

Wikis for Supporting Distributed Collaborative Writing

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Wikis allow distributed teams to collaboratively write and edit documents through the Internet in a shared online workspace, without the need for special HTML knowledge or tools. The flexibility of wiki technology is a boon for increased cooperative work on large team projects. However, wiki technology also complicates notions of usable design as the information architecture of a wiki site may be created on the fly by all participants rather than by a dedicated technical communicator. This paper describes the basic technology of wikis, some advantages and disadvantages, and areas of concern with regard to information design.

INTRODUCTION

Virtual or distributed work groups are becoming more common as the technology to support their work becomes increasingly more available. Distributed work arrangements may run the gamut from teams whose members occasionally telecommute to groups that never meet face-to-face. To support such varied distributed work processes, virtual teams turn to an array of collaborative work tools from postal mail and telephones to e-mail, instant messaging, and software tools specially designed to support cooperative work. This paper discusses one such software tool: the wiki.

A wiki is an online workspace that allows members to collaboratively create and edit Web pages without requiring HTML knowledge, using no more complicated technology than a Web browser.¹ Using a minimal set of wiki mark-up language and a standard Web browser, users can create brand-new Web pages, including headings, hyperlinks, and tables depending on the wiki software and configurations. Editing privileges may be extended to all visitors to the wiki site or restricted to a select team. Wiki software has finally made the Web available in a read-write form for all who are willing to learn a bit of wiki syntax. Wikis are fulfilling Tim Berners-Lee's original vision of the Web as a medium for people to not only read but also create their own content.

Wikis may be used for a variety of purposes. A simple wiki may be used as a "scratchpad" for brainstorming on a text or as a place to archive shared content and link to resources such as a group calendar or external Web

sites. More sophisticated wikis with additional technical features can be used in a more dynamic and ambitious fashion, such as in support of a corporate intranet or a massive documentation project. An example of the latter is the Wikipedia (<http://www.wikipedia.org/>), an online encyclopedia that is written, reviewed, and edited by volunteers worldwide. These technically sophisticated wikis have features that support meta-conversation about the writing and editing of a page and allow users to easily compare past revisions of a page. Wikis that allow users to hold a stake in the community and develop a reputation ultimately can foster close, productive group work.²

Regardless of how wikis are used by a virtual team, they create a unique dialogue: the developers of content for the wiki are also the site's intended audience of readers. The wiki's interface mediates the distributed members' experience working with each other, and at the same time it serves the audience of end-users. This dichotomy has significant usability repercussions, as the wiki must be usable by people who are playing the roles of both "author" and "reader." Further complicating the design of wikis is that they may evolve on their own without the guidance of an information architect dedicated to the task. In such situations, extra care must be taken to ensure that relevant navigation structures are revealed to users regardless of whether they are operating as authors, editors, or readers.

This paper overviews available wiki technology and then discusses the advantages and disadvantages of using wikis for online collaborative efforts. Next, the paper discusses some information and navigation design problems unique to wikis and examines how guidelines might be designed that better support the work of technical communicators who collaborate using wikis.

WIKI TECHNOLOGY

Wiki technology dates from the mid-1990s and was created to support the work of the Portland Pattern Repository.³ The term wiki means "quick" in Hawaiian and therein lies the value of wikis—to facilitate a speedy work flow and reduce the impedances so common in shared authoring environments. Today, dozens of wiki engines or software packages exist, each with different modifications and improvements.⁴ Some of the most popular ones are UseMod (<http://www.usemod.com/>), OddMuse (<http://www.oddmuse.org/>), MediaWiki

(<http://www.mediawiki.org/>), and TWiki (<http://twiki.org/>).

The differences between wikis lie in the underlying programming languages of the wiki software (such as PHP, Perl, ASP, Java, or C++) and the server platform or additional programs required for the wiki to function (e.g., Windows, Apache, GNU Tools). Features and robustness of wiki software vary, and many wiki engines are based on adaptations of other engines. OddMuse, for example, is a descendent of UseMod that incorporates Unicode support and a better HTML generation engine. Once a group selects a wiki package, the software must be installed on a Web server so that it is accessible to the intended users via the Internet or a LAN.

Wikis share many general features such as making it easy to create links to old or new pages.⁵ For example, UseMod uses a system called PascalCase that allows users to concatenate the capitalized words "Meeting" and "Agendas" to create a link to a "Meeting Agendas" page. The wiki engine automatically determines whether the link text refers to an existing page or one that has not yet been created. If "MeetingAgendas" does not already exist, a question mark will appear after the word on the rendered page, and by clicking on that question mark, the user can immediately begin writing text for the new MeetingAgendas page.

