Toward a Knowledge Acquisition Framework for Web Site Design

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Abstract

Due to the development of Web technology and interdependency between organizations and customers, organizations are using Web sites as a mechanism to enable and facilitate knowledge acquisition (KA). A user can acquire knowledge that a sponsor offers via a Web site. Conversely, s sponsor can acquire knowledge that a user offers via a Web site. This paper introduces a set of propositions that can underlie efforts to develop a KA framework for guiding and studying Web site design. The propositions identify four major elements (user features, sponsor features, system features, and environmental features) as the main determinants of a Web site's usability for KA.

Introduction

Because of the development of Web technology and interdependency between organizations and customers, organizations are using Web sites as a mechanism to enable and facilitate KA. The interplay of various entities on the Web manifests as patterns of knowledge flows. The net effect is that KA occurs for both users and sponsors of Web sites. Increasingly, organizations are recognizing the importance of the World Wide Web as a conduit, not only for acquiring knowledge about potential customers, competitors, and partners, but also as a means of facilitating Web users' acquisition of knowledge about the organizations' activities, products and services.

Web users have experienced various problems, ranging from slow downloads to failures in readily finding knowledge they seek (Pitkow and Kehoe, 1996). Thus, there is room for further progress in understanding how to design a Web site to facilitate KA.

There has been considerable progress in studying Web site design, including identifying usage patterns and common problems of Web users, observing users' reactions to alternative Web sites, proposing feature-based evaluation criteria for Web sites, measuring users' performance in Web site usage, developing methodologies and frameworks to guide Web site design, suggesting guidelines for information retrieval and evaluation on the Web, and expounding practical rules, principles and tips of Web site design (Fang and Holsapple, 2000). Nevertheless, a large portion of Web sites intended for e-commerce are not profitable (Hof, 1998)

A Delphi study, including an international panel of researchers and practitioners in the area of knowledge management, has identified four sub- activities for knowledge acquisition: identifying appropriate knowledge, capturing identified knowledge, organizing captured knowledge and transferring organized knowledge to target processors (Joshi and Holsapple, 1998). Viewing Web sites as KA mechanisms, we can link problems, encountered in the course of Web interaction to one or more of these four sub-activities. Web designers should explicitly consider impacts of their Web site design on performance of each KA sub-activities.

However, there is no framework or (development tools) that explicitly recognize the notion of KA in the context of Web site design. Such a framework would offer a platform for communication and sharing idea related to designing Web sites that better assist knowledge acquisition, It would foster identification and systematic study of the KA issue inherent in Web site design. It would aid researchers and practitioners in evaluating the KA efficacy of alternative Web site design. This paper sketches out a broad outline of such a framework. This outline takes the form of four basic propositions and a discussion of some of their implications. .

Basic Propositions

A Web site serves as a vehicle that coordinates knowledge flows between the site's users and sponsor within environmental constraints. A user can acquire knowledge that a sponsor offers via the site. Conversely, a sponsor can acquire knowledge that a user offers via the site. Web sites are not equally adept at fostering knowledge flows; some are more usable that others. These simple observations lead to a set of propositions that can underlie efforts to develop a KA framework for guiding Web site design. The propositions identify four major elements (user features, sponsor features, system features and environmental features) as the main determinants of Web sites' usability for knowledge acquisition. Various studies have identified usability as a construct to determine system value (Nielsen, 1999). The set of propositions concerning constructs that affect Web site usability has not been explicitly recognized in Web site design literature, but rather touched on one or another

study, without presenting a full picture (Fang and Holsapple, 2000)

Proposition: User features affect Web site usability

As in any system design, developers begin by asking who are the users and what are their traits, characteristics, and requirements (McGraw, 1994; Shneiderman 1997). Several empirical studies have attempted to understand Web users' traits (Pitkow and Kehoe, 1996).

User features can be characterized along multiple dimensions. For instance, a user has a purpose when visiting a Web site. To achieve the purpose, a user can perform tasks such as conducting an online transaction, seeking decision support, and / or satisfying recreation interests. In performing a task, a Web user has preferences regarding system features, such as interface and content. Moreover, a Web user has experience in using sites and understanding task domain. A user's economic condition represents another dimension of user features. In sum, user features such as rationale, preferences, experiences / knowledge, affiliations, physical characteristics, job / task traits, and economic condition can affect a Web site's usability.

