Using conjoint analysis to assess website information utility

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ABSTRACT

This study investigates the relationships between website information content utility and various outcomes of user interactions with retail websites. Although previous research has consistently identified high quality information content as a critical factor of successful e-commerce websites, those studies have not reported how to identify the specific information cues that comprise high-utility information content. In this study, we demonstrate how a new instrument, the Website Information Content Survey, can be used to accurately and reliably assess website information content. We also demonstrate how the MaxDiff statistical method can be used to assess website information content utility. Finally, to investigate the relationships between website information content utility and various outcomes of user-website interactions (perceived information quality, perceived design quality, flow, trust, and risk), a 4x2 full-factorial experiment was performed.

Keywords: conjoint analysis, information utility, MaxDiff

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1 INTRODUCTION

Current high-speed internet technology makes the incremental costs of presenting information content relatively insignificant for sellers. At the same time, modern web search-engines and shop-bot technologies have made finding large amounts of information relatively cheap and easy for consumers. However, because human cognition is limited, consumers cannot be expected to find, organize, and process all information possibly available about even simple product choices [27]. The relative ease of providing information content on the Web presents e-tailers with a paradox- sellers must provide customers with enough information to make decisions, but not so much information as to instigate information overload [28, 14].

In the on-line environment, consumers are largely dependent upon information provided by the seller when making product assessments. A significant body of work has demonstrated that specific website information cues can be identified, and that the effects of these information cues can be meaningfully measured and assessed [18]. For example, Kovar et al. [26] found that the presence of quality assurance seals at a website significantly customer purchase intentions. As a result, a large set of heuristics have proposed the relative importance of various types of information content and how that content might affect use-website interactions. However, studies also demonstrate that the effects of website information content are dependent upon task and context factors [23]. Consequently, the external validity of many website information management heuristics is relatively unknown.

Previous studies have used ordinal measures to assess the relative importance of various website information cues. The purpose of this study is to demonstrate how website information cue utility can be meaningfully measured on an interval scale, and to investigate whether website information content utility has a significant impact on the outcomes of user-website interactions. Towards this end, the Maximum Differential Scaling (MaxDiff) information utility measurement method was used to assess the relative utilities of a set of website information content cues. Once utilities were assessed, a controlled experiment was used to measure and assess whether retail websites with relatively high information content utility result in significantly different outcomes than websites with relatively low information content utility. Ultimately, the results of the MaxDiff activity, website user surveys, and server logs were used to address the following research questions:

(1) How can website information content utility be meaningfully assessed on an interval scale?
(2) What are the relationships between website information utility and user-website interaction outcomes?

The results of this study provide guidance to researchers and e-commerce practitioners who seek to understand how information content influence website effectiveness and profitability.

The rest of this paper is structured as follows: The next section reviews literature on information content, utility, and the outcomes of user-website interactions. The subsequent section presents discusses theory and presents our research hypotheses. The next section presents the experiments conducted to test our hypotheses. The paper concludes with an analysis and discussion of the results of our experiments, a discussion of the study's limitations and opportunities for future research, and the study's implications for theory and practice.

2 LITERATURE REVIEW

This research frames a user-website interaction within the [44] human-computer interaction model. Hence, a user-website interaction refers to interactions between website users (individuals) who visit the websites (technologies) of product or service providers (context) and purchase products or services (task) as a result of their visit. This article focuses on consequential user interactions with transaction-oriented business-to-consumer websites. In this context, web portals and search engines are not considered transaction-oriented websites because their income is obtained from advertisers, not directly from user purchases.

2.1 Website Information Content

According to Resnik and Stern [36], information content is composed of information 'cues', which are the information points that allow consumers to compare and differentiate products. Overwhelmingly, the information cues investigated in the literature refer to discrete, explicit information cues included within a website's copy or media content. In the context of this research, we define information cues as these discrete elements.

Several studies have attempted to identify or catalogue various types of website information content in an attempt to describe a website or to identify the relative importance of various website dimensions (eg: information content, website design, service quality, etc.) One study [37] created a list of 46 web design elements, of which 27 were specific information cues. Their results found that information content (as measured by the presence or absence of various cues) was significantly related to website visitors' purchase intentions and their attitudes about the website. Another study [44] compiled an inventory of 77 website elements and used ordinal measurements to compare the relative importance of the elements across six common web domains. While no specific information cues rated within the top 5 most important elements in any domain, 'Completeness/Comprehensiveness of Info' ranked as the first or second most important element in four of the six domains examined.

A significant number of studies have investigated how specific website information cues influence the outcomes of user-website interactions. For example, one of the most commonly studied types of information cue has been assurance seals, which are cues that attempt to allay website visitor fears by offering third-party assurances of transaction security (e.g., Verisign). In one study [26], website visitors who noticed the seal or who had been exposed to WEBTRUST advertising had more positive expectations of their interaction with the site and stronger intention to make an on-line purchase than did their counterparts. In another study [33], the presence of a third-party assurance seal at a website significantly increased purchasing likelihood and reduced visitors' concerns about privacy and transaction integrity. Other studies have investigated how customer feedback mechanisms influence outcomes. For example, the results of [37] found that five categories of web-site information cues (defined by those authors as promotion, service, external interpersonal, ease of use and navigation, and purchase facilitation) influence visitors' beliefs about both the website and their own self-efficacy. Positive feedback ratings were also associated with higher price premiums for 13 of the 18 products the authors investigated.

In addition to investigating the effects of information content per se, researchers have investigated user perceptions of information content (often conceptualized as "information quality"), and how those perceptions of information content influence other UWI outcomes. Several dimensions of information quality, including perceived accuracy, completeness,

relevance, and timeliness have consistently been reported in the literature [3, 30, 40], and many dimensions of website information quality have been shown to influence various UWI outcomes. For example, one study [11] conceptualized information quality as the credibility, currency, relevance, and sufficiency of information. Their results indicated that adequate, high-quality information content was positively associated with higher levels of pleasure, satisfaction, and trust. Ha [19] found that perceived brand trust was positively associated with the quality of information offered by the site. Agarwal and Venkatesh [1] found a significant positive relationship between website content quality and website visitor satisfaction. Lee, Love and Han [29] found a strong relationship between information quality (understandability, readability, usefulness, clarity, and relevance of information) and website user satisfaction.

2.2 Information Utility

In the simplest sense, utility is a subjective assessment of value, desirability, or satisfaction provided or derived from a good, service, or experience [20]. In the basic additive model of utility [22], overall utility is the sum of the values, or "part-worths", that a user places on each attribute or factor that influences the global assessment of utility, such that:

Utility = part-worth of factor 1 + part-worth of factor 2 + part-worth for factor n

By using statistical methods of assessing information utility, it is possible to assess the individual part-worths of individual information cues and, subsequently, the overall information utility of an information set composed of those cues [20].

As noted above, previous studies of website information content have, effectively, tried to identify high-utility website information cues, as well as the relative utilities of various website information cues. However, no previous studies have attempted to measure utility on an interval scale that would facilitate direct assessments and comparisons of information cue part-worth utilities. This study adds to the body of knowledge by demonstrating how website information content utility can be measured on an interval scale, thus allowing for valid, meaningful assessments and comparisons of information cue value.

