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## Wikis as a Collaboration Tool



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construction of meaning through the self-design of knowledge repositories (Jonassen et al. 1999).

Wikis are known for their ease of use and deployment, making both information sharing and straightforward collaboration possible (Boulos et al. 2006). Further, these tools require minimal technical skill to use their features, allowing users to focus on knowledge creation, information exchange, and collaborative tasks without the challenge of a difficult technological environment (Kirkpatrick 2006).

### Definition

A wiki is an interactive, modifiable, and collaborative website, the contents of which can be edited via web browser; only those granted access can modify site content.

### Introduction

Wikis are social networking tools characterized by a high degree of connectivity, providing users the means to collaboratively develop web content (Alexander 2006).

Wikis add powerful collaborative dimensions to the classroom by actively involving learners in their own construction of knowledge (Boulos et al. 2006). They offer information sharing and collaboration features, acting as cognitive reflection and intensification tools and aiding the

### Wiki Defined

In essence, a wiki involves a simplified process of creating HTML pages combined with a system to record each individual change that occurs over time, so that at any time a page can revert to any of its previous forms. A wiki may also include tools that allow the user community to monitor changes in the state of the wiki and discuss issues that emerge. While everyone may view a wiki page, some wikis restrict access to a group of approved members, allowing only those members to edit page content. Others allow anyone to both edit and view content (Olson 2006).

Howard “Ward” Cunningham was the first to devise the concept of the wiki. His WikiWikiWeb first became available on the Internet in March 1995 and was so named because Cunningham envisioned a quickly evolving web and remembered that wikiwiki is a Hawaiian word meaning

quick. The original site's URL included the abbreviation "wiki," and the short form began to be commonly used (Parker and Chao 2008). The word "wiki" is included in the Oxford English Dictionary and is defined as "A type of web page designed so that its content can be edited by anyone who accesses it, using a simplified markup language" ("wiki, n.").

A wiki is a collaborative website made up of reader-modifiable web pages. The content of a wiki can be edited by approved members or in some cases anyone visiting the site, allowing them to easily create and edit web pages collaboratively (Chao 2007). Wikis are not just a tool for collaborative authoring but can also serve as a source of information and knowledge. Wikis allow visitors to engage in learning with each other by using wikis as a collaborative environment in which to construct their knowledge, as well as to engage in dialog and share information among participants in group projects (Boulos et al. 2006).

A wiki is essentially a vast collaboration space that allows knowledge to be organized and cross-linked (Leuf and Cunningham 2001). At the functional level, Leuf and Cunningham (2001) describe the essence of wikis as follows:

- A wiki permits users to edit any page or to create new pages within the wiki site, using only a web browser with no additional additions.
- A wiki encourages associative thought by making the creation of page links almost intuitively easy, resulting in meaningful topic associations between pages.
- A wiki does not provide a carefully crafted site for casual visitors but rather seeks to involve the visitor in an ongoing process of creation and collaboration that constantly alters the website content.

Some additional features of wikis include the following:

- Wikis are intended to allow multiple users to create knowledge repositories through collaborative authoring.

- Wikis encourage knowledge sharing around topics, which are expected to evolve and often expand into something of a permanent knowledge base.
- Wikis are useful when information is intended to be modified and enhanced through a collaborative effort (Mader 2006c).

Wikipedia, the web-based, open-access encyclopedia, is the largest and most well-known wiki project (Lamb 2004). It is a multilingual, free content encyclopedia written collaboratively by volunteer contributors and provides the foremost illustration of a well-executed wiki. Wikipedia was formally launched in January 2001 and in 2019 the English wikipedia alone had over 5.8 million articles in approximately 300 languages (List of Wikipedias 9). It currently ranks as the fifth most-visited website worldwide (Alexa Internet 2017). The accuracy of encyclopedic entries on scientific topics in Wikipedia is quite good, with the number of errors in a typical Wikipedia entry being only slightly higher than a comparable entry in Encyclopaedia Britannica, often considered the gold-standard entry-level reference work (Giles 2005; Nature editors 2005).

