

Supporting Knowledge Creation – Using Wikis for Group Collaboration

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Abstract

Described as “an emerging foundation for Web 2.0” (Abram 2005), wiki technology is becoming a popular tool for collaboration in organizations and institutions around the world.

Though wiki technology was developed prior to blogging technology, its functionality has not been widely used until recently. Wikis not only provide a venue through which information can be made available online, but they provide all participants the opportunity to edit that information.

Groups requiring a collaborative medium, particularly over physical distances, have been among the first to take advantage of wiki functionality. 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 innovative wiki use including the RUBRIC Project wiki installation, this paper discusses how wiki technology enables the online collaborative process.

Famous wikis such as Wikipedia have helped change the perception of the World Wide Web as an online information platform to that of an interactive and participatory space. Moving beyond Wikipedia, the paper also analyses the shift toward wiki use in the context of Web 2.0 and Library 2.0 discussions, particularly in corporations, institutions, libraries, and by researchers for the purpose of supporting knowledge creation through collaborative group work.

Introduction

The term “collaboration” can have different connotations in different sectors. For the purposes of this paper, “collaboration” has been used to describe any initiative requiring the contribution of more than one person.

Essential to any collaborative effort is the creation, communication and management of knowledge. In discussing the promotion of knowledge creation in scholarly institutions, Allard (2002) suggests six mechanisms that make this possible - the forum mechanism where forums are provided for interaction; the multi-disciplinary mechanism where interaction across disciplines is encouraged; the resource power mechanism where resources from a wide range of areas are utilized; the perspective mechanism where perspectives on a geographical, cultural and institutional basis are shared; the sharing mechanism where existing knowledge is shared in order to create new knowledge, and; the connectivity mechanism where effective communication flow is enabled.

Allard's mechanisms highlight the need for a community-based approach to knowledge creation. An important concept that supports this approach is that of communities of practice (Johnson, 2001). Communities of practice (CoP) can be defined as "informal, self-organising networks of people dedicated to sharing knowledge" (Breu & Hemingway, 2002, pp. 148) 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 (VCoPs). While virtual communities have become an important means of sharing information (Neus, 2001), they are not necessarily exclusively virtual. VCoPs may utilize a combination of traditional and virtual communications technologies such as teleconferencing, videoconferencing, email and new online technologies including 3D virtual worlds (Dube, Bourhis & Jacob, 2006; Prestridge, Dunn & Lang, 2006). One of the newer online technologies that can be used to support virtual communities of practice and other collaborative group initiatives, is the wiki.

Wikis

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.

As 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 (Desitlets 2005). They also provide an asynchronous platform for VCoPs, and with their capacity to archive different page versions can act as repositories, thereby enabling effective knowledge management.

Wikis and virtual communities of practice 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 centralised, web-based knowledge repository for storing shared and created knowledge. As discussed by Wagner (2004), "while wikis support a decentralised group, the technology is designed to be centralised".

Maintaining a centralised knowledge repository facilitates more efficient knowledge management processes for groups. This works to increase communication efficiency and productivity over 'back-and-forth' exchanges of email attachments and discussion boards, and can alleviate the inundation of emails and instant messages that some analysts have referred to as "occupational spam" (McKiernan 2005; Bean 2005). Literature also indicates that wiki users feel content stored in a wiki knowledge repository keeps documents 'live' and prevents content from being out-dated and unused. The British Computer Society (2006) discuss how a wiki "turns static and outdated documents to live and dynamic ones", while Sauer (2005) says of his group's

wiki that “information that was buried in out-dated manuals and QMS-documents with cryptic titles is now easily accessible and updated parallel to its use”. 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 VCoPs 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) discuss the impact of sharing in virtual communities further when identifying the “willingness to share knowledge and willingness to use a CoP as a source of knowledge” (pp. 66) as the main requirements of all communities of practice, virtual or otherwise.

Trust and social interaction are also imperative to collaboration both in person and in the virtual environment. In facilitating greater communication and information exchange, trust leads to the development of common understanding; a group that has trouble trusting one another will have trouble sharing knowledge (Malhotra & Majchrzak, 2004). Research by Chua (2002) also suggests that the level of social interaction amongst 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 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 knowledgebase. Wagner and 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 knowledgebase at times that suit them and their work practices, regardless of when that might be or what time zone the users live in.

The wiki philosophy

Described by wiki creator Ward Cunningham (2001) as an inherently democratic process, the wiki philosophy is one that enables 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 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”.

