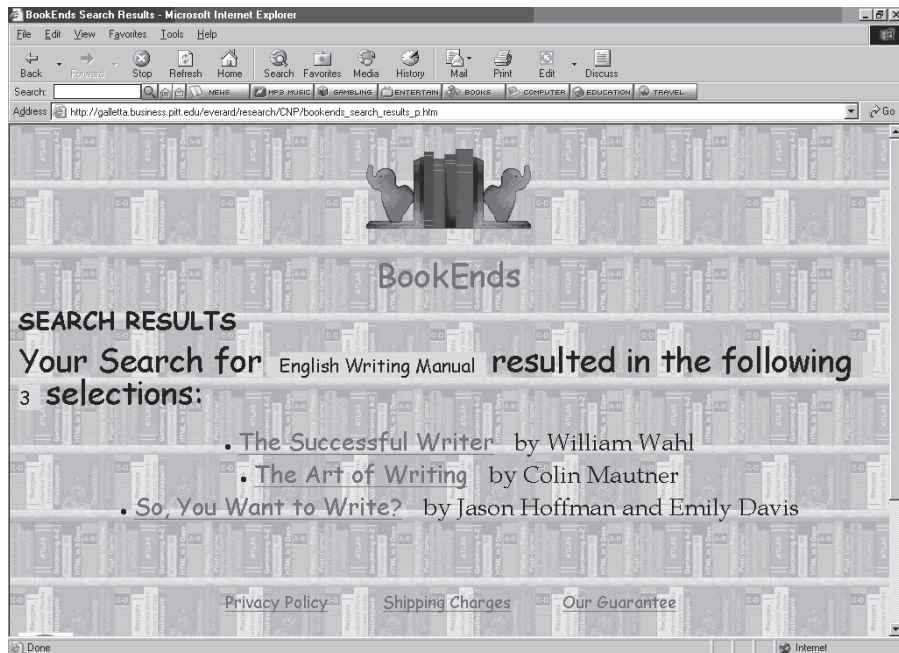
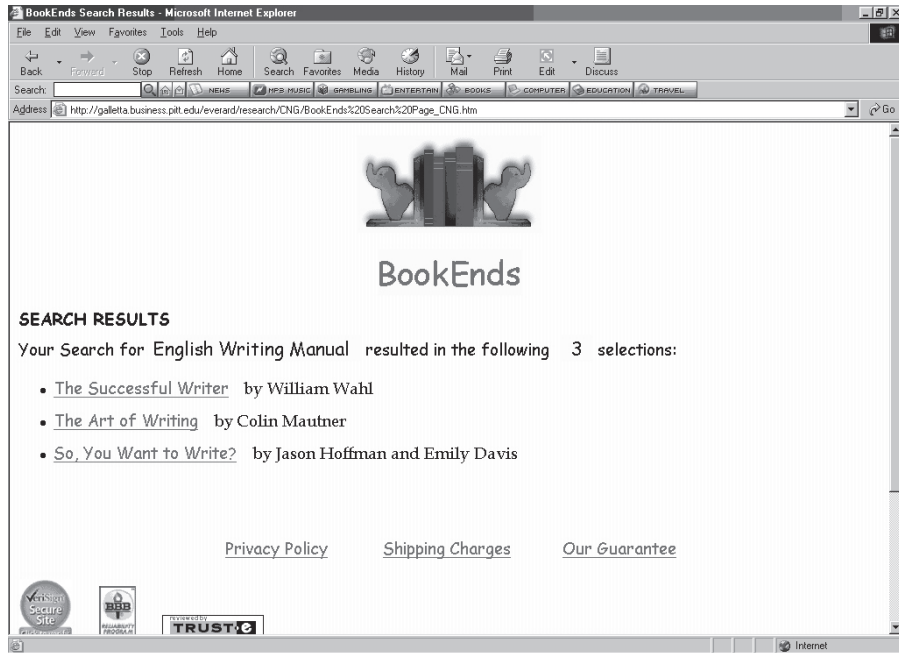
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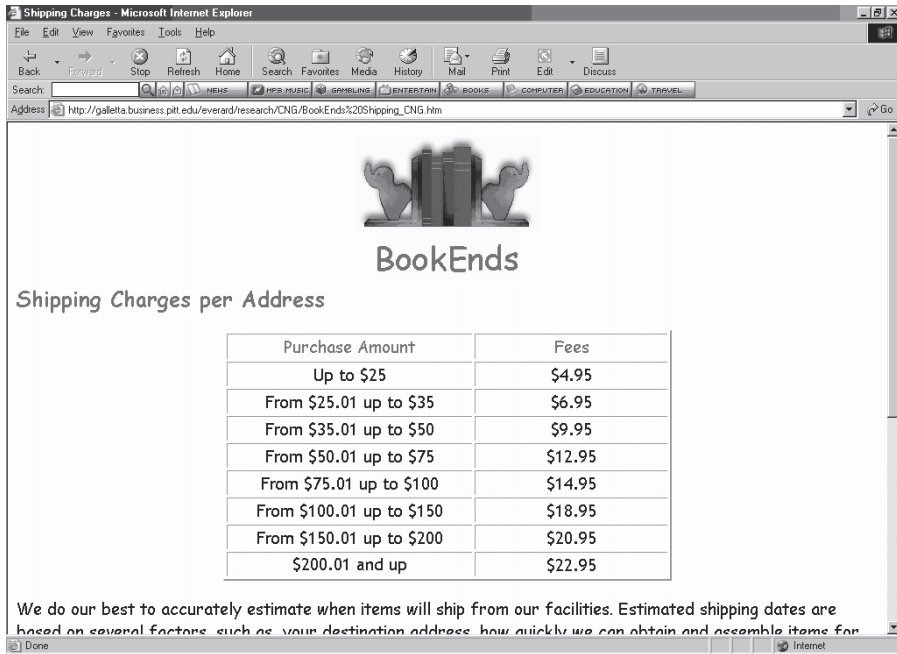
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Appendix A. Sample Screens

