Supporting Knowledge Management in Organizations with Conversational Technologies: Discussion Forums, Weblogs, and Wikis

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ABSTRACT

The article reviews requirements and tool availability for knowledge management in virtual communities and other knowledge sharing environments, where professionals wish to quickly and easily share knowledge and information. The article compares the characteristics of several newer technologies, notably weblogs (blogs) and wikis, to the more conventional discussion forums. Wikis, the currently least popular technology emerged as the one best facilitating knowledge management needs. The article concludes that although discussion forums are the most popular, different community types are best supported by different technologies. Some opportunities for research in this area are identified, especially for the database community.

Keywords: community of practice; conversational technologies; discussion forum; knowledge management; virtual community; weblog; Wiki

INTRODUCTION

Knowledge management continues to be one of the top issues for senior IS and business executives. A recent Gartner survey (Bertram, 2002) placed knowledge management among the top 10 key concerns of CIOs, with increasing importance over the next three years. The importance of knowledge management has resulted in numerous technologies being developed, from simple single-user tools, such as mind mapping software, to highly expensive enterprise systems for content management or data mining. Interestingly enough, among all available technologies, those that enable the knowledge management of online and virtual communities (e.g., VerticalNet, Dell, EZBoard) have proven to be highly popular and effective.

Recently, several new technologies have come about to support knowledge and information sharing with increased capabilities, although businesses are still slow to
adopt them (e.g., Cortese, 2003; Weidlich, 2003). These technologies try to address a similar question, namely, how to enable people to quickly and easily publish their knowledge so that it can be effectively and securely shared with other members of the community. In this article, we will analyze discussion forums and two additional technologies, wikis and weblogs, all of which offer the potential for better knowledge management in organizations. The key question we seek to answer is how knowledge managers can best take advantage of conversational knowledge management technologies, based on application or situation specific knowledge needs.

We will refer to the three technologies, discussion forums, wikis, and weblogs, as conversational, to reflect that much of the knowledge creation and sharing is carried out through a process of discussion with questions and answers (discussion forum), collaborative editing (wikis), or through a process of storytelling (weblogs).

The article explores conversational knowledge management and critically examines the above mentioned three conversational knowledge management technologies: discussion forums, weblogs, and wikis. To do so, we review conversational knowledge management systems’ characteristics and requirements. Then, we introduce the three knowledge management systems in more detail, explaining key features and analyzing their fit with the requirements of conversational knowledge management. This is followed by conclusions concerning the usefulness and improvement potential for conversational knowledge management technologies and the identification research opportunities in this area.

**Requirements for Conversational Technologies**

Conversations, whether in discussion forums or other media have been recognized as a useful medium for knowledge exchange and extraction (e.g., Nishida, 2002). Brown (2000, 2001) stresses the role of storytelling as a fundamental form of knowledge transfer. While Brown values storytelling for the sharing of otherwise implicit knowledge, constructivist learning theory (Piaget, 1928; Bruner, 1960; Vygotsky, 1978; Leidner & Jarvenpaa, 1995) suggests that the process of expressing knowledge helps people to construct it (cognitive constructivism) as the conversation helps in refining the knowledge (social constructivism). Consequently, conversational knowledge management should yield benefits at numerous stages of the knowledge management process beginning with knowledge creation and ending with knowledge use and refinement (compare Alavi & Leidner, 2001).

Conversational knowledge management systems usually forego formal knowledge representation, as end users usually do not formally structure their knowledge as rules or similar constructs. Consequently, there is less need for a highly structured database and no need for a knowledge interpretation mechanism. In contrast, a conversational system needs to capture and represent conversations and has to accommodate contextualization, search, and community (e.g., making contributors explicit). By-and-large then, these tools need to be able to represent information and knowledge in plain text, paired with the ability to build relationships to other content in the repository. They also must offer
ease and efficiency of representation and sharing.

Internet and Web connectivity has greatly improved the popularity of these conversational technologies in recent years. Major types of technologies include e-mail, static and database backed Web pages, discussion forums, instant messengers, Internet chat, video and audio streaming, video and audio conferencing, group decision support system, weblogs, and wikis.