3 THEORY AND HYPOTHESES

This study uses the Maximum Differential Scaling technique, otherwise known as "MaxDiff", to measure the relative part-worth utilities of various website information content cues. The study then explores the impact of website information content utility on various outcomes of user-website interactions.

3.1 Measuring Information Content Using Maximum Differential Scaling

MaxDiff is a measurement and scaling technique based on the principles of best-worst conjoint analysis [8]. Conjoint analysis is a decompositional approach in which respondents are presented with various product profile options and asked to make definite choices of preference between the product options. Traditional methods of conjoint analysis focus on intra-attribute comparisons of attribute levels (e.g., preference levels for blue, red, or silver color options), but do not allow for inter-attribute comparisons that would allow managers to assess the relative

importance of attributes (e.g., the relative importance of color options versus gas mileage), because the scaling of the attributes is unique to each attribute [20]. The MaxDiff method permits inter- and intra-attribute scaling by measuring each attribute preference level on a common, interval scale [8].

3.2 Website Quality

The website quality construct borrows strongly from the Technology Acceptance Model [10] in that one of its major objectives is to measure the "usefulness" and "usability" of websites. However, as Loiacono et al. [31] pointed out, website managers and developers require more guidance than usefulness and usability. Hence, perceived website quality models often identify web-specific sub-dimensions of usability and usefulness [5]. For example, perceived website quality models often measure usefulness in terms of information quality, functional quality, information fit-to-task, relative advantage; usefulness is often measured in terms of navigation quality, site organization, etc.

This study examines the possible relationships between information content and two of the most commonly identified dimensions of website quality: information quality and design quality. Information utility and website information quality are both measurements of the value of a website's information content. However, the relationship between information utility and website information quality has not been investigated in the UWI literature. We posit that adding high-utility information to a website should make a website's information content more complete, accurate, timely, and relevant. On the other hand, if low or negative utility information is added to a website, the additional information may serve to distract or confuse visitors, or even lead to information overload [6, 28]. Specifically, we propose the following:

Hypothesis 1a: There is a positive relationship between website information utility and perceived website information quality.

The second major dimension of website quality this study investigates is design quality. We posit that website information content utility can significantly influence several dimensions of website design. The results of at least one study [4] found that websites perceived to be more usable by visitors were also considered more aesthetically pleasing. In addition, we expect that websites that provide high-utility information cues will be less likely to induce users to engage in fruitless searching for relevant content and will, consequently, be perceived as easier to navigate and better organized.

Hypothesis 1b: There is a significant positive relationship between website information utility and perceived website design quality.

3.3 Flow

In its most basic sense, flow is a latent construct that describes immersion within a task [34]. Empirical studies have demonstrated that individuals experiencing flow exhibit several consistent states including arousal, focused attention, affect, and elaboration. Arousal describes a state of heightened awareness and involvement with a task [34]. Focus of attention refers to the selective allocation of cognitive resources [21], accompanied by a heightened differentiation

of relevant from irrelevant stimuli. Affect describes the states of pleasure and enjoyment that occur during the state of flow [34]. Elaboration describes attempts to integrate or compare current circumstances and information to previously encountered experiences or information [39], as well as attempts to cognitively process counterarguments, source derogation, support arguments, or source bolstering [42].

The results of previous research indicate that there is a positive link between perceived website information value and flow. De Wulf et al. [11] found a significant link between information content and perceived pleasure. In general, websites that present high-value information content should increase both the utilitarian and hedonic value of a website [15]. Consequently, this study posits that adding high utility information cues to a website should stimulate user attention and arousal as users are given more useful and interesting information to consider. Users should also experience increased elaboration as they become more aware of website and product attributes and capabilities. Alternatively, users should experience frustration and possibly begin to withdraw from a website interaction when low or negative utility information is added to a website.

Hypothesis 2: There is a significant positive relationship between website information utility and flow.

3.3 Trust

Trust has received considerable attention within the e-commerce domain, especially in regards to its affects on customer behavior on the Internet, where the effects of trust (or mistrust) are heightened due to the relative ease with which vendors can act in an opportunistic manner. In the context of e-commerce, "trust" describes a trustor's willingness to be vulnerable to a trustee in an environment of uncertainty [17]. Several studies have found that consumers' concerns about website trustworthiness are a major obstacle to consumers' willingness to share personal information or engage in on-line transactions [13], and that websites that establish high levels of trust are able to demand higher prices than websites that elicit comparatively low levels of trust [2]. Previous studies also indicate that website information content and perceived information quality can significantly influence perceptions of trust. [2, 41].

This study posits that providing high-utility information content in a well-designed user interface should increase users' perceptions of seller ability. On the contrary, providing low or negative utility information may have the effect of confusing the visitor, who may assume that a seller who is unable to fulfill the users' information needs will be equally unable to fulfill their product or service needs, resulting in lower perceived ability. A visitor could also perceive low-utility information content to be a sign of a seller's carelessness or ambivalence toward customers, deteriorating the customer's perception of the seller's benevolence. Hence, we posit the following:

Hypothesis 3: There is a significant positive relationship between website information utility and trust.

3.4 Risk

Many buyer-seller relationships are characterized by an information asymmetry in which the buyer is dependent upon the seller for product information [32]. The signalling theory of information economics [38] posits that under conditions of information asymmetry, a signal is an action that a seller can take to convey information about unobservable product quality [35] or a service provider's skill level [25]. At retail websites, signals occur as the technical aspects of the website (website design and information content). Information signals are most useful in situations where product or service quality are largely unknown, and can be assessed only after purchase [25]. This study posits that information cues perform as signals about product quality and seller capability, and that informative, high-utility information cues will decrease information asymmetry, buyer uncertainty, and perceived risk regarding the product or service they seek.

Hypothesis 4: There is a significant negative relationship between website information utility and risk.

The hypotheses being investigated in by this study are summarized in figure 1.

4 RESEARCH METHODS AND DESIGN

To address the research questions posed by this article, a three-phase study was conducted. In the first phase, Maximum Difference Scaling was used to calculate the relative utilities of various information cues commonly found on authors' websites. In phase 2, the information cue utilities calculated in phase 1 were used to create four treatments for each of three regional authors' websites and a 4 x 3 full-factorial experiment was performed to investigate the relationships between website information utility and perceived information quality, flow, trust, and risk.

The websites of regional authors (defined as an author who has published at least three books and who sells less than 1,000 books a year) were chosen as the domain for this study. This domain was chosen because the purpose of a regional author's website is typically limited to marketing the author's books. Consequently, advertisements for products other than the author's books are rarely included at these sites. Equally important, unlike some on-line stores that offer hundreds or thousands of products or services, the number of products (books) and the number of cues describing those products are relatively limited. Consequently, it is relatively easy to account for all of the information cues presented within a website, and to limit the effects of information cues that were not of interest to the study. Finally, the consistency of the information presented at regional authors' websites means that the same categories of cues (with different representations for each author) could be presented at each author's websites.