Search Page—Good Versus Poor Style (Both Complete and with No Errors)



Shipping Page—Good Versus Poor Style with No Errors



Shipping Charges - Microsoft Internet Explorer

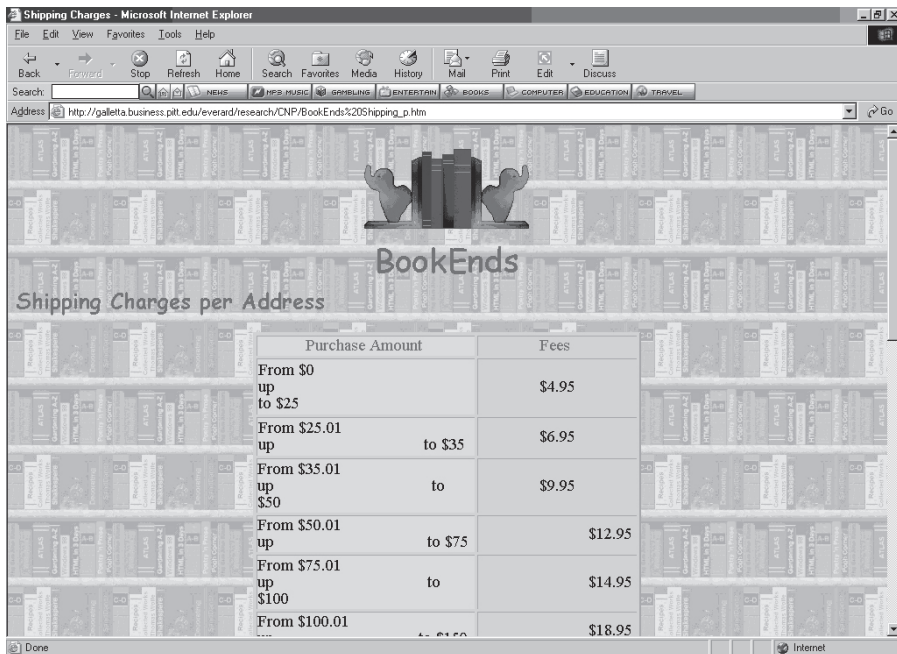
Address: http://galletta.business.pitt.edu/everard/research/CNG/BookEnds%20Shipping_CNG.htm

BookEnds

Shipping Charges per Address

Purchase Amount	Fees
Up to \$25	\$4.95
From \$25.01 up to \$35	\$6.95
From \$35.01 up to \$50	\$9.95
From \$50.01 up to \$75	\$12.95
From \$75.01 up to \$100	\$14.95
From \$100.01 up to \$150	\$18.95
From \$150.01 up to \$200	\$20.95
\$200.01 and up	\$22.95

