

Measuring Affective Reactions on Information Objects: Quantitative vs. Qualitative Analysis

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Two measures of affective reactions on information objects were tested in an experiment. Participants were given a question and a set of nine websites to find the answer. Participants were asked to evaluate the websites they reviewed by assigning Willingness to Pay (WTP) and Experienced Utility (EU) values to each website. WTP measure was solicited by asking participants to assign dollar amounts to their experiences with the given websites. EU measure was solicited by asking participants to rate their experience with the website using a slider scale from “negative” to “positive”. Participants were also asked to write short statements explaining their rationale for assigning the two values. Statistical analysis of the WTP and EU values showed statistically significant correlation of the two measures with the availability of answer on a website. The content analysis of participants’ explanations of the rationale for assigning the values revealed that WTP reflects rational value of an object for completing the task while EU reflects emotional, task-neutral value of an object.

Introduction

The poster compares the results of the qualitative and quantitative findings of the experimental study that tested two affective value measures: willingness to pay (WTP) and experienced utility (EU).

WTP measure was developed in economic research for assessing the value of goods and services not traded on the market. It is usually derived by asking individuals to assign monetary value to goods or services. The measure is broadly used to determine a value of natural resource (Haefele, Kramer, & Holmes, 1992), non-environmental policies and programs (Krupnick & Cropper, 1992), cultural heritage (Navrud & Ready, 2002), national television programming (Papandrea, 1999), cultural institutions,

including theatres (Bille Hansen, 1997), museums (Martin, 1994), and libraries (Aabø, 2004; Holt, Elliott, & Moore, 1999). WTP measure was never applied for the evaluation of information retrieval (IR) systems. In information science, a measure similar to the WTP was suggested by Cooper (1973) who proposed to measure “whatever the user finds to be of value about the system output, whether its usefulness, its entertainment or aesthetic value, or anything else” (p. 89). Cooper proposed a naïve methodology for measuring utility that included asking users to determine the value of the retrieved documents in monetary units. Coopers methodological suggestions were incorporated into the experimental design.

The second measure, EU, was primarily informed by the research of well-being (Kahneman, 1999). As a concept of enjoyment, utility goes back to the 18th century work of Jeremy Bentham, who defined it as a pleasure or pain, the “sovereign master” that “points out what we ought to do, as well as determine what we shall do” (Bentham, 2000). EU construct is based on assumption that we constantly assign affective commentary on the current states and that this commentary can be summarized in one value (Kahneman, 1999). EU value is usually derived by asking individuals to evaluate their experiences by selecting the appropriate alpha and/or numerical value (Redelmeier & Kahneman, 1996; Schkade & Kahneman, 1998; Schreiber & Kahneman, 2000).

Methodology

WTP and EU measures were tested in an experimental study. Thirty-two (N = 32) participants were given a question “In what year and for how much Howard Hughes sold his share of TWA airline” and then asked to find the answer in the nine provided websites. Not all the websites in the experimental document set contained answers to the question: three documents contained full answer, three documents contained only portion of the answer, and three documents did not contain answer at all.

WTP measure was collected by asking participants to evaluate the websites by assigning any dollar amount they would have been willing to pay to have the experience or avoid having the experience with the website. EU was collected by asking the participants to rate their feeling about the document using a slider bar ranging between ‘negative’ and ‘positive’ values that corresponded with the hidden values 0 through 100.

In addition to assigning WTP and EU values, participants were asked to provide a short written explanation for assigning the values.

Results

One of the research objectives was to determine the correlation between the two affective measures and availability of the answer in documents. The WTP and EU values were correlated with the availability of the answer in the document. Both measures were statistically significantly correlated with the availability of the answer in document ($R = .430$, $p < .001$ for the correlation of the WTP with the availability of the answer, and, $R = .387$, $p < .001$ for the correlation of the EU with the availability of the answer in document). WTP and EU also were statistically significantly correlated with each other ($R = .701$, $p < .001$).