4.1 Identifying Cues

To identify the information cues commonly presented within author websites, 3 subject matter experts (1 graduate student and 2 professors) were asked to evaluate the information content of the websites of each of five regional authors. The final cues identified by the experts are listed in Table 1 (Appendix).

4.2 Phase 1: Determining the Relative Part-Worth Utilities of Specific Information Cues

To implement the MaxDiff assessment method and determine the relative part-worths of the twelve information cues examined in this study, the Sawtooth Software suite was used to create a website that presented fifteen different conjoint evaluation tasks. Each task presented 4 information cues and asked the question, "When deciding whether to purchase a book on-line… if you consider only these 4 features, which is the most important and which is the least important?" Figure 2 shows an example of one such task that was used in this study.

For the conjoint evaluation activity, 263 participants (university staff and graduate students) were recruited. 86 responses were received, and 84 provided usable responses. To increase the quality of the task outcomes, we followed guidelines from Sawtooth Software to ensure the orthogonality of the attributes under study. Orthogonality is a mathematical test of the independence of part-worth estimates. If part-worth estimates are not independent, then the use of an additive utility model is called into question because an additive utility model does not account for interactions between attributes. The minimum number of questions to ask in order to achieve orthogonality is 3(K/k) where K is the number of items total and k is the number of items in each set [8]. Since this survey evaluated twelve items, and presented four items in each set, a minimum of nine questions were required to achieve orthogonality. Our survey asked fifteen questions to ensure the orthogonality of the cues. The average part worth utilities (as well as the upper and lower confidence intervals) of each information cue assessed by the conjoint evaluation task are presented in Table 2 (Appendix). The averages that result from a MaxDiff assessment are relative weights, with the average weights of all the cues assessed by conjoint tasks adding to 100 (difference below represent rounding error). The average scores theoretically represent an interval scale. It should be noted that because all of the author websites included price, and because of its overwhelming influence [37], price information was not manipulated.

4.3 Phase 2: An Investigation of the Relationships Between Information Utility and User-Website Interaction Outcomes

In phase 2, the information cue part-worth utilities that were determined in phase 1 were used to create four versions (treatments) of a website for each of three regional authors' (ie: Sierra, Tango, Romeo), and a 4 x 3 full-factorial experiment was performed to investigate the relationships between website information utility and perceived information quality, flow, trust, and risk.

4.3.1 Cue Validation

To ensure that each specific cue was representative of the cue category it was intended to represent, two subject matter experts (different individuals from the subject matter experts who participated in other study phases) participated in a cue sort activity that was administered through a website designed for the task. At the website, each of the information cues was presented, and the experts were asked to determine which type of information cue the specific cue represented. No cue was found to be consistently un-reliable.

4.3.2 Cue Groupings

Based upon the results of the information utility scores calculated in phase two, three clusters of information cues were identified (high-utility, medium-utility, and low-utility cues). These groups were clustered because the scores for each of the three highest-utility cues ("samples of the book (text)", "book reviews", and "book synopsis") received scores of eighteen or above, and together these cues accounted for 56.03 of the possible 100 points allotted. The lowest score in this group (18.38 for "Book Synopsis (description/summary of each book the author has written)) was almost twice that of the highest score in the middle-utility group (9.70 for "Samples of the book (audio that you can listen to)). Together, the four cues in the middle-utility group accounted for 41.07 of the possible 100 points. The lowest score for the middle-utility group (6.69 for "A biography of the author") was more than six times that of the highest-ranking cue in the lowest category (0.98 for "The name of the publisher of the author's books"). The lowest-scoring information set accounted for only 2.90 of the possible 100 points.

Based on input (requests for various fonts and design) from the participating regional authors, three websites (one for each author) were created. Eleven information cues were appropriately customized for each author's experimental website (e.g., author names, book lists, book descriptions, author biographies, etc.). The prices listed within the experimental websites were the prices available from Amazon.com or, if a particular book was not available from Amazon.com, the price available from the book publisher's website was listed. Finally, four different versions (treatments) of each of the three author's website were created. The four treatments presented information sets intended to represent different levels of utility (Max utility, High-medium utility, high-low utility, or high utility). The information cues contained within each treatment are listed in Table 3 (Appendix). Examples of the maximum utility and high utility treatments for the author Romeo are shown in figures 3 and 4.

4.3.3 Survey Design

The items of previously developed surveys were analyzed and items appropriate for measuring information quality, design quality, flow, trust, and risk were modified to reflect the domain and outcomes investigated in this study. The twenty-three items intended to measure outcomes were constructed as "strongly agree - strongly disagree" statements on a seven-point Likert scale. The final survey items that were used to measure information quality, website design, flow, trust, and risk, as well as the codes used to identify these questions, are shown in Table 4 (Appendix).

4.3.4 Experimental Procedure

To recruit participants for the experiment, invitations to participate were posted to poetry and literature FaceBook fan group pages. Additionally, invitations were sent to 1,834 staff members of public libraries (both local libraries and public university libraries). Characteristics of the phase three respondents are listed in Table 5 (Appendix).

Survey participants who chose to participate in the study were asked to visit a website and to browse the site as if they were considering purchasing a book from the website. The version of the website an individual viewed (author and high, high-medium, high-low, or high-medium-low utility) was assigned at random by a computer program. Once visitors finished browsing their assigned site, they were asked to complete an on-line survey intended to record

their impressions of the website. Participants chose the computer and the setting where they viewed the sites and completed the survey.

For a MANOVA analysis, a sample size of at least 20 samples for each treatment being investigated is recommended [20]. Hence, the minimum number of respondents needed for this study was 240. Ultimately, we received 349 usable responses, and each treatment received a minimum of 20 responses.

5 ANALYSIS OF RESULTS

5.1 MANOVA Analysis

A MANOVA analysis was conducted to examine the possible effects of the independent variables information utility and author on the dependent variables measured by the survey questions. Results of the MANOVA indicated that, in general, the effects of utility and author on the outcomes of interest were significant ($p < 0.05$) for only very few sets of survey questions.

5.2 ANOVA Analysis

In addition to MANOVA, separate ANOVA analyses were conducted to investigate the effects of "information utility" and "author" on each dependent variable. Results of the ANOVA indicated that visitors' answers to the questions IQ3, IQ5, IQ13, WD2, WD3, WD6, T1, and F1 were significantly influenced by which authors' website survey participants visited. The results indicate that the variable "author" had a strong main effect on survey participants' reactions to the website they visited, as well as a strong moderating effect on how information utility affected survey participants' reactions to the site. The results are shown in Table 6.

To further investigate how the authors' websites influenced survey outcomes, separate ANOVAs were conducted to compare the four experimental websites for each of the three authors. The results of the ANOVA for authors Sierra and Romeo did not indicate a significant relationship between information utility and survey outcomes (ie: information quality, website design, flow, trust, or risk). However, the results of the ANOVA for author Tango indicated that information utility significantly influenced participant answers for information quality and website design (ie: questions IQ3, IQ4, IQ5, IQ10, WD3, WD5, WD6, and IQ13.) The mean scores for these questions are shown in Table 7 (Appendix).