We do our best to accurately estimate when items will ship from our facilities. Estimated shipping dates are based on several factors, such as your destination address, how quickly we can obtain and assemble items for



Shipping Charges - Microsoft Internet Explorer

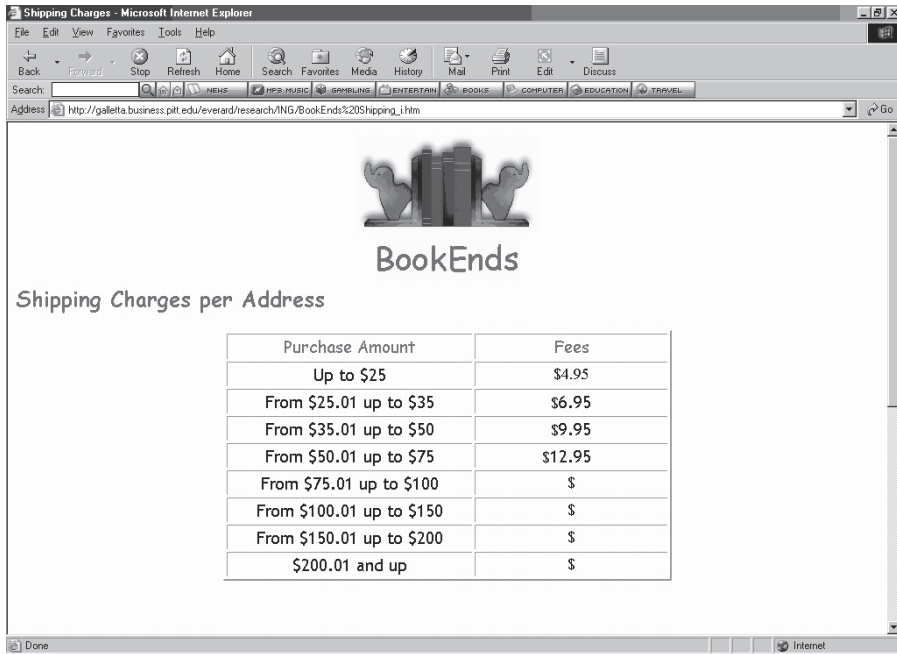
Address: http://galletta.business.pitt.edu/everard/research/CNP/BookEnds%20Shipping_p.htm

BookEnds

Shipping Charges per Address

Purchase Amount	Fees
From \$0 up to \$25	\$4.95
From \$25.01 up to \$35	\$6.95
From \$35.01 up to \$50	\$9.95
From \$50.01 up to \$75	\$12.95
From \$75.01 up to \$100	\$14.95
From \$100.01 up to \$150	\$18.95

Shipping Page—Incomplete with Good Style and No Errors



Shipping Charges - Microsoft Internet Explorer

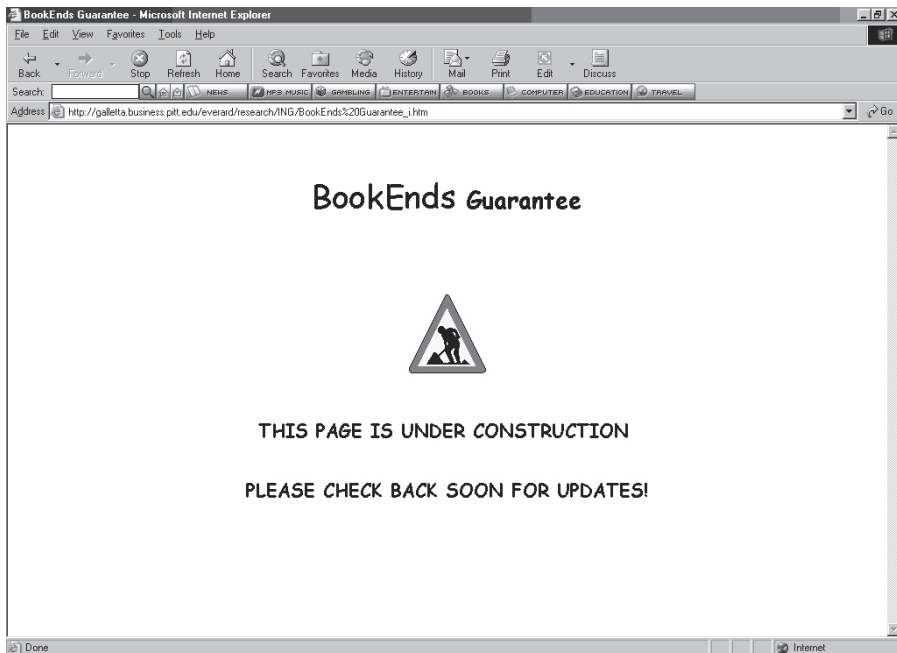
Address: http://galletta.business.pitt.edu/everard/research/ING/BookEnds%20Shipping_i.htm