The results of the statistical analysis suggested that the availability of the answer impacted the WTP and EU measures. They also indicated similarity between the WTP and EU measures. However, WTP and EU values and statistical tests alone did not explain the differences and similarities between the two measures, and did not indicate what factors influenced WTP and EU values.

To better understand the two measures, participants' written responses explaining the reasons for assigning WTP and EU were examined. Participants' responses usually consisted of short sentences, for example, "great source of information - quick and to the point" or "ease of use; brief document of facts". Content analysis of responses yielded six broad themes: usefulness, reliability, thoroughness, style-related, interest, and ambiguous comments. Most of the comments related to usefulness mentioned the presence or absence of the answer in text and relevancy of the article for the task. References to the reliability of information and authority of the source formed the reliability theme. Participants' comments about the level of specificity and factual richness of the documents formed the thoroughness theme. Style-related theme included comments about website presentation, length, organization, availability of illustrations and other style-related comments. Some of the comments referred to the personal interest in the website information; they formed the interest theme. Ambiguous comments theme included comments about participants' preferences and personal interests. Some of the comments in this category were humorous or included language indicating "resistance" to the task at hand (for example, "like this number", "That's share he sold to TWA in 1966. I wish I could have that share:-)"). It is worth noting that some participants' comments related to scope (information richness), novelty, document source and others appeared in Berry and Schamber (1997) and other information science research and informed the six themes of this study.

Participants' responses were re-coded by three coders and analyzed for inter-coder reliability. Cronbach's Alpha was calculated at .937 and indicated an acceptable

consistency in coders' responses (Nunnally, 1978).

Table 1 shows the ranking of the six themes based on their frequencies in responses explaining the rationale for assigning the WTP and EU. Based on participants written accounts, the WTP measure was largely effected by the usefulness of the websites, while EU was mostly effected by the style of the websites. The analysis suggests that WTP reflects instrumental, rational value of an object for completing the task.

Comments about availability of the reliable answer and document presentation that facilitates timely retrieval of the answer were the most frequently mentioned reasons for assigning WTP values. In contrast, comments related to the EU values seem to indicate emotional value not related to the task. Style-related properties of websites were mentioned the most frequently as reasons for assigning EU. Personal interest in the object was often identified as a reason in assigning EU. Usefulness, thoroughness and reliability of the object had less impact on EU values than they had on WTP values, indicating that task-specific properties of the object become secondary in affecting users' feelings about the object.

Table 1. Themes Ranking Based on their Frequencies in WTP and EU Comments.

Ranking order	WTP-related comments	EU-related comments
1	Usefulness (98)	Style-related (97)
2	Style-related (77)	Interest (48)
3	Thoroughness (38)	Usefulness (36)
4	Ambiguous comments (38)	Ambiguous comments (31)
5	Interest (22)	Thoroughness (28)
6	Reliability (21)	Reliability (16)

*Note: The frequencies of themes appear in parenthesis.

Conclusion

Two measures of affective reactions on information objects, WTP and EU, were tested in the experiment. Statistical analysis of the WTP and the EU values indicated positive statistically significant correlation of both measures with the availability of the answer in text. However, the values alone did not explain participants' rationale for assigning different values to websites. Content analysis of participants' comments explaining the rationale for assigning the WTP and EU values helped to better understand what WTP and EU measure. Participants' responses suggest that WTP reflects rational value of an object for completing the task. According to uses' accounts, object's usefulness

becomes the main determinant of the WTP value. EU reflects emotional, task-neutral value of an object. Style features and personal interest in an object become most important reasons for assigning EU. Two measures reflect different aspects of affective value and can be applied in different IR evaluation contexts. Both measures can help to understand users' preferences of information objects and can be easily incorporated into design of the test IR systems.

This preliminary work shows the potential of the WTP and EU measures and importance of incorporating qualitative and quantitative techniques for testing new IR measures. Future studies are needed to validate preliminary findings reported in the paper.

Acknowledgement

The research was partially funded by the Texas Center for Digital Knowledge (TxCDK) grant.

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