6 DISCUSSION

Overall, our analysis of the results indicate that study participants who visited websites with relatively high information utility did not have significantly better reactions to the site than did participants who visited websites with relatively low information utility.

6.1. Hypothesis 1

In general, the results of the survey conducted for phase two did not find a significant relationship between calculated website information utility and visitors' perceptions of information quality. Consequently, hypothesis 1a was not supported. Despite this, we do consider some outcomes of the analysis to be noteworthy.

The results of the survey indicate that there were effectively no significant differences between survey participants' responses to the experimental websites of the authors Sierra and Romeo. Specifically, for author Sierra, ANOVA analysis of survey responses indicated that there were no significant ($p <= 0.05$) differences in the information quality of any of the treatments. For the author Romeo, participant answers to one survey question about information content ("There was a lot of information at this site") exhibited significant differences between treatments. In this case, the mean scores for the high and high_low treatments were very close to one another (means scores of 4.464 and 4.370, respectively) and were significantly different ($p <= 0.05$) from the mean scores of the high_medium and max treatments (mean scores of 5.708 and 5.609, respectively).

Unlike the results for authors Sierra and Romeo, a weak trend did occur among the mean scores of certain survey questions about information quality for author Tango. Specifically, mean scores for the survey questions "The information in this website was not presented clearly", "At this website, one can find details about products and/or services", "The amount of information at this website is appropriate for the website's purpose", and "There is a lot of information at this website") were significantly ($p <= 0.05$) lower for the hi information utility version of the website than were the mean scores for the other versions (high_low, high_medium, and max) of the site. These comparisons are noted in Table 8 (Appendix).

Hypothesis 1b posited that a significant relationship would exist between a website's calculated information utility and visitors' perceptions of that website's design quality. In general, the results of the survey conducted for phase two did not find a significant relationship between calculated website information utility and visitors' perceptions of design quality. Consequently, hypothesis 1b was not supported. Specifically, at two authors' websites (Sierra and Romeo), there were no significant differences in the design quality of any of the treatments. However, at the Tango website, for two questions about design quality ("The website's design is visually pleasing", "The layout of the website is annoying") the mean scores for the high_low, high_medium, and max treatments were not significantly different from one another, but were significantly different ($p <= 0.05$) from the mean score for the hi treatment. As with hypothesis 1a, although the mean scores of these few questions do show significant results between treatment variations, they do not demonstrate a significant relationship between information utility and perceptions of design quality.

Overall, the mean scores and lower bounds of user responses to questions about website information quality and design quality were above the mid-point score of 4 but below 5.5 (on a 7-point scale). Consequently, based upon these scores, we infer that neither the information content nor the design of the websites were negatively received by survey participants. On the other hand, the scores are closer to a "neutral" judgment (a score of 4) than they are to a "high" judgment (a score of 7), indicating that the sites did not elicit satisfaction or delight from visitors. Ultimately, these results indicate that visitors were generally ambivalent to the content and design of the experimental websites they visited.

6.2. Hypothesis 2

The results of the study did not find evidence of a significant relationship between calculated website information utility and flow. Survey participant responses to the survey question "Visiting this website was fun" were at or below the neutral score of four, indicating that survey participants did not find the website fun to visit. As previously noted, although the

scores for website design and information quality were not exceptionally high, they were above the neutral threshold score of four, and they were not so low as to imply that users were upset by any treatment's design or content. In the absence of a clear dislike for the site, we suspect that the reasons for the low flow scores are due to the fact that visitors to the author's website did not find information content or design factors that they considered to be entertaining or interesting, resulting in limited levels of arousal, attention, and elaboration.

6.3. Hypotheses 3 and 4

The results of the statistical analysis performed for this study found no relationships between information utility and measured levels of user trust or risk. Consequently, hypotheses 4 and 5 were not supported. Interestingly, the mean scores for the survey question "My interaction with this website was risky" were between 2 and 3 for each of the twelve treatments, indicating that users generally perceived very low risk. Alternatively, the mean scores for the question "I trust this website" were between 4 and 5 for all but one treatment (the max utility treatment of the Romeo website, which had a mean score of 5.348), and none of the treatments exhibited significantly different mean scores. These results indicate that survey participants had relatively low perceptions of risk while visiting the site, but did not form strong opinions of trust or distrust during their visits.

6.4. Effects of Information Quantity

To examine whether the amount of information presented by the experimental websites influenced survey responses, the mean scores for high and high_low treatments were compared to scores for high_medium and max treatments of each author's websie. Theoretically, the high_low and high_medium treatments presented the same quantity of information (the same number of cues), but the cues presented by these treatments offer very different levels of information utility (calculated utility of the high_low treatment = 58.93, calculated utility of the high_medium treatment = 97.1). If the differences in the mean scores were due to the site's information utility, the mean scores for the hi and high_low treatments (mean scores 3.833 and 5.538, respectively) should not be significantly different from one another because these treatments have very similar calculated information utility scores (56.03 and 58.93, respectively). At the same time, the mean scores for the hi and high_low treatments should be significantly different than the mean score for the high_medium treatment. Ultimately, if differences between the mean survey scores of various websites are caused by differing amounts of information utility, this should be evidenced by significant survey mean score differences between the websites with the largest differences between levels of calculated website utility (ie, the high_low and high_medium versions of a website). Conversely, if differences between the mean survey scores of various websites are caused by differing quantities of website information content (different numbers of cues), this should be evidenced by significant survey mean score differences between the websites with the largest differences between levels of information quantity (ie, the hi and high_low versions of a website).

For the Sierra and Tango websites, our analysis found no instances where the mean score of a study question was significantly lower for the high_low version of the site than for the high_medium or max treatments. However, for author Romeo's treatments, participant answers to one survey question about information content (ie: IQ13, "There was a lot of information at

this site") did exhibit significant significant differences between the treatments. These comparisons are noted in Table 9 (Appendix).

In this case, the mean scores for the treatments that had hi and high_low levels of calculated information utility (56.03 and 58.93, respectively) exhibited very similar survey scores (4.464 and 4.370, respectively), and the scores for the treatments with high_medium and max levels of calculated information utility (97.1 and 100, respectively) also exhibited very similar survey scores (5.708 and 5.609, respectively). However, the scores for the group consisting of the high and high_low utility treatments were significantly different from the scores of the group consisting of the high_medium and max information utility treatments, indicating that survey respondents did perceive significant differences between websites that presented different levels of information utility. The perceived differences in information quantities apparently did not appear to influence other outcomes, since no other survey questions exhibited a similar trend of significantly higher scores for high-utility versus low-utility websites.

