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Exploring Website Evaluation Criteria using the Repertory Grid Technique: A Web Designers' Perspective

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ABSTRACT

This study aims to investigate web designers' perceptions of an "effective" website. Twenty web designers were interviewed using Kelly's Repertory Grid Technique in order to elicit factors that they consider important when designing or developing B2C websites. Using grounded theory approach, these elicited data were then classified into 14 meta-categories. The intensive nature of the interviews eventually gave rise to a comprehensive framework that broadens the base of existing web evaluation literature. This framework is based on an adapted Technology Acceptance Model with the 4 dimensions of Perceived Ease of Use, Perceived Usefulness, Perceived Playfulness and Attractiveness.

Keywords

Website evaluation, repertory grid, human-computer interaction.

INTRODUCTION

Research has suggested that poor web-design is turning customers away (Amato-McCoy, 1999). In response, organizations have sought to assess their Web presence through evaluation of their websites and identification of potential problems. However, research on website evaluation to date, has been highly fragmented.

Firstly, it is largely user or customer-focused. Users' views have been studied more extensively because serving users' needs is the primary objective of websites in cyberspace (Bell and Tang, 1998, Dragulanescu, 2002, Whyte et al., 1997). Research has generally placed less emphasis on what web designers consider are important attributes of effective websites.

Secondly, existing research often center their studies on selected aspects of web design which are deemed more important (Aladwani and Palvia, 2001), thereby failing to address website's effectiveness in its entirety. For instance, with the emergence and widespread acceptance of Human-Computer Interaction (HCI) (Hartson, 1998), huge emphasis has been placed on studying websites' usability (Agarwal and Venkatesh, 2002, Cockrell and Jayne, 2002, Hornbaek and Frokjaer, 2001), thus neglecting other qualities such as visual attractiveness.

Finally, most website evaluation research methodology is plagued by one other major drawback: that of having pre-determined structures. Examples include the use of pre-structured questionnaires to collect data (Bell and Tang, 1998, Ranganathan and Ganapathy, 2002) and the use of scripted actions that govern the way participants walkthrough a website in a simulated or laboratory environment (Agarwal and Venkatesh, 2002, Cockrell and Jayne, 2002, Hornbaek and Frokjaer, 2001). Attributes and constructs used in these pre-structured questionnaires are predetermined prior to the start of the study. These methods can limit the scope of information obtained as researchers explore specific selected aspects of web design.

The objective of this study is therefore to investigate website evaluation from the perspective of web designers. It attempts to answer the question "What factors do web designers consider important when designing or developing effective B2C websites?" To circumvent the problem of using pre-determined structures, this research applies an inductive approach, the Repertory Grid Technique (RGT), to elicit a comprehensive set of B2C e-commerce website evaluation constructs and their definitions based on the experiences of web-designers. The application of the RGT has gained some attention recently in the Information Systems (IS) field (Tan and Hunter, 2002, Hunter and Beck, 2000, Whyte et al., 1997) and is comprehensively discussed in Tan & Hunter (2002).

LITERATURE REVIEW

The literature review revealed the use of three common theoretical lenses in the research to date. These lenses have been used to guide researchers in coming up with the evaluation criteria. The first is the Technology Acceptance Model (TAM) (Davis, 1989). Studies that use TAM as a framework or guide to website evaluation include Lee and Lee (2003), Koufaris (2002), Schubert and Dettling (2002) and Benbunan-Fich (2001). These studies use the TAM framework to look at factors affecting the acceptance of websites. However, we find that for these studies, the measures for and criteria affecting PEOU and PU are different even though they deploy the same framework.

The second lens is the application of flow theory to the evaluation of websites, either as a standalone theory (Koufaris, 2002) or used in conjunction with TAM for website evaluation. Flow has been defined as “the holistic sensation that people feel when they act with total involvement” (Csikszentmihalyi, 1975). Many studies also looked at perceived playfulness or perceived enjoyment, as part of the framework for their analyses (Katerattanakul, 2002, Liu and Arnett, 2000). Perceptions of playfulness and shopping enjoyment originated from flow theory, which argues that when a person is in a flow, they shift into a mode of experience and become absorbed in their activity. Therefore, websites that promotes playfulness and shopping enjoyment are likely to be more engaging to the consumers of the website.

A third lens that has been used to examine website evaluation is the Human-computer Interaction (HCI) lens, where the notion of usability is a key theme (Agarwal and Venkatesh, 2002, Palmer, 2002). The theoretical foundation for HCI studies are grounded in psychology and cognitive science. Many studies looked at design features that will help improve the usability of websites, including attractiveness and interactivity (Skadberg and Kimmel, 2003, Lindgaard and Dudek, 2003).