BookEnds

Shipping Charges per Address

Purchase Amount	Fees
Up to \$25	\$4.95
From \$25.01 up to \$35	\$6.95
From \$35.01 up to \$50	\$9.95
From \$50.01 up to \$75	\$12.95
From \$75.01 up to \$100	\$
From \$100.01 up to \$150	\$
From \$150.01 up to \$200	\$
\$200.01 and up	\$


Guarantee Page—Incomplete with Good Style and No Errors



BookEnds Guarantee - Microsoft Internet Explorer

Address: http://galletta.business.pitt.edu/everard/research/ING/BookEnds%20Guarantee_i.htm

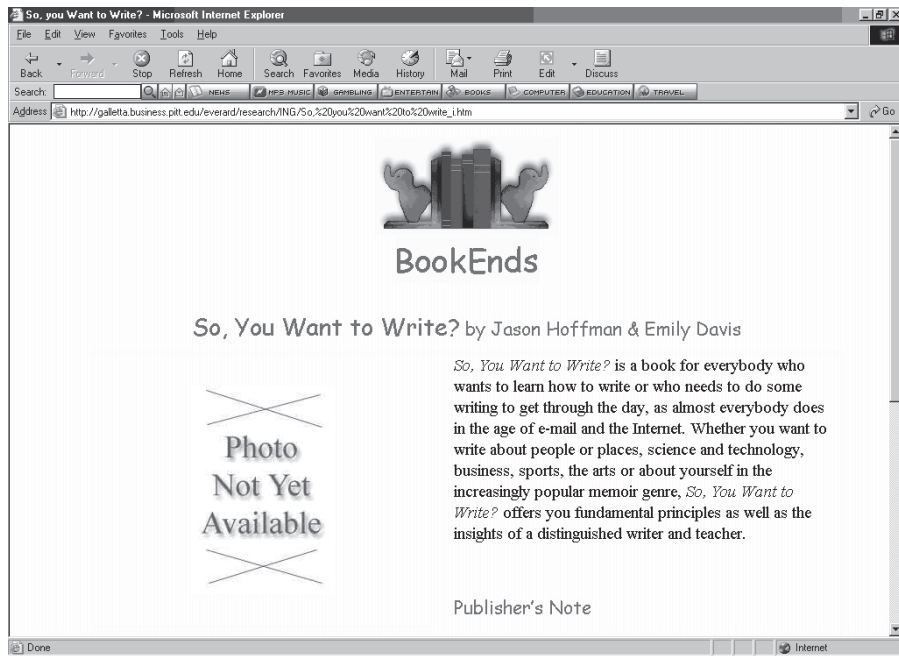
BookEnds Guarantee



THIS PAGE IS UNDER CONSTRUCTION

PLEASE CHECK BACK SOON FOR UPDATES!

Book Page—Incomplete with No Errors and Good Style (Partial Page)



Appendix B. Task

Welcome to BookEnds

BOOKENDS IS AN ONLINE BOOKSTORE offering a wide range of scholarly, business, and general interest books. BookEnds prides itself on its varied selection of best sellers, textbooks, study guides, and reference material. BookEnds carries over 1,000 titles.

The first Web page you are about to see is a result page of a key word search of “English Writing Manual.” As a college student, no matter what discipline you are in, you will need to know how to write properly and correctly. We hope you find BookEnds’ selection of books on writing interesting and useful to browse.

Enjoy your visit to BookEnds’ web site!

Log on to www.pitt.edu/~aeverard/research.htm and follow the directions.

While browsing the BookEnds’ Web site, please answer the following questions.

All questions in this section refer to the book, *So, You Want to Write?*

Please answer the *ten* questions to *the best of your ability*. This is *not* a memory exercise. You may browse the site as you answer the questions.

If you have any questions, or if anything is unclear, please raise your hand and the experimenter will assist you.