We will focus on only three technologies: discussion forum, weblog, and wiki. These three technologies share several common useful characteristics. They:

- Create a nonvolatile shared record of expressed knowledge.
- Are relatively lightweight with much of the knowledge in text form (possibly enhanced by multimedia attachments).
- Support the collaboration of people in different time and place environments.
- Support forms or knowledge organization, such as threading or hyperlinking.
- Contain mechanisms for knowledge protection in a shared environment (security).
- Are Web based (not necessary for discussion forum but typical).

How can these technologies help communities engaged in conversational knowledge creation? A study by the American Productivity and Quality Center (APQC, 2000), involving 40 companies, identified four community of practice (CoP) types and corresponding needs (Table 1).

Each community’s unique requirements dictate technology features to best support these needs. In this respect, lightweight conversational technologies seem least suitable for the facilitation of knowledge steward communities, which require enterprise solutions, such as document management and portal functionality. Support for other community types appears well in the realm of conversational technologies.

**DISCUSSION FORUM, WEBLOG, AND WIKI**

While conversational technologies can address many of the needs of CoPs, the suitability for particular needs differs by technology.

**Discussion Forum**

The discussion forum (also discussion board or bulletin board) has been one of the earliest technologies for collaborative knowledge creation and knowledge sharing. The Internet Guide (http://

<table>
<thead>
<tr>
<th>Community Type</th>
<th>Unique Requirements</th>
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<tbody>
<tr>
<td><em>Help Communities</em> to support each other on everyday problems and share ideas on an ad hoc basis*</td>
<td>Connect people and enable spontaneous exchange</td>
</tr>
<tr>
<td><em>Best practice communities</em> that developed, validated, and then shared best practices*</td>
<td>Process support for idea validation and refinement</td>
</tr>
<tr>
<td><em>Knowledge stewarding communities</em> that maintained a body of knowledge for day-to-day use as well as the community around it*</td>
<td>Document management; community management; enlisting of experts</td>
</tr>
<tr>
<td><em>Innovation communities</em> that sought breakthrough ideas*</td>
<td>Bringing together individuals with multiple perspectives; identifying new trends</td>
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www.internet-guide.co.uk/bulletin-board.html) describes a bulletin board as a “world wide web based application that allows people to post messages and share information”.

Discussion forums are among the oldest knowledge sharing technologies, largely due to their simplicity (see for instance http://www.lsoft.com/products/listserv-history.asp). At present, millions of communities use this type of technology (ezBoard.com alone already claimed to host over 1 million discussion forums in 2002). Idea exchange is possible even with e-mail technology plus a common list of addresses of registered users (listserv). Messages are broadcast to all list members. Newer features, such as Web publication and message threading, provide an independent record of the content (independent from personal e-mail collections) and transform the discussion forum from a push technology into a pull technology.

Newer discussion forum technologies have added additional aspects, including group support, statistics (e.g., number of reads), message approval ratings, and filters. Slashdot.com, for instance, allows readers to rate the quality of postings and to set thresholds to increase the signal-to-noise ratio.

**Weblog**

A weblog (Barger, 1997) is a personal Web page kept by the author in reverse chronological diary form. It is a “log on the Web” and a “log of the Web”; Blogs use special blogging software to simplify Web publication for end users.

The result is an anytime and anyplace (where there is Web access) information and knowledge site that is easily maintained, typically by one individual (but possibly also as a multiperson collaboration facility). Its archival, search, and categorization features help in content organization and retrieval, especially when authors intend to build knowledge logs (k-logs).

Weblogs are both powerful and easy to set up. In 2003, approximately 2.4 to 2.9 million active blogs (http://www.blogcount.com) existed on the Web, some of them now assuming an influential role even in journalism (The Week, 2003). Weblog readership is vastly unevenly distributed, following a Power Law distribution, with few weblogs attracting a very large readership (e.g., instapundit.com) and the majority being read by few people (Sharky, 2003). As such, weblogs are an ideal medium for experts who wish to broadcast their expertise to a large following but also suitable for bloggers who wish to converse with a small group of others by each telling their stories through the weblog and possibly linking to each other.