## How Wikis Work

Because wikis are web based, navigation is generally intuitive. The processes of reading and editing a wiki are both quite simple. Wikis are editable through a browser: simply clicking an "edit" link allows the user to make instant revisions (Lamb 2004). Wiki content can be linked and cross-linked, making locating and utilizing information quick and easy. Wikis enable users to easily edit or update an existing webpage; as the user browses a topic to which they can intellectually contribute, they can begin editing the page by clicking the appropriate link and making changes from within their browser. There is no fixed taxonomy since the organization of a wiki is based on user contributions and their collective personality (Howley 2007).

Wikis have two types of writing modes: thread mode and document mode. Thread mode permits users to carry out discussions by posting signed messages to which others respond, and eventually a group of threaded messages evolves. Document mode allows users to create collaborative documents. User additions to the wiki document are unsigned, and multiple authors edit and update the content of the document. Over the passage of time, the content becomes a representation of the shared knowledge or beliefs of all contributors (Leuf and Cunningham 2001).

Wikis provide a mechanism that records every change that occurs over time as a document evolves through a series of revisions. Each time there is a change to a wiki page, that revision of the content becomes the current version, and an older version is archived. Versions of the document can be compared, and edits can be “rolled back” if necessary. Hence, it is possible to revert a page, if necessary, to any of its previous states.

The administrator of the wiki has control over access, determining which portions are user-editable. Some wikis restrict editing access, allowing only approved members to edit page content, while others provide unrestricted access, allowing anyone to both edit and view content (Olson 2006).

Some wiki systems have added functionalities such as web-based spreadsheets, calendars, photo galleries, private workspaces, WYSIWYG editing, and even integration with centralized content management systems (Lamb 2004).

## Social Networking Features

Wikis are characterized by a variety of unique and powerful information sharing and collaboration features and therefore epitomize the definition of social networking (Parker and Chao 2007). Wikis are expressly designed for collaborative authoring, allowing topics to be edited directly and encouraging knowledge sharing around topics. The extremely rich, flexible collaborations made possible by wikis have positive psychological consequences for their participants and powerful competitive ones for their organizations (Evans and Wolf 2005).

The information sharing encouraged by wikis allows everyone to take equal responsibility for the information published (Brännström and Mårtenson 2006). The system is democratic because all participants have an equal voice. Anyone can contribute content or modify content contributed by someone else (Korfiatis and Naeve 2005), fostering the social ties vital for knowledge sharing (Boyd 2003; Gonzalez-Reinhart 2005). This social environment technically supports the aspirations of individuals to belong and contribute in a group atmosphere (Boyd 2003; Gonzalez-Reinhart 2005). Such group participation among volunteers can create social connections that help realize personal goals (Boyd 2003; Gonzalez-Reinhart 2005).

Wikis foster social relationships over a domain of social actions stemming from the acceptance, objection, or rejection of a contribution (Korfiatis and Naeve 2005). The implicit negotiation process involved in writing and structuring an article is of particular interest from a social research perspective. The submission and assessment process involves interactions that characterize the dynamics of the negotiation process (Korfiatis and Naeve 2005). For example, if a user makes a contribution that is not accepted and ultimately rolled back, the user can review the change log to determine whether one or multiple individuals were responsible for the change. They can resubmit their contribution, in either its original or modified form, and continue the negotiation process. The communication, collaboration, and negotiation features make it possible to reach a determination of what is collectively considered acceptable and pertinent knowledge (Gonzalez-Reinhart 2005).

Wikis mimic physical communities through socialization and the exchange of information, leading to the creation of conversational knowledge (Gonzalez-Reinhart 2005). Wiki-style collaborative efforts establish systems of trust and reputation within communities of practice (Evans 2006). A community of practice is made up of people engaged in collective learning in a shared domain, where learning becomes a collaborative process of a group (Brodahl and Hansen 2014). Wikis provide a platform for communities of practice that facilitates the exchange

of knowledge (Fuchs-Kittowski et al. 2004), allowing members of the community to share their knowledge with the group, work together, discuss issues, etc. (Schaffert et al. 2006a).