1. Do you find the book cover attractive?
 - ☐ Yes ☐ No
 - ☐ Don’t know/can’t tell (explain: _____)
2. Based on the description of the book, people in which field(s) might improve their writing skills? (check all that apply)
 - ☐ Travel ☐ Arts and humanities
 - ☐ Sports ☐ Technology
 - ☐ Biography ☐ Cooking
 - ☐ Sociology ☐ Arts and crafts
 - ☐ Business ☐ Psychology
 - ☐ Don’t know/can’t tell (explain: _____)
3. According to the publisher, would this book serve as a good reference if you need assistance with the presentation of statistical and mathematical data?
 - ☐ Yes ☐ No
 - ☐ Don’t know/can’t tell (explain: _____)
4. According to BookEnds’ Privacy Policy, does the company ever make your mailing address available to other businesses?
 - ☐ Yes ☐ No
 - ☐ Don’t know/can’t tell (explain: _____)

5. If the need arises, how does BookEnds contact its customers? (check all that apply)
- ☐ Telephone
 - ☐ Mail
 - ☐ E-mail
 - ☐ Courier service
 - ☐ Don't know/can't tell (explain: _____)
6. When is the BookEnds Customer Service Department available for customer support?
- Answer: _____
- ☐ Don't know/can't tell (explain: _____)
7. According to the Guarantee Policy, if you return a purchase, what does BookEnds guarantee? (check all that apply)
- ☐ An exchange
 - ☐ A replacement
 - ☐ You cannot return merchandise
 - ☐ A refund
 - ☐ Don't know/can't tell (explain: _____)
8. Under what circumstances does BookEnds reimburse postage? (check all that apply)
- ☐ BookEnds' error
 - ☐ Customer does not like item
 - ☐ Finished reading/no longer useful
 - ☐ Defective item
 - ☐ BookEnds does not under any circumstance reimburse postage
 - ☐ Don't know/can't tell (explain: _____)
9. According to the Shipping Charges table, what would the shipping fees be if you bought only this book?
- Answer: _____
- ☐ Don't know/can't tell (explain: _____)
10. Does your destination address have any influence on the delivery time (number of days) of your order?
- ☐ Yes
 - ☐ No
 - ☐ Don't know/Can't tell (explain: _____)

After completing this questionnaire, go back to the BookEnds Search Results Page and click on the "Survey" button.

Appendix C. Questionnaire Items

Computer Experience (adapted from [54])

THIS INSTRUMENT USES A SEVEN-POINT SCALE, where 1 = strongly low and 7 = strongly high.

Participants are asked to indicate their:

1. Ability to use software packages (e.g., Excel, PowerPoint, etc.).
2. Ability to access data with a computer (e.g., data retrieval, queries, etc.).
3. Ability to develop (design and implement) a database using a generalized database management system (e.g., Access, DB2, etc.).
4. Ability to handle data communications.
5. Ability to use specific application systems (if trained, e.g., in recording transactions).
6. Ability to use office automation systems (e.g., electronic mail, voice mail, text editing, calendar management, etc.).
7. Ability to use operating systems (e.g., moving files around, making backups).
8. Ability to write HTML code and maintain a Web site.
9. Ability to use an HTML editor (e.g., FrontPage, Dreamweaver, GoLive, etc.).

Computer Efficacy [13]

This instrument uses a seven-point scale, where 1 = not at all confident and 7 = totally confident.

Participants are asked to complete the following sentences: "I could complete most jobs using an unfamiliar software package . . ."

1. If there was no one around to tell me what to do as I go.
2. If I had never used a package like it before.
3. If I had only the software manual for reference.
4. If I had seen someone else using it before trying it out myself.
5. If I could call someone for help if I got stuck.
6. If someone else had helped me get started.
7. If I had a lot of time to complete the job for which the software was provided.
8. If I had just the built-in help facility for assistance.
9. If someone showed me how to do it first.
10. If I had used similar packages before this one to do the same job.

Web Experience [47]

This instrument uses a seven-point scale, where 1 = none, 2 = 0–30 minutes, 3 = 30–60 minutes, 4 = 1–2 hours, 5 = 2–4 hours, 6 = 4–8 hours, 7 = 8+ hours.

On average, how much time per week do you spend on each of the following Web activities?

1. Reading newspapers on the Web?
2. Reading and/or posting messages to news groups?
3. Accessing information on the Web about products and services you may buy?
4. Shopping (i.e., actually purchasing something) on the Web?