**Wiki**

A wiki (wikiwiki means fast in Hawaiian) is a set of linked Web pages (as well as the wiki software enabling its development), created incrementally by a group of collaborating users. Wiki content pages resemble regular Web pages. Authors write pages in plain text or with a simplified markup language. Authors can ask questions, by creating hyperlinks to nonexisting pages. The resulting, rendered page shows these open links as question marks behind the term (i.e., “NewPage?”), inviting other community members to add the missing page.

As a collaborative technology and incorporating Cunningham’s eleven design principles (http://c2.com/cgi/WikiWikiDesignPrinciples), wikis permit and encourage the editing of other users’ pages. Users can and should incrementally im-
prove each others’ contributions. To avoid disastrous effects of undesired modifications, wikis keep extensive Web page histories and permit viewing and rollback of earlier versions. With their focus on incremental knowledge creation and enhancement, version management, and multiuser participation, wikis can effectively be an open source technology for knowledge content.

**Comparison**

The three technologies offer different benefits vis-à-vis the needs of conversational knowledge management. Table 2 summarizes their characteristics and benefits.

The last row in Table 2 highlights the best fit with different CoP types (Table 1). Help communities with their need for day-to-day dialog are well supported by threaded discussion forums, with explicit questions and corresponding answers and chronological organization. Innovation communities are well served by drawing on and harvesting the weblogs of a diversified expert group. Best practice communities can benefit from wiki technology facilitating their joint incremental development of practices.

The unique characteristics of newer conversational technologies suggest that CoPs can now be better served than even a few years ago, when the APQC’s (2000) study of CoPs identified threaded discus-

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**Table 2. Comparison of wikis, weblogs, and discussion forums**

<table>
<thead>
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<th></th>
<th>Discussion Forum</th>
<th>Weblog</th>
<th>Wiki</th>
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<tbody>
<tr>
<td><strong>Speed of Publication</strong></td>
<td>Single-click publication possible with many implementations. Results reflected instantaneously on the server. (“web speed”)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ease of Publication</strong></td>
<td>Single-click publication with many implementations, indexing and formatting large handled by software. Users may have access to a simplified markup language.</td>
<td></td>
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</tr>
<tr>
<td><strong>Knowledge Representation and Organization</strong></td>
<td>Chronological organization less useful than topical organization, workaround “sticky” messages.</td>
<td>Chronological organization less useful than topical organization. Workaround through indices and access to archives.</td>
<td>Topical organization as well as bidirectional indexing, as well as chronology of changes.</td>
</tr>
<tr>
<td><strong>Team Support</strong></td>
<td>Provided in the form of open or closed set of members; some of the members may be designated as moderators.</td>
<td>Meant for individual publishing, but most tools offer team support as well.</td>
<td>Inherently open to public for contributions editing, but most tools facilitate restricting wikis to a closed group of users.</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>Security measures, such as access rights and administrative permissions, are normally provided.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Version Management</strong></td>
<td>Not provided; messages posted are not expected to be modified (although some forums permit editing after posting).</td>
<td>Not provided; although blog posts may be edited by the contributor(s).</td>
<td>Versions and history of changes are provided; facilities are available for rollback.</td>
</tr>
<tr>
<td><strong>Community of Practice Fit</strong></td>
<td>Help</td>
<td>Innovation</td>
<td>Best practice</td>
</tr>
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</table>
sion forums as the preferred supporting technology. What gives these technologies both similar and different characteristics and capabilities? A more detailed comparison reveals several pairwise similarities, namely, in mode of conversation, content indexing, and medium.

Mode of Conversation

Two paradigms are available for the sharing and distribution of knowledge, which we may call dialog and broadcasting. The dialog mode creates knowledge through questions and answers between community members. Both discussion forum and wiki operate in this mode. We might consider these also many-to-many communication tools.