6.5 Overall Summary of Hypotheses

In summary, analysis of the survey results implies that increasing information quantity did not have a significant overall positive or negative impact on user perceptions of the high_low, high_medium, or max versions of the Tango website. For two of the three authors investigated, information utility was not found to significantly influence website users' perceptions of information quality, design quality, engagement, trust, or risk. This is in agreement with previous work [12] which also did not find a significant relationship between website information quantity and website popularity. However, for one author (Tango), analysis indicated that for some questions about information quality and design quality, there was a significant difference between treatments with the lowest information utility and treatments with more than the minimum information utility, and that adding any information beyond the minimum amount (regardless of the quantity or utility of the information) increased the acceptability of the information content. This supports previous findings [37] in which information cues presented within an experimental website treatments were significantly related to website visitors' purchase intentions and the users' attitudes about the website.

The lack of agreement in the findings for the different authors for this study and the lack of agreement in studies performed by prior researchers [12, 37] suggests that other factors besides information content or information utility may be influencing users perceptions of the information content available at websites. Thus, the results of this study do not necessarily imply that information utility cannot be useful when creating websites and predicting user reactions to those sites, or that it should not be considered in future research. Instead, the results of this study suggest the need for additional research about how users interact with websites in both real and experimental situations.

6.6 Post Hoc Analysis

To look for possible explanations for this study's results, web server logs were examined to see if the user-website interactions per se could explain why information utility did not affect the website interaction outcomes measured by this study. Previous investigations have used total time at a website and total pages visited as indicators of a visitor's website interaction experience [7, 9]. Thus, the study authors analyzed 50 visits to the four experimental Tango websites and 30

visits to the actual Tango website (the site posted for the author). A typical participant in the experiment visited the site for less than two minutes and visited between 2 and 5 pages. It was not uncommon for participants in the experiment to spend less than a minute at the website. Of the 30 visitors to the actual Tango website, all but three viewed the landing page and then exited the site (as was evidenced by the fact that their IP did not request any other pages from the server). As previously mentioned, the results of the survey did not find the website design to be significantly unacceptable. Hence, the authors assume that visitors performed a cursory overview of the website and quickly decided that the subject (books and authors) or the authors' genres (poetry and fiction) were not of interest to them.

7 CONCLUSION

Despite paying careful attention to this research project's design, execution, and analysis, the study has significant limitations. Perhaps the most significant limitation of this study is the limited external validity of its overall findings, especially since the results do not agree with the results of previous studies of information utility that have demonstrated relationships between information utility and consumer responses to shopping experiences [24, 6]. By investigating the effects of information content at three different websites within the same domain, we were able to very effectively examine the effects of not only website information content, but also the different website designs presented at each author's website. Overall, the fact that no website's design was found to be overwhelmingly different (better or worse) than the other websites examined in the study reduce the chance that the study's results were caused by the design qualities of a single website. However, there is no evidence to suggest that the results of this study do or should apply to other domains, especially in light of the work of [44], who demonstrated that different website cues and dimensions are often given very different levels of importance across different website domains.

Although the results of this study were largely inconclusive, future studies may be able to apply use the website information content utility construct to answer questions beyond those addressed by this study. For example, the ability to measure website information cue utility may facilitate new investigations of how information content exacerbates or alleviates website visitors' perceptions of asymmetry. This study also demonstrates the ability to move away from website engineering decisions based on heuristics and towards data-driven website engineering decisions. Increasingly, free analytical tools such as Google Website Optimizer and relatively low-cost and easy to implement software tools such as the Sawtooth Software Suite are making available market research techniques that were, until quite recently, only available to companies willing to make large investments of time and capital in research and development. The rapidly decreasing costs of powerful, easy-to-implement and interpret website analysis tools make applied empirical research much more timely and economical than even a few years ago. The increasing ability to cheaply and purposefully apply empirically-based website design decisions may enable companies to enter markets or marketing channels that were previously considered too costly, too competitive, or otherwise closed.

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Appendix

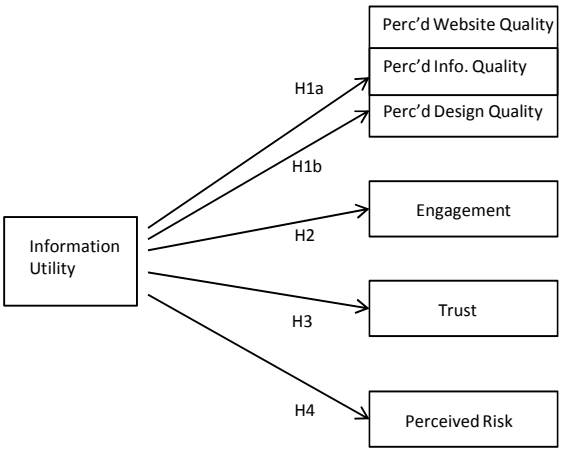

Figure 1. Hypothesized information utility and user-website interaction outcomes model

When deciding whether to purchase a book on-line...

If you consider **only** these 4 features, which is the **most** important and which is the **least** important?

Most Important		Least Important
○	A list of stores or websites where you can purchase the book	○
○	Upcoming readings by the author (locations and times)	○
○	Book synopsis (description/summary of each book the author has written)	○
○	Samples of the book (text that you can read)	○

Click the 'Next' button to continue...

Next

Figure 2. A screenshot of a conjoint task presented by a web application.

Table 1
The common cues manipulated at the experimental websites.

Author website information cues
A picture of the author
Book reviews
A biography of the author (100 to 300 words)
Book synopsis
Samples of the book (text that you can read)
Samples of the book (audio that you can listen to)
Upcoming readings/appearances by the author (location, time)
Awards for the book or the author
The name of the publisher(s) of the author's books
A list of stores or websites where the book can be purchased
The author's contact information
A picture of the book cover
Price

Table 2: Results of the MaxDiff investigation of cue utility

Cue	**Average**	**95% Lower**	**95% Upper**
Samples of the book (text that you can read)	19.12	18.29	19.96
Book reviews	18.53	17.76	19.3
Book synopsis (description/summary of each book the author has written)	18.38	17.48	19.29
Samples of the book (audio that you can listen to)	9.7	8.15	11.25
A list of stores or websites where you can purchase the book	9.19	7.68	10.71
Awards for the book or the author	7.98	6.78	9.19
A picture of the book cover	7.51	6.15	8.86
A biography of the author (100 to 300 words)	6.69	5.86	7.52
The name of the publisher of the author's books	0.98	0.35	1.6
A picture of the author	0.87	0.49	1.24
Upcoming readings by the author (locations and times)	0.75	0.48	1.02
The author's contact information (e-mail and/or phone number)	0.3	0.17	0.43

Table 3
The website information cues included in each experimental treatment

Treatment version	**Cues Included**	**Part-worth utility**	**Calculated utility of treatment**
Maximum utility	Samples of the book (text)	19.12	100
	Book reviews	18.53	
	Book synopsis	18.38	
	Samples of the book (audio)	9.7	
	Awards for the book or the author	7.98	
	A picture of the book cover	7.51	

