EDUCAUSE Center for Applied Research

Research Bulletin

Volume 2008, Issue 3

February 5, 2008

Supporting Knowledge Creation:

Using Wikis for Group Collaboration

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Overview

The term *wiki* is commonly used to describe a set of interconnected web pages that can be edited by multiple users on the Internet (Wagner, 2004). As described by Louridas (2006), however, the term also refers to the software that enables this open editing and the philosophy surrounding how users edit information.

Groups requiring a collaborative medium, particularly over physical distances, have been among the first to take advantage of wiki functionality. Because collaborative group work often involves a limited, defined number of participants, wikis provide a relatively safe and effective virtual forum for interaction and web authoring (Desilets, Paquet & Vinson, 2005). They also provide an asynchronous platform for virtual communities of practice (VCoPs). With the capacity to archive different page versions, wikis can act as repositories, thereby enabling effective knowledge management.

This research bulletin examines the wiki philosophy and how it fits within the Web 2.0 context. Based on an extensive literature review, the results of a research project into blog and wiki use in Australian libraries (sponsored by the ALIA Ray Choate Scholarship), and evaluations of the RUBRIC Project wiki installation, the bulletin also provides evidence as to how wiki technology can enable the online collaborative process.

The Wiki Philosophy

Described by wiki creator Ward Cunningham (Cunningham & Leuf, 2001) as an inherently democratic process, wikis enable any group member to add, delete, or modify wiki content. Research indicates that this not only harnesses the power of diverse individuals to create collaborative works (McKiernan, 2005) but also works to level the playing field, allowing all opinions to be heard (Bean & Hott, 2005). Wagner (2004) states that as a result of this process, “We should expect faster knowledge management with fewer mistakes than in ‘closed source’ knowledge management environments.”

Wiki software enables version control. When changes are made to wiki pages, the previous changes are automatically recorded and made available to users. As discussed by Wagner and Bolloju (2005), “To avoid disastrous effects of undesired modifications, wikis keep extensive web page histories and permit viewing and rollback of earlier versions,” making version management a valuable safety net for knowledge protection.

While wikis offer a number of benefits for supporting knowledge creation in collaborative groups, the literature suggests a strong need to establish conventions to enable long-term success. As noted by Godwin-Jones (2003), such a system only works with users serious about collaborating and willing to follow the group conventions and practices. Fichter (2005a) supports this notion, stating that “technology should be a supportive player in any collaboration effort, not the driver.” Establishing conventions involves not only developing wiki guidelines and etiquette for user participation but also ensuring that wiki group members follow those guidelines. As noted by Chawner and Lewis (2006), large, successful wikis usually have some type of constitution or philosophy that establishes goals and provides guidelines for individuals who want to participate in the group.

Research indicates that wikis go beyond technological innovations and related benefits and also offer a change of philosophy in relation to the knowledge creation process (Desilets, Paquet, & Vinson, 2005; Andersen, 2005; Louridas, 2006). Desilets states that in addition to technological innovations, “Wiki[s] introduced groundbreaking innovations at the level of the process, philosophy, and even sociology of such collaborative authoring.” Andersen states, “Wikis offer a management philosophy that manages knowledge creation through evolution of norms and values rather than directives and incentives.” He goes on to comment, “Managers seeking to make effective use of collaborative tools can benefit as much from adapting the Wikis’ management philosophy as by adopting the technology.”

For wiki use to be supported by collaborative groups, the “wiki way” philosophy must fit the culture of the group (Louridas, 2006). As noted by Wagner and Bolloju (2005), conversational technologies such as wikis need people to share their knowledge, invite critique, present multiple points of view, and seek to change others' ideas. Organizations that do not value such open-minded and nonhierarchical exchange of ideas may not find conversational technologies useful. Fichter (2005b) believes that “wikis work best in organisational cultures in which there is a high level of trust and control can be delegated to the users of the system.” As noted by Cunningham and Leuf (2001), “not everyone needs a wiki. Not everyone wants a wiki. Not every situation benefits from becoming an open discussion or collaboration forum.” Groups need to be sure wikis suit their knowledge creation and management needs and not implement wikis for the sake of implementing wikis. A variety of Web 2.0 alternative technologies are now available that also provide interactivity and collaborative opportunities.

Web 2.0: New Collaborative Technologies

Web 2.0 has been described as “an attitude not a technology” (Davis, 2005). Essentially, it is a philosophy supporting the development of online collaborative technologies, and it has changed how the World Wide Web is perceived and used. The concept surrounds the change from Internet users being visitors to a web where knowledge is pre-created and view-only to a web in which users can participate in knowledge creation through technologies such as wikis, blogs, RSS feeds, folksonomies, and tagging (Abram, 2005). It has also led to other “2.0” discussions including E-Learning 2.0, Information Literacy 2.0, and Library 2.0, as specific groups attempt to define how Web 2.0 developments apply to their sectors.