The following items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

1. I often use electronic mail.
2. I often use a word processor (e.g., Word).
3. I often use a Web browser (e.g., Explorer, Netscape).
4. I often use the Web to gather information about products or services.
5. I have purchased books over the Web.
6. I often purchase products or services over the Web.
7. I often access the Web to conduct research for my course work.
8. I have access to a major credit card that I can use to make purchases.
9. I have convenient access to a computer that I can use to access the Web.
10. I often am required to submit my assignments and school work using the Web.
11. I have used Web-enabled applications in my course work (e.g., Courseweb, Lotus Notes, instructor-designed Web site).

Web Shopping Risk Attitude Items [35]

These items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

1. I would feel safe completing commercial transactions over the Internet. [reverse coded]
2. There is too much uncertainty associated with shopping on the Internet.
3. Compared with other ways of shopping, buying on the Internet would be more risky.

Risk Perception [35]

These items use a seven-point scale; the anchors are indicated in parentheses.

1. How would you characterize the decision of whether to buy a product from this Web retailer? (significant opportunity/significant risk)
2. How would you characterize the decision of whether to buy a product from this Web retailer? (high potential for loss/high potential for gain) [reverse coded]
3. How would you characterize the decision to buy a product from this Web retailer? (very positive situation/very negative situation)

Disposition to Trust [50]

These items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

Faith in humanity—general:

1. In general, people really do care about the well-being of others.
2. The typical person is sincerely concerned about the problems of others.
3. Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.
4. In general, most folks keep their promises.
5. I think people generally try to back up their words with their actions.
6. Most people are honest in their dealings with others.

Faith in humanity—professional:

1. I believe that most professional people do a very good job at their work.
2. Most professionals are very knowledgeable in their chosen field.
3. A large majority of professional people are competent in their area of expertise.

Trusting stance:

1. I usually trust people until they give me a reason not to trust them.
2. I generally give people the benefit of the doubt when I first meet them.
3. My typical approach is to trust new acquaintances until they prove I should not trust them.

Disposition to Distrust [50]

These items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

Suspicion of humanity—general:

1. People are usually out for their own good.
2. People pretend to care more about one another than they really do.
3. Most people inwardly dislike putting themselves out to help other people.
4. Most people would tell a lie if they could gain by it.
5. People do not always hold to the standard of honesty they claim.
6. Most people would cheat on their income tax if they thought they could get away with it.

Perceived Quality of the Online Store's Web Site (adapted from [71])

These items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

Overall site quality:

1. This Web site is of high quality.
2. The likely quality of this Web site is extremely high.
3. This Web site must be of very good quality.
4. This Web site appears to be of very poor quality. [reverse coded]

Trust in the Online Store Items (adapted from [35])

These items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

1. This online store is trustworthy.
2. This online store wants to be known as one who keeps promises and commitments.
3. I trust this online store keeps my best interests in mind.
4. I find it necessary to be cautious with this online store. [reverse coded]
5. This online store has more to lose than to gain by not delivering on its promises.
6. This online store's behavior meets my expectations.

Intention to Purchase from the Online Store (adapted from [71])

These items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

If I needed this book in the near future . . .

1. I would consider purchasing it from this online store.
2. I would purchase it from this online store.
3. I would expect to buy it from this online store.
4. If this book were competitively priced, I would consider buying it from this online store.
5. If this book were significantly less expensive at this online store than at a better-known online merchant, I would consider buying it from this online store.

Manipulation Checks

These items use a seven-point scale, where 1 = strongly disagree and 7 = strongly agree.

For incompleteness:

1. Some pictures were not visible.
2. Some pages were “under construction.”
3. The site had some missing information.

For error:

4. There were typographical errors in the Web site.
5. Some words were misspelled in the Web site.
6. There were spelling errors in the Web site.

For poor style:

7. Overall, the Bookends Web site looked rather unattractive.
8. Some of the pages were hard to read.
9. Some pages were rather messy.

For delay:

10. Some pages were slow to load.
11. Some pages took a long time to appear.
12. Overall, the Web site was slow.

Demographic Questions

1. What is your gender?
2. What is your class standing (freshman, sophomore, junior, senior, graduate)?
3. What is your age?
4. What is your major?
5. What is your nationality?
6. If you have responded to this survey at the request of a professor, please indicate his or her full name: _____
7. Please enter your name if extra credit is given: _____

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