Wikis also commonly feature preliminary security controls. All content may be editable by a select group or by the world, depending on how the wiki pages are configured. Pages may be locked to disallow further changes by any user, or the engine may be configured to disallow anonymous edits by unauthenticated users.

Many packages also implement revision control, allowing users to track and compare edits of a page and follow the evolution of a document. This provides a minimum protection against vandalism or unintentional loss of content. More sophisticated systems accommodate uncoordinated edits by multiple users by automatically detecting and resolving revision conflicts.

Most implementations include search functionality that performs a live full-text search on the most recent version of all pages within a wiki installation.

ADVANTAGES OF WIKIS

Because wikis give groups a shared online space to store documents, exchange information, and work collaboratively as many technical communicators would do with co-authored works, wikis can be a great boon to virtual teams. Other tools are available to support

distributed information sharing and exchange (such as e-mail, shared server space, and content management systems), but they can be clumsy in certain situations. In large multi-author documentation projects, e-mailing files back and forth can quickly take up account space as well as create mass confusion regarding the currency of a draft. Shared server space alleviates many exchange problems, but version control is still an issue when multiple authors are attempting to edit a file. Access to a secure file server can also be problematic for workers who are off-site. Content management systems typically provide different levels of editorial privileges and contributors who do not have publishing privileges must submit materials for review by a site's editors.

A wiki, on the other hand, has the advantage of being a live, shared space, where all team members can have writing and editing privileges. Its availability and ease of use from any location can make all team members into productive participants. A wiki is a technologically simple way to give editorial access to a Web site to many people without requiring team members to funnel editorial requests through a Webmaster and without concerns that novice Web authors will destroy the site by accidentally deleting files. Turnaround time to update the wiki is reduced, and it is more likely to become a useful and regularly used space. The ease of collaboration in a wiki can make it a powerful tool for project management and collaborative writing.⁶

The technology that supports user experience for a wiki is lightweight in that the user needs access only to a Web browser. The centralization of a wiki can be useful for team members who are traveling and may not have access to specific word processing programs. Further, a wiki eliminates the hassle of redistributing documents: there is one document to work from rather than multiple copies circulating around the team. The simplicity of a wiki also makes it less burdensome to make small, spontaneous edits and may encourage team members to contribute more ideas or improve prose quality without the social appearance of quibbling or nitpicking that might result if they were to recirculate a Word document with only a minor change. Contributing authors can percolate their ideas longer and include more ideas in the draft as a result of more frequent editing sessions.

Public wikis that provide information to larger audiences have the advantage of attracting any contributor who is willing to add or edit content. Many public wikis allow visitors to edit anonymously without the burden of creating a user account. Although one might assume that this lack of accountability would result in rampant vandalism and poor quality content, large public wiki projects such as Wikipedia and Wikibooks (<http://www.wikibooks.org/>) have grown into mature

projects with thousands of complete, well-written articles and more than 100,000 articles in development—all by volunteer authors.

Besides the productivity advantages, wikis can be useful as shared social spaces for team members who work remotely. Members of virtual work groups that do not meet in real space may seem like disembodied voices or text. With an easy-to-edit wiki, it is simple for team members to create their own home page with a photo of themselves. The user home pages afford added awareness of the other members of the team and increase social presence, a valuable tool in building community. But more importantly, users are able to update the page as desired to make their Web presence feel alive and dynamic rather than static and out-of-date. A wiki may also be a good place for distributed teams to blow off steam by uploading jokes or movie clips that they might otherwise hesitate to share for fear of wasting e-mail bandwidth. Since wikis are a new technology where norms of use are still being developed, they may encourage more playful and creative interaction among users.

DISADVANTAGES OF WIKIS

Despite their benefits, wikis also have some disadvantages. Chiefly, they require the users to learn wiki syntax in order to maximize use of the formatting capabilities of the wiki. Adding plain text on a page is simple, but formatting headings, lists, or tables requires the use of a somewhat arcane system of special punctuation. Some of this syntax is easily learned though by novice users who can copy the syntax used by other wiki authors. Editing pages through a Web browser usually does not allow users to spell-check or have the same sophisticated editing functionality of a word processing program.