Library 2.0 is of particular interest to library practitioners because it provides an avenue through which Web 2.0 opportunities can be discussed in the library context. While literature suggests such an interest in the global sphere, to date there has been little to suggest how Library 2.0 has been integrated into Australian libraries. In an attempt to gain insight into the Australian context, the authors conducted an investigation in 2006 into the use of blogs and wikis in Australian public, academic, and special libraries.[1] This research, sponsored by the 2005 ALIA Ray Choate Scholarship, aimed to uncover the landscape of blog and wiki use in Australian libraries, increase knowledge of blog and wiki technologies, and promote innovative communication within the library and information sectors.

The research included an online survey, involving a sample of more than 600 public, academic, and special libraries. Survey participants were asked to report on their use of blogs and wikis, the purpose of their implementations, reasons why they had not engaged in using these technologies (where applicable), the types of software used, and the types of statistics recorded.

The survey results[2] indicated that blogs were slightly more popular than wikis in Australian libraries. Blogs had been implemented by 18% of survey respondents, while 11% reported wiki implementations. Of the library wikis, only 7% had been available to their intended audience for more than 12 months. In terms of purpose, 33% of wikis reported were used for internal workflows, as compared to 24% for reference services purposes, 14% for professional development purposes, and 29% for "other" purposes.

The survey results indicated interest in using wiki applications as part of the information tool suite used by Australian libraries. The results also indicated that libraries were experimenting with wikis for a number of tasks, though internal applications were more common. A possible explanation for this is the controversy that continues to surround well-known public applications of wikis, such as Wikipedia, that remain relatively open to editing from an unlimited number of users. Despite such controversy, it is the editable nature of wikis that makes them of particular interest to groups including communities of practice (CoPs) and VCoPs.

Virtual Communities of Practice

Communities of practice can be defined as "self-organising networks of people dedicated to sharing knowledge" (Breu & Hemingway, 2002) and are commonly discussed in terms of the connections made between members over shared interests (Ardichvili, Page & Wentling, 2003).

The popularity of the Internet has expanded CoP conversations to include virtual communities of practice. While virtual communities have become an important means of sharing information (Neus, 2001), they are not necessarily exclusively virtual. VCoPs may use a combination of traditional and virtual communications technologies such as teleconferencing, videoconferencing, e-mail, and new online technologies including 3D virtual worlds such as Second Life (Dubé, Bourhis & Jacob, 2006; Prestridge, Dunn & Lang, 2006). Among the suite of new Web 2.0 technologies available to VCoPs and other collaborative initiatives is the wiki.

Wikis and VCoPs in general have been described as important knowledge management tools (Walker, 2006; Ardichvili, Page & Wentling, 2003). A contributing factor to this is the ability of wikis to offer geographically dispersed group members a centralized, web-based knowledge repository for storing shared and created knowledge. This facilitates efficient knowledge management processed for groups and can alleviate the inundation of back-and-forth e-mails and instant messages that some analysts have referred to as "occupational spam" (McKiernan, 2005; Bean & Hott, 2005). Literature also indicates that wiki users believe that storing content in a wiki knowledge repository keeps documents "live" and prevents content from being outdated and unused. Of particular

interest is the ability of a wiki knowledge repository to be indexed, thereby making all content searchable by users.

It is important to note, however, that using wikis as part of any collaborative effort presents a problem experienced with many virtual applications: how to encourage sharing and participation. As noted by Malhotra and Majchrzak (2004), the process of sharing information is instrumental in the creation of new knowledge. Ardichvili, Page and Wentling (2003) further discuss the impact of sharing in virtual communities when identifying the "willingness to share knowledge and willingness to use a CoP as a source of knowledge" as the main requirements of all communities of practice, virtual or otherwise. Research by Chua (2002) also suggests that the level of social interaction among group members positively influences the quality of the knowledge created.

Selecting the appropriate application for such interchanges is vital for the improvement of communication and knowledge sharing within groups (Sauer et al., 2005). As stated by Tonkin (2005), "It is important to ensure that the application chosen has the right span of features for the user requirements; furthermore that the expected users are comfortable with the software, its capabilities, and the intended community." Any technology solution needs to be flexible to support the evolving needs of the group and to support knowledge creation in various forms.

One way in which wikis do this is by enabling the incremental development of the knowledge base. Wagner & Bolloju (2005) comment on this when stating that "practice communities can benefit from wiki technology facilitating their joint incremental development of practices." The technology fosters an incremental question-and-answer knowledge creation process, which supports the process of users' creating hyperlinks to "unknown" information in the hope that other users will enhance what they have added. Wagner (2004) adds that wikis combine multiple sets of knowledge gracefully and states that "individuals are able to begin creating knowledge content that is incomplete and then to rely on other collaborators to add content." Wikis support this incremental knowledge creation by enabling users to deposit information to the knowledge base at times that suit them and their work practices, regardless of when that might be or what time zone the users live in. An example of how wikis can operate within this Web 2.0 context can be found in the RUBRIC Project.