One-to-many, or broadcasting tools, allow a single author (or group of authors acting as if one) to post knowledge and information to the community, whether the community wants it or not. The corresponding tools include weblogs, which also by design are single-user publication tools.

One-to-many conversation mode is more difficult to sustain than many-to-many mode, as all content needs to be created by one individual. Hence, this format is favorable for individuals who have a significant information and knowledge advantage over others (e.g., experts).

Content Indexing

Weblogs and discussion forums are time-indexed. Hence, new topics ultimately push older topics out of the focus of attention. This representation model is highly useful for news distribution but less useful for (“sticky”) topics with longevity. When such media are used for knowledge management, it is common that the same topics are discussed repeatedly, with long-time members complaining about newbies never reading the archives (see for instance discussion forum etiquette at http://www.tuxfiles.org/linuxhelp/forums.html). Knowledge management, in contrast to news management, favors topic-based indexing and search, as is the primary knowledge organization mode in wikis. Newer discussion forums and blogs incorporate topic-based indexing and search but usually as a secondary content organization mechanism.

Consistent with their indexing method, blogs and discussion forums also use different elementary information units than wikis. The basic information unit in a discussion forum is a comment-by-participant-on-topic-at-time. Participants rarely have the opportunity to edit comments, combine them, and such. Weblogs have similar information units, only they are mostly single-user, so the unit is comment-on-topic-at-time. In the weblog, as in a discussion forum, changes in point of view, additions, or such will result in new comments (information units), typically threaded to the existing ones. The wiki, in contrast, has as its basic information unit the comment-on-topic. Neither time nor user are relevant (for information presentation), and the information unit in its most updated form represents the best and most timely version of thoughts on that topic. Wikis thus permit incremental improvement of an information unit.

Medium

Among these three conversational technologies, only two are truly Web based, namely, the blog and the wiki. Discussion forums have long been maintained with e-mail and mailing lists (e.g., the ISWorld mailing list), enabling low bandwidth and low technology knowledge management
and sharing. However, knowledge management technologies benefit from a jointly kept searchable repository. Weblogs and wikis thus dominate listservs with respect to knowledge dissemination.

The multiple comparisons made here suggest that the technologies have several strengths and application advantages. Among them, wikis appear to be the most versatile, although each technology has its preferred use.

**CONCLUSIONS**

Conversational technologies are a significant innovation in knowledge management. They succeed by harnessing communal knowledge and social capital of groups by supporting the natural process of conversation and documenting its results. The conversational technologies analyzed here are beneficial in reducing the negative effects typically associated with knowledge capture in systems, such as large development time or skill requirements, while amplifying the positive effects, such as knowledge sharing or knowledge search. Furthermore, conversational technologies have the advantage of being lightweight and relatively inexpensive, thus enabling widespread application with moderate resources. Collectively, conversational technologies can satisfy the needs of several types of communities of practice, satisfying needs of daily question answering, access to a diverse group of experts, and incremental knowledge refinement mechanisms.

To maximize the benefits from these knowledge management technologies, certain technology-related and behavior-related issues must be addressed through further research and development. Since many of the tools based on these technologies are built to support open and informal communities, we need to incorporate capabilities to support closed and formal communities. In addition, integrating the tools with other systems that provide structured data (e.g., databases) and unstructured data (e.g., e-mail, documents) would enhance the usability and acceptance of these technologies.

A potential hindrance to the adoption of these knowledge management technologies is the possible mismatch with the organization culture. The technologies need people to share their knowledge; they invite critique, present multiple points of view, and seek to change others’ ideas. Organizations that do not value such open-minded and nonhierarchical idea exchange may not find conversational technologies too useful, as has been learned through past GDSS use.

**ACKNOWLEDGMENTS**

The research reported in this article has been supported in part by two CityU TDF grants [Project No. 6980028 and 6980037] and by a grant from the Research Grants Council of the Hong Kong Special Administrative Region, China [Project No. CityU 1151/02H].

**REFERENCES**


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