Despite the differences in the theoretical lenses applied to web evaluation studies, there were commonalities in their findings. A case in point is Agarwal and Venkatesh (2002), which examined usability of websites via the HCI lens. The usability categories in that study included ease of use, and “content”, which the authors argued was akin to “perceived usefulness”. Both perceived ease of use and perceived usefulness are TAM constructs. Additionally, as we have mentioned earlier, there is no consistency on the measures for and criteria affecting similar constructs using the same framework, such as those for PU and PEOU. Finally, for the majority of research that we have reviewed, there is no theoretical framework to guide the criteria selection. One common approach to the selection of criteria is through a review of published academic and/or practice-oriented literature in the general area of website evaluation (Kim et al., 2003). Because the criteria are not derived from theory, these researches are often fragmented: there are no theoretical justifications for the criteria selections and no assurances that the selected criteria are comprehensive and relevant to the measurement of website effectiveness. The Repertory Grid Technique that we will describe in the next section will help in the selection of appropriate criteria and addresses these problems as well as those mentioned earlier on.

RESEARCH METHODOLOGY

Sampling

The sample of intended subjects (web-designers) was drawn from a listing of 1012 software retailers published

in the e-Source Directory¹ (2001). Given the intensive nature of the RGT, a relatively small sample size (about 15 to 25 subjects) is often sufficient in eliciting a comprehensive list of constructs for the purpose of a study (Ginsberg, 1989, Dunn et al., 1986, Tan and Hunter, 2002). A modified systematic sampling procedure was applied to the listing, starting with a random record and applying a selection interval of 5. A total of 20 web-designers agreed to participate in this study.

The Repertory Grid Interview Process

Six pilot interviews were conducted with university students with web design experience. As a result, we were able to standardize the RGT interview process and confirm our procedures for the actual interviews. The interview involved 3 steps – element selection, construct elicitation (involving triading and laddering), and then the rating of elements along each elicited construct.

The relevant elements for our study are B2C websites. A minimum of six elements is required in order to provide sufficient triads for use in the second step. Based on Nielsen/NetRatings Singapore Internet Audience Activity Report for April 2000 (Osman, 2002), the websites included are *Yahoo!*, *MSN*, *Singapore Telecom*, *Pacific Internet*, *AOL websites* and *Lycos*. One week prior to the interviews, we emailed the participants general details of the interview and requested them to surf the six websites to familiarize themselves with the sites. Just before the start of the interview, we confirmed with the participants that they have surfed the 6 stipulated websites. We also gave the participants an option to browse unscripted, the websites for up to 10 minutes at their own workstations before the interview commenced if they wished to do so. At the commencement of the interview, an overview of the study was provided to the participant. To reduce interviewer’s bias, all instructions were read from prepared notes to ensure that all subjects received the same set of instructions.

Construct elicitation aims to identify meanings, in the form of bipolar constructs, that subjects attach to the elements (Marsden and Littler, 2000). Two interviewing methods, “*triading*” and “*laddering*”, are employed to achieve this. *Triading* (Kelly, 1955) involves the participant selecting three elements (websites) at random. The participant is then asked to identify, how two of them are similar and different from the third, in terms of what s/he, as a web-designer, consider important when designing or developing websites. The labels for similarity and difference identified form a bipolar construct eg. good navigation – poor navigation. The “*laddering*” method is then used to elude in-depth explanations of the bipolar construct. For example, the respondent might be asked which pole of the construct

¹ This is a directory containing vendor listings of services, software and hardware retailers.

they prefer (good or poor navigation), or how and why they think that particular aspect (Marsden and Littler, 2000) affects the websites. The elicitation process is then repeated to identify more constructs, until the participant cannot add any new constructs to the ones s/he already named earlier.

At the 3rd step of the interview the participant is asked to rate all elements based on the attributes elicited. Each element is rated independently, on a scale of 1 to 7, where 1 represents the construct pole, and 7, the contrast pole. By using a rating scale, the subject is accorded greater freedom when sorting the constructs as they are not forced to take side with either the construct or its contrast pole (Beail, 1985).

To conclude the interview, participants were requested to fill up a demographic sheet and indicate their relevant expertise as web-designers.

Analysis of Data

Using RGT, participants were generally given vast freedom in determining the perceived similarities and differences within each triad, and providing personal interpretations pertaining to the constructs elicited (Hunter and Beck, 2000). This section describes how we analyzed and classified our rich findings into common themes. A walkthrough using examples from our data will be presented. We used a three-layer classification scheme to categorize the data collected, namely **construct class**, **conceptualization** and **meta-category**. The interpretations and labels we assigned to each of these layers were informed by literature on website evaluation.

In order to facilitate classification of the constructs into conceptualizations, we grouped the constructs into classes. Conceptualizations were formed from the construct classes. Meta-categories of conceptualizations were derived using the grounded theory approach (Strauss, 1987).

RESULTS AND ANALYSIS

Eleven males and nine female web designers participated in this study. They were mostly between 21-30 years of age and had more than 2 years experience in web design. On average, all participants surf the Internet several times a day for up to 5 hours each time.

Forty-six conceptualizations were obtained from the identified construct classes and fourteen meta-categories were derived using grounded theory approach. Table 1 presents a sample of the 14 meta-categories, their underlying conceptualizations, construct classes and a sample of the constructs that make up the categories.