Wikis have a variety of features fundamental to a successful community of practice, including easy participation, a virtual presence, democratic participation, a variety of interactions, valuable content, connections to a broader subject field, personal and community identity and interaction, and evolution over time (Schwartz et al. 2004). Wikis allow members of a community of practice to discuss concepts and contribute feedback, adapt to situations in which knowledge changes quickly, and provide a convenient means to contribute (Campanini et al. 2004).

### Alternative Online Collaboration tools

Wikis are often compared to blogs because they are both characterized by content generation and extremely easy publishing capabilities. They appeared about the same time, and both offer an easy publishing tool for disseminating information as well as getting feedback from the public. Wikis were intended to allow multiple users to create knowledge repositories, while blogs were intended for use by individuals in writing personal diaries.

Although they are intended for different purposes, the distinctions between them are subtle because they have converged in functionality. However, there are a number of noteworthy differences between wikis and blogs, among them being the way they organize their information and the number of contributors and what the contributors intend to achieve (Doyle 2006).

- Wikis are designed for collaborative authoring, while blogs are more personal and generally written by a single author.
- Wikis typically organize information into topics, while blogs organize information in reverse chronological order. Information in blogs is more of a historical record and rarely changes. Topics in wikis are expected

to evolve and often expand into a long-term knowledge base.

- The reverse chronological order of blogs makes it difficult to find and browse through all postings on a particular topic. Wikis do not as easily show when information was contributed or in what order, but do show topic associations and make it easy to browse (Woolf 2006).
- Wiki content is created by allowing the public to edit topics directly, while blog contents belong to the owner but provide a mechanism for reader comments.
- Wikis encourage knowledge sharing around topics, while blogs often share spontaneous thoughts.
- Blogs are more effective for disseminating information and for enabling feedback while keeping the original text intact. Wikis are the preferred tool when information is intended to be modified and enhanced as part of a collaborative effort (Mader 2006c).

Another online tool related to wikis is Google Docs, a web-based text editor that supports collaborative editing (Gruhn and Hannebauer 2012). Like wikis, Google Docs allows users to create and to share online documents, spreadsheets, presentations, and forms and allows concurrent online editing and collaboration for knowledge building by multiple users with minimal technical knowledge of HTML (Chu et al. 2009). Although a variety of studies classify Google Docs as a wiki (West and West 2009; Orehovački and Babić 2017), it is more accurately classified as a “collaborative writing application,” a form of social media that enables the joint and simultaneous editing of a web page or an online document by at least two users (Archambault et al. 2014).

New users cannot edit a system of linked Google Docs. Thus, there are no notable wiki instances using Google Docs as a platform. Further, wikis require additional capabilities over a web-based text editor like Google Docs. Neff (2013) states some reasons why Google Docs does not serve as a suitable wiki, including the fact that Google Docs is optimized for the printed

page rather than online viewing, is always in edit mode, has no mechanism to dynamically embed content or lists of documents in another document, does not link documents as easily as wikis but instead requires interaction with menus/mouse and copying full URLs to documents, and lacks cross-document consistent styling.

Additional salient differentiations between wikis and Google Docs are pointed out by Guhlin (2009), including the following:

- Most wikis allow either anonymous editing or editing by a limited number of approved users, while with Google Docs each document is created by an individual who can then invite collaborators.
- A wiki site is a hyperlinked collection of individual pages, while in Google Docs each document is separate.
- Wikis are updated as needed, usually when new information about the topic becomes available, information changes, or a mistake is found. Docs are usually created and edited for a specific purpose, but they can be saved indefinitely for reuse at a later time.