The RUBRIC Project

A number of large-scale projects have enlisted the collaborative engine provided by wiki technology, including the RUBRIC Project. An acronym for Regional Universities Building Research Infrastructure Collaboratively, RUBRIC is sponsored by the Australian Commonwealth Department of Education, Science and Training (DEST), under the Systemic Infrastructure Initiative (SII). The project aims to build capacity across regional research universities to enable the research output of participating institutions to be available transnationally, contributing to the research mission of higher education in Australia and internationally through collaboration with New Zealand partners. The project outcomes are to

- establish and populate institutional repository solutions for all partner institutions;
- build a central resource and knowledge base covering issues and topics relating to the implementation and maintenance of institutional repositories; and
- provide a centralized base for assistance to RUBRIC Project partners.

A partner structure with University of Southern Queensland, University of the Sunshine Coast, University of Newcastle, University of New England, Massey University, Flinders University, Macquarie University, and Murdoch University participating, the RUBRIC Project is a collaborative, cross-institutional initiative.

Participants include a RUBRIC Central team of 12 staff, a board of directors, and a partner project management team of 8, with group members located across Australia and New Zealand. The widespread distribution of the RUBRIC team has therefore required not only a collaborative environment to facilitate knowledge creation and knowledge management but also an environment that supports these practices in the virtual realm.

At the establishment stages of the RUBRIC Project a number of needs were identified, including

- support for collaboration;
- support for a distributed group;
- the need for centralized recording of collaborative activities; and
- security access where appropriate.

It was recognized that a set of centralized tools providing a diverse range of communication and collaboration channels was required to capture the activity of the group. In the first instance, RUBRIC Central wanted to provide a range of basic collaborative tools and refine (or discard) these tools as working relationships emerged from group practice.

While this suite of collaborative tools was made available to group members, there was no directed expectation of how they were to be used. It was left to group members to use each tool as they saw fit, enabling use to grow organically. This meant usage of many of the tools started in an unstructured manner and developed a structure reflecting the groups' needs.

The RUBRIC Project Wiki

One collaborative tool embraced organically by the RUBRIC group was the project wiki. The wiki was introduced by the group later than the other collaborative tools yet became more popular than other platforms including SharePoint and del.icio.us. RUBRIC Central administration believes the wiki has succeeded because it was developed out of, and driven by, group member requirements.

RUBRIC Project group members have used the wiki in a number of ways, including:

- Writing up personal research and comments on topics of interest to the project (instead of storing these on a PC or in folders)
- Sharing information gathered with other group members (information that previously would have been e-mailed)
- Asking questions to the group—in the hope that the other group members will be able to collaboratively answer them
- Posting links to resources and documents that may be of interest to other group members
- Adding details for upcoming events
- Adding information in a pin-board style format to let other group members know what they have been up to
- Adding comments to other group members' information and pages
- Building on, changing, adding to, and editing other group members' information
- Using it simply to consume information discovered by other group members
- Recording minutes from meetings in real time

Responses from an informal survey of RUBRIC group members highlighted a number of benefits and limitations from their experiences in using the wiki. Questions were e-mailed to relevant RUBRIC Project participants, with a 100% response rate achieved.

The majority of respondents commented that they found the wiki to be fairly easy to use for changing and updating information. Two group members commented that this ease of use lowered the barriers to engagement, while another said it enabled users to be more flexible and responsive to the knowledge creation process. One group member commented that although the wiki was easy to use, it could potentially prove difficult for new users with no technical experience. Another group member said that using the wiki formatting structure was easier to pick up with regular usage.

All RUBRIC group members surveyed stated that they enjoyed how the technology allowed other group members to add, comment on, and edit the group information. Overall the group did not seem to have issues with other group members adding to or changing their work and seemed happy with community authoring and commenting. While group members recognized the wiki rollback versioning feature to be a benefit offered by the software, to date there has not yet been a need to roll back a wiki page to a previous version. Group members also stated they enjoyed using the RSS feed on the wiki to monitor content changes. A number of group members stated they enjoyed the fact that the technology was largely unmoderated. One group member expressed approval that members were able to use the wiki to contribute as much or as little as

able, without having to ask permission. Another group member reported that the unmoderated atmosphere enabled the knowledge to grow organically and naturally.