	A biography of the author	6.69	
	The name of the publisher of the author's books	0.98	
	A picture of the author	0.87	
	Upcoming readings by the author	0.75	
	The author's contact information	0.3	
High-med utility	Samples of the book (text)	19.12	97.1
	Book reviews	18.53	
	Book synopsis	18.38	
	Samples of the book (audio)	9.7	
	Awards for the book or the author	7.98	
	A picture of the book cover	7.51	
	A biography of the author	6.69	
High-low utility	Samples of the book (text)	19.12	58.93
	Book reviews	18.53	
	Book synopsis	18.38	
	The name of the publisher of the author's books	0.98	
	A picture of the author	0.87	
	Upcoming readings by the author	0.75	
	The author's contact information	0.3	
High utility	Samples of the book (text)	19.12	56.03
	Book reviews	18.53	
	Book synopsis	18.38	

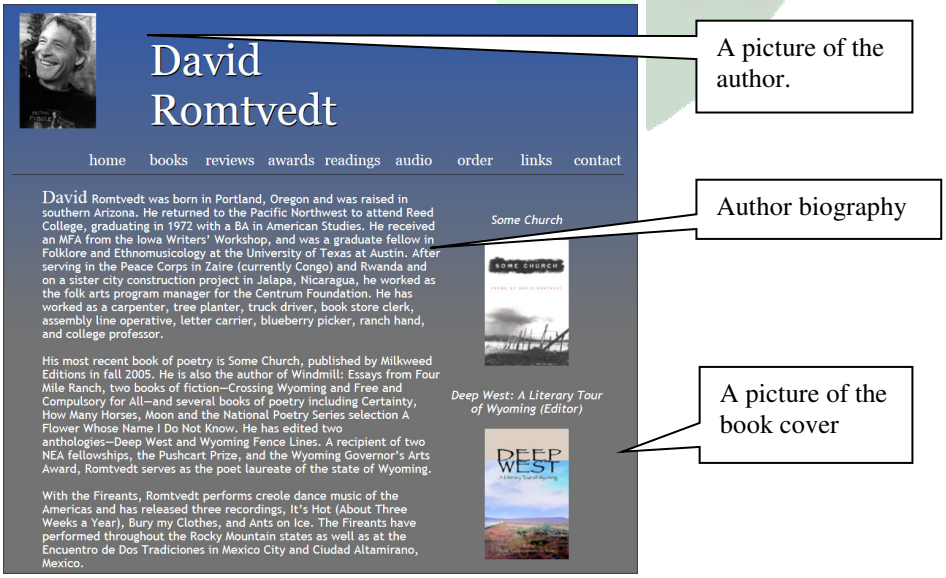

Figure 3. Screenshot of Romeo's "Maximum Utility" website treatment.

Figure 4. Screenshot of Romeo's "High Utility" website treatment.

Table 4
Survey items used to measure information quality, website design, flow, trust, and risk.

Construct	**Item**
Information Quality	IQ1: The information in the website is pretty much what I need when considering whether or not to purchase a book from this website.
	IQ2: The content of this website is accurate.
	IQ3: The information in this website is not presented clearly.
	IQ4: The information in this website is sufficiently detailed.
	IQ5: At this website, one can find details about products and/or services.
	IQ6: The information at this website is not precise.
	IQ7: This website's information is easy to understand.
	IQ8: The information in this website is to the point.
	IQ9: I can rely on the information in this website.
	IQ10: The amount of information at this website is appropriate for the website's purpose.
	IQ11: The information in this website does not help me at all.
	IQ12: The content of this website is not complete.
	IQ13: There is a lot of information at this website.
Website Design	WD1: This website's use of fonts and colors is pleasing.
	WD2: This website's design is innovative.
	WD3: This website's design is visually pleasing.
	WD4: The information within this website is easy to read.
	WD5: The layout of this website is annoying.
	WD6: This website looks organized.
Flow	F1: Visiting this website was fun.
	F2: This website held my attention.
Trust	T1: I trust this website.
Risk	R1: My interaction with this website was risky.

Table 5
Experiment participant characteristics

Item	Value	Frequency	Percent
Gender (M/F)	Male	166	48.1%
	Female	179	51.9%
Age	18-22	81	23.4%
	23-29	67	19.4%
	30-39	84	24.3%
	40-49	34	9.8%
	50-59	65	18.8%
	60-89	15	4.3%
About how long have you been using the internet?	0-2 months	3	0.9%
	3-6 months	0	0.0%
	7-12 months	1	0.3%
	more than 1 yr.	342	98.8%
During the last 2 months, about how many hours a week have you spent online?	Less than 1 hour	2	0.6%
	1-3 hours	25	7.2%
	4-10 hours	80	23.1%
	More than 10 hours	348	69.1%
About how long have you been buying online?	0-2 months	15	4.4%
	3-6 months	9	2.6%
	7-12 moths	12	3.5%
	More than 1 year	308	89.5%
In the past 2 years, approximately how many purchases have you made online?	None- zero	4	1.1%
	1 to 3	35	10.2%
	4 to 10	101	29.5%
	More than 10	203	59.2%
In the past 2 years, approximately how many times have you purchased books, CD's, or DVD's online?	None- zero	47	13.6%
	1 to 3	99	28.6%
	4 to 10	116	33.5%
	More than 10	84	24.3%
Please indicate the highest level of education you have completed.	Some high school, no diploma	1	0.3%
	High school graduate, GED or equivalent	16	4.7%
	Professional degree	109	32.0%
	Some college, no degree	71	20.8%
	Bachelor's degree	74	21.7%
	Master's degree	13	3.8%
	Doctorate degree	57	16.7%

Table 6
Summaries of the ANOVA results for each of the survey questions that measure information quality, website design, flow, trust, and risk.

Construct	Question	Factor	df	Mean Square	F	Sig.
Information Quality	IQ1	Author	2	0.998	0.343	0.71
		Utility	3	0.355	0.122	0.947
		Author * Utility	6	6.074	2.086	0.054
	IQ2	Author	2	0.178	0.11	0.895
		Utility	3	0.755	0.464	0.708
		Author * Utility	6	1.355	0.834	0.545
	IQ3	Author	2	9.05	3.056	0.048
		Utility	3	2.924	0.987	0.399
		Author * Utility	6	3.927	1.326	0.245
	IQ4	Author	2	4.95	1.875	0.155
		Utility	3	2.891	1.095	0.351
		Author * Utility	6	5.194	1.967	0.07
	IQ5	Author	2	11.82	3.823	0.023
		Utility	3	3.034	0.981	0.402
		Author * Utility	6	7.006	2.266	0.037
	IQ6	Author	2	4.626	1.921	0.148
		Utility	3	2.086	0.866	0.459
		Author * Utility	6	2.345	0.974	0.443
	IQ7	Author	2	6.093	2.935	0.054
		Utility	3	4.228	2.037	0.109
		Author * Utility	6	0.84	0.405	0.876
	IQ8	Author	2	0.049	0.021	0.979
		Utility	3	4.518	1.943	0.122
		Author * Utility	6	1.612	0.693	0.655
	IQ9	Author	2	3.465	1.644	0.195
		Utility	3	1.904	0.903	0.44
		Author * Utility	6	1.512	0.717	0.636
	IQ10	Author	2	3.007	1.075	0.342
		Utility	3	4.68	1.675	0.172
		Author * Utility	6	8.21	2.936	0.008
	IQ11	Author	2	7.658	2.927	0.055
		Utility	3	1.768	0.676	0.057
		Author * Utility	6	2.681	1.025	0.409
	IQ12	Author	2	2.619	0.733	0.481
		Utility	3	4.108	1.149	0.329
		Author * Utility	6	3.187	0.891	0.501
	IQ13	Author	2	7.02	2.378	0.094
		Utility	3	13.889	4.706	0.003
		Author * Utility	6	8.59	2.91	0.009
Website Design	WD1	Author	2	5.358	1.517	0.221