Proposition: Sponsor features affect Web site usability

On the back side of a Web site, there is a sponsor who finances and directs the site development and operation. Sponsor features mirror user features, being characterized into such dimensions : rationale, preferences, experience, and economic conditions. As for rationale, an organization may want to use online transactions to decrease sales' cost or garner customers' knowledge to assist organizational decision making. An organization preferences, economic conditions, and experience may allow its Web site to have some advanced functionality, such as connections to data warehouses or expert systems. Thus, a sponsor's rationale, preferences / knowledge, experience, affiliations, physical characteristics, role traits, and economic condition are examples of characteristics that affect the usability of a Web site for knowledge acquisition.

Proposition : System features affect Web site usability

A Web site consists of interrelated components working together to identify, capture, organize, and transfer knowledge between recipients and providers. Those components function as a system and presents certain traits. System features can be understood in terms of such dimensions as interface, functionality, content, coordination mechanism, and processing location.

The user interface is the main point of contact between a user and a Web site. Variations in interface design from site to site may result in different KA efficiencies. Functionality refers to exactly what the Web site will do (Conger and Mason, 1998). This can take the form of selecting and /deriving knowledge that a user seeks to acquire, or interpreting and assimilating knowledge being acquired from the user. For example, a Web site may allow a user to place an order or receive decision support. We contend that functionality features affect usability. Content denotes knowledge available for acquisition via a Web site, including descriptive knowledge, procedural knowledge, and reasoning knowledge. For instance, a insurance quotes are description knowledge. Specification of steps that a user can follow to buy an insurance policy is procedural knowledge, and rules to employ in determining which policies to consider are reasoning knowledge. Designers should take steps to ensure the shared understanding about content between users and sponsors. Coordination refers to means for managing interdependent online activities. Within a Web site, interrelated events can occur as Web content processing takes place. To support those interrelated events, a Web site may employ technologies such as cookies. There are also user events to be coordinated; A Web site may, for instance, a site may use a chat room or forum to coordinate interacting entities. Processing location refers to the place where processing occurs: in client side, server side, or both. As processing location changes, usability can be affected regarding download speed and security (Bajaj and Krishnan, 1999). Overall, usability appears to be affected by the system's interface, functionality, content, coordination and location features.

Proposition: Environmental features affect Web site usability

A Web site is exposed to various environmental constraints. To protect users and sponsors, laws and regulations form one aspect of the environment in which a site, user, and sponsor exist. For instance, taxation or content registration can strongly affect a Web site's usability. Ethics issues can arise even when no laws have been broken. For instance, collecting information and tracking consumer habits raises questions of ethics regarding online privacy. Additionally, culture is an environmental aspect that Web site designers should consider. For example, certain images and expressions are benign in one culture can be offensive in another. The immediate environment for site usage (e.g., office setting versus mobile setting) may also influence usability. In summary, usability is influenced by such

environmental features as laws, regulations, ethics, culture and immediate conditions.

Conclusion

The four propositions introduced in this paper give a foundation for constructing KA frameworks for Web site design. The discussion accompanying each proposition identifies various dimensions that could be incorporated into such a framework. Moreover, it shows that KA enabled and facilitated by a Web site has a bilateral nature which involves users' KA and sponsors' KA. Expanding and elaborating on the work reported here could lead to advances in commercial tools for Web site design and advances in Web design methodology. However, additional research building on this is needed.

Given a framework that characterizes major elements impinging on Web site design for knowledge acquisition, detailed research models can be derived, denoting independent, dependent, and moderator variables. Using such a model, a researcher can operationalize its variables, generate hypotheses about relationships between dependent and independent variables, and proceed to test those hypotheses. For instance, data collection for testing hypotheses may employ a survey instrument to capture Web users', designers', and sponsors' perceptions about features of Web sites and their usability. Alternatively, data collection can be accomplished via lab experimentation that observes subject performance for alternative Web site designs.

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