Wiki editing can also intimidate users new to the collaborative environment. If collaborative writers and editors are accustomed to the visual cues offered by Microsoft Word as they edit documents using tracking and comment boxes, the opaque nature of these activities in wiki editing may be unsettling. It may take demonstrations to reassure the novice editor that edits are recorded, if not denoted visually, and can be compared in the revision history.

In contrast to novice, intimidated wiki users, very large wiki projects may have pages that become the battleground of editing wars between two or more writers holding strongly opposing views. When this occurs, the version history logs become less useful because of the flood of repetitive changes. Wikipedia

addresses this problem by disallowing any person to revert a page more than three times within a 24-hour period. The 24-hour rule can be very helpful with a public site such as Wikipedia but it could cause problems with a small group that is actively editing a time-sensitive document. They may very well need to enter multiple edits in a short time frame. Of course, users can request that highly contested pages be protected so that they can be edited only by the site administrators.

Another disadvantage of wikis is that their basic design can be primitive looking, without graphics or exciting colors, unless the team upgrades the basic template. The basic template often looks like a relic of the early days of the World Wide Web without site-wide navigation menus. If left uncustomized, a wiki may not inspire some users and it may actually demotivate others. Furthermore, navigation systems are not automatically built into wiki packages. Team members must be diligent about creating and updating their own navigational links and menus to match the growth of the site. If the navigation system is not carefully nurtured, the site can easily sprawl out of control, with the initial purpose of the site lost to view.

The wiki can be also become resource intensive, consuming storage space for revision history and hogging processor time to calculate differences between edits. In addition, a wiki requires computing resources to dynamically regenerate pages on each visit rather than delivering static content. Intensive editing, or even viewing, can quickly overload an underpowered server.

Finally, the collaborative nature of the wiki, like other interactive software, requires group buy-in and collective adoption in order to be successful.⁷ A lone devotee cannot take advantage of the many features of the wiki; the group as a whole must be committed to using the site. In a small wiki supporting a cooperative group, a hierarchy may develop and one or two users may become the invisible autocrats of the wiki. With skill, these dedicated users may enhance usability of the overall wiki for the entire group, but they are also at risk of overpowering the rest of the team, or worse, making the wiki useful only for themselves.

INFORMATION DESIGN OF WIKIS

The previous discussion shows that the implementation and use of a wiki can be beneficial despite its initial complexity. The wiki architecture, which supports flexible page creation and a free hand at writing and editing for the whole team, lends itself to intriguing and complicated information design questions. As mentioned

earlier, the wiki's design must support the needs of users who may be fulfilling multiple roles, a problem that has begun to be addressed by the developers of CoWeb, a wiki-like collaborative tool.⁸ A major question is how navigation menus and information architecture can keep pace with the growth of the content when multiple people individually contribute to the organization of the site. Wiki technology strongly supports users' abilities to create new content, but it does not yet support the structuring of information or the creation of proper site-wide navigation systems. Since participants can create content that radically affects the wiki's underlying themes, structure, and organization, its navigation affordances and information structure must be extremely agile. Because wikis largely lack a technological solution to this problem, the users of the wiki must self-monitor the wiki's growth and organization.

Curiously, many wiki sites do not customize the default template with site-wide navigation menus and other usability affordances. It is possible that wikis are conceptualized as a feature of an existing internal Web site, rather than a content management system that can drive the Web site. Even a team of technical communicators may not feel the same instinct to customize and make the wiki as usable as it might a traditional Web site. Some groups, however, organize their wiki and attempt to reveal its general structure through a linear list of links on the home page, such as IAWiki (<http://www.iawiki.net/>), a wiki about information architecture, and Meatball Wiki (<http://www.usemod.com/cgi-bin/mb.pl?MeatballWiki>), an online community wiki. However, the links listed on the home page are generally on the meta-level rather than content-level. For example, on IAWiki, the home page links point to "How to Contribute" and "Starting Points" rather than specific information architecture topics. Such wikis do not impose a content-specific information structure, perhaps because the community founders fear inadvertently restricting dialogue or because their navigation structures are intended to remain general enough to support all the directions that the wiki may lead them.

Some wikis help users to structure information to a limited extent. UseMod can nest information in a hierarchy using categories or subpages if the user creates the new page with reference to a higher-level topic. For example, on a page about "MeetingAgendas," one can create links to nested pages for "January15Meeting," "February15Meeting," etc. Depending on how the team adapts the programming of UseMod, this nested information could be used to create links on a site-wide navigation menu. However, this feature requires users to have awareness of this capability, access to the wiki server, and programming facility that is out of step with

the vision of wiki use being as simple as possible. The hierarchical information feature is not common or intuitive and requires user education both for awareness and use.