		Utility	3	2.619	0.741	0.528
		Author * Utility	6	5.065	1.434	0.201
	WD2	Author	2	21.889	6.309	0.002
		Utility	3	4.099	1.181	0.317
		Author * Utility	6	2.59	0.747	0.613
	WD3	Author	2	27.573	7.992	0
		Utility	3	12.292	3.563	0.015
		Author * Utility	6	2.482	0.719	0.634
	WD4	Author	2	3.228	1.317	0.269
		Utility	3	0.265	0.108	0.955
		Author * Utility	6	3.39	1.603	0.145
	WD5	Author	2	17.254	4.571	0.011
		Utility	3	7.541	1.998	0.114
		Author * Utility	6	3.313	0.878	0.511
	WD6	Author	2	10.437	4.613	0.011
		Utility	3	4.158	1.838	0.14
		Author * Utility	6	6.091	2.692	0.014
Flow	F1	Author	2	15.35	5.946	0.003
		Utility	3	3.22	1.247	0.293
		Author * Utility	6	3.084	1.195	0.309
	F2	Author	2	9.008	2.544	0.08
		Utility	3	3.525	0.996	0.395
		Author * Utility	6	4.36	1.231	0.29
Trust	T1	Author	2	7.943	3.346	0.036
		Utility	3	3.193	1.345	0.26
		Author * Utility	6	0.698	0.294	0.94
Risk	R1	Author	2	2.663	1.096	0.336
		Utility	3	3.982	1.638	0.18
		Author * Utility	6	1.501	0.618	0.716

Table 7
Pairwise comparisons of the means for questions demonstrated to be significantly influenced by information utility within the Tango website.

Question	(i) version (mean)	(j) version	Mean Difference (i-j)	Std. Error	Sig.	Lower Bound	Upper Bound
IQ3	High 3.38	High_Low	1.08	0.442	0.016	0.203	1.955
		High_Med	0.93	0.42	0.03	0.089	1.752
		Max	1.02	0.42	0.018	0.18	1.843
	High_Low 2.30	High	-1.08	0.442	0.016	-1.955	-0.203
		High_Med	-0.15	0.439	0.719	-1.028	0.712
		Max	-0.06	0.439	0.878	-0.937	0.803
	High_Med 2.45	High	-0.93	0.42	0.03	-1.752	-0.089
		High_Low	0.15	0.439	0.719	-0.712	1.028
		Max	0.09	0.417	0.828	-0.734	0.916
	Max 2.63	High	-0.75	0.42	0.018	-1.843	-0.18
		High_Low	0.33	0.439	0.878	-0.803	0.937
		High_Med	0.18	0.417	0.828	-0.916	0.734
IQ4	High 4.62	High_Low	-1.34	0.389	0.001	-2.108	-0.568
		High_Med	-0.38	0.369	0.312	-1.106	0.356
		Max	-0.71	0.369	0.057	-1.439	0.022
	High_Low 5.96	High	1.34	0.389	0.001	0.568	2.108
		High_Med	0.96	0.386	0.014	0.199	1.727
		Max	0.63	0.386	0.106	-0.135	1.394
	High_Med 5.00	High	0.38	0.369	0.312	-0.356	1.106
		High_Low	-0.96	0.386	0.014	-1.727	-0.199
		Max	-0.33	0.366	0.365	-1.058	0.392
	Max 5.33	High	0.71	0.369	0.057	-0.022	1.439
		High_Low	-0.63	0.386	0.106	-1.394	0.135
		High_Med	0.33	0.366	0.365	-0.392	1.058
IQ5	High 4.22	High_Low	-1.41	0.479	0.004	-2.36	-0.462
		High_Med	-1.14	0.455	0.013	-2.046	-0.244
		Max	-1.03	0.458	0.026	-1.939	-0.124
	High_Low 5.63	High	1.41	0.479	0.004	0.462	2.36
		High_Med	0.27	0.476	0.577	-0.676	1.208
		Max	0.38	0.479	0.43	-0.569	1.328
	High_Med 5.36	High	1.14	0.455	0.013	0.244	2.046
		High_Low	-0.27	0.476	0.577	-1.208	0.676
		Max	0.11	0.455	0.803	-0.787	1.014
	5.25	High	1.13	0.458	0.026	0.124	1.939
		High_Low	-0.38	0.479	0.43	-1.328	0.569
		High_Med	-0.11	0.455	0.803	-1.014	0.787
IQ10	High	High_Low	-1.77	0.385	0	-2.528	-1.005

	4.23	High_Med	-1.04	0.366	0.005	-1.764	-0.315
		Max	-1.22	0.366	0.001	-1.945	-0.497
	High_Low 6.00	High	1.77	0.385	0	1.005	2.528
		High_Med	0.73	0.376	0.056	-0.018	1.472
		Max	0.55	0.376	0.15	-0.199	1.29
	High_Med 5.27	High	1.04	0.366	0.005	0.315	1.764
		High_Low	-0.73	0.376	0.056	-1.472	0.018
		Max	-0.18	0.357	0.611	-0.888	0.525
	Max 5.45	High	1.22	0.366	0.001	0.497	1.945
		High_Low	-0.55	0.376	0.15	-1.29	0.199
		High_Med	0.18	0.357	0.611	-0.525	0.888
WD3	High 3.84	High_Low	-1.35	0.458	0.004	-2.248	-0.435
		High_Med	-1.1	0.435	0.013	-1.957	-0.235
		Max	-1.28	0.435	0.004	-2.138	-0.417
	High_Low 5.19	High	1.35	0.458	0.004	0.435	2.248
		High_Med	0.25	0.455	0.59	-0.655	1.146
		Max	0.07	0.455	0.888	-0.836	0.964
	High_Med 4.94	High	1.1	0.435	0.013	0.235	1.957
		High_Low	-0.25	0.455	0.59	-1.146	0.655
		Max	-0.18	0.431	0.674	-1.036	0.672
	Max 5.12	High	1.28	0.435	0.004	0.417	2.138
		High_Low	-0.07	0.455	0.888	-0.964	0.836
		High_Med	0.18	0.431	0.674	-0.672	1.036
WD5	High 4.09	High_Low	1.16	0.502	0.022	0.175	2.161
		High_Med	1.48	0.476	0.002	0.545	2.431
		Max	1.21	0.476	0.012	0.272	2.158
	High_Low 2.93	High	-1.16	0.502	0.022	-2.161	-0.175
		High_Med	0.32	0.498	0.522	-0.666	1.306
		Max	0.05	0.498	0.925	-0.939	1.033
	High_Med 2.61	High	-1.48	0.476	0.002	-2.431	-0.545
		High_Low	-0.32	0.498	0.522	-1.306	0.666
		Max	-0.27	0.473	0.565	-1.208	0.663
	Max 2.88	High	-1.21	0.476	0.012	-2.158	-0.272
		High_Low	-0.05	0.498	0.925	-1.033	0.939
		High_Med	0.27	0.473	0.565	-0.663	1.208
WD6	High 4.47	High_Low	-1.57	0.383	0	-2.326	-0.811
		High_Med	-0.71	0.363	0.052	-1.432	0.006
		Max	-1.32	0.363	0	-2.038	-0.6
	High_Low 6.04	High	1.57	0.383	0	0.811	2.326
		High_Med	0.86	0.38	0.026	0.103	1.607
		Max	0.25	0.38	0.513	-0.503	1.001
	High_Med 5.18	High	0.71	0.363	0.052	-0.006	1.432
		High_Low	-0.86	0.38	0.026	-1.607	-0.103