The 14 meta-categories and their definitions are presented in Table 2.

Category	Definition
Graphics Usage	Refers to the purpose for which they are used and extent of usage, including the quality of graphics and how they are being organized
Text Usage	Relates to the purpose of using a text-based interface
Content/ Information	Mainly the scope (wide or specific) and quality of information
Updates	Design considerations with respect to websites that require updating
Layout/ Space Usage	How web space is utilised to present the features and functions across the pages within the website
Presentation of information	Concerns the implications of using colours, fonts and display styles to present information
Headlines	Covers the objective and extent of headline usage
Categorisation of Information	Refers to ways of grouping information on the pages in order to facilitate reading
Navigation	The features used in designing the site that facilitates transition from page to page
Colour use	Concerns the usage and choice of colours used
Visual Appearance	How the website looks and the impact it effects
Advertisements/ Pop-ups/ Animation	The purpose and extent of usage of such features
Downloading Time	Factors in designing that impacts speed of downloading
Establishing Website's Identity	Various methods designers use to portray its unique image

Table 2: Definitions of the Meta-Categories

DISCUSSION

From above, we have identified the set of criteria designers consider when evaluating websites. The findings of this study (i.e., meta-categories, conceptualizations and construct classes) represent a comprehensive list of important considerations web designers should take into account when designing and developing B2C websites.

Additionally, in order to enable the set of criteria to be tested in future studies, and to facilitate an understanding of how our results contribute to increasing user acceptance and website effectiveness, we propose a framework to encompass these criteria at the meta-categories level. This framework is informed by research in Technology Acceptance Model (TAM) (Davis, 1989) and flow theory (Csikszentmihalyi, 1975, Deci and Ryan, 1985). It also incorporates research from the HCI literature, especially in the area of design of websites.

In the proposed research framework, we propose that the set of design factors (the 14 meta-categories of criteria surfaced above) affects perceived usefulness (PU), perceived ease of use (PEOU) and perceived playfulness (PP). The set of causal links in this research model is consistent with Moon and Kim's (2001).

We propose that 2 design factors, content/information and updates, are positively related to PU. From the literature, research has indicated that content is a factor determining usability (Agarwal and Venkatesh, 2002), website quality (Aladwani and Palvia, 2001) and website success (Palmer, 2002). Additionally, information usefulness and information service has been cited as factors affecting PU (Lee and Lee, 2003). As information usefulness is similar to content while information service is similar to updates, this provide support for our proposition that the 2 factors, content/information and updates, are positively related to PU.

In terms of factors affecting PEOU, we propose a positive relationship between the following 5 design factors and PEOU: navigation, categorization of information, downloading time, presentation of information and headlines. There is support for the inclusion of these 5 design factors from the literature. In Agarwal and Venkatesh (2002), for instance, ease of use consist of 3 subcategories: (i) goals, having clear and understandable objectives, (ii) structure, referring to the organization of the site and (iii) feedback, provision of information of progress. In Cox and Dale (2002), ease of use refers to the clarity of purpose, design (for usability during navigation) and communication.

As anticipated, there are many design factors that goes to improving attractiveness and interactivity of the websites. We adopt Skadberg and Kimmel's (2003) definition of attractiveness of a Website as the representation's richness and quality and interactivity to refer to the response triggered by the user. In this study, our variable "attractiveness and interactivity" are design factors that will promote richness, quality and response to the website. We categorize the remaining 7 design factors as appropriate graphic and text usage, visual appearance/look, layout and space usage color usage, advertisements/popup/animation and establishing website's identity as factors affecting attractiveness and interactivity of the design.

Lastly, we propose that perceived playfulness is determined by the attractiveness, interactivity and ease of use of the website. Literature on playfulness and flow has supported this contention. Skadberg and Kimmel (2003), for instance, found that attractiveness and interactiveness demonstrated a causal relationship with the flow experience

CONCLUSION

In this study, we translated web-designers' practice into the set of criteria they consider when evaluating websites. The application of the RGT yielded rich and relevant qualitative data from the interviews. The findings of this study (i.e., meta-categories, conceptualizations and construct classes) represent a comprehensive list of important considerations web designers should take into account when designing and developing B2C websites.

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Meta-Category	Conceptualization	Construct Class	Construct Example
Content/ Information	Scope of Information	Wide variety / General Information	- wide variety of content to attract larger audience
		Specific Information	- information based on user interests
		Specific Corporate Information	- provides information on company and products for corporate website (target specific audience)
	Quality of Information	Breadth and Depth of Information	- should not have so much variety that quality of information suffers (too broad but no quality)
Updates	Information / content / feature update	Frequency of updates	- frequent updates makes website more user-friendly, attract users to visit more frequently
		Characteristics to facilitate frequent updates	- use of pre-defined design that allows frequent updates, changing content only for each update
	Design update	Up-to-date design	- use of new, up-to-date design, graphics always changing

Table 1: Sample Meta-categories, Conceptualizations and Construct Classes