## Current State of Wikis in Education

Many educators have embraced wikis since they facilitate not only communication but also the collaborative finding, shaping, and sharing of knowledge, all of which are quintessential in an educational context (Reinhold 2006). Because both teachers and students can easily create wiki pages with no prior knowledge or skill in web development or programming, the extra time necessary to develop these skills is eliminated. The ability to interact with evolving text over time allows teachers and learners to see assignments as they are drafted, rather than reviewing only the final draft. A wiki can also be extremely useful tool both in online classes and even in traditional classes for asynchronous communication within groups. Wikis can be used in education to support a variety of learning paradigms, including

cooperative/collaborative learning and reflective learning.

In a cooperative/collaborative learning environment, students participate in heterogeneous groups intended to support the learning of their individual members. Wikis provide an excellent tool for facilitating computer-supported collaborative learning, i.e., the development of collaboration by means of technology to augment education (Augar et al. 2004). Wikis can also help enhance peer interaction and group work and can facilitate sharing and distributing knowledge and expertise among a cooperative group of learners (Lipponen 2002). Online collaborative tools like wikis can help to alleviate some of the problems inherent in collaborative learning (Houghton et al. 2017), because they share many of the elements fundamental to a community of practice, including an online presence, a variety of interactions, communication, participation, and relationships to a broader subject field of interest (Brodahl and Hansen 2014). These tools can enhance peer interaction and group work, facilitate sharing, and facilitate the distribution of knowledge and information among a community of learners (Lipponen 2002).

Wikis also facilitate reflective learning and enrich students' experience beyond the specific details of each project, "overlaying this experience with a more general and overarching, personally-constructed viewpoint on design processes, on how we experience and create the designed world in which each person lives – and a conceptual framework that will enable them to quickly develop their understanding further" (Chen et al. 2005). The collaborative nature of wikis shifts the focus from individual learners to a larger community.

## Wikis in Education

A literature search reveals the application of wikis across a variety of areas. Mader's wikis in education site (2006b) cites such educational uses as simple webpage creation, group authoring, data collection, class/instructor reviews, project development with peer review, and tracking

group projects. His online text (Mader 2006a) contains discussions by several authors of such topics as integrating wikis in instruction through group wiki projects, constructing science knowledge, collaborative writing projects, using wikis within course management systems, and wiki-based collaboration and academic publishing. Fountain's (2005) survey of wiki use in education suggests several additional uses of wikis, such as co-creating and co-monitoring projects and collaborative concept elaboration.

Reviewing some of the uses of wikis in education reveals a great deal of ingenuity and creativity. Duffy and Bruns (2006) list multiple educational uses of wikis:

- Students can use a wiki to develop research projects, with the wiki providing ongoing documentation of their work.
- Students can summarize their thoughts from prescribed readings, using a wiki to compile a collaborative annotated bibliography.
- Course resources like syllabi and handouts can be published via wiki, allowing students to edit and comment for all to see.
- Teachers can construct knowledge bases on wikis, sharing reflections and thoughts regarding teaching practices, supplemented by versioning and documentation.
- Wikis can assist in mapping concepts by documenting brainstorming activities.
- Editing a given wiki topic can produce a linked network of resources.
- Wikis can be used as a presentation tool, allowing students to directly comment on and revise the presentation content.
- Wikis are ideal for group authoring, pulling group members together and enabling them to build and edit the document on a single, central wiki page.

Similarly, Parker and Chao (2007) note additional educational uses for wikis:

- Project planning and documentation
- Facilitating online learning groups

- Semantic wiki to serve as a mathematical resource
- Course textbook writing
- Student software project collaboration

Lamb (2004) suggests that faculty design teams can utilize wikis to quickly and collaboratively build reference lists and outlines, brainstorm instructional strategies, and capture suggestions. Bergin (2002) discusses a variety of uses for wikis including student homepages, anonymous feedback, student-created FAQs, suggestions related to the course, infrastructure hints, and discussions.