		Max	-0.61	0.36	0.095	-1.32	0.107
	Max 5.79	High	1.32	0.363	0	0.6	2.038
		High_Low	-0.25	0.38	0.513	-1.001	0.503
		High_Med	0.61	0.36	0.095	-0.107	1.32
IQ13	High 3.84	High_Low	-1.72	0.408	0	-2.519	-0.904
		High_Med	-1.1	0.387	0.005	-1.862	-0.329
		Max	-1.4	0.387	0	-2.165	-0.632
	High_Low 5.56	High	1.72	0.408	0	0.904	2.519
		High_Med	0.62	0.405	0.131	-0.186	1.418
		Max	0.32	0.405	0.441	-0.489	1.115
	High_Med 4.94	High	1.1	0.387	0.005	0.329	1.862
		High_Low	-0.62	0.405	0.131	-1.418	0.186
		Max	-0.3	0.384	0.432	-1.064	0.458
	Max 5.24	High	1.4	0.387	0	0.632	2.165
		High_Low	-0.32	0.405	0.441	-1.115	0.489
		High_Med	0.3	0.384	0.432	-0.458	1.064

Table 8
Pairwise comparisons of the means of questions demonstrated to be significantly influenced by information utility at the Tango website treatments.

question	(i) version (mean)	(j) version	Mean Difference (i-j)	Std. Error	Sig.	Lower Bound	Upper Bound
IQ3	High 3.38	High_Low	1.08	0.442	0.016	0.203	1.955
		High_Med	0.93	0.42	0.03	0.089	1.752
		Max	1.02	0.42	0.018	0.18	1.843
	High_Low 2.30	High	-1.08	0.442	0.016	-1.955	-0.203
		High_Med	-0.15	0.439	0.719	-1.028	0.712
		Max	-0.06	0.439	0.878	-0.937	0.803
	High_Med 2.45	High	-0.93	0.42	0.03	-1.752	-0.089
		High_Low	0.15	0.439	0.719	-0.712	1.028
		Max	0.09	0.417	0.828	-0.734	0.916
	Max 2.63	High	-0.75	0.42	0.018	-1.843	-0.18
		High_Low	0.33	0.439	0.878	-0.803	0.937
		High_Med	0.18	0.417	0.828	-0.916	0.734
IQ5	High 4.22	High_Low	-1.41	0.479	0.004	-2.36	-0.462
		High_Med	-1.14	0.455	0.013	-2.046	-0.244
		Max	-1.03	0.458	0.026	-1.939	-0.124
	High_Low 5.63	High	1.41	0.479	0.004	0.462	2.36
		High_Med	0.27	0.476	0.577	-0.676	1.208
		Max	0.38	0.479	0.43	-0.569	1.328
	High_Med 5.36	High	1.14	0.455	0.013	0.244	2.046
		High_Low	-0.27	0.476	0.577	-1.208	0.676
		Max	0.11	0.455	0.803	-0.787	1.014
	5.25	High	1.13	0.458	0.026	0.124	1.939
		High_Low	-0.38	0.479	0.43	-1.328	0.569
		High_Med	-0.11	0.455	0.803	-1.014	0.787
IQ10	High 4.23	High_Low	-1.77	0.385	0	-2.528	-1.005
		High_Med	-1.04	0.366	0.005	-1.764	-0.315
		Max	-1.22	0.366	0.001	-1.945	-0.497
	High_Low 6.00	High	1.77	0.385	0	1.005	2.528
		High_Med	0.73	0.376	0.056	-0.018	1.472
		Max	0.55	0.376	0.15	-0.199	1.29
	High_Med 5.27	High	1.04	0.366	0.005	0.315	1.764
		High_Low	-0.73	0.376	0.056	-1.472	0.018
		Max	-0.18	0.357	0.611	-0.888	0.525
	Max 5.45	High	1.22	0.366	0.001	0.497	1.945
		High_Low	-0.55	0.376	0.15	-1.29	0.199
		High_Med	0.18	0.357	0.611	-0.525	0.888
IQ13	High	High_Low	-1.72	0.408	0	-2.519	-0.904

	3.84	High_Med	-1.1	0.387	0.005	-1.862	-0.329
		Max	-1.4	0.387	0	-2.165	-0.632
	High_Low 5.56	High	1.72	0.408	0	0.904	2.519
		High_Med	0.62	0.405	0.131	-0.186	1.418
		Max	0.32	0.405	0.441	-0.489	1.115
	High_Med 4.94	High	1.1	0.387	0.005	0.329	1.862
		High_Low	-0.62	0.405	0.131	-1.418	0.186
		Max	-0.3	0.384	0.432	-1.064	0.458
	Max 5.24	High	1.4	0.387	0	0.632	2.165
		High_Low	-0.32	0.405	0.441	-1.115	0.489
		High_Med	0.3	0.384	0.432	-0.458	1.064

Table 9: Pairwise comparisons of the means for questions demonstrated to be significantly influenced by information quantity.

Question	(i) version (mean)	(j) version	Mean Difference (i-j)	Std. Error	Sig.	Lower Bound	Upper Bound
IQ13	High 4.34	High_Low	-0.03	0.443	0.954	-0.903	0.852
		High_Med	-1.3	0.452	0.005	-2.191	-0.399
		Max	-1.2	0.457	0.01	-2.103	-0.291
	High_Low 4.37	High	0.03	0.443	0.954	-0.852	0.903
		High_Med	-1.27	0.459	0.007	-2.181	-0.359
		Max	-1.17	0.464	0.013	-2.092	-0.25
	High_Med 5.64	High	1.3	0.452	0.005	0.399	2.191
		High_Low	1.27	0.459	0.007	0.359	2.181
		Max	0.1	0.473	0.836	-0.84	1.036
	Max 5.54	High	1.2	0.457	0.01	0.291	2.103
		High_Low	1.17	0.464	0.013	0.25	2.092
		High_Med	-0.1	0.473	0.836	-1.036	0.84