Respondents were divided when discussing the open structure of the wiki, with some group members describing it as a benefit and others seeing it as a limitation. While three group members discussed how the minimal rules and open structure were a benefit prompting collaboration, other group members described how the structure was sometimes difficult to navigate when searching for specific information. One group member commented that information on the wiki was often found serendipitously and was then difficult to relocate when required. Another group member commented that having some underlying structure determined in advance may have helped navigation issues. Some group members were concerned about the wiki's growing "wild" in the future, with large numbers of new pages appearing. Group members discussed solutions to this "wild wiki" problem, including taking care to use clear headings for pages and making an effort to ”garden” and ”weed” individual pages to prevent them from becoming cluttered. In discussion on this topic, the RUBRIC Project Technical Manager stated, "A wiki is like a garden. It needs pruning sometimes, and weeding, and the harvest needs to be gathered."

Another topic RUBRIC group members were divided on was the use of the wiki for creating living documents. Some group members thought this was a benefit because it allowed for regular updates and revisions as more information emerged, preventing documentation from becoming static and outdated. One group member thought this feature embodied the living nature of the wiki technology. In contrast, another group member saw this feature as a limitation, given that documents were not definitive, with the last word never said.

One wiki feature all group members discussed as an important benefit was the ability the wiki offered to work both in and out of real time. While the group used the wiki in real time during meetings and teleconferences, they also used the wiki asynchronously. Group members discussed how this feature was important for the RUBRIC Project group, where members were all at different stages of development and topic understanding. One group member explained this benefit as ”having a conversation over a few months in some cases.” All group members felt this wiki feature not only enabled them to collaborate over distance but also over time.

What It Means to Higher Education

The RUBRIC Project wiki is one example of wiki functionality being used within the higher education sector. With institutional repositories becoming increasingly important to the Australian higher education sector, new solutions to resolve communication and knowledge management issues within this framework are essential.

Overall, whether as an active collaborator, editor, or consumer, RUBRIC Project group members seem to have adopted wiki use, with members reporting using the wiki for knowledge deposit, creation, collaboration, and consumption. While group members are using the wiki in different ways according to their personal information needs, as a whole

the group seems to be using the wiki as a forum for group knowledge creation more so than the other collaborative forums made available to them. While group members have identified a number of collaborative benefits offered by the technology, they also appear to be conscious of associated limitations and seem committed to working through these to meet the needs of the group as a whole. The group, which seems conscious of the fact that a wiki alone will not be adequate for collaborative knowledge creation, continues to use a suite of collaborative mediums.

As noted by one project manager, “RUBRIC Central understands that group knowledge will be created when the group decides to do so and has endeavored to provide the right tools for the right purpose and remain willing to try something new if needed.” So while the wiki currently stands out as the group collaborative tool of choice, this may not always be the case.

In both the literature and in practice, the editable nature of the wiki is heralded as a key function in developing a centralized knowledge repository and enabling a forum for group communication and interaction. However, there appears to be a discrepancy in the role guidelines, policies, and procedures have to play. The theory suggests outlining the purpose and goals of the wiki initially; however, in the case of the RUBRIC Project wiki, the lack of definition led to a more interesting and organic progression. Despite this, it is evident that the key to unlocking wiki functionality is to keep in mind that it is not the technology that fosters collaboration, communication, and knowledge creation. Whether they do so as part of a formal group or informal virtual community, it is the group members collaborating via the wiki who foster these things; the wiki itself is simply a platform that allows the online collaboration to occur. Acting as the driving force, it is the collaborators who shape and are ultimately responsible for the success of any wiki application.

Key Questions to Ask

- How does our institution proactively seek to capture and manage both formal and informal knowledge sources?
- In what ways does our institution currently facilitate interaction and collaboration between distributed groups?
- What are the primary drivers for community-based knowledge creation in our institution?
- To what degree does our institution support the ”wiki way” philosophy and culture?
- How does our institution support initiatives involving the use of new technologies, and how can such initiatives be strategically aligned with the goals and mission of the university?

Where to Learn More

- Ebersbach, A., Glaser, M., and Heigl, R. (2007). *Wiki: Web collaboration*, 2nd ed. New York: Springer-Verlag.
- The Knowledge Management Resource Center, http://www.kmresource.com/
- RUBRIC (Regional Universities Building Research Infrastructure Collaboratively), http://www.rubric.edu.au/

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Acknowledgements

The foundation of this ECAR research bulletin is a paper presented by the authors at the EDUCAUSE Australasia 2007 Conference, April 29–May 2, 2007, in Melbourne, Australia. ECAR gratefully acknowledges the generosity of the conference organizers for permission to make this content available to ECAR subscribers.

Endnotes

1. Results to be published.
2. Presented at Information Online 2007, January 30–February 1, in Syndey, Australia, http://www.information-online.com.au/docs/Presentations/watson.pdf

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Citation for This Work

Watson, Kate, and Chelsea Harper. “Supporting Knowledge Creation: Using Wikis for Group Collaboration” (Research Bulletin, Issue 3). Boulder, CO: EDUCAUSE Center for Applied Research, 2008, available from http://www.educause.edu/ecar.