If mistakes do occur, or if pages are incorrectly changed, wiki software now 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 & 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 (2005) supports this notion stating that “technology should be a supportive player in any collaboration effort, not the driver”. Establishing conventions involves not only the development of wiki guidelines and etiquette for user participation, but also ensuring that the wiki group follow the proposed conventions. 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 to the knowledge creation process (Desilets 2005, Andersen 2005, Louridas 2006). Desilets (2005) states that in addition to technological innovations, “wiki introduced groundbreaking innovations at the level of the process, philosophy and even sociology of such collaborative authoring”. Andersen (2005) 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 be supported by collaborative groups, the ‘wiki way’ philosophy must fit into the culture of the group. As noted by Louridas (2006), “more important than the particular wiki implementation... is being sure that a wiki really fits in the culture of the project or organisation”. 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. Organisations that do not value such open-minded and nonhierarchical exchange of ideas may not find conversational technologies useful. Fichter (2005b) believes “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 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 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 the use of 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 sector.

Library 2.0 is of particular interest to library practitioners as 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 (results unpublished at time of writing). 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 sector.

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 (presented at the Information Online 2007 conference) 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 libraries with 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% reported ‘other’ purposes.

The survey results indicated interest in using wiki applications as part of the information tool suite utilised by Australian libraries. While blog implementations were more predominant at the time of the survey, the results indicated that interest in wikis had grown rapidly in the 12 months prior to the

survey being conducted. The results also indicated that libraries were experimenting with wikis for a number of tasks, though internal applications were more popular. 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. An example of how virtual communities of practice can operate within this 2.0 context is the RUBRIC project.

The RUBRIC project: VCoP example

A number of large-scale projects have enlisted the collaborative engine provided by wiki technology, including the RUBRIC project. Standing 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 trans-nationally, 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 centralised 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 project.

Participants include a RUBRIC Central team of twelve staff, a board of directors, and a partner project management team of eight, with group members located across Australia and New Zealand. The widespread distribution of the RUBRIC team has therefore not only required a collaborative environment to facilitate knowledge creation and knowledge management, but 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 centralised recording of collaborative activities; and
- security access where appropriate.

It was recognized that a set of centralised 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.

The suite of collaborative tools and forums implemented as a result of these needs are represented in Table 1.

Table 1 – RUBRIC Project Use of Collaborative Software

Collaborative Software	RUBRIC Project Use
Trac – supports the tracking of jobs and tickets	Group members log jobs/tickets and monitor job progress. RUBRIC Central staff can track jobs enabling transparency and accountability of tasks and reporting on project milestones
Sharepoint – stores static documents	Sharepoint is the RUBRIC platform for storing completed static documents created by group members. Example documents include project plans, procedures and policies (draft and final versions), meeting documents and position descriptions
Del.icio.us	Used to share websites of interest to the project. Acts as a 'favourites' list that is transparent to other group members and the broader community
Genisys teleconferencing	Weekly teleconferences are conducted using the Genisys package
Predefined email lists	Predefined closed email lists are utilised for email communication, including a Project Manager list, a Board Member list and a RUBRIC Central staff list
Integrated Content Environment (ICE)	Used as a structured publishing environment
Blogs	RUBRIC Central staff use personal blogs for reporting, discussing and reflecting on issues. Partner Project Managers use RSS feeds and readers to stay informed of new blog content

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 required, enabling use to grow organically. Set processes, rules and procedures for the tools were not initially set and were left to emerge through group usage. 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 a 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 feels the wiki has succeeded as it was developed out of, and was 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 (that previously would have been emailed)
- 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/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 emailed 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 they felt this ease of use lowered the barriers to engagement while another commented that they felt this ease of use enabled them 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 possibly be confronting for new users with no technical experience. Another group member commented that using the wiki formatting structure was easier to pick up with regular usage.

All RUBRIC group members surveyed stated 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 recognised the wiki rollback versioning feature to be a benefit offered by the software, to date there has not yet been a need to rollback 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 permissions. 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, while others discussing 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 having some underlying structure determined in advance may have helped navigation issues. Some group members were concerned about the wiki 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 felt this was a benefit as it allowed for regular updates and revisions as more information emerged preventing documentation from becoming static and out-dated. One group member described how they felt this feature embodied the living nature of the wiki technology. In contrast, another group member felt this feature was a limitation, as 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.

Conclusion

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 also seems conscious of the fact that a wiki alone will not be adequate for collaborative knowledge creation, and continue to use a suite of collaborative mediums.

As commented by one Project Manager, "RUBRIC Central understands that group knowledge will be created when the group decides to do so, and has endeavoured 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 centralised 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 wiki technology does not foster collaboration, communication and knowledge creation. 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.

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