Intuitive design is the gold standard in technical communication, where the design reveals its purpose and use on its own merits. Wiki technology, however, is evolving and still unfamiliar to most people. Many people have never used a wiki and may not have any idea of what they can expect of the feature set. The most elemental function of the wiki—editing the text of a page—is easy to grasp because every wiki page has an "Edit text of this page" link embedded in it and creating content is simply a matter of typing. However, the more advanced features of a wiki, such as creating headings, hyperlinks, tables, or customized navigation menus, are often not intuitive to use. User education may be required for initial use of the wiki, perhaps with a "jumpstart" class akin to the ones for word processing or database programs.

TOWARDS DEVELOPING GUIDELINES FOR THE DESIGN OF WIKIS

Wikis are an emergent technology and norms of wiki design are still developing. The time is ripe to carefully consider how wikis can best be designed, bearing in mind that although they may look like ordinary Web sites, they are implemented and used very differently. One of the chief distinctions is that wikis are used by groups, not individuals. The wiki must support the interactions of an entire virtual work group. For that reason, researching wiki use in order to develop design guidelines for them requires new methods and strategies. Studying a lone user interacting with the wiki reveals only a portion of information design problems, while assembling a group of volunteers who do not normally work together to usability test the wiki in a lab setting creates a highly artificial research context. Wiki research methods must allow for long-term study of an extant team to see how use of the wiki evolves and what design guidelines would best serve the needs of the group.

A possible method for examining wiki design issues would be ethnographic fieldwork, with the researcher observing a group and its use of the wiki. Although this anthropological approach can be very effective, when the wiki supports a distributed work group, the researcher may face substantial logistical issues in order to observe the entire team at work.

Another emerging research method may alleviate some of these problems. With Internet-based research methods, a researcher can study the behavior and perceptions of wiki users remotely. A research team can instrument a wiki with server-side scripts that record the writing, editing, and reading behaviors that occur on the wiki and that supplement the wiki's native archive of revisions. Other researchers have taken similar approaches, such as creating a visual "history flow" from the wiki's logs to help researchers parse the pattern of revisions on a page.⁹ Internet surveys could also be deployed to capture users' opinions on various design features of the wiki.

Our research group has used an experimental toolkit to instrument experiments studying user interaction with ordinary Web sites. These remotely administered, Internet-based studies have tested the effectiveness of hyperlink wording variations¹⁰ and the design of a multi-page Web article's table of contents¹¹. This research method could also be extended to the study of more technically sophisticated Web sites such as wikis. Although this method lacks some of the richness of the in-person ethnographic fieldwork, it may be a useful supplement to such studies of collaborative group work.

CONCLUSION

Wikis are an exciting emerging online tool that can potentially affect how distributed work groups collaborate with one another. Besides offering the convenience of a shared online workspace, wikis promise to reshape how distributed teams think about working together. Wikis facilitate transparent online interactions and erase some of the boundaries that exist between author and reader. With a wiki, group members working on a collaborative document can more easily and frequently cross the lines between author and reader, supporting the multiple iterations needed to properly develop a writing project. A wiki's pages are owned by a group rather than a gatekeeper; consequently, team members should feel freer about contributing their thoughts on a group effort.

Although wikis hold much potential, the norms for their use are still emergent. Commonly accepted (let alone empirically supported) design guidelines have yet to be created that address the unique needs of distributed groups that collaborate through a wiki. Wiki navigation menus and other important design features that reveal structure and organization of the content on a wiki, out of necessity, are crafted very much on an ad hoc basis. It is likely that as wikis are more widely adopted, de facto standards for the design of wikis will emerge, as they did for today's Web sites. However, technical

communicators also have the opportunity to be active and develop guidelines for the design of wikis, at least for the ones that support their own group processes.

More research is needed to determine empirically how best to support the cooperative work on a wiki. Such research will not only ripple through the general field of computer-supported cooperative work, but actually will help transform the Web into a truly interactive space, where users can actively create and change the content they read. Distributed teams can interact with one another over the Internet by doing what they have always done—clicking hyperlinks and exchanging messages—but more importantly, by actively co-creating live Web content. This shift in writing methods challenges current thinking about effective design for the Web but in the end will enrich user experience.

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