Naish (2006) describes educational uses for wikis including an information resource, a collaboration tool, a tool for building e-learning content, and as icebreaker tools. Schaffert et al. (2006a) suggest the use of wikis in project-based learning, collaborative story writing, and interdisciplinary and intercultural learning.

Rather than discussing specific uses, Tonkin (2005) groups educational wikis into four basic forms:

- Single-user wiki: allows individuals to collect and edit their thoughts using a web-based environment.
- Lab book wiki: allows students to keep notes online but provides the added benefit of allowing them to be peer reviewed and changed by fellow students.
- Collaborative writing wiki: can be used by a team for joint writing.
- Knowledge base wiki: provides a knowledge repository for a group.

Many studies focus on specific educational uses of wikis in the classroom. Leifer (2015) studied the use of a wiki in helping teach pathology, finding that the use of wikis helped the students create presentations, demonstrate time difference in pathology, and find past results quickly. Schelly et al. (2015) used wiki technology to help train students on how to use a 3d printer, employing the wiki as a supplemental

manual or textbook to help the students keep track of the nuances of using a 3d printer. Martinsen and Miller (2016) used wikis to help group compositional foreign language assignments to increase student participation in all aspects of the project, rather than just those for which they were specifically responsible. Allen et al. (2015) used a wiki in a chemistry class as a replacement for a college textbook, finding that the students who used the wiki received similar grades and decreased out-of-class study time.

Chen et al. (2015) used wikis to help coordinate lesson plans for science teachers, comparing the use of wikis and Google Docs. Lawrie et al. (2016) used wikis as a science laboratory notebook. Cunningham et al. (2016) used wikis as a documentation tool to help collect data for a clinical trial, noting that teamwork and collaboration were increased through wiki use as compared to traditional documentation.

### Project-Based Learning

Wikis are very effective for project planning and documentation (Schaffert et al. 2006a). Particularly useful in collaborative class projects, wikis make it possible for students to meet virtually at their convenience and work on projects together (Byron 2005). Geographically dispersed project teams can use wikis as a discussion tool, to share ideas and to develop the project. With all comments and ideas consolidated on one webpage, a wiki provides a clearer picture of team direction than do individual email messages (Naish 2006).

Schaffert et al. (2006b) suggest applications of wikis with regard to project knowledge management, including brainstorming and exchange of ideas, coordination of activities, coordination and records of meetings, and providing a virtual notepad for shared information items.

Houghton et al. (2017) and Davey et al. (2016) identify a range of common problems associated with project-based learning and then examine various techniques and tools like wikis to determine their efficacy in helping to overcome those problems. Chen et al. (2005) observed that wikis help to alleviate one of the more common

pedagogical challenges associated with project-based courses, that of students seeing what they have produced but not what they have learned.

### Conclusion

The use of wikis has proliferated and become more commonplace as insightful educators continue to envision innovative uses. Creative use of wikis and the opportunities for collaboration that they offer have proven beneficial across the educational community. Wikis excel at connecting students through interaction and collaboration, empowering education through openness and flexibility.

Today's students will not only manage future business innovations but in many cases will drive them. Collaborative creativity is becoming an increasingly critical business skill. Because so many organizations have adopted wikis or other collaborative tools for internal and external collaboration as well as information dissemination, interacting with them at the educational level better prepares students for the workforce. Educational institutions can add immense value to their graduates by familiarizing students with the technologies that make collaborative networks possible. Educators must ensure that graduates are aware of the business contributions made possible by wikis and other social software, not just as a phenomenon but also as a skill (Evans 2006). Educators can more effectively prepare students to make innovative uses of collaborative software tools by incorporating wikis into the curriculum.

### Cross-References

- ▶ [Collaboration and Social Networking](#)
- ▶ [Social Networking and Education](#)
- ▶ [Social Media and Networks as Digital Instruction and Learning Platforms](#)
- ▶ [Using Social Media to Promote Academic